

TRAVIS AIR FORCE BASE
ENVIRONMENTAL RESTORATION PROGRAM

**ANNUAL REPORT
ON THE STATUS OF
LAND USE CONTROLS
ON RESTORATION SITES
IN 2016**

FINAL



Air Force Civil Engineer Center
Western Region Installation Support Team
Travis Air Force Base, California

JUNE 2017

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List of Acronyms and Abbreviations

AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
ANSI	American National Standards Institute
BGP	Base General Plan
CAMU	Corrective Action Management Unit
CEMIRT	Civil Engineer Maintenance, Inspection and Repair Team
CERCLA	Comprehensive Response, Compensation, and Liability Act of 1980
COC	Chemical of Concern
COEC	Chemical of Ecological Concern
DCA	Dichloroethane
DCB	Dichlorobenzene
DCE	Dichloroethene
ECC	Environmental Chemical Corporation
EPA	U. S. Environmental Protection Agency
ERP	Environmental Restoration Program
GET	Groundwater Extraction and Treatment
GMU	Grazing Management Unit
GRISR	Groundwater Remedial Implementation Status Report
IDP	Installation Development Plan
IST	Installation Support Team
LUC	Land Use Control
LUCIP	Land Use Control Implementation Plan
MCL	Maximum Contaminant Level
MILCON	Military Construction
MNA	Monitored Natural Attenuation
NEWIOU	North/East/West Industrial Operable Unit
NOU	North Operable Unit
OSHA	Occupational Safety and Health Administration
OWS	Oil/Water Separator
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
POCO	Petroleum Only Contamination
POL	Petroleum, Oil, Lubricant
ppb	parts per billion
RA	Remedial Action
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RPM	Restoration Program Manager
SFPP	Santa Fe Pacific Pipeline
SSA	Solvent Spill Area
TCE	Trichloroethene
TPH	Total Petroleum Hydrocarbon
WABOU	West/Annexes/Basewide Operable Unit

1.0 Introduction

This Annual Report on the Status of Land Use Controls (LUCs) on Restoration Sites describes the status of environmental restrictions on the use of property on Travis Air Force Base (Travis AFB) in 2016. The property use restrictions are based on the presence of residual chemicals of concern (COCs) in the soil or groundwater that could pose a potential risk to human health or the environment if human or ecological receptors were to come into contact with these COCs. The LUC implementation has been conducted under the Travis AFB Environmental Restoration Program (ERP). Parcels of property in the ERP are referred to as ERP sites.

The primary purpose of LUCs is to prevent the uncontrolled movement of, or exposure of human or ecological receptors to, COCs that are present in either soil, soil gas or groundwater. In risk assessment terms, LUCs block the pathway between the COC and all potential receptors in order to prevent adverse health impacts.

LUCs can either be the only remedy that is assigned to an ERP site, or they can be a part of a more active remedy that is designed to achieve a level of remediation that would preclude the need for environmental restrictions. For a soil example, LUCs would remain in place until a soil remedy (such as excavation and landfill disposal) attained a cleanup level that no longer posed a potential risk to all receptors. For a groundwater example, LUCs would remain in place as long as the groundwater treatment technology (examples are groundwater extraction and treatment, or reductive dechlorination via emulsified vegetable oil injection) is in operation.

For sites with more than one medium of concern, LUCs are assigned to each medium and are treated as separate remedies. For example, Site SD033 has separate remedies for soil (Alternative 17 – LUCs), sediment (Alternative 18 – Excavation with Alternative 17 – LUCs as a contingency remedy), surface water (Alternative 10 – No Action), and groundwater (Monitored Natural Attenuation [MNA] with LUCs as an integral part of the remedy). When Travis AFB conducted a sediment cleanup action at Site SD033 in 2009 and achieved residential cleanup levels, LUCs were no longer needed for the sediment at this site. However, the LUCs assigned to the other media of concern remain in place. Appendix B provides the documentation of the medium-specific remedial actions that led to the attainment of cleanup levels and the removal of LUCs from ERP sites.

A secondary purpose of LUCs is to maintain the integrity of remedial and monitoring systems, such as monitoring wells and extraction wells. For example, LUCs ensure that soil excavation associated with base construction or repair projects does not damage monitoring/extraction/injection wells or piezometers that are a part of a groundwater remedy.

On 2 May 2017, Mr. Glenn Anderson, Mr. Lonnie Duke, and Mr. Gene Clare from the Air Force Civil Engineer Center (AFCEC) Installation Support Team (IST) office on Travis AFB conducted a formal inspection of the Travis AFB LUCs at 9 soil sites, 16 on-base groundwater sites, and 3 off-base groundwater sites. The 9 soil sites are listed as SS015, SS016, SD033, SD037, DP039, SD043, LF044, SS046, and LF007 (including the CAMU). The 16 on-base groundwater sites are listed as FT004, LF006, LF007 (subareas B and D), LF008, SS015, SS016, ST027B, SS029, SD031, SD033, SD034, SS035, SD036, SD037, DP039, and SD043. The 3

off-base groundwater sites are listed as FT005, LF007 (subarea C), and SS030. They were assisted by Mr. Lorenzo Lujan from CH2M and Mr. Angel Santiago from AFCEC/CZOW. This report serves as the official record of the results of this inspection.

The 2016 LUC inspection was carried out much later than in past years. Usually, the inspection is scheduled in the January –February timeframe of the following year once all participants return from holiday leave and a four-wheel drive government vehicle can be acquired from the base motor pool. However, starting in December 2016 Travis AFB received an unusually large volume of rain that kept the ground surface in a soaked state. Because the wet soil prevented the inspection team from accessing several ERP sites, the inspection schedule was delayed until a period of dry conditions would allow a vehicle to drive onto dirt roads without creating ruts and dragging loose soil into high security aircraft parking ramps and taxiways.

One significant disadvantage associated with conducting LUC inspection so late in the winter is the large amount of vegetation that had grown in some controlled areas. This makes site walks more difficult to complete, and because of the thick vegetation growth in one area (the east boundary of the southern portion of the Site LF044 controlled area) the inspectors could not walk around the entire perimeter. To avoid slip, trip and fall hazards, the inspector completed this inspection visually from an adjacent off-site location.

The following list provides a brief summary of the organization and content of the 2016 LUC Status Report:

- Section 1.0 – Introduction. Provides descriptions of the purpose and content of this annual report.
- Section 2.0 – Regulatory Framework. Describes the documentation that mandates LUC requirements for Travis AFB.
- Section 3.0 - Performance Measures. Describes the performance measures for LUCs. Subsections describe how these measures have been met.
- Section 4.0 – Fire Training Area #3 (FT004). Describes the environmental conditions at Fire Training Area #3 and the status of groundwater LUCs at that site.
- Section 5.0 – Fire Training Area #4 (FT005). Describes the environmental conditions at Fire Training Area #4 and the status of groundwater LUCs at that site.
- Section 6.0 – Landfill #1 (LF006). Describes the environmental conditions at Landfill #1 and the status of groundwater LUCs at that site.
- Section 7.0 – Landfill #2 (LF007). Describes the environmental conditions at Landfill #2 and the status of the soil and groundwater LUCs at that site as well as that of the Travis AFB Corrective Action Management Unit (CAMU).

- Section 8.0 - Landfill #3 (LF008). Describes the environmental conditions at Landfill #3 and the status of groundwater LUCs at that site.
- Section 9.0 – Solvent Spill Area (SS015). Describes the environmental conditions at the Solvent Spill Area and Facilities 550 and 552 and the status of soil and groundwater LUCs at that site.
- Section 10.0 – Oil Spill Area (SS016). Describes the environmental conditions at the Oil Spill Area, Facilities 11, 13, 14, 20, 42, 1941, 139, and 144 and sections of the Storm Sewer Right-of-Way and the status of soil and groundwater LUCs at that site.
- Section 11.0 – Facilities 1918, 1919, and 1754 (ST027B). Describes the environmental conditions at Facilities 1918, 1919, and 1754 and the status of groundwater LUCs at that site.
- Section 12.0 – Monitoring Well (MW) 329 Area (SS029). Describes the environmental conditions at the MW 329 area and the status of groundwater LUCs at that site.
- Section 13.0 – MW 269 Area (SS030). Describes the environmental conditions at the MW 269 area and the status of groundwater LUCs at that site.
- Section 14.0 – Facility 1205 (SD031). Describes the environmental conditions at Facility 1205 and the status of groundwater LUCs at that site.
- Section 15.0 – Storm Sewer System B, Facilities 810 and 1917, and South Gate Area (SD033). Describes the environmental conditions at Storm Sewer System B, Facilities 810 and 1917, and the South Gate Area and the status of soil and groundwater LUCs at that site.
- Section 16.0 – Facility 811 (SD034). Describes the environmental conditions at Facility 811 and the status of groundwater LUCs at that site.
- Section 17.0 – Facilities 818 and 819 (SS035). Describes the environmental conditions at Facility 818 and 819 and the status of groundwater LUCs at that site.
- Section 18.0 – Facilities 872/873/876 (SD036). Describes the environmental conditions at Facilities 872/873/876 and the status of groundwater LUCs at that site.
- Section 19.0 – Sanitary Sewer System; Facilities 837, 838, 919, 977, and 981; Area G Ramp; and the Ragsdale/V Area (SD037). Describes the environmental conditions at the Sanitary Sewer System; Facilities 837, 838, 919, 977, and 981; Area G Ramp; and the Ragsdale/V Area and the status of soil and groundwater LUCs at that site.
- Section 20.0 – Building 755 (DP039). Describes the environmental conditions at the former Building 755 and the status of soil and groundwater LUCs at that site.

- Section 21.0 – Building 916 (SD043). Describes the environmental conditions at Building 916 and the status of soil and groundwater LUCs at that site.
- Section 22.0 – Landfill X (LF044). Describes the environmental conditions at Landfill X and the status of soil LUCs at that site.
- Section 23.0 – Railhead Munitions Staging Area (SS046). Describes the environmental conditions at the Railhead Munitions Staging Area and the status of soil LUCs at that site.
- Section 24.0 – Conclusion and Summary of Findings. Summarizes the thirteenth year of managing soil LUCs in the WABOU, the tenth year of managing soil LUCs in the NEWIOU, and the third year of managing groundwater LUCs where assigned by the *Final 2014 Travis AFB Groundwater Record of Decision (ROD)* (CH2M HILL, 2014).
- Section 25.0 – Works Cited. Lists the documents used to develop this annual report.

Appendices

- Appendix A – Photographs. Shows photographs of sites with LUCs.
- Appendix B – Documentation of Remedial Actions that Resulted in Land Use Control Removal. Summarizes the cleanup actions that resulted in the removal of previously assigned LUCs.

2.0 Regulatory Framework

In 1983, the Air Force initiated the Installation Restoration Program (IRP) to investigate the nature and extent of hazardous waste releases into the environment. Based on an EPA evaluation of IRP data, Travis AFB was placed on the National Priorities List on 21 November 1989. On 27 September 1990, the Air Force, the U.S. Environmental Protection Agency, the California Department of Toxic Substances Control, and the San Francisco Bay Regional Water Quality Control Board signed a Federal Facility Agreement that established the framework and schedule for environmental cleanup at Travis AFB.

The investigation and cleanup of hazardous waste releases are governed by the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). CERCLA establishes the methodology for selecting the most appropriate cleanup strategies or technologies. Before hazardous waste cleanup can start, the best available cleanup actions are selected and described in a legally-binding ROD. This selection is based on an evaluation of potential cleanup options against nine (9) CERCLA criteria.

The following subsections identify the RODs that selected LUCs for specific restoration sites and summarize the purposes of the LUCs at these sites.

2.1 Soil LUCs

The *Soil ROD for the West/Annexes/Basewide Operable Unit (WABOU)* (Travis AFB, 2002a) and the *North/East/West Industrial Operable Unit (NEWIOU) Soil, Sediment and Surface Water (SSSW) ROD* (URS, 2006) are the legal documents that describe the selected remedies for twenty eight soil and sediment Environmental Restoration Program (ERP) sites on Travis Air Force Base (AFB).

Alternative S2 (Land Use and Access Restrictions) is the selected remedial or contingent remedial alternative for nine of ten WABOU soil sites. Alternative #17 (Land Use Controls) is the selected remedial or contingent remedial alternative for ten of the eighteen NEWIOU soil and sediment sites. Both remedial alternatives provide the administrative and physical measures needed to restrict future land use, prevent unauthorized soil disturbance and removal activities, and/or ensure the effectiveness of the remedies at these nineteen LUC sites.

The remedial action objective of Alternative S2 and Alternative #17 is to restrict residential development and unauthorized disturbance and relocation of soil. While the descriptions of Alternatives S2 and #17 differ slightly in the respective RODs, their objectives are identical.

For four WABOU sites (DP039, SD043, LF044, and SS046), Alternative S2 is the only selected soil remedy. For the remaining five active WABOU sites (LF008, RW013, SS041, SD042, and SD045), the *WABOU Soil ROD* (Travis AFB, 2002) selected an active remedy and Alternative S2 as a contingency remedy. The active remedy is required to reduce COC concentrations to industrial cleanup levels so that the sites are safe for base workers. Alternative S2 serves to

restrict residential activity at those sites. Section 5.4 (Land Use Controls) of the *WABOU Soil ROD* (Travis AFB, 2002) describes these requirements in more detail.

Similarly, for five NEWIOU soil sites (SS015, SS016, ST032, SD033 [soil], and SD037 Area 6), Alternative #17 is the only selected soil remedy. Alternative 16 (No Action) is the soil remedy for SD037 Areas 1 through 5. For the remaining NEWIOU sites (SD001 [sediment only], FT003, FT004, FT005, LF007, and SD033 [sediment]), the *NEWIOU SSSW ROD* (URS, 2006) selected an active remedy and Alternative #17 as a contingency remedy. Because the active remedy is required to reduce COC concentrations to industrial cleanup levels, Alternative #17 serves to restrict activity at those sites to industrial uses only. Section 5.4 (Land Use Controls [LUC]) of the *NEWIOU SSSW ROD* (URS, 2006) describes these requirements in more detail.

One active remedy (Alternative S6 for WABOU soil sites and Alternative #18 for NEWIOU soil sites) consists of excavation and placement of contaminated soil in a Corrective Action Management Unit (CAMU). Alternative #18 also allows soil to be sent to an off-base landfill. A CAMU is a designated on-base area that is designed to receive and consolidate contaminated soil. The location of the Travis AFB CAMU is within the boundaries of Site LF007. The CAMU received contaminated soil from other soil sites during the 2003 and 2007 soil remedial actions. The CAMU is now closed and is not available to receive contaminated soil in the future. See Sections 7.1 and 7.2 for additional information regarding the CAMU.

2.2 Groundwater LUCs

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) supersedes the *Groundwater Interim ROD for the WABOU* (CH2M HILL, 1999) and the *Groundwater Interim ROD for the NEWIOU* (URS, 1997) and describes the selected remedies for nineteen groundwater ERP sites on Travis AFB.

Unlike the soil RODs, the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) does not have a separate LUC alternative. Rather, LUCs are built into every active groundwater remedy to prevent the exposure of base personnel and contractors to contaminated groundwater or any associated vapors and to maintain the integrity of remedial and monitoring systems, such as extraction and monitoring wells. Figure 1 shows the boundaries of the land use controls associated with the Travis AFB groundwater sites.

Groundwater LUCs are an integral part of the achievement of Remedial Action Objectives (RAOs) that are described in the *Travis AFB Groundwater ROD* (CH2M HILL, 2014). The first RAO for all groundwater sites pertains to the restriction of human exposure (ingestion and direct dermal contact) to COCs and the reduction of COC concentrations to restore designated beneficial uses. LUCs are established to enforce the restriction of human exposure to COCs while the selected groundwater remedy works to reduce COC concentrations. For each groundwater site in this report, the achievement of the portion of the first RAO that applies to human exposure restriction is stated.

Travis AFB obtains its drinking water from two sources: a water treatment facility that is owned and operated by the City of Vallejo and a group of deep groundwater production wells at the

Cypress Lakes Golf Course. As a result, the base does not use its groundwater for either domestic or industrial use. It does use treated groundwater to recharge the Duck Pond, an on-base recreational area.

For the on-base sites, a records review revealed no drinking water wells have been constructed. The on-base controls are procedural in nature and are based primarily on the administrative and worker safety tasks that base personnel and contractors must complete to obtain permission to excavate soil as part of a construction or repair project. All on-base plumes are located in industrial areas, and the footprint of most of them is covered by other, more stringent controls that are associated with aircraft/military operations. For example, the footprint of the LF008 plume is covered by quality distance safety arcs that prevent unauthorized activities near munitions storage facilities, and the footprint of the SS016 plume lies under aircraft runways and parking ramps and is covered by Federal Aviation Administration restrictions. There are no physical controls associated with these groundwater restrictions that can be inspected, so the weekly review by AFCEC restoration staff of excavation permits, work requests and environmental impact analyses is an effective means to ensure groundwater restrictions are enforced. Section 4.1.2 (Institutional Controls on Groundwater Use) of the *Third Five-Year Review Report* (Endpoint Consulting, 2013) provides a detailed description of the implementation of groundwater land use controls.

For the three groundwater sites with off-base components (FT005, LF007C, and SS030), the base purchased four easements that allow the base to carry out environmental investigations and restoration activities on private property. Each easement contains enforceable restrictions preventing the landowner from interfering or bridging the exercise of the government's rights under the easements and also prevents landowners from engaging in water development or soil disturbing activities that could interfere with cleanup activities. The Air Force views any residential development and any well drilling on the properties covered by the four easements as interference with the government's easements. Each easement has been recorded. If an easement expires before the solvent concentrations in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health, then the base will negotiate a subsequent easement with the property owner. The Air Force monitors and will continue to monitor for inconsistent usage by the landowners. To date, there has been no interference by the landowners through inconsistent usage. Thus, the easement serves as an important tool for the implementation and enforcement of off-base LUCs on privately owned property.

The off-base groundwater plumes at Sites FT005, LF007C, and SS030 are enclosed entirely by the respective easements. Rather than assigning LUC boundaries to the plumes based on changing contaminant isoconcentration lines, the base considers the off-base LUC boundary for each site to be the entire footprint that is covered by the easement. Once cleanup levels for all COCs are achieved over the entire off-base portions of the plumes, the Air Force and the regulatory agencies will review the site conditions and determine whether the restrictions contained in the easements continue to be necessary to support site remediation.

For groundwater sites with solvent contamination, LUCs are established to prevent a potential exposure to indoor air vapor. The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) placed restrictions for residential and industrial land uses above solvent plumes; these restrictions can

only be removed when the concentrations of volatile COCs that could potentially emanate from groundwater to indoor air do not pose an unacceptable risk to human health. By enforcing these restrictions, Travis AFB complies with the RAO as described in the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) that pertains to the restriction of COC inhalation that migrates from the subslab of a building into indoor air. For each groundwater site in this report that is assigned this RAO, the achievement of this COC inhalation restriction RAO is stated.

The *Vapor Intrusion Assessment Report* (CH2M HILL, 2010) described a phased approach that was used to evaluate the potential vapor intrusion risk associated with solvent plumes beneath current office buildings. The assessment compared available groundwater data against screening levels, collected and analyzed subslab soil vapor and indoor air samples to establish site-specific risk-based concentrations, and identified buildings where there was a potential human health risk associated with the vapor intrusion pathway. A subsequent *Vapor Intrusion Assessment Update Technical Memorandum* (CH2M HILL, 2013) updated the original vapor intrusion assessment, based on revised risk-based concentrations and developed residential and industrial groundwater-to-indoor air LUC boundaries to support the *Travis AFB Groundwater ROD* (CH2M HILL, 2014).

Groundwater LUCs do not prevent the construction of new office buildings above solvent plumes. However, to ensure that the occupants of new buildings are not exposed to contaminated vapor from the solvent plumes, the new construction projects include the installation of a passive ventilation system beneath the office spaces that blocks the pathway between the occupants and the potentially contaminated subsurface soil gas. The requirement to incorporate a passive ventilation system into the building design is identified during the siting of the new building as part of the administrative controls. Figure 2 shows the boundaries of the land use controls associated with industrial groundwater-to-indoor air values that exceed acceptable risk levels, and Figure 3 shows the boundaries of the land use controls associated with residential groundwater-to-indoor air values that exceed acceptable risk levels.

The surface completions of monitoring, extraction and injection wells vary, depending on local industrial activities or property use. For example, flush mounts would be used in a parking lot, and stovepipe completions are often used in open fields that are subject to winter flooding. There are nearly 1,000 wells on Travis AFB, and almost all of these wells are closely inspected either during routine field maintenance, during the two semiannual groundwater level measurement and sample collection events, or when extraction system repairs are needed. During the annual LUC inspection, the overall site is viewed to ensure that the environmental restrictions that are described in three RODs are enforced. However, well maintenance is not a primary aspect of LUC enforcement, and detailed descriptions of well material observations (e.g., a missing bolt or lock) are not provided in this report. This annual report does describe any significant signs of infrastructure degradation that resulted from improper activities; if no significant degradation was observed, the lack of degradation is not mentioned in the text.

Currently, Travis AFB is conducting five CERCLA groundwater demonstration projects. Three projects at Sites FT004, FT005, and SD031 are attempting to horizontally distribute emulsified vegetable oil (EVO) in a low permeability clay-rich saturated zone. One project at Site SD034 is attempting to use subgrade biogeochemical reactor technology to accelerate the cleanup of

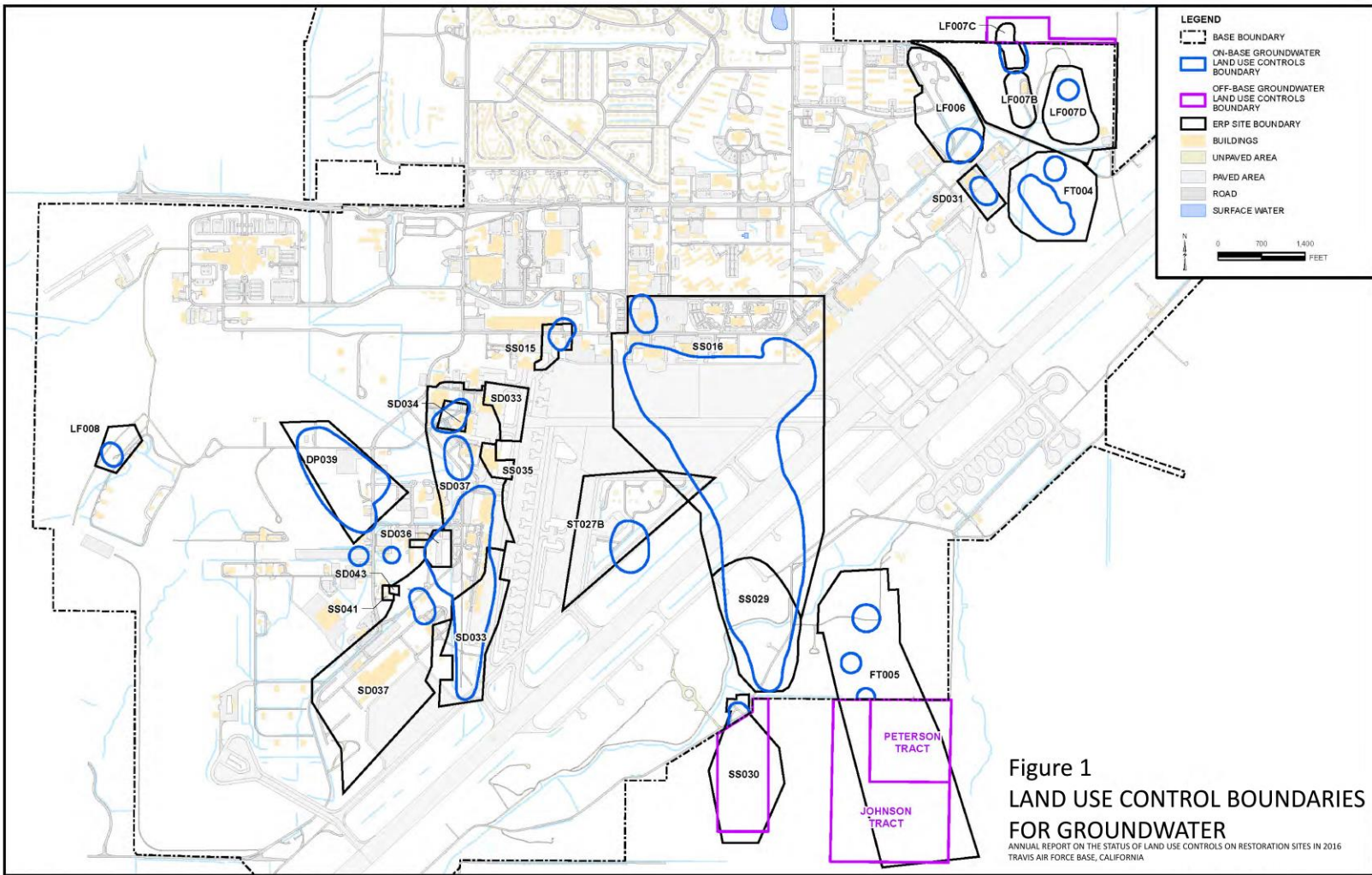
hydrocarbon contamination. The final project at Sites ST027B and SD036 is evaluating the use of a bioaugmentation culture to improve the performance of EVO injection remedies. If successful, the lessons learned from these projects could be used to optimize future remedies at other chlorinated solvent and petroleum hydrocarbon sites. The infrastructure that supports these demonstration projects is new and in excellent material condition, and the administrative processes and procedures that are used to manage LUCs at groundwater sites will also protect the material integrity of this infrastructure. However, because this infrastructure does not directly support a remedy, these demonstration projects will not be mentioned in this annual LUC report.

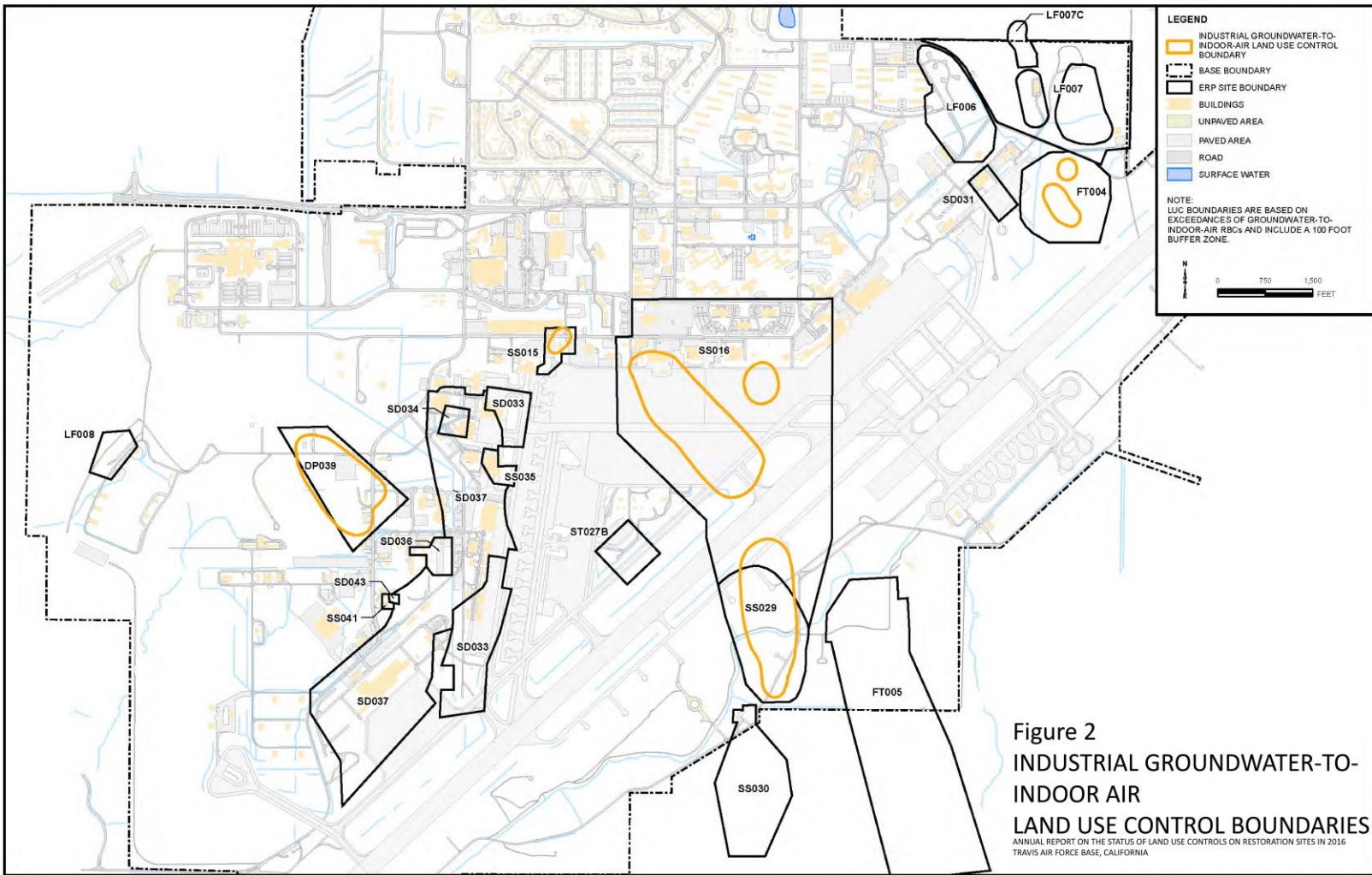
2.3 Petroleum Only Contaminated (POCO) Sites

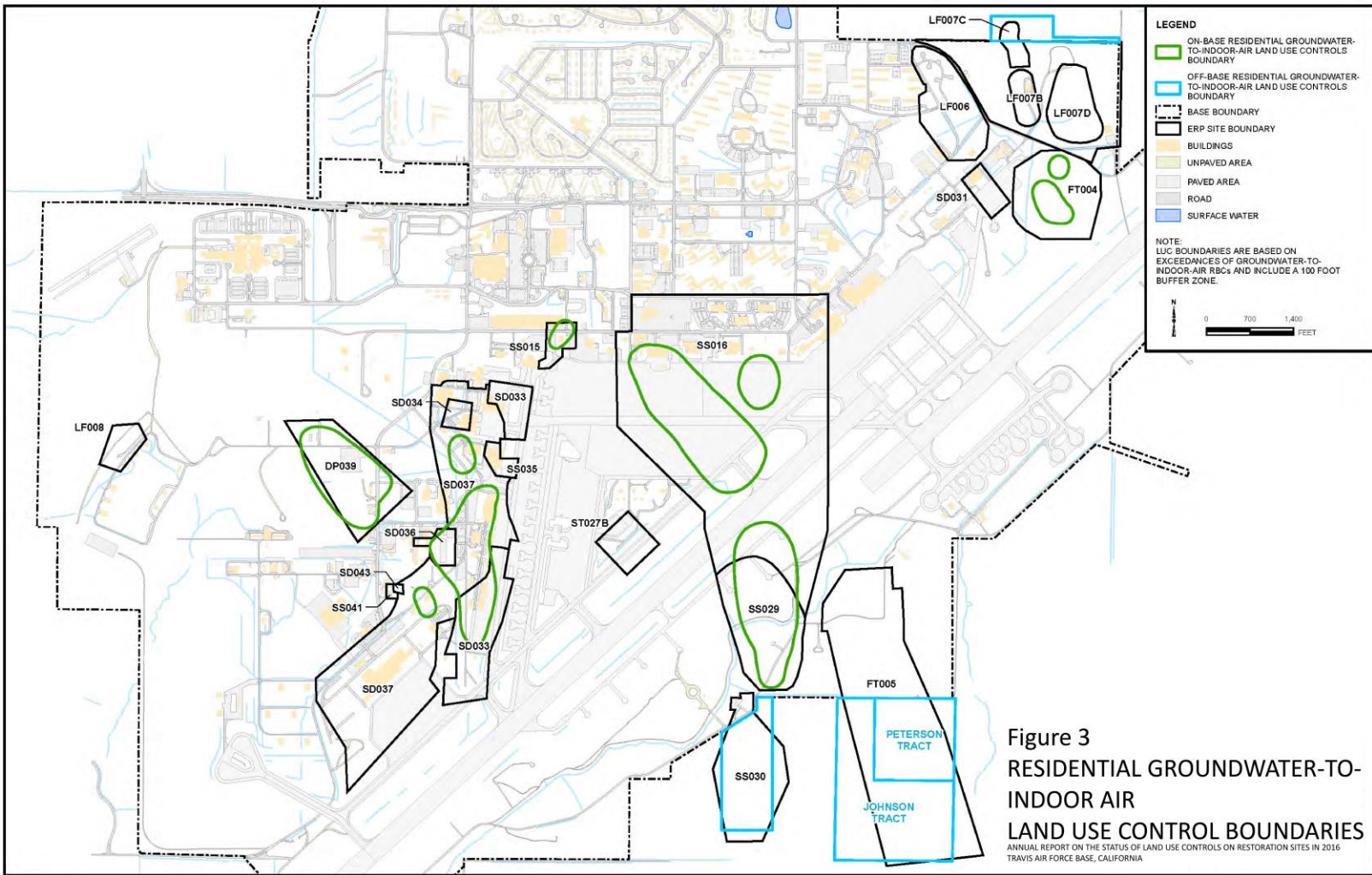
The Travis AFB ERP also addresses several sites with petroleum contamination only. Petroleum cleanup is not authorized under CERCLA, so the base established a Petroleum Only Contamination (POCO) program, which addresses locations with fuels and other petroleum COCs. POCO sites receive regulatory oversight from the San Francisco Bay Regional Water Quality Control Board.

Although POCO sites are not mentioned in this report, they receive similar administrative on-base controls as ERP sites. The controls are designed to prevent inadvertent exposure of petroleum contamination in soil and groundwater to base personnel and contractors during construction activities that involve soil excavation.

Site ST032 is a site that had been a part of previous inspections and had been discussed in previous annual LUC reports. In April 2009, ST032 was transferred to the POCO program. The final *Recommendation to Transfer ERP Site ST032 to the POCO Program Technical Memorandum* (CH2M HILL, 2009b) provides the rationale for this transfer to the POCO program. This transfer did not change the field activities at ST032; however, this site will no longer be mentioned in annual LUC reports.







3.0 Performance Measures

Sections 5.4 (Land Use Controls) of both the *WABOU Soil ROD* (Travis AFB, 2002) and the *NEWIOU SSSW ROD* (URS, 2006) as well as Section 2.12.2.8 (Land Use Controls) of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) address the Air Force requirements and responsibilities for implementing, monitoring, maintaining, and enforcing LUCs. The following subsections explain how these requirements and responsibilities (performance measures) have been met.

3.1 Base General Plan Revisions

The first performance measure pertains to the Base General Plan (BGP). The BGP is a long-range planning document that provides a framework for selecting the locations of future facilities needed to carry out the base mission. Each ROD required Travis AFB to incorporate within its BGP all specific LUCs at each site, the reasons for the controls, and site-specific details to adequately describe them to base personnel. Once a soil remedial action is complete, the base updates the site-specific restrictions in the BGP, if needed.

Section 3.1 of the *Travis Air Force Base Annual Report on the Status of Land Use Controls on Restoration Sites in 2013* (Travis AFB, 2014) provides a history of the maintenance and challenges associated with the BGP. It also stated that congressionally-mandated Department of Defense budget cuts prevented the Air Force from maintaining a web-based version of the Travis AFB BGP. Soon after the web-based BGP was shut down, AFCEC issued a contract to Jacobs Engineering Group to develop an Installation Development Plan (IDP) to support the long-term planning function at Travis AFB and other AF installations. Similar in structure and content to the original BGP, the IDP summarizes the AF Comprehensive Planning Process and applies geospatial and written data (text, maps, tables, figures, photographs, etc.) to allocate resources through project programming, promote airfield safety, and enhance the general health and welfare of the natural and built environment.

The Travis AFB IDP was finalized in March 2016 and is the result of a comprehensive planning process that describes the installation's past, present and future physical state and guides future facility programming decisions. It is intended to align with the Air Force installation planning goals for mission capability, sustainability, readiness, and modernization.

The IDP serves as a replacement of the BGP and has a section that summarizes the Travis ERP and the need for soil, groundwater and soil gas LUCs. However, it does not contain sufficient LUC information to be a useful enforcement and management tool. To provide base project planners with the latest detailed LUC data to support future projects, the AFCEC IST at Travis AFB is working on a Land Use Control Implementation Plan (LUCIP). The LUCIP is an internal Air Force tool that will describe the responsibilities of base personnel in maintaining LUCs, provide site-specific LUC data for each site, and present figures that show the boundaries of the groundwater and indoor air restrictions. The Travis AFB LUCIP will provide a framework for consistent and effective LUC implementation, management, and compliance tracking.

At the time of the 2016 LUC inspection, the LUCIP was in a draft form and was still undergoing internal revision. One feature of the Travis AFB LUCIP is a series of checklists, one for each restoration site that will help the inspectors to identify the key LUC aspects that should be evaluated during the inspection. The 2016 LUC inspection team used a draft version of the checklists during their inspection. Overall, the checklists supported the inspection, although several improvements were identified to make the checklists more site-specific and useful. Changes to the checklists and the document text will be incorporated into a revised draft LUCIP. The revised draft version will be reviewed by base and AFCEC personnel to ensure that it complies with ROD and Air Force requirements. Currently, the Travis restoration IST is responsible for ROD compliance, but once the LUCIP is finalized, the 60th Civil Engineer Squadron will assume the responsibility for LUC enforcement on Travis AFB. Eventually, future LUC inspections will be carried out by base personnel with appropriate assistance provided by the Travis IST to support the transition.

3.2 Regulatory Agency Notification

The second performance measure involves the notification of the regulatory agencies of any base proposals for a major land use change at a site inconsistent with LUC objectives or the selected remedy, any anticipated action that may disrupt the effectiveness of the LUCs, any action that might alter or negate the need for LUCs, or any anticipated transfer of the property subject to the LUCs.

For the soil and groundwater sites that are addressed in this report, there were no land use change proposals or activities in 2016 that were inconsistent with, disruptive of, or negated the need for LUCs. Also, no property transfers took place in the vicinity of these sites.

Section 5.4 of the *NEWIOU SSSW ROD* (URS, 2006) and Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) specify a period up to 10 days after discovery for regulatory agency notification of LUC changes or breaches as described above. They also describe the notification of how the Air Force has addressed or will address the breach. Since Travis AFB made no notifications in 2016, the LUC inspection did not evaluate notification timeliness.

3.3 Existing Administrative Control Maintenance

The third performance measure requires the maintenance of existing administrative controls (e.g., through the review of excavation permits) while LUCs are in place. Although there are no material changes to the administrative procedures for tracking land use on-base, Travis AFB implemented a new facility management system that transition from paper forms to a web-based system.

TRIRIGA is the Air Force's designated system for processing all facility alterations and repair, and is mandated to meet Financial Improvement and Audit Readiness (FIAR) compliance as

prescribed by Office of the Secretary of Defense policy. This tool enables base civil engineers to focus resources to more effectively maintain and repair real property assets.

One significant system change is the replacement of the Civil Engineer Work Request (AF Form 332) with a TRIRIGA service request. The service request starts the proposal evaluation process and provides the information needed by reviewers to compare the proposed building or construction activity location with the local environmental constraints before approval. TRIRIGA also uses the service request to initiate an initial environmental analysis which often leads to the submission of a Request for Environmental Impact Analysis (AF Form 813). This allows the Civil Engineer Squadron to verify that environmental issues pertaining to the proposed project are properly considered and addressed. One administrative procedure that has not changed is the excavation permit (60 AMW Form 55) which is still submitted and approved in paper format.

During the 2016 LUC inspection, the reviewers noted that all LUCs at the soil and groundwater sites that are addressed in this report were intact. There were no indications of improper land use or soil disturbance in any of the controlled areas. Based on the site inspections and weekly attendance in project coordination meetings throughout 2016, the reviewers concluded that the existing administrative measures are properly maintaining the LUCs.

3.4 Periodic Monitoring

Periodic monitoring is the final requirement as described in three Travis AFB RODs. Officially, Travis AFB is required to conduct annual inspections of its controlled areas and to take prompt action to restore, repair, or correct any LUC deficiencies or failures identified. Also, the RODs provide the flexibility to select a different monitoring schedule as long as all parties agree with it and if the change reasonably reflects the potential risk presented by the site.

The AFCEC IST at Travis AFB has two restoration project managers and one environmental contractor who routinely visit environmental restoration and military construction projects. As a result, site visits take place on at least a quarterly (and often more frequent) basis, with few exceptions. However, these site visits are not considered to be official LUC inspections as described in Section 4.1 (IC assurance monitoring) of *Institutional Controls: A Guide to Preparing Institutional Control Implementation and Assurance Plans at Contaminated Sites*, EPA-540-R-09-002, dated December 2012. Past annual LUC reports listed any specific activities or incidents that resulted in more frequent site visits, based on an EPA recommendation to state the total average number of episodic visits by contractors and base representatives to each site during the course of the annual reporting period (EPA email, James Chang, 12 February 2009). To avoid confusion, only the results of the annual LUC inspection will be reported. In the event that a potential LUC deficiency is identified, it is investigated promptly. During this reporting period, there were no LUC deficiencies that required restoration, repair or correction.

3.5 Other Monitoring Requirements

In addition to the LUC requirements described above for all sites, the RODs require the following measures at some sites:

3.5.1 Signs

Specific sites will have appropriate signs on display to warn site visitors of potential hazards associated with surface soil contamination, conforming to ANSI Z 53.1 and Unified Facilities Criteria 3-120-01 (Air Force Sign Standard).

In 2003, Travis AFB placed signs at all WABOU sites with LUCs. In 2006, the base placed signs at SS016 and the soil portion of SD033. Sites SS015 and SD037 did not receive signage because of incompatibilities with safe vehicle or aircraft operations. To ensure that base personnel can contact an environmental restoration representative when needed, the phone numbers and other contact information on the signs are checked during the annual inspections. The 2016 LUC inspection noted that the all signs display the same cell phone number that is forwarded to the Travis IST office (290-8458). This ensures a consistent response to any phone inquiries and provides the flexibility of forwarding incoming calls to an assigned base representative. Appendix A (Photographs) presents photographs taken during the 2016 inspection that show examples of the signs that have been posted at LUC sites.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) does not have a signage requirement mainly because of the expectation that the boundaries and COC concentrations in plumes will fluctuate during the life of remedial actions. Signage is only effective when the COC boundaries are stationary.

3.5.2 Use of Clean Soil

At sites where the selected remedy involves soil excavation, Travis AFB is required to backfill the excavation voids with clean soil. This removes the potential for exposure to surface soil COCs. If there is any residual contamination at depth, the excavation permit process is used to ensure that future industrial activities or construction projects either do not disturb the contaminated subsurface soil or that the base takes appropriate mitigation measures.

3.5.3 Landfill X

The *WABOU Soil ROD* (Travis AFB, 2002) requires Travis AFB to install a fence around the Landfill X area, build protective berms to prevent the transport of soil contamination via surface water flow during rain events into nearby vernal pools, and comply with applicable OSHA regulations, including relevant worker notification, training, and protective measures.

In 2003, Travis AFB completed the installation of a fence and berm at Landfill X. The details of this soil action are found in the *Remedial Action Report for the Soil Remedial Actions at Site LF044* (ECC, 2003a).

3.5.4 Report Submittal

In accordance with the three RODs, Travis AFB is required to submit in a timely manner to the U.S. EPA, California Department of Toxic Substances Control, and the San Francisco Regional

Water Quality Control Board an annual monitoring report on the status of LUCs; including the operation, maintenance, and monitoring thereof; and how any LUC deficiencies or inconsistent uses have been addressed. The source of the analytical data that is presented in this report is the *Final 2015 Annual Groundwater Remediation Implementation Status Report* (GRISR) (CH2M HILL, 2016a).

A hard copy of this report has been placed in the Travis AFB Information Repository at the Vacaville Cultural Center Library, and an electronic copy of this report will be accessible through the environmental portion of the Travis AFB Public Web Site (<http://www.travis.af.mil/About-Us/Environment/Document-Library/>). Although this 2016 annual LUC report is not subject to approval and/or revision by EPA and the State of California regulatory agencies, Travis AFB will voluntarily consider any suggestions from the regulatory agencies and the public to improve the format and/or content of future reports.

4.0 Fire Training Area #3 (FT004)

FT004 is in the northeastern part of Travis AFB and consists of the former Fire Training Area #3, an unoccupied 30-acre open field that was used to train fire fighters from about 1953 to 1962. Waste fuels, oils, and solvents were burned on open ground, contaminating the groundwater with chlorinated solvents, mainly trichloroethene (TCE).

4.1 Environmental Conditions

The list of chlorinated COCs for FT004 groundwater include TCE, cis-1,2-dichloroethene (DCE), 1,2-dichloroethane (DCA), chloroform, bromodichloromethane, 1,1-DCE, vinyl chloride, and 1,4-dichlorobenzene (DCB). The indicator COC for FT004 is TCE. The maximum TCE concentration in the groundwater at FT004 is 2,300 parts per billion (ppb) at injection well IW2311x04; this well supports an ongoing demonstration project. The federal and State of California drinking water standard for TCE is 5 ppb. Appendix D of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for FT004.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation [MNA]) to address the residual dissolved solvent contamination. The interim Groundwater Extraction and Treatment (GET) system at FT004 is not a part of the selected remedy, so it is shut down. The progress that MNA has made in reducing COC mass and concentrations is reported in annual Groundwater Remediation Implementation Status Reports (GRISRs).

4.2 Status of FT004 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at FT004 also poses a potential indoor air vapor intrusion risk to industrial workers, so the LUCs also restrict residential and industrial land uses that could result in a vapor intrusion hazard (e.g., office construction) until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at FT004 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new non-environmental construction has taken place at the site. Most of the monitoring wells have stovepipe completions and are protected by bollards. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 1 in Appendix A of this report shows the controlled area at FT004.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for FT004.

5.0 Fire Training Area #4 (FT005)

FT005 is in the southeastern part of Travis AFB and consists of the former Fire Training Area #4, an unoccupied 30-acre open field that was used to train fire fighters from about 1962 to 1987. From 1962 to the early 1970's, waste fuels, oils, and solvents were burned on open ground. From the early 1970's to when Fire Training Area #4 was closed, only waste fuels were burned. These activities contaminated the groundwater with chlorinated solvents, mainly 1,2- DCA.

5.1 Environmental Conditions

The list of chlorinated COCs for FT005 groundwater include TCE, 1,2-DCA, cis-1,2-DCE, chloroform, and bromodichloromethane. The indicator COC is 1,2-DCA. The maximum 1,2-DCA concentration in the groundwater at FT005 is 3.7 ppb at EW01x05. The federal and State of California drinking water standard for 1,2-DCA is 0.5 ppb. Appendix E of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for FT005.

FT005 is one of three restoration sites with a solvent plume that extends beyond the base boundary. To allow the base to carry out environmental investigations and restoration activities on private property, the base purchased an easement that covers the lateral extent of the 1,2-DCA plume. The easement restricts the activities of the property owner that could potentially interfere with the selected groundwater remedy for FT005. If the easement expires before the solvent concentrations in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health, then the base will negotiate a subsequent easement with the property owner. This easement expires and may need to be renewed in 2026.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 3 (GET) to address the residual dissolved solvent contamination. The progress that GET has made in reducing COC mass and concentrations is reported in annual GRISRs.

5.2 Status of FT005 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. Because the COC concentrations at FT005 are not high, the groundwater does not pose a potential indoor air vapor intrusion risk to industrial or residential workers.

The 2016 inspection of the groundwater LUCs at FT005 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel or the off-base property owner to contaminated groundwater, and no new construction has taken place at the site. The GET system is actively treating groundwater, and all of the monitoring and extraction wells were inspected during field maintenance by contractor personnel prior to the LUC inspection. The LUC inspection

identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 2 in Appendix A of this report shows the off-base portion of FT005 that is under an easement. Photograph 3 shows the on-base portion of FT005.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for FT005.

6.0 Landfill 1 (LF006)

LF006 is a former waste disposal landfill in the northeastern portion of Travis AFB that was operated from about 1943 through 1950. The waste contained chlorinated solvents, mainly TCE, and petroleum fuel hydrocarbons that contaminated the local groundwater.

6.1 Environmental Conditions

The list of chlorinated COCs for LF006 groundwater includes TCE and 1,1-DCE. The indicator COC is TCE. The maximum concentration of TCE in groundwater is 4.4 ppb at MW208Dx06. The federal and State of California drinking water standard for TCE is 5 ppb. However, the maximum concentration of 1,1-DCE in groundwater is 10 ppb at MW258Dx06. The federal and State of California drinking water standard for 1,1-DCE is 6 ppb. This is the first time that 1,1-DCE was detected in groundwater at Site LF006 at a concentration above the cleanup level. Petroleum fuel hydrocarbons have not been recently detected.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

6.2 Status of LF006 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at LF006 does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at LF006 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction has taken place that could create a potential vapor intrusion risk. The monitoring wells that support the remedy have stovepipe completions and are protected by bollards. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 4 in Appendix A of this report shows the controlled area at LF006. A pump test at one of the LF006 wells was taking place at the time of the inspection.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) for LF006. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for LF006.

7.0 Landfill 2 (LF007)

LF007 is a closed municipal landfill in the northeast corner of the base that was active from the 1950s to 1974. It is a NEWIOU restoration site that was selected in the *WABOU Soil ROD* (Travis AFB, 2002a) as the location for the construction of the Corrective Action Management Unit (CAMU). There are also active operations at LF007 conducted at Buildings 1360 (Military Affiliated Radio Station), 1365 (Permitted Treatment, Storage and Disposal Facility), and 1370 (Small Arms Range).

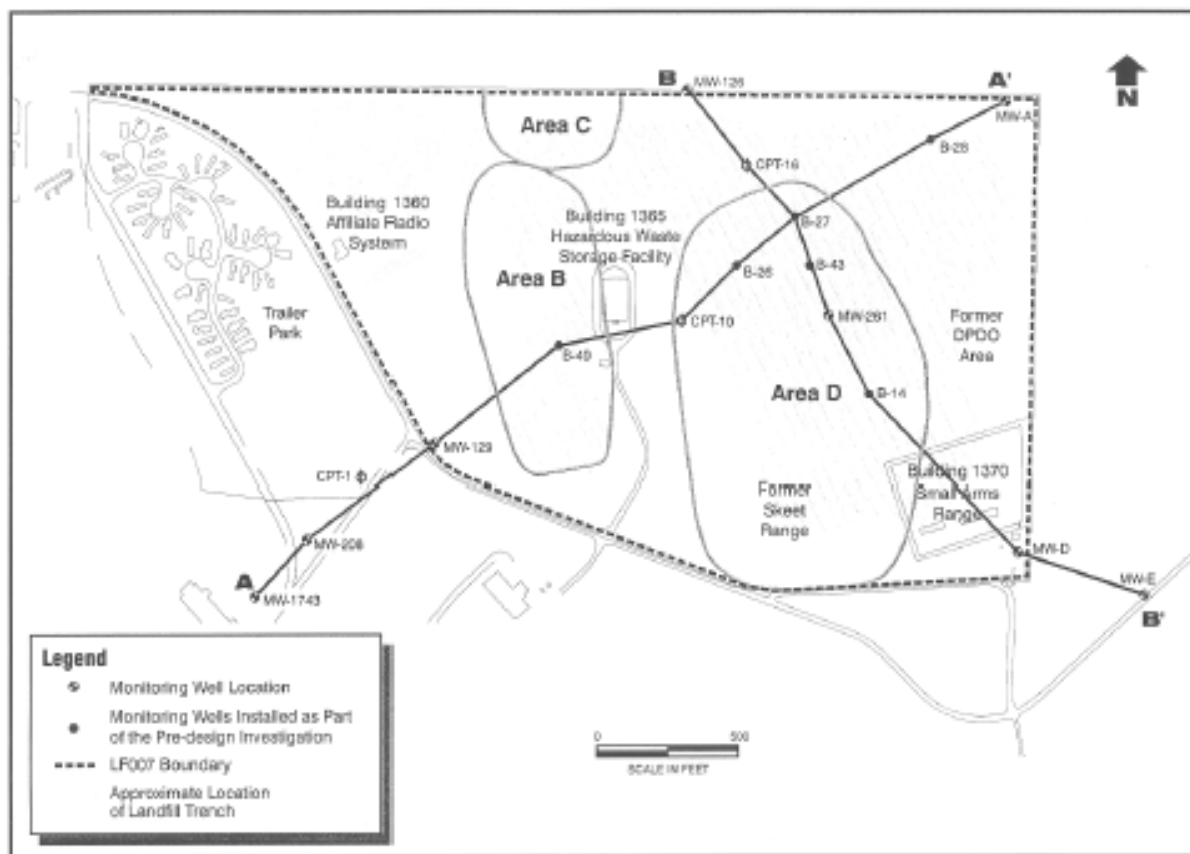


Figure 4 Physical Features and Area Designations at LF007

7.1 Environmental Conditions

During the North Operable Unit (NOU) Remedial Investigation (RI), the human health risk assessment identified seven (7) subareas for investigation. This annual LUC report focuses on Areas B, C, and D for groundwater and the CAMU. Figure 4 shows the primary features at LF007 and the three subareas.

LF007 Area B (LF007B) covers north-south trending disposal trenches northwest of Building 1365. The NOU RI identified several groundwater COCs (benzene; 1,4-DCB; chlorobenzene, etc.), but none of these COCs have been detected after years of monitoring under the

Groundwater Sampling and Analysis Program. Therefore, the groundwater COC concentrations are below cleanup levels, and LF007B has no plume dimensions. The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

LF007 Area C (LF007C) is located near the northern NOU boundary in a low, swampy area and contains a solvent plume that extends beyond the base boundary. The list of chlorinated COCs for LF007C groundwater include TCE, vinyl chloride, 1,1-DCE, 1,2-DCA, and 1,2-dichloropropane. The indicator COC for LF007C is TCE. The maximum concentration of TCE in the groundwater at LF007C is 31 ppb at MW2007x07. The federal and State of California drinking water standard for TCE is 5 ppb. To allow the base to carry out environmental investigations and restoration activities on private property, the base purchased an easement that covers the lateral extent of the TCE plume. The easement restricts the activities of the property owner that could potentially interfere with the selected groundwater remedy for LF007C. If the easement expires before the solvent concentrations in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health, then the base will negotiate a subsequent easement with the property owner. This easement expires and will have to be renewed in 2018. The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 3 (GET) to address the residual dissolved solvent contamination. The progress that GET has made in reducing COC mass and concentrations is reported in annual GRISRs.

LF007 Area D (LF007D) is located east of Building 1365 and has a groundwater plume that is limited to one small area in the vicinity of MW261x07. The groundwater COCs for this subarea are benzene, vinyl chloride, 1,4-dichlorobenzene, 1,1-dichloroethene, chlorobenzene, 2,3,7,8-TCDD (equivalent), and arochlors 1242 and 1248. The concentrations of benzene (2.3 J- ppb) and 1,4-dichlorobenzene (19 J- ppb) still exceed their cleanup levels of 1 ppb and 5 ppb, respectively. The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

Alternative #17 (Land Use Controls) is the selected remedial action in the *NEWIOU SSSW ROD* (URS, 2006) for the CAMU cover, CAMU associated features, the Landfill cover and associated buried wastes. For PCB-contaminated soils in Area E, Alternative #18 (Excavation) is the selected remedy and Alternative #17 is the contingency remedy. Appendix B describes the cleanup of the PCB-contaminated soil at LF007E.

The CAMU was built in three phases. Phase 1 consisted of landfill maintenance and the placement of large quantities of clean soil into subsidence trenches that formed in the original soil cap. The soil also served as a foundation for the CAMU. Phase 2 involved the placement of contaminated soil from WABOU soil sites into the CAMU and the construction of an evapotranspiration cap over the consolidated soil. Travis AFB completed the fieldwork for Phases 1 and 2 in November 2003. Phase 3 involved the placement of contaminated soil from NEWIOU and WABOU sites into the CAMU and the completion of the CAMU cap. The base completed the fieldwork for Phase 3 in December 2007.

The *Remedial Investigation Report for the North Operable Unit* (Radian, 1995) contains a detailed description of the LF007 environmental conditions. The *Design Report and Post-Construction Maintenance Plan for the LF007 Soil Remedial Action* (CH2M HILL, 2002) contains a detailed description of the CAMU design. The *Project Summary Report for the LF007 Soil Remedial Action Phase 1, Landfill Cap, Corrective Action Management Unit Subgrade, Wetlands Mitigation* (Shaw E&I, 2003) contains the description of the fieldwork that supports the closure of this landfill. The *Project Summary Report for the Site LF007 Phase 2 Soil Remedial Action* (Shaw E&I, 2004) describes the placement of contaminated soil from WABOU soil sites and the construction of the CAMU protective cap as well as other designed features. The *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Soil Sites* (URS, 2004) and the *North/East/West Industrial Operable Unit Ecological Technical Memorandum* (URS, 2005) also describe environmental conditions at LF007.

7.2 Status of LF007 Soil Land Use Controls

Section 4.2 of the *WABOU Soil ROD* (Travis AFB, 2002a) describes the CAMU and its part of the selected remedies for WABOU soil sites. Section 5.3.6 of the *NEWIOU SSSW ROD* (URS, 2006) states that Alternative #17 (Land Use Controls) is the selected soil remedial action for LF007 Areas B through D.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of the CAMU cover, CAMU associated features, Landfill 2, and their land use controls. Travis AFB also does not allow unauthorized soil disturbance and relocation activities at LF007 and has placed a gate and sign at the entrance to the landfill area to ensure that its integrity and function remain intact.

Currently, the CAMU is in an Operation and Maintenance phase. Now that all CAMU phases are complete, the base prepared the CAMU for the eventual transition to a Long-Term Management phase by building a 6-foot high security rectangular fence with triple-strand barbed wire at the top around it. The fence was positioned to provide sufficient room for heavy equipment to move around the CAMU, and two custom-designed gates were placed at both ends to allow easy access for future field work. Twelve LUC signs with contact phone number are attached to the fence (four on the long sides and two on the short sides).

The 2016 inspection of the soil LUCs at LF007 found that the current administrative and physical controls are adequate to enforce the restrictions. There is no evidence that the contaminated soil at LF007 has been disturbed or that the active operations at Buildings 1360, 1365 and 1370 are compromising the LUCs in place on the portions of LF007 discussed above. The CAMU fence and gates are in excellent material condition. During the 2016 construction season, the base replaced the old warning sign adjacent to the entrance swing gate with a new sign. Photograph 5 in Appendix A of this report shows the new LF007 entrance gate adjacent to the new warning sign. Photograph 6 shows the northwest CAMU gate with one of the 12 warning signs that are attached to the fence. Photograph 7 shows one of the 12 signs that are attached to the CAMU fence.

7.3 Status of LF007 Groundwater Land Use Controls

The following subsections describe the LUCs associated with the three groundwater subareas.

7.3.1 Status of LF007B Groundwater Land Use Controls

There are no groundwater COCs at LF007B that exceed their cleanup standards, but LUCs are still in place to ensure that groundwater is not used for potable purposes. Travis AFB will eventually request from the regulatory agencies to remove the LF007B groundwater LUCs in a future decision document.

7.3.2 Status of LF007C Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at LF007C also poses a potential indoor air vapor intrusion risk to future residents, so the LUCs also restrict residential land uses until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at LF007C found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction has taken place that could create a potential vapor intrusion risk. The GET system is shut down during the wet winter season, and wells cannot be accessed because of the presence of the large vernal pool that covers both on-base and off-base infrastructure. All extraction and monitoring wells are inspected by contractor personnel when the GET system is restarted at the beginning of the summer dry season. Except for the wells that lie in the roadway along the perimeter fence, all wells in the field have stovepipe completions and are protected by bollards. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 8 shows the LF007 solar panels that power the groundwater extraction system. Photograph 9 shows the off-base LF007C extraction and monitoring well network within the LF007C easement. Photograph 10 shows the label on the monitoring well on the top of the CAMU.

7.3.3 Status of LF007D Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at LF007D does not pose a potential indoor air vapor intrusion risk to future residents.

The 2016 inspection of the groundwater LUCs at LF007D found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for LF007 subarea C. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for LF007 subareas B and D.

8.0 Landfill 3 (LF008)

LF008 was an inactive historical landfill consisting of a series of small, unlined trenches used to dispose of old pesticide containers. This disposal resulted in groundwater contamination with organochlorine pesticides, primarily alpha-chlordane.

8.1 Environmental Conditions

The list of chlorinated COCs for LF008 groundwater includes alpha-chlordane, heptachlor, and heptachlor epoxide. The indicator COC is alpha-chlordane. The maximum concentration of alpha-chlordane epoxide in groundwater is 0.048 J ppb at EW717x08. The federal and State of California drinking water standard for alpha-chlordane is 0.1 ppb. The interim remedial action for Site LF008 (GET) had limited effectiveness at removing the residual organochlorine pesticide contamination from groundwater. Concentrations are stable, and contaminants are not migrating.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual pesticide contamination. The primary mechanism for attenuation at Site LF008 is likely sorption of the pesticides to the soil. The site sediments have a high clay content, which increases sorption and also reduces permeability. Comparisons of filtered and non-filtered groundwater samples indicated that no detectable concentrations were in the filtered samples. This result indicates that the contamination is not dissolved in groundwater but rather adsorbed to the fine soil particles suspended in the groundwater. The *June 2009 6-Month Rebound Study Completion at Site LF008* (CH2M HILL, 2010a) describes the study that supports this conclusion.

The interim GET system at LF008 is not a part of the selected remedy, so it is shut down. The pesticide concentrations have decreased in the absence of active pumping. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

8.2 Status of LF008 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at LF008 does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at LF008 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction has taken place at the site. All monitoring and extraction wells have stovepipe completions that are protected by bollards and are in good material condition. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 11 shows the controlled area at LF008.

LF008 is located inside a separately fenced field that lies within the explosive safety clear zone of a nearby conventional weapons storage facility. This field is accessible through a locked gate which is in good material condition, and the explosive safety clear zone has access restrictions that are more stringent than environmental restrictions. Special permission is required to enter the explosive safety clear zone for any activities, including inspections and sample collection. For this reason, additional administrative controls are not required to enforce the environmental land use restrictions.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) for LF008. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for LF008.

9.0 Solvent Spill Area and Facilities 550 and 552 (SS015)

SS015 is in the central part of the NEWIOU and consists of the Solvent Spill Area (SSA) and the former Facilities 550 and 552. The SSA covers approximately 1.4 acres east of Facility 550, in an area previously used for stripping paint from aircraft and where solvent spills were reported to have occurred. The site was an open grassy plot adjacent to an asphalt driveway and Facility 552.

Facility 552 consisted of a fenced, bermed, concrete pad constructed in 1964 and used as a temporary hazardous waste collection point. Stored wastes included paint, chromic acid, and solvents generated during aircraft maintenance operations at Facility 550. Facility 550 contained a corrosion control facility that treated and painted aircraft parts and support equipment. A metals-processing shop in Facility 550 used cadmium-based plating solutions.

In 2004, Facilities 550 and 552 were demolished to build a petroleum, oil, and lubricants (POL) facility under a military construction (MILCON) project. The facility consists of an office building (new Facility 552), a fuel truck maintenance building (Facility 554), and a large, concrete truck parking area.

9.1 Environmental Conditions

Surface soil in the vicinity of the former metals-plating shop in Facility 550 contains cadmium residue. The list of chlorinated COCs for SS015 groundwater includes TCE, cis-1,2-DCE, vinyl chloride, 1,2-DCA, and PCE. The indicator COC is TCE. The maximum concentration of TCE in the groundwater at SS015 is 300 ppb at IW2135x15. The federal and State of California drinking water standards for TCE is 5 ppb. Appendix H of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

Currently, the cadmium-contaminated soil is covered by concrete from the truck parking area, which is divided into individual parking stalls and entrance/exit lanes. A high security fence surrounds the POL facility, and warning signs associated with fuel handling activities are attached to the fence. The footprint of the environmentally-controlled area is small in relation to the large footprint of the fuel truck parking area, so it is impractical and somewhat unsafe from an operations perspective to place environmental warning signs in the vicinity of the contaminated soil.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 5 (Emulsified Vegetable Oil [EVO] and Enhanced Attenuation [EA]) to address the residual dissolved solvent contamination. The progress that EVO and EA have made in reducing COC mass and concentrations is reported in annual GRISRs.

9.2 Status of SS015 Soil Land Use Controls

Section 5.3.8 of the *NEWIOU SSSW ROD* (URS, 2006) states that Alternative #17 (Land Use Controls) is the selected remedial action for this site, because cadmium concentrations in the soil exceed levels that allow for unlimited use and unrestricted exposure. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of cadmium in the surface soil and the associated land use restrictions, particularly on the unauthorized disturbance and use of the soil beneath the concrete at this site.

The 2016 inspection of the soil LUCs at SS015 found that administrative controls and existing physical infrastructure are adequate to enforce the environmental restrictions. In addition, the inspectors noted a potential for additional physical barriers (i.e., fences) and signage to adversely impact vehicle operations. There is no evidence that the cadmium-impacted soil beneath the concrete parking area has been disturbed. Photograph 12 in Appendix A of this report shows the controlled area at SS015.

9.3 Status of SS015 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SS015 also poses a potential indoor air vapor intrusion risk to industrial workers, so the LUCs also restrict residential and industrial land uses until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable potential risk to human health.

The 2016 inspection of the groundwater LUCs at SS015 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction has taken place at the site. All injection and monitoring wells associated with the SS015 groundwater remedy are flush mounts and are in good material condition. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SS015.

10.0 Oil Spill Area, Facilities 11, 13/14, 20, 42/1941, 139/144, and Selected Sections of the Storm Sewer Right-of-Way (SS016)

SS016 is in the central part of the NEWIOU and consists of the Oil Spill Area (OSA); Facilities 11, 13/14, 20, 42/1941, and 139/144; and portions of the Storm Sewer Right-of-Way. The OSA covers approximately 7 acres north of Facility 16. The facilities within the site support flight line service equipment repair, aircraft engine repair, fuel storage, aircraft wash racks, and vehicle maintenance.

The OSA originally encompassed an area where waste oil from cleaning and degreasing operations at Facility 18 had reportedly been spilled or disposed of on a grassy field. The area is now entirely paved and covered with buildings. Facility 139 is a vehicle maintenance shop, and facility 144 is a vehicle body shop. Facilities 13 and 14 were used for paint stripping and parts cleaning, using TCE and a dilute phosphoric acid solution; the facilities were demolished in 1988. Facility 11 is a vehicle maintenance shop, and facilities 42/1941 include a wash rack, oil-water separator, and four 250-gallon above-ground storage tanks. Facility 20 is the aircraft control tower.

10.1 Environmental Conditions

Surface soil in a grassy field west of facility 18 contains polycyclic aromatic hydrocarbon (PAH) residue. A small portion of PAH-contaminated soil is covered by concrete and a brick walkway. The list of chlorinated COCs for SS016 groundwater includes TCE, cis-1,2-DCE, vinyl chloride, benzene, chloroform, 1,4-DCB, bromodichloromethane, 1,2-DCA, 1,1-DCE, and PCE. The indicator COC is TCE. The maximum TCE concentration in the groundwater at SS016 is 620,000 ppb at IW2213x16. The federal and State of California drinking water standard for TCE is 5 ppb. Appendix I of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 4 (Bioreactor and GET) to address the residual dissolved solvent contamination. The progress that the bioreactor and GET have made in reducing COC mass and concentrations is reported in annual GRISRs.

10.2 Status of SS016 Soil Land Use Controls

Section 5.3.9 of the *NEWIOU SSSW ROD* (URS, 2006) states that Alternative #17 (Land Use Controls) is the selected remedial action for this site, because PAH concentrations in the soil exceed levels that allow for unrestricted use and unlimited exposure. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of PAH in the surface soil and the associated land use restrictions, particularly on the unauthorized disturbance and use of soil at this site.

The 2016 inspection of the soil LUCs at SS016 found that administrative controls are adequate to enforce the restriction, so physical barriers (i.e., fences) are not needed. There is no evidence that the PAH-impacted soil has been disturbed. A warning sign has been posted on a tree that lies within the southern border of the rectangular grassy field that contains the PAH residue to notify base workers of the presence of the controlled area. Photograph 13 in Appendix A of this report shows the controlled area at SS016.

10.3 Status of SS016 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SS016 also poses a potentially significant indoor air vapor intrusion risk to industrial workers. Building 18 (located just north of the SS016 Bioreactor) is the only existing office facility on Travis AFB that is restricted in its use (for storage purposes only), based on the potential vapor intrusion risk that is posed by solvent COCs associated with Site SS016. So, the LUCs also restrict residential and industrial land uses until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at SS016 found that administrative controls are adequate to enforce the groundwater and vapor intrusion restrictions. Most of the solvent plume is located beneath the aircraft flight line, which receives a high level of security. All monitoring and extraction wells are flush mounted and are considered to be in good material condition, based on observations by the field team that collects groundwater samples and water level measurement during two Groundwater Remediation Implementation Program (GRIP) sampling events. Building 18 continues to be used for storage purposes, all doors that access the office area were locked, and the inspection team observed no office activity within the building during the inspection. There is no evidence of any activities that could expose base personnel to contaminated groundwater or vapor, and no new construction has taken place at the site. Although it was not considered necessary for LUC enforcement, a new warning sign was placed on one of the two office doors of Building 18. Photograph 15 in Appendix A of this report shows the new warning sign on the north side of Building 18.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SS016.

11.0 Facilities 1918, 1919, and 1754 (ST027B)

ST027B is located in a restricted access area in the central part of the NEWIOU. It is bound by aircraft taxiways and parking ramps that were formerly used for fuel storage and aircraft engine testing. These industrial activities contaminated groundwater with petroleum hydrocarbons and TCE. The portion of the plume with petroleum contamination is referred to as ST027A and is managed under a separate program. The portion of the plume with TCE contamination is referred to as ST027B.

11.1 Environmental Conditions

The list of chlorinated COCs for ST027B groundwater includes TCE, vinyl chloride, cis-1,2-DCE, benzene, and toluene. The indicator COC is TCE. The maximum TCE concentration at ST027B is 260 ppb at MW791x27. The federal and State of California drinking water standard for TCE is 5 ppb. The *Site ST027 – Area B Human Health Risk Assessment* (CH2M HILL, 2011) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

11.2 Status of ST027B Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at ST027B does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at ST027B found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction has taken place at the site. All of the ST027B monitoring wells are flush mounted and are located in the center of the high security portion of the base. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 16 in Appendix A of this report shows the controlled area at ST027B.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) for ST027B. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for ST027B.

12.0 Monitoring Well (MW) 329 Area (SS029)

SS029 is located in the southern portion of the NEWIOU. Site SS029 is an open field south of Taxiway R and includes an ordnance disposal range. Union Creek traverses the middle of the site and flows from northeast to southwest.

12.1 Environmental Conditions

Groundwater contamination at Site SS029 has been defined primarily as a TCE and cis-1,2-DCE plume that lies within the boundaries of Travis AFB. The origin of groundwater VOC contamination at Site SS029 is unknown. The indicator COC is TCE. The maximum concentration of TCE in groundwater is 510 ppb at EW02x29. The federal and State of California drinking water standard for TCE is 5 ppb. Groundwater monitoring suggests that the SS016 and SS029 plumes have merged, so the SS016 groundwater remedy focuses on COC mass removal, while the SS029 groundwater remedy prevents the COC mass that flowed beneath the flight line from migrating past the base boundary. Appendix K of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 3 (GET) to address the solvent contamination. The progress that GET has made in reducing COC mass and concentrations is reported in annual GRISRs.

12.2 Status of SS029 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SS029 also poses a potential indoor air vapor intrusion risk to industrial workers. So, the LUCs also restrict residential and industrial land uses until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at SS029 found that administrative controls are adequate to enforce the groundwater and vapor intrusion restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater or vapor, and no new construction has taken place at the site. All of the SS029 wells in the field have stovepipe completions that are protected by bollards. The wells are in good to excellent material condition. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 17 in Appendix A of this report shows the controlled area at SS029.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SS029.

13.0 MW 269 Area (SS030)

SS030 is in the southern part of the NEWIOU and consists of a solvent plume from unknown historical activities on undeveloped land near the southern base boundary. The COC plume extends onto off-base private property that is used for animal grazing.

13.1 Environmental Conditions

The list of chlorinated COCs for SS030 groundwater includes TCE, chloroform, bromodichloromethane, and 1,2-DCA. The indicator COC is TCE. The maximum concentration of TCE in groundwater is 15 ppb at MW05x30. The federal and State of California drinking water standard for TCE is 5 ppb. Appendix L of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

A portion of the SS030 plume has migrated off-base and is located beneath private property. To allow the base to carry out environmental investigations and restoration activities on private property, the base purchased an easement that covers the lateral extent of the TCE plume. The easement restricts the activities of the property owner that could potentially interfere with the selected groundwater remedy for SS030. If the easement expires before the solvent concentrations in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health, then the base will negotiate a subsequent easement with the property owner. This easement expires and may have to be renewed in 2030.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 3 (GET) to address the residual dissolved solvent contamination. The progress that GET has made in reducing COC mass and concentrations is reported in annual GRISRs.

13.2 Status of SS030 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SS030 does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at SS030 found that administrative controls are adequate to enforce the groundwater restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new non-environmental construction has taken place at the site. The off-base SS030 wells are flush mounted to prevent a safety risk to personnel and grazing animals; they are in good material condition. Photograph 18 in Appendix A of this report shows the off-base portion of the controlled area at SS030 that is under the easement.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SS030.

14.0 Facility 1205 (SD031)

SD031 is a concrete and asphalt industrial area that is used by the Civil Engineer Maintenance Inspection and Repair Team (CEMIRT). Site SD031 covers approximately 5.5 acres and encompasses Facility 1205 in the northeastern part of the EIOU. Facility 1205 was constructed in 1957, and operations included the maintenance and repair of diesel-powered generators. A wash rack, just south of the facility, is still used to clean diesel engine parts; it discharges to an OWS.

14.1 Environmental Conditions

The list of chlorinated COCs for SD031 groundwater includes TCE, benzene, 1,1-DCE, cis-1,2-DCE, carbon tetrachloride, chloroform, 1,2-DCA, and vinyl chloride. The indicator COC is 1,1-DCE. The maximum concentration of 1,1-DCE in groundwater is 500 J ppb at IW2197x31. The federal and State of California drinking water standard for 1,1-DCE is 6 ppb. The *East Industrial Operable Unit Remedial Investigation Report* (Roy F. Weston, 1995) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

14.2 Status of SD031 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SD031 does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at SD031 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new non-environmental construction has taken place at the site. Depending on their locations, the SD031 wells have both stovepipe and flush mounted completions. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 19 in Appendix A of this report shows the controlled area at SD031.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) for SD031. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SD031.

15.0 Storm Sewer System B (West Branch of Union Creek), Facilities 810 and 1917, and South Gate Area (SD033)

SD033 is in the western part of the NEWIOU and consists of the West Branch of Union Creek, parts of Storm Sewer System B, Facilities 810 and 1917, the area around the South Gate, and Outfall II. Storm Sewer System B collects runoff from within the west side of the aircraft industrial area. This runoff enters Union Creek at Outfall II. Facility 810 is used to refurbish aircraft, and facility 1917 has sumps and an oil/water separator that are no longer in use.

15.1 Environmental Conditions

Surface soil on the east and west side of facility 810 contains cadmium and benzo(a)pyrene residue. All of this soil is covered by asphalt. Appendix N of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

During the 2016 construction season, the decommissioning of oil/water separator OW057 took place. OW057 is located on the west side of facility 810, near the SD033 soil LUC area. The OW057 decommissioning was conducted in accordance with the *Petroleum Only Contamination Oil Water Separator Corrective Action Plan* (CH2M, 2016b) and resulted in the excavation and proper disposal of contaminated soil.

The list of chlorinated COCs for SD033 groundwater includes TCE, 1,1-DCE, 1,2-DCA, and cis-1,2-DCE. The indicator COC is TCE. The maximum TCE concentration in the groundwater at SD033 is 29 ppb at EW501x33. The federal and State of California drinking water standard for TCE is 5 ppb.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The interim GET system in the West Industrial Operable Unit is not a part of the selected remedy, so it is shut down. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

15.2 Status of SD033 Soil Land Use Controls

Section 5.3.14 of the *NEWIOU SSSW ROD* (URS, 2006) states that Alternative #17 (Land Use Controls) is the selected remedial action for the soil portion of this site, because cadmium and benzo(a)pyrene concentrations in the soil exceed levels that allow for unrestricted use and unlimited exposure. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of cadmium and benzo(a)pyrene in the surface soil and the land use restriction, particularly on the unauthorized disturbance and use of soil at this site.

The 2016 inspection of the soil LUCs at the soil portion of SD033 found that administrative controls are adequate to enforce the restriction, so physical barriers (i.e., fences) are not needed. There is no evidence that the cadmium- and benzo(a)pyrene-impacted soil has been disturbed. Warning signs have been posted on both sides of Facility 810 to notify base workers of the presence of the controlled areas. The inspection team noted that the phone number on both signs have been updated with the appropriate phone number. Photographs 20 and 21 in Appendix A of this report show the controlled soil areas at SD033.

15.3 Status of SD033 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SD033 also poses a potential indoor air vapor intrusion risk to future residents, so the LUCs also restrict residential land uses until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at SD033 found that administrative controls are adequate to enforce the groundwater and vapor intrusion restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater or vapor, and no new construction has taken place at the site. The SD033 wells are flush mounted because of the considerable amount of vehicle activity in the area. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SD033.

16.0 Facility 811 (SD034)

SD034 is located in the western part of the NEWIOU and consists of an aircraft wash rack facility with an oil/water separator (OWS) and an overflow pond. Leaks from the OWS resulted in a layer of Stoddard Solvent, containing dissolved solvents, floating on the groundwater table. The leaking OWS was replaced in 1994. The use of Stoddard Solvent to wash aircraft in Facility 811 was discontinued in September 2014.

16.1 Environmental Conditions

Stoddard Solvent by itself does not pose a potential risk to human health and the environment, so the potential risk is derived from the chlorinated solvents within the Stoddard Solvent layer. MW811x34 had the only measureable product thickness (0.06 foot) of Stoddard Solvent. The list of chlorinated COCs for SD034 groundwater includes TCE, benzene, 1,1-DCE, cis-1,2-DCE, PCE, and vinyl chloride. The maximum concentration of TCE in groundwater is 120 ppb at EW2450x34, based on the analytical results from the SD034 technology demonstration which included the wells and analytes that are normally a part of the 2015 GRIP. The federal and State of California drinking water standard for TCE is 5 ppb. Appendix O of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 7 (Passive Skimming and EA) to address the residual solvent contamination. The progress that Passive Skimming and EA have made in reducing COC mass and concentrations is reported in annual GRISRs.

16.2 Status of SD034 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SD034 does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at SD034 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction (other than the construction of the infrastructure associated with the technology demonstration) has taken place at the site. The SD034 wells are flush mounted because of the considerable amount of vehicle activity in the area. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 22 in Appendix A of this report shows the controlled area at SD034.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) for SD034. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SD034.

17.0 Facilities 818 and 819 (SS035)

SS035 is located in the western part of the NEWIOU and consists of an aircraft hangar and wash rack with an OWS. Historical practices at Facilities 818 and 819 include aircraft repair, painting and washing.

17.1 Environmental Conditions

TCE is the only groundwater COC at SS035. The maximum TCE concentration in the groundwater at SS035 is 5.4 ppb at MW01x35. The federal and State of California drinking water standard for TCE is 5 ppb. Appendix P of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The interim GET system in the West Industrial Operable Unit (WIOU) is not a part of the selected remedy, so it is shut down. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

17.2 Status of SS035 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SS035 does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at SS035 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction has taken place at the site. The SS035 wells are flush mounted because of the considerable amount of vehicle activity in the area. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 23 in Appendix A of this report shows the controlled area at SS035.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) for SS035. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SS035. Currently, SS035 is being monitored semi-annually to verify achievement of cleanup levels and support site closure.

18.0 Facilities 872/873/876 (SD036)

SD036 is located in the western part of the NEWIOU and consists of a number of multiple-use shops, including a wash rack and OWS.

18.1 Environmental Conditions

The list of chlorinated COCs for SD036 groundwater includes TCE, 1,1-DCE, 1,2-DCA, cis-1,2-DCE, vinyl chloride, benzene, bromodichloromethane, and PCE. The indicator COC is TCE. The maximum TCE concentration in the groundwater at SD036 is 12,000 ppb at IW2179x36. The federal and State of California drinking water standard for TCE is 5 ppb. Appendix Q of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 5 (EVO and EA) to address the residual dissolved solvent contamination. The progress that EVO and EA have made in reducing COC mass and concentrations is reported in annual GRISRs.

18.2 Status of SD036 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SD036 also poses a potential indoor air vapor intrusion risk to industrial workers, based on the potential vapor intrusion risk that is posed by solvent COCs associated with Site SD036. So, the LUCs also restrict residential and industrial land uses until solvent concentrations in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at SD036 found that administrative controls are adequate to enforce the groundwater and vapor intrusion restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater or vapor, and no new construction has taken place at the site. The SD036 injection and monitoring wells are flush mounted because of the considerable amount of maintenance vehicle activity in the area. The LUC inspection identified a few monitoring wells that require some maintenance to ensure their continued usability in a heavily trafficked area, but there was no evidence of damage or excessive wear. Photograph 24 in Appendix A of this report shows the controlled area at SD036.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SD036.

19.0 Sanitary Sewer System; Facilities 837/838, 919, 977, and 981; Area G Ramp; and Ragsdale/V Area (SD037)

SD037 is in the western part of the NEWIOU and consists of Facilities 837, 838, 919, 977, and 981; the Area G Ramp; and the Ragsdale/V Street. It also includes approximately 22,000 feet of sanitary sewer piping, an oil/water separator, sumps, wash racks, and a fuel-hydrant system. The sanitary sewer system conveys domestic and industrial wastewater from facilities within the NEWIOU to the Fairfield-Suisun publicly owned treatment facility. Facility 919 is used to maintain heavy equipment, facility 977 is an air freight terminal, and facility 981 has a hazardous waste satellite accumulation point. Past industrial activities include wastewater management, aircraft maintenance, heavy equipment maintenance, air cargo handling, vehicle washing, fuel transport, and waste accumulation.

The WIOU RI divided SD037 into the following six (6) areas:

- Area 1 – Designated by a surface soil sample collected for the sanitary sewer investigation.
- Areas 2 and 3 – Locations between the sanitary sewer system and the jet fuel pipeline.
- Area 4 – Facility 919 along with an OWS and hazardous waste accumulation point.
- Area 5 – Facility 981 along with an OWS and hazardous waste accumulation point.
- Area 6 – Facility 977.

19.1 Environmental Conditions

Section 8.9 of the WIOU RI report (Radian, 1996) identified two subsurface locations within Facility 977 with total petroleum hydrocarbons-extractable (TPH-E) residue in the soil. Sample location W0977H01 contained TPH-E at a concentration of 189 mg/kg, and sample location W0977H02 contained TPH-E at a concentration of 3580 mg/kg. Both samples were collected at 1 foot below ground surface, and the TPH-E originated from hydraulic fluid leaks beneath hydraulic rams that are used to operate cargo loading ramps.

Appendix R of the *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Sites* (URS, 2004) identified two contaminated surface soil locations. Sample location W0977U01 to the east of facility 977 contained benzo(a)pyrene (0.658 mg/kg) and benzo(b)fluoranthene (3.02 mg/kg), and sample location W0977U02 to the southwest of facility 977 contained benzo(a)pyrene (0.484 mg/kg) and lead (809 mg/kg). Both controlled areas are covered in asphalt and lie in busy areas where aircraft receive and deliver palletized cargo from loading vehicles.

The list of chlorinated COCs for SD037 groundwater includes TCE, 1,1-DCE, 1,2-DCA, cis-1,2-DCE, vinyl chloride, benzene, bromodichloromethane, carbon tetrachloride, and PCE. The indicator COC is TCE. The maximum concentration of TCE in groundwater is 1,500 ppb at MW2101Bx37. The federal and State of California drinking water standard for TCE is 5 ppb. Appendix R of the *Summary of Remedial Investigation Data and Risk Management Decisions*

for Human Health at NEWIOU Sites (URS, 2004) presents a more detailed description of the human health risk assessment for this site.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 5 (EVO and EA) to address the residual dissolved solvent contamination. The progress that EVO and EA have made in reducing COC mass and concentrations is reported in annual GRISRs.

19.2 Status of SD037 Soil Land Use Controls

Section 5.3.18 of the *NEWIOU SSSW ROD* (URS, 2006) states that Alternative #17 (Land Use Controls) is the selected remedial action for Area 6; because PAH, lead, and TPH-E concentrations in the soil exceed levels that allow for unrestricted use and unlimited exposure. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site. Alternative 16 (No Action) is the selected remedy for Areas 1 through 5.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of PAH, lead, and TPH in the surface soil and the land use restriction, particularly on the unauthorized disturbance and use of soil at this site.

The 2016 inspection of the soil LUCs at SD037 found that administrative controls are adequate to enforce the restriction, so physical barriers (i.e., fences) are not needed. The contaminated soil cannot be seen, since it is covered with asphalt or located beneath hydraulic rams. There is no evidence that the PAH-, lead-, and TPH-impacted soil has been disturbed.

Due to the nature of operations at the air freight terminal, it is not practical or safe to post warning signs to notify base personnel of the presence of contaminated soil beneath the asphalt or the hydraulic rams. Specifically, vehicles that are designed to transport large cargo pallets to and from both military and commercial aircraft require an open area free of physical hazards. The two small controlled areas outside of Facility 977 lie in the middle of these open work areas, and there are no existing posts or structures that could be used to post signs that point out their location. Because of the high tempo of mission-critical operations associated with the air freight terminal, any obstructions would pose significant risk to both personnel and equipment. Photograph 25 in Appendix A of this report shows the view of the interior of Facility 977 where the hydraulic rams are located, and photograph 26 shows the controlled area on the southwest side of Facility 977.

19.3 Status of SD037 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SD037 also poses a potential indoor air vapor intrusion risk to industrial workers, based on the potential vapor intrusion risk that is posed by solvent COCs associated with Site SD037. So, the LUCs also restrict residential and industrial land uses until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at SD037 found that administrative controls are adequate to enforce the groundwater and vapor intrusion restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater or vapor, and no new construction has taken place at the site. The SD037 injection and monitoring wells are flush mounted to conform to facility appearance standards and to avoid safety hazards in vehicle parking areas. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 27 in Appendix A of this report shows the groundwater controlled area at SD037.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SD037.

20.0 Building 755 (DP039)

Building 755 is the Travis AFB Battery and Electric Shop. The site consists of Building 755 and a former battery acid neutralization sump. Past operations have included the recharging and dismantling of lead-acid and nickel-cadmium batteries. Before 1978, lead-acid solutions were discharged into a sink inside Building 755. The pipeline from the sink led to a rock-filled sump approximately 65 feet northwest of the building. This practice was discontinued in 1978 when the pipeline was dismantled and reconnected to the sanitary sewer system. The sump was removed in 1993. Building 755 was vacated and demolished in 2009.

20.1 Environmental Conditions

Lead residue is the COC associated with the surface soil around the edges of the former sump area. Since the lead-acid solution entered the former sump through a subsurface pipe, the presence of lead in the surface soil is attributed to the deposition of small amounts of lead-contaminated subsurface soil during the 1993 sump removal action. The Human Health and Ecological risk assessments for Building 755 concluded that the lead residue does not pose an unacceptable risk to local workers or ecological receptors. Sections 4.1.7 and 4.1.8 of the *WABOU Remedial Investigation Report* (CH2M HILL, 1997) present more detailed descriptions of the risk assessments for Building 755.

In 2008, the base constructed a sustainable in situ bioreactor over the footprint of the former sump. Funded by the Technology Transfer Office at the Air Force Center for Engineering and the Environment, the DP039 bioreactor is designed to clean up residual solvent contamination associated with the former sump. Travis AFB obtained regulatory approval to authorize the construction of the bioreactor as a demonstration project. Data from this project supported the selection of final groundwater remedies in the *Travis AFB Groundwater ROD* (CH2M HILL, 2014). Also, the base shut down the existing Dual-Phase Extraction system to return the subsurface to steady-state conditions. The final *Sustainable Bioreactor Demonstration Work Plan Site DP039* (CH2M HILL, 2009a) describes the bioreactor technology and its construction details.

As part of the bioreactor construction, the remedial action contractor excavated a 20' x20' x20' void, centered in the middle of the former sump. The bioreactor footprint completely covers the lead-contaminated surface soil area. When the excavation began, the lead-contaminated soil was removed first and placed in a large bin. Soil sample collection and analysis was used to characterize the waste and to determine the amount of residual lead remaining in the soil at DP039. The details of the disposal of the contaminated soil during the bioreactor construction are presented in the *Final Site DP039 Lead-Contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015).

The list of chlorinated COCs for DP039 groundwater includes TCE, 1,1-DCE, 1,2-DCA, 1,1,1-TCA, 1,1,2-TCA, PCE, methylene chloride, bromodichloromethane, and acetone. The indicator COC is TCE. The maximum concentration of TCE in groundwater is 1,500 ppb at MW2042Bx39. The federal and State of California drinking water standard for TCE is 5 ppb.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 6 (Bioreactor, Phytoremediation, EVO Permeable Reactive Barrier, and EA) to address the residual dissolved solvent contamination. The progress that EVO and EA have made in reducing COC mass and concentrations is reported in annual GRISRs.

20.2 Status of DP039 Soil Land Use Controls

Section 5.3.1 of the *WABOU Soil ROD* (Travis AFB, 2002a) states that Alternative S2 (Land Use and Access Restrictions) is the selected remedial action for this site. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of lead in the surface soil and the land use restriction, particularly on the unauthorized disturbance and use of soil at this site.

The 2016 inspection of the soil LUCs at DP039 found that administrative controls and a LUC warning sign are still adequate to enforce the restriction, so physical barriers (i.e., fences) are not needed. Section 20.1 stated that the lead-impacted soil had been excavated and sent by truck to an appropriate landfill as a result of the bioreactor demonstration project, as described in the *Final Site DP039 Lead-Contaminated Soil Excavation Technical Memorandum* (CH2M HILL, 2015). Travis AFB will continue to enforce the soil restrictions until the base receives approval through an amendment to the *WABOU Soil ROD* (Travis AFB, 2002a) to remove the soil restrictions from the site. The submission of the draft ROD amendment for regulatory review will take place once all risk assessment data from other WABOU sites is reviewed and accepted. Photograph 28 in Appendix A of this report shows the surface of the bioreactor at DP039. The warning sign that notifies site visitors of the presence of LUCs can be seen in the background. The inspectors noted that the phone number on the sign has been updated.

20.3 Status of DP039 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at DP039 also poses a potential indoor air vapor intrusion risk to industrial workers, based on the potential vapor intrusion risk that is posed by solvent COCs associated with Site DP039. So, the LUCs also restrict residential and industrial land uses until concentrations of solvents in groundwater are reduced to the point where they no longer pose an unacceptable risk to human health.

The 2016 inspection of the groundwater LUCs at DP039 found that administrative controls are adequate to enforce the groundwater and vapor intrusion restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater or vapor, and no new non-environmental construction has taken place at the site. The inspectors noted the new sign on the north side of the phytoremediation tree stand. The DP039 wells and piezometers have either stovepipe or flush mounted completion, depending on the surface where the wells

have been installed. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells. Photograph 29 shows the new sign near the north entrance to the phytoremediation area, and Photograph 30 shows a portion of the DP039 biobarrier.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) and the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for DP039.

21.0 Building 916 (SD043)

Building 916 is an emergency electrical power facility. The diesel-powered generators inside the building sit above a cellar, or sump area, that also houses sump pumps. Prior to 1991, spilled diesel fuel from the generators and wash water were pumped out of the building through one of four pipes. The pipes discharged onto small concrete spillways constructed for erosion control on the side slope of the trapezoidal drainage channel that lies east of the building. From the spillways, wastewater flowed down the side-slope and into the drainage channel. This method of sump water disposal was discontinued in 1991.

There had been a fenced electrical transformer area on the southwest corner of the building. This area contained three liquid-filled transformers on top of a concrete pad. In 1992, one of the transformers developed a leak onto the concrete pad and ground surface. The base removed the transformers and pad in 1993.

21.1 Environmental Conditions

Polychlorinated Biphenyl (PCB)-1254 was detected in soil at concentrations that do not pose an unacceptable risk to local workers or ecological receptors. PCB-1254 was detected in a groundwater sample immediately below the transformer area, and there was a possibility that PCB-1254 in subsurface soil is a source of ongoing groundwater contamination. Additional groundwater sampling in June 1999 demonstrated that there is no PCB-contaminated groundwater migrating from the site. The *Reevaluation of Soil and Groundwater Contamination at Building 916 (SD043) Technical Memorandum* (CH2M HILL, 2000) presents a detailed discussion on this groundwater sampling effort.

TCE is the only groundwater contaminant at SD043. The maximum concentration of TCE in groundwater is 10 ppb at MW543x43. The federal and State of California drinking water standard for TCE is 5 ppb. Sections 4.3.7 and 4.3.8 of the *WABOU Remedial Investigation Report* (CH2M HILL, 1997) present detailed descriptions of the human health and ecological risk assessments for Building 916, respectively.

The *Travis AFB Groundwater ROD* (CH2M HILL, 2014) selected Alternative 2 (Monitored Natural Attenuation) to address the residual dissolved solvent contamination. The progress that MNA has made in reducing COC mass and concentrations is reported in annual GRISRs.

21.2 Status of SD043 Soil Land Use Controls

Section 5.3.3 of the *WABOU Soil ROD* (Travis AFB, 2002a) states that Alternative S2 (Land Use and Access Restrictions) is the selected remedial action for this site. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site. As long as administrative controls are adequate to enforce the restriction, physical barriers (i.e., fences) are not needed.

The draft Travis AFB LUCIP describes the presence of PCB-1254 in the soil and the land use restriction, particularly on the unauthorized disturbance and use of soil at this site.

Section 4 of the *Annual Report on the Status of Land Use Controls on Restoration Sites* (Travis AFB, 2004) describes the construction of a concrete pad within the boundaries of the controlled area at SD043. A standby emergency generator had been placed on the pad; the purpose of the generator was to provide additional utility support to the air freight terminal, located in Building 977.

As a result of this construction activity within the controlled area, the Environmental Flight enlarged the footprint of the controlled area to incorporate the concrete pad beneath the generator and all utilities. The new footprint also includes the soil within 10 feet to the east, south and west of the concrete pad. The Flight also posted three warning signs on Building 916 to notify site workers and visitors of the presence of LUCs at SD043.

Since no soil samples were collected and analyzed as part of the generator installation project; any future projects on site, including any to expand, alter, or remove the infrastructure associated with the generator, will include analysis of the soil to be impacted by project activities prior to project approval. Decisions on soil disturbance activities and the disposition of any excavated soil will be made based on the results of sample analysis. The expanded LUC footprint has been incorporated into the draft LUCIP.

During the 2016 summer construction season, the Air Force collected several soil samples from SD043 to verify the footprint of the contaminated soil area and to reevaluate the human health risk that is potentially posed by the soil contaminants under the residential exposure scenario. The data from this field effort will be used to support risk management decisions in an upcoming amendment to the WABOU Soil ROD. The risk assessment using the data from this field effort is undergoing internal review.

The 2016 inspection of the soil LUCs at SD043 found that administrative controls are adequately enforcing the restriction, so physical barriers (i.e., fences) are not needed. There is no evidence that any soil disturbances in the vicinity of the concrete pad took place in 2015. Photograph 31 in Appendix A shows the east side of the controlled area south of Building 916, and Photograph 32 shows the warning signs and pad on the west side of the at SD043. The inspectors noted that the green generator has been removed from the site and the phone number on the signs have been updated.

21.3 Status of SD043 Groundwater Land Use Controls

Section 2.12.2.8 of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014) states that LUCs are required to ensure that groundwater is not used for potable purposes until it is remediated to MCLs that allow for unlimited use and unrestricted exposure. The groundwater contamination at SD043 does not pose a potential indoor air vapor intrusion risk to industrial workers or future residents.

The 2016 inspection of the groundwater LUCs at SD043 found that administrative controls are adequate to enforce the environmental restrictions. There is no evidence of any activities that could expose base personnel to contaminated groundwater, and no new construction has taken place at the site. The SD043 wells and piezometers are flush mounted to avoid safety hazards associated with the contracted lawn mowing service. The LUC inspection identified no evidence of damage or excessive wear that could adversely impact the use of these wells and piezometers.

Based on the results of this inspection, Travis AFB is in compliance with the first groundwater ROD RAO (Restrict human exposure to COCs) for SD043. Also, Travis AFB has achieved the second groundwater ROD RAO (Restrict inhalation of COCs to indoor air) for SD043.

22.0 Landfill X (LF044)

Landfill X is not a landfill at all. It received this name, because the past activities at this site had not been completely identified at the start of the WABOU Remedial Investigation. It comprises approximately 25 acres and is located within Grazing Management Unit (GMU)-2, a 126-acre parcel of land that had been used to graze horses. The soil COCs are attributed to the asphalt and other construction debris that had been stockpiled onsite.

22.1 Environmental Conditions

(COCs detected in surface soils include benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene. These COCs are also chemicals of ecological concern (COECs) together with benzo(k)fluoranthene, fluoranthene, and pyrene. COCs detected in subsurface soils include benzo(a)anthracene, benzo(a)pyrene, and dibenz(a,h)anthracene, benzo(k)fluoranthene. These COCs are also subsurface COECs together with anthracene, acenaphthene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-c,d)pyrene, phenanthrene, bis(2-ethylhexyl)phthalate, cadmium, lead, and silver. Sections 4.8.7 and 4.8.8 of the WABOU RI report present a detailed description of the human health and ecological risk assessments for Landfill X, respectively.

In the spring of 2010, Kinder Morgan for SFPP, LP (under a ground lease with Travis AFB and an agreement with the Defense Energy Support Center) made the preparations to construct a new above-ground storage tank (AST) fuel facility within the footprint of the LF044 controlled area. The placement of the fuel facility in the LF044 area was based on its proximity to an existing AST facility on base, as well as to an off-base fuel pipeline. The placement also avoided the destruction of vernal pools and other sensitive habitats at the alternative construction locations.

Prior to the start of the tank construction, earth-moving equipment removed vegetation, construction debris, and contaminated soil from the construction area. Most of the concrete debris was taken to Concrush, a construction material recycling company in Fairfield, CA. The vegetation, weathered asphalt, contaminated soil and other miscellaneous debris were sent to the Hay Road Landfill in Vacaville, CA. When this phase of the project was complete, the construction area had been scraped to the point where only native soil was exposed. Earth-moving operations continued to ensure that the foundations for the ASTs were level and met specified geotechnical standards and soil compaction requirements. Clean soil was then brought onto the construction site to build the secondary containment walls for the AST enclosures. Tank construction was complete by the summer of 2012. It should be noted that the secondary containment walls next to the LF044 berm are designed to capture and hold 110% of the contents of the new tanks. These walls are much larger than the LF044 berm.

22.2 Status of LF044 Soil Land Use Controls

Section 5.3.6 of the *WABOU Soil ROD* (Travis AFB, 2002) states that Alternative S2 (Land Use and Access Restrictions) is the selected remedial action for this site. The selected remedy requires the installation of a fence around the contaminated area and the training/stockpile area

and the construction of a protective berm within the fenced area. The purpose of the berm is to provide environmental protection by preventing contaminated sediment from flowing during rain events into nearby vernal pools. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site. The objective of this remedial action is to apply land use controls to prevent the site from being used for residential purposes.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of the soil COCs and the land use restrictions, particularly on the unauthorized disturbance and use of soil at this site. Now that the AST facility construction is complete, the base has reassessed the footprint of the environmentally controlled area. For the new tank facility, the restrictions associated with fuel operations are more stringent than the previous environmental restrictions and are under contractor management. For example, tank facility visitation is significantly limited and requires prior coordination. The *Report on the Environmental Impact of the SFPP Fuel Tank Project on the Land Use Controls at Site LF044* (AFCEC and AMEC, 2014) is a joint data report from the base and the construction contractor that describes the excavation and disposal of contaminated soil and construction materials from the construction area. The joint report reduces the footprint of the LF044 controlled area to the area outside of the new tank facility. Figure 6 shows the tank facility and the remaining portions of LF044 that are under LUCs. The two small northern portions are 0.30 acre and 0.20 acre in size, and the larger southern portion is 18.41 acres in size (AFCEC and AMEC, 2014).

Past visits to LF044 had identified multiple piles of surface debris that could pose a potential safety hazard to base personnel and contractors who work in the southern portion of the LF044 controlled area. Between 5 October 2015 and 8 October 2015, Cape Environmental Management, Inc., under subcontract to CH2M HILL, conducted surface improvements at LF044 to remove this potential hazard. Surface improvements consisted of the collection and offsite disposal of surface debris, including chunks of asphalt and concrete, tires, old barbed-wire fencing, and metal debris. To prepare for this work, wetland features were identified and delineated as described in the Biological Opinion issued by the U.S. Fish and Wildlife Service (Sacramento Fish and Wildlife Office) on July 21, 2015.

Using an excavator and a loader, a total of 55.02 tons of surface debris was loaded into roll-off dumpsters and transported offsite for disposal at the Potrero Hills Landfill, located in Solano County. Areas where debris was removed were regraded using onsite topsoil and seeded with a Travis AFB-approved seed mix. The seed was not watered because of the potential presence of endangered/threatened California Tiger Salamanders (CTS), although no CTS were observed during the course of site work.

The *Remedial Action Report for Soil Remedial Actions at Site LF044* (ECC, 2003a) provides a detailed description of the construction of the physical controls at LF044. This report is the source of some of the information provided in the following subsections.

22.2.1 Fence and Gate Installation

Environmental Chemical Corporation (ECC) and a fencing subcontractor installed the fence according to RD Specification #02831 of the *LF044 Soil Remedial Design Package* (URS,

2002b). ECC installed an additional gate on the southeastern side of LF044 site along with the northern gate that accesses Hangar Avenue. Warning signs were posted at the gates and every 200 feet along the fence as required.

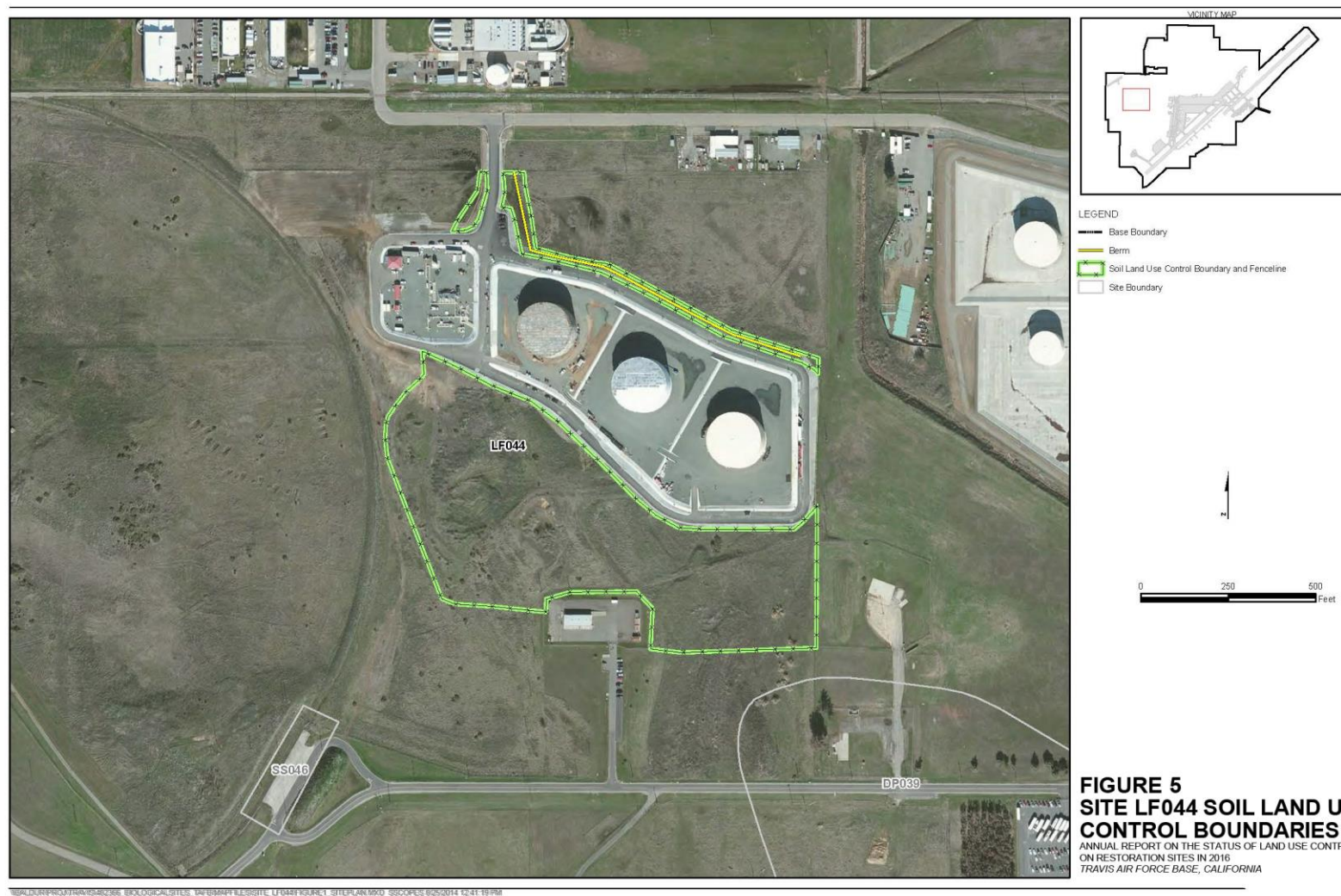
The 2012 inspection of the LUCs at LF044 found the fence and signs along all but the southern sides of the controlled area as well as the north gate had been removed and replaced with security fencing and a new gate to control entry into the tank facility. All contaminated soil and construction debris within the footprint of the new tank facility had been excavated and taken off-site. A significant portion of the security fence around the southern side of the new tank facility now serves as part of the fence around the larger southern LF044 controlled area.

The 2016 inspection noted the significant amount of brush and weeds that had grown on the east side of the controlled property which made it very difficult to completely walk the site. There is no evidence to suggest that the property is being used for other than industrial purposes. Photograph 33 of Appendix A shows the berm and the fence on the west side of LF044, and photograph 34 shows the northwest LF044 fence and the Kinder Morgan AST containment enclosure. Photograph 35 shows the north side of the LF044 fence, and photograph 36 shows the south gate with its warning sign.

22.2.2 Berm Construction

The berm was constructed with aggregate, type ABII. A total of 647.54 tons of ABII aggregate was imported for the berm construction. The material originated from a local quarry owned by Syar Industries. The material met the physical and chemical characteristics required by RD specification #02210 of the *LF044 Soil Remedial Design Package* (URS, 2002b). The aggregate was placed along the surveyed and staked perimeter line. Following precision spreading, the berm was shaped and compressed using 6-inch maximum horizontal lifts. ABII aggregate has a good mixture of fines and course material, which made it easy to compact to the required 85% of laboratory maximum dry density.

The 2016 inspection of the LUCs at LF044 found the berm to be in good to excellent physical condition. However, the excavation of the 7,140 cubic yards of contaminated soil and 90 cubic yards of construction debris from the northern portion of the site during the Kinder Morgan tank construction project (AFCEC and AMEC, 2014) also removed the potential source of contaminated sediment that could have migrated into nearby vernal pools. As a result, the berm no longer serves its original purpose, which was to prevent the flow of contaminated sediment into nearby vernal pools. However, the thin strip of land between the berm and the fuel facility containment structure on the northeast side of LF044 may still contain contaminated sediment, so a soil sampling and analysis work plan that describes the collection and analysis of dry sediment samples to determine whether contaminated sediment is present has been submitted for regulatory review. The dry sediment sample collection is scheduled during the 2017 summer construction season. The results of this field work will be used to either support the removal of LUCs from the two small LF044 parcels or determine the cost to remove any identified contaminated sediment in a future action.



23.0 Railhead Munitions Staging Area (SS046)

The Railhead Munitions Staging Area 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 and is within the explosive safety clear zone of a nearby conventional weapons storage facility.

23.1 Environmental Conditions

(COCs detected in surface soil include benzo(a)pyrene, benzo(b)fluoranthene, benzo(a)anthracene, and benzo(k)fluoranthene. COCs detected in subsurface soil include cadmium, lead, benzo(a)pyrene, benzo(k)fluoranthene, fluoranthene, phenanthrene, pyrene, and pentachlorophenol. All of the COCs were detected in the vicinity of the railroad tracks. Section 4.12.7 of the *WABOU RI Report* (CH2M HILL, 1997) presents a detailed description of the human health risk assessment for this site.

Chemicals of Ecological Concern (COECs) were detected in isolated areas surrounding the concrete pad. The COECs include benzo(a)pyrene, benzo(k)fluoranthene, fluoranthene, pentachlorophenol, phenanthrene, pyrene, cadmium, and lead. Section 4.12.8 of the *WABOU RI Report* (CH2M HILL, 1997) presents a detailed description of the ecological risk assessment for this site.

23.2 Status of SS046 Soil Land Use Controls

Section 5.3.8 of the *WABOU Soil ROD* (Travis AFB, 2002) states that Alternative S2 (Land Use and Access Restrictions) is the selected remedial action for this site. The objective of this remedial action is to document the location of the COCs and apply land use controls to prevent the site from being used for residential purposes. The Air Force is to restrict residential development and unauthorized disturbance and relocation of soil at this site.

The draft Travis AFB Land Use Control Implementation Plan describes the presence of COCs in the surface soil and the land use restriction, particularly on the unauthorized disturbance and use of soil at this site.

The 2016 inspection of the LUCs at SS046 found that administrative controls and two warning signs are adequate to enforce the restriction, so additional physical barriers (i.e., fences not associated with the Grazing Management Unit) are not needed. There is no evidence that the contaminated soil has been disturbed. Photograph 37 of Appendix A of this report shows the warning sign at the east end of the SS046 controlled area, and Photograph 38 shows the warning sign at the west end of the controlled area. The inspectors noted that the foundation of the warning sign on the east end of the controlled area may have been damaged, because the sign post is standing loosely in the ground. So, the IST will evaluate the need to reposition the sign with a new foundation.

24.0 Conclusion and Summary of Findings

On 2 May 2017, representatives from the AFCEC Restoration IST and CH2M HILL conducted a formal inspection of the LUCs at nine (9) soil sites, fifteen (16) on-base groundwater sites, and three (3) off-base groundwater sites associated with the Travis AFB ERP. The nine soil sites are designated as LF007 (including the CAMU), SS015, SS016, SD033, SD037, DP039, SD043, LF044, and SS046. The 16 on-base groundwater sites are designated as FT004, LF006, LF007 (subareas B and D), LF008, SS015, SS016, ST027B, SS029, SD031, SD033, SD034, SS035, SD036, SD037, DP039, and SD043. The 3 off-base groundwater sites are designated as FT005, LF007C, and SS030. This inspection complies with Section 5.4 (Land Use Controls) of the *WABOU Soil ROD* (Travis AFB, 2002), Section 5.4 (Land Use Controls [LUC]) of the *NEWIOU SSSW ROD* (URS, 2006), and Section 2.12.2.8 (Land Use Controls) of the *Travis AFB Groundwater ROD* (CH2M HILL, 2014).

The inspection team found the LUCs at the 9 soil sites and the 15 on-base groundwater sites to be in place and effective at restricting land use to industrial purposes only, preventing the construction of office space without appropriate vapor intrusion mitigation measures above solvent plumes, and/or protecting groundwater treatment infrastructure associated with selected remedies from damage. There is no evidence that any unauthorized land uses or unauthorized soil disturbances in the controlled areas took place in 2016. In addition, a records review revealed no on-base drinking water wells have been constructed. There are no physical controls associated with these groundwater restrictions that can be inspected. The three (3) off-base properties that cover 3 off-base groundwater sites and are under easements were also inspected to verify that no residential development or well drilling activities other than base remedial activities had taken place.

The inspectors made the following observations:

1. The inspectors did not identify any sites where the addition of physical barriers could improve LUC management. They noted that all signs are in place and have the same phone number, and new signs have been placed at the LF007 entrance and the DP039 phytoremediation entrance. They also noticed that the concrete foundation for one sign at SS046 may have been damaged and needs to be evaluated for replacement.
2. The base will continue to enforce LUCs on the three LF044 subareas that are outside of the Kinder Morgan aboveground storage tank (AST) facility. The final *Report on the Environmental Impact of the SFPP Fuel Tank Project on the Land Use Controls at Site LF044* (AFCEC and AMEC, 2014) describes the environmental activities that took place during tank construction and the impact of the new facility on the LF044 LUC footprint. A work plan to evaluate the need to maintain LUCs on the two north portions of the LF044 footprint has been submitted for regulatory review.
3. Although the base is maintaining the DP039 soil LUCs, they are no longer necessary, since the lead-contaminated surface soil that required the placement of soil land use controls at site DP039 had been completely excavated as part of an unrelated groundwater cleanup demonstration project (bioreactor). They are also redundant; the

groundwater LUCs associated with the bioreactor cover a footprint that exceeds the footprint of the soil LUC area. The base will request the removal of the soil LUCs through a future amendment to the *WABOU Soil ROD* (Travis AFB, 2002).

4. As described in section 3.1, the Travis AFB General Plan (BGP) has been replaced with a Travis AFB Installation Development Plan (IDP). Additionally, the Travis Restoration IST is working on a Land Use Control Implementation Plan (LUCIP) that will describe the responsibilities of base personnel in LUC management and will include the LUCs associated with the groundwater remedies that were selected in the *Travis AFB Groundwater ROD* (CH2M HILL, 2014). The inspection team used draft LUC checklists from the LUCIP to support the inspection, evaluate their usefulness, and look for ways to improve them.
5. Building 18 is the only building on Travis AFB that cannot be used as an office because of the potential vapor intrusion risk associated with the SS016 solvent plume. The building is locked and not occupied. The internal controls that are described in the groundwater ROD prevent the use of the building as an office until contaminant concentration drop to a point when the VI risk is acceptable, and the two new LUC signs that have been attached to the two main Building 18 entry doors make clear the presence of LUCs.

25.0 Works Cited

Air Force Civil Engineer Center (Travis AFB Restoration Installation Support Team) and AMEC Environment & Infrastructure, 2014. *Final Report on the Environmental Impact of the SFPP Fuel Tank Project on the Land Use Controls at Site LF044*. Environmental Restoration Program. Travis Air Force Base, California. September.

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

CH2M HILL, 1999. *Final Groundwater Interim Record of Decision for the West/Annexes/Basewide Operable Unit*. Installation Restoration Program. Travis Air Force Base, California. June.

CH2M HILL, 2000. *Final Reevaluation of Soil and Groundwater Contamination at Building 916 (SD043)* Technical Memorandum. Installation Restoration Program. Travis Air Force Base, California. February.

CH2M HILL, 2002. *Final Design Report and Post-Construction Maintenance Plan for the LF007 Soil Remedial Action*. Installation Restoration Program. Travis Air Force Base, California. August.

CH2M HILL, 2009a. *Final Sustainable Bioreactor Demonstration Work Plan Site DP039*. Environmental Restoration Program. Travis Air Force Base, California. January.

CH2M HILL, 2009b. *Final Recommendation to Transfer ERP Site ST032 to the POCO Program Technical Memorandum*. Environmental Restoration Program. Travis Air Force Base, California. April.

CH2M HILL, 2010a. *Final June 2009 6-Month Rebound Study Completion at Site LF008*. Environmental Restoration Program. Travis Air Force Base, California. January.

CH2M HILL, 2010b. *Final Vapor Intrusion Assessment Report*. Environmental Restoration Program. Travis Air Force Base, California. March.

CH2M HILL, 2011. *Final Site ST027 – Area B Human Health Risk Assessment*. Environmental Restoration Program. Travis Air Force Base, California. December.

CH2M HILL, 2013. *Final Vapor Intrusion Assessment Update Technical Memorandum*. Environmental Restoration Program. Travis Air Force Base, California. February.

CH2M HILL, 2014. *Final Travis Air Force Base Groundwater Record of Decision*. Environmental Restoration Program. Travis Air Force Base, California. June.

CH2M HILL, 2015. Final *Site DP039 Lead-Contaminated Soil Excavation Technical Memorandum*. Environmental Restoration Program. Travis Air Force Base, California. February.

CH2M HILL, 2016a. Final *2015 Annual Groundwater Remediation Implementation Status Report*. Environmental Restoration Program. Travis Air Force Base, California. November.

CH2M HILL, 2016b. Final *Petroleum Only Contamination Oil Water Separator Corrective Action Plan*. Travis Air Force Base, California. June.

Endpoint Consulting, 2013. Final *Third Five-Year Review Report*. Environmental Restoration Program. Travis Air Force Base, California. September.

Environmental Chemical Corporation, 2003a. Final *Remedial Action Report for Soil Remedial Actions at Site LF044*. Environmental Restoration Program. Travis Air Force Base, California. October.

Environmental Chemical Corporation, 2003b. Final *Remedial Action Report for Soil Remedial Actions at Site RW013*. Environmental Restoration Program. Travis Air Force Base, California. August.

Environmental Chemical Corporation, 2003c. Final *Remedial Action Report for Soil Remedial Actions at Site SS041*. Environmental Restoration Program. Travis Air Force Base, California. August.

ITSI, 2010. Final *Sites SD001 and SD033 Remedial Action Report*. Environmental Restoration Program. Travis Air Force Base, California. July.

ITSI Gilbane, 2012. Final *FT005 Remedial Action Report*. Environmental Restoration Program. Travis Air Force Base, California. September.

Radian, 1995. Final *Remedial Investigation Report for the North Operable Unit*. Installation Restoration Program. Travis Air Force Base, California. July.

Radian, 1996. Final *Remedial Investigation Report for the West Industrial Operable Unit*. Installation Restoration Program. Travis Air Force Base, California. February.

Roy F. Weston, 1995. Final *East Industrial Operable Unit Remedial Investigation Report*. Installation Restoration Program. Travis Air Force Base, California. October.

Shaw Environmental and Infrastructure, 2003. Final *Project Summary Report for the LF007 Soil Remedial Action Phase 1, Landfill Cap, Corrective Action Management Unit Subgrade, Wetlands Mitigation*. Environmental Restoration Program. Travis Air Force Base, California. September.

Shaw Environmental and Infrastructure, 2004. Final *Project Summary Report for the Site LF007 Phase 2 Soil Remedial Action*. Environmental Restoration Program. Travis Air Force Base, California. April.

Shaw Environmental and Infrastructure, 2004. Final *Site LF008 Soil Remedial Action Report*. Environmental Restoration Program. Travis Air Force Base, California. May.

Shaw Environmental and Infrastructure, 2008. Final *North, East, and West Industrial Operable Unit and West/Annexes/Basewide Operable Unit Soil Remedial Action for Sites SD045, FT003, FT004, FT005, Union Creek SD001 and SD033, and LF007 Area E Report*. Environmental Restoration Program. Travis Air Force Base, California. September.

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

Travis Air Force Base, 2002b. Final *Travis AFB General Plan*. Travis Air Force Base, California.

Travis Air Force Base, 2004. Final *Annual Report on the Status of Land Use Controls on Restoration Sites*. Environmental Restoration Program. Travis Air Force Base, California. January.

Travis Air Force Base, 2014. Final *Annual Report on the Status of Land Use Controls on Restoration Sites in 2013*. Environmental Restoration Program. Travis Air Force Base, California. March.

URS Corporation, 1997. Final *Groundwater Interim Record of Decision for the North, East, West Industrial Operable Unit*. Installation Restoration Program. Travis Air Force Base, California. December.

URS Corporation, 2002a. Final *Basewide Soil Remedial Design/Remedial Action Plan*. Installation Restoration Program. Travis Air Force Base, California. June.

URS Corporation, 2002b. Final *LF044 Soil Remedial Design Package*. Installation Restoration Program. Travis Air Force Base, California. July.

URS Corporation, 2004. *Summary of Remedial Investigation Data and Risk Management Decisions for Human Health at NEWIOU Soil Sites*. Environmental Restoration Program. Travis Air Force Base, California. October.

URS Corporation, 2005. Final *North/East/West Industrial Operable Unit Ecological Technical Memorandum*. Environmental Restoration Program. Travis Air Force Base, California. September.

URS Corporation, 2006. Final *North/East/West Industrial Operable Unit Soil, Sediment, and Surface Water Record of Decision*. Environmental Restoration Program. Travis Air Force Base, California. May.

Appendix A

Photographs

The following photographs were taken at the time of the annual LUC inspection on 02 May 2017 between 9:17 AM and 3:45 PM. The purpose of the photographs is to give the reader a better understanding of site conditions and to identify any changes to site appearances over time by comparing these photographs to those in previous annual LUC reports. Please note that these photographs were taken on a high-security military installation. Although the base inspectors had a current photography pass and had notified the appropriate offices of the inspection activities, it is prohibited to take photographs of high-security areas, especially when aircraft are present. As a result, some photographs lack a lot of detail and focus on small portions of the base where restoration infrastructure is present.

The approximate direction the photographer was facing when each photograph was taken is shown in brackets.



Photograph 1: Controlled Area (Groundwater) at FT004 [SE]



Photograph 2: Off-base Controlled Area (Groundwater) at FT005 [SE]



Photograph 3: On-base Controlled Area (Groundwater) at FT005 [ESE]



Photograph 4: Controlled Area (Groundwater) at LF006 [SE]



Photograph 5: LF007 Entrance Gate with New Warning Sign [N]



Photograph 6: Northwest CAMU Gate with Warning Sign [N]



Photograph 7: One of 12 CAMU Warning Signs with Revised Phone Number [NE]



Photograph 8: LF007 Solar Panels [NW]



Photograph 9: View of LF007C Extraction/Monitoring Well Network [NW]



Photograph 10: LF007 CAMU Well Label [NE]



Photograph 11: Controlled Area (Groundwater) at LF008 [W]



Photograph 12: Controlled Area at SS015 [NW]



Photograph 13: Controlled Area at SS016 [N]



Photograph 14: SS016 Bioreactor [NW]



Photograph 15: SS016 Building 18 [S]



Photograph 16: Controlled Area (Groundwater) at ST027B [SE]



Photograph 17: View of SS029 Monitoring Wells [E]



Photograph 18: View of SS030 Easement [S]



Photograph 19: Controlled Area (Groundwater) at SD031 [E]



Photograph 20: Warning Sign at Controlled Area on East Side of SD033 [SW]



Photograph 21: Warning Sign at Controlled Area on West Side of SD033 [N]



Photograph 22: Controlled Area (Groundwater) at SD034 [E]



Photograph 23: Controlled Area (Groundwater) at SS035 [E]



Photograph 24: Controlled Area (Groundwater) at SD036 [N]



Photograph 25: View of SD037 Hydraulic Ram Infrastructure [NW]



Photograph 26: Controlled Area on Southwest Side of SD037 [SE]



Photograph 27: Controlled Area (Groundwater) at SD037 [E]



Photograph 28: Controlled Area at DP039 (Post Bioreactor Construction) [SW]



Photograph 29: New Sign near Phytoremediation Area Entrance [S]



Photograph 30: DP039 Biobarrier [W]



Photograph 31: Warning Sign near East Side of SD043 [W]



Photograph 32: Generator Pad and Warning Signs at SD043. Stanchion of Former Pad with Leaking Transformers is visible behind the warning sign post. Generator has been relocated. [E]



Photograph 33: Fence and Warning Sign on West Side of LF044 [N]



Photograph 34: Northwest LF044 Fence and Kinder Morgan AST Containment Enclosure [SW]



Photograph 35: North Side of LF044 Fence [SE]



Photograph 36: Gate and Warning Sign on South Side of LF044 [N]



Photograph 37: Warning Sign at East Side of SS046 [N]



Photograph 38: Warning Sign at West Side of SS046 [NW]

Appendix B

Documentation of Remedial Actions that Resulted in Land Use Control Removal

Documentation of Remedial Actions that Resulted in Land Use Control Removal

Land Use Controls (LUCs) are applied to a restoration site with COCs that are present in an environmental medium of concern at concentrations that pose a potential human health or ecological risk and do not allow for unrestricted use and unlimited exposure. LUCs can either be a selected standalone remedy or a contingency remedy in conjunction with an active remedy that has the potential to reach residential cleanup levels. When residential cleanup levels are achieved, the restoration site has no restrictions to its present or future use, and there is no limit to the amount of time that a person can occupy that site. If an active remedy reduces COC levels to those that allow for unrestricted use and unlimited exposure, then there is no need for LUCs and the selected contingency LUC remedy is not applied to the site. The Remedial Action Report documents the attainment of cleanup levels for all chemicals of concern (COCs) and the justification for not applying LUCs for that particular environmental medium of concern.

Each ROD states that the LUC alternative requirements will be deleted for a site in the event that the cleanup achieves levels for all COCs that allow for unlimited use and unrestricted exposure. This appendix provides a list of restoration sites that had received environmental restrictions based on the presence of COCs, the medium in which the COCs were present, the remedial action(s) that attained residential cleanup levels for the particular medium, and the remedial action report that documents the attainment of residential cleanup levels and the removal of LUCs for the particular medium.

As the Travis AFB Environmental Restoration Program completes cleanup actions that achieve residential cleanup levels and removes LUCs for a particular medium, those cleaned sites will be removed from the main body of this report and placed in this appendix. Future annual LUC reports will update this appendix, which will help future project managers to track the status of LUCs on Travis AFB and eventually support the partial or complete delisting of Travis AFB from the National Priority List.

Tables 1 through 3 list the sediment, soil and groundwater sites that received cleanup actions that achieved residential cleanup levels and had their LUCs removed. Table 4 lists the restoration sites that were transferred into the Petroleum Only Contamination (POCO) program; these sites receive regulatory oversight from the San Francisco Bay Regional Water Quality Control Board.

Table 1: Travis AFB Restoration Sites with Previous Sediment Contamination				
Site	Primary Chemicals of Concern	Cleanup Action	Cleanup Year	Documentation
SD001 – Storm Sewer Systems A and C, Union Creek	Benzo(a)pyrene	Alternative 18 (Excavation) ¹	2009	Sites SD001 and SD033 Remedial Action Report (ITSI, 2010)
SD033 – Storm Sewer System B (includes West Branch of Union Creek)	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Dibenz(a,h)anthracene Cadmium	Alternative 18 (Excavation) ¹	2009	Sites SD001 and SD033 Remedial Action Report (ITSI, 2010)

¹ Selected in North, East, West Industrial Operable Unit Soil, Sediment, and Surface Water Record of Decision

² Selected in West/Annexes/Basewide Operable Unit Soil Record of Decision

Documentation of Remedial Actions that Resulted in Land Use Control Removal

Table 2: Travis AFB Restoration Sites with Previous Soil Contamination				
Site	Primary Chemicals of Concern	Cleanup Action	Cleanup Year	Documentation
FT003 – Fire Training Area #2	Benzo(a)anthracene Benzo(a)pyrene 2,3,7,8-TCDD	Alternative 18 (Excavation) ¹	2007	North, East, and West Industrial Operable Unit and West/Annexes/ Basewide Operable Unit Soil Remedial Action for Sites SD045, FT003, FT004, FT005, Union Creek SD001 and SD033, and LF007 Area E Report (Shaw Environmental and Infrastructure [E&I], 2008)
FT004 – Fire Training Area #3	Lead 2,3,7,8-TCDD	Alternative 18 (Excavation) ¹	2007	North, East, and West Industrial Operable Unit and West/Annexes/ Basewide Operable Unit Soil Remedial Action for Sites SD045, FT003, FT004, FT005, Union Creek SD001 and SD033, and LF007 Area E Report (Shaw E&I, 2008)
FT005 – Fire Training Area #4	Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene	Alternative 18 (Excavation) ¹	2012	FT005 Remedial Action Report (ITSI Gilbane, 2012)
LF007E – Landfill #2 Area E and Sample Location E19	Polychlorinated Biphenyl (PCB)-1260	Alternative 18 (Excavation) ^{1 3}	2007	North, East, and West Industrial Operable Unit and West/Annexes/ Basewide Operable Unit Soil Remedial Action for Sites SD045, FT003, FT004, FT005, Union Creek SD001 and SD033, and LF007 Area E Report (Shaw E&I, 2008)
LF008 – Landfill #3	Alpha-Chlordane Gamma-Chlordane Heptachlor Heptachlor Epoxide	Alternative S5 (Excavation/ Off-base Disposal) ²	2003	Remedial Action Report for Soil Remedial Action at Site LF008 (Shaw E&I, 2004)

Documentation of Remedial Actions that Resulted in Land Use Control Removal

Table 2: Travis AFB Restoration Sites with Previous Soil Contamination				
Site	Primary Chemicals of Concern	Cleanup Action	Cleanup Year	Documentation
RW013- Radioactive Burial Site #2/ Dry Waste Landfill	Uranium-234 Uranium-235	Alternative S5 (Excavation/ Off-base Disposal) ²	2002	Remedial Action Report for Soil Remedial Actions at Site RW013 (Environmental Chemical Corporation [ECC], 2003)
SS041 – Building 905	Alpha-Chlordane Gamma-Chlordane Heptachlor Epoxide Toxaphene	Alternative S6 (Excavation/ On-base Consolidation) ²	2003	Remedial Action Report for Soil Remedial Actions at Site SS041 (ECC, 2003)
SD042 – Buildings 929/931/940	Benzo(a)pyrene Dibenz(a,h)anthracene Benzo(b)fluoranthene Cadmium Chromium	Alternative S6 (Excavation/ On-base Consolidation) ²	2003	Remedial Action Report for Soil Remedial Action at Site SD042 (Shaw E&I, 2003)
SD045 – Former Small Arms Range	Lead Antimony Copper	Alternative S6 (Excavation/ On-base Consolidation) ²	2007	North, East, and West Industrial Operable Unit and West/Annexes/ Basewide Operable Unit Soil Remedial Action for Sites SD045, FT003, FT004, FT005, Union Creek SD001 and SD033, and LF007 Area E Report (Shaw E&I, 2008)

¹ Selected in North, East, West Industrial Operable Unit Soil, Sediment, and Surface Water Record of Decision

² Selected in West/Annexes/Basewide Operable Unit Soil Record of Decision

³ Alternative 17 (Land Use Controls) is the selected remedy for the remaining LF007 subareas

Table 3: Travis AFB Restoration Sites with Previous Groundwater Contamination				
Site	Primary Chemicals of Concern	Cleanup Action	Year of LUC Removal	Documentation
SS041 – Building 905	Heptachlor Epoxide	Groundwater Extraction and Treatment	2014	Travis AFB Groundwater Record of Decision (CH2M HILL, 2014)

Documentation of Remedial Actions that Resulted in Land Use Control Removal

Table 4: Travis AFB Restoration Site Transfers into POCO Program			
Site	Primary Chemicals of Concern	Transfer Year	Documentation
ST032	Total Petroleum Hydrocarbons – Gasoline (TPH-G)	2009	Technical Memorandum: Recommendation to Transfer ERP Site ST032 to the POCO Program (CH2M HILL, 2009)