



MCCLELLAN AFB CALIFORNIA

ADMINISTRATIVE RECORD COVER SHEET

AR File Number 7668



DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER

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SUBJECT: Final (Signed) Ecological Sites Record of Decision (DSR #525-7)

1. Please find the attached Final (Signed) Ecological Sites Record of Decision (ROD) for your records. It has an assigned McClellan Deliverable Status Report (DSR) #525-7, is categorized as a primary document, and is due on 4 April 2013. The effective date of this ROD is 7 March 2013, corresponding to the date the ROD was signed by the U.S. Environmental Protection Agency, Region 9.
2. Any questions regarding this document should be directed to Ms. Molly Enloe, (916) 643-0830 ext. 231.


STEVEN K. MAYER, P.E.
BRAC Environmental Coordinator

Attachment:
Final (Signed) Ecological Sites Record of Decision

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Final

Ecological Sites Record of Decision

**Former McClellan Air Force Base
Air Force Civil Engineer Center**

February 2013

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Acronyms and Abbreviations

AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFRPA	Air Force Real Property Agency
AOC	Area of Concern
ARAR	applicable or relevant and appropriate requirement
Cal/EPA	California Environmental Protection Agency
CAMU	Corrective Action Management Unit
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
Central Valley Water Board	California Regional Water Quality Control Board, Central Valley Region
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
COC	contaminant of concern
CS	Confirmed Site
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyldichloroethane
DTSC	Department of Toxic Substances Control
DWQ	Department of Water Quality
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
FFA	Federal Facilities Agreement
FS	feasibility study
gpm	gallon(s) per minute
GPS	global positioning system
HHRA	human health risk assessment

ACRONYMS AND ABBREVIATIONS

HI	hazard index
HQ	hazard quotient
IC	investigation cluster
IRP	Installation Restoration Program
IWTP	Industrial Wastewater Treatment Plant
Jacobs	Jacobs Engineering Group, Inc.
LDR	land disposal restriction
McClellan	former McClellan Air Force Base
McLaren	McLaren Environmental Engineering, Inc.
mg/kg	milligram(s) per kilogram
MTR	minimum technological requirement
NCP	National Oil and Hazardous Substance Pollution Contingency Plan
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PCG	Preliminary Cleanup Goal
ppm	part(s) per million
PRL	Potential Release Location
RAB	Restoration Advisory Board
Radian	Radian International
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RICS	remedial investigation characterization summary
ROD	record of decision
SAFR	Small Arms Firing Range
SAQMD	State Air Quality Management District
SARA	Superfund Amendments and Reauthorization Act of 1986

SEV	screening ecotoxicity value
SLUC	State Land Use Covenant
SVOC	semivolatile organic compound
TCDDeq	tetrachlorodibenzo-p-dioxin equivalent
TIE	toxicity identification evaluation
TRV	toxicity reference value
TSCA	Toxic Substances Control Act
USC	U.S. Code
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

SECTION 1

Declaration

1.1 Site Name and Location

This Record of Decision (ROD) is for 12 Ecological Sites located at the former McClellan Air Force Base (AFB) in Sacramento, California (see Figure 1).

Department of the Air Force
Air Force Civil Engineer Center (AFCEC)/Western Execution Center
3411 Olson Street
McClellan, California 95652-1003
CERCLIS Identification Number CA 4570024337
Superfund Site ID Number 0902759

The 12 Ecological Sites addressed herein, or the affected portions thereof, have been grouped together in this ROD because these sites have common features and thus warranted the evaluation of common remedial strategies and alternatives. The most notable common feature of the sites, and the primary reason for providing a consolidated evaluation, is that each site provides wildlife habitat, or otherwise has the potential to affect ecological resources that may inhabit the sites. The 12 Ecological Sites included in this ROD are listed below and in Table 1 along with the specific features and media addressed in this ROD. This ROD addresses potential impacts to ecological receptors and human health from contaminants at these 12 sites.

- West Nature Area (SD165 and SD317)
- Offbase Creeks (SD301)
- Magpie Creek West of the Runway (SD165)
- Don Julio Creek West of the Runway (SD317)
- IC 17 Seasonal Creek and Drainage Ditch (SD316)
- Vernal Pools Associated with CS 007 and SAFR (SD007 and FR299)
- Vernal Pool Associated with PRL S-010 (SS095)
- Second Creek (SD083)
- IC 17 Holding Ponds (WP049)
- Former A-1 Metals Facility (SS315)
- Former Soils Holding Area (CF260)
- Robla Creek (SD264)

McClellan is listed on the National Priorities List (NPL) and has a Federal Facilities Agreement (FFA) in place that governs investigation and cleanup at this former military facility. The Air Force and state and federal regulatory agencies work as a team to investigate and clean up McClellan. The Air Force is the lead agency for environmental cleanup activities at McClellan. The primary regulatory agencies overseeing the McClellan cleanup are the U.S. Environmental Protection Agency (EPA) and the California Environmental Protection Agency (Cal/EPA), represented by the Department of Toxic

Substances Control (DTSC) and the California Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) (collectively, the "State"). In accordance with 42 U.S. Code (USC) Section 9620(e)(4), the Air Force and EPA co-select the remedies, with concurrence from the State.

1.2 Statement of Basis and Purpose

This ROD documents the selected remedies for the 12 Ecological Sites and addresses public comments to the *Proposed Plan for the Ecological Sites* (Proposed Plan) (CH2M HILL, 2011). Contamination at these sites is addressed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), commonly known as Superfund, and the FFA. Section 117 of CERCLA (42 USC Section 9717) requires public involvement in decisions related to the cleanup and closure of these sites. The Proposed Plan and subsequent ROD address the community involvement requirements of CERCLA.

This ROD addresses dioxins/furans, metals, pesticides, polychlorinated biphenyls (PCBs), and polycyclic aromatic hydrocarbons (PAHs) in soil and sediment that present a threat to human health and the environment. The Air Force and the EPA are selecting the remedial actions for the 12 Ecological Sites in accordance with the CERCLA process, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) 42 USC, Section 9601 et seq., and to the extent practicable, the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. This decision is based on the Administrative Record, and in particular the *Ecological Sites Feasibility Study* (FS) (CH2M HILL, 2010a), which is part of the Administrative Record file for these sites. The Administrative Record is available for review at the AFCEC office located at 3411 Olson Street, McClellan, California. The State concurs with the selected remedies.

1.3 Assessment of the Sites

As a result of past activities, hazardous substances are present in soil and sediment. Actual or potential releases of hazardous substances present a potential threat to public health and welfare, and the environment, if not addressed by implementing the response actions selected in this ROD. Following are the sites requiring a response action as presented in this ROD: West Nature Area tailings (SD165 and SD317), Offbase Creeks (SD301), Magpie Creek West of the Runway (SD165), Investigation Cluster (IC) 17 Seasonal Creek and Drainage Ditch (SD316), Vernal Pools Associated with Confirmed Site (CS) 007 and Small Arms Firing Range (SAFR) (SD007 and FR299), Second Creek (SD083), and Former A-1 Metals Facility (SS315) (see Figure 2).

The Former Soils Holding Area (CF260), Robla Creek (SD264), Don Julio Creek West of the Runway (SD317), the Vernal Pool Associated with Potential Release Location (PRL) S-010 (SS095), and the IC 17 Holding Ponds (WP049) were determined to be No Action sites because No Action is necessary to protect human health or the environment (see Figure 2).

1.4 Description of Selected Remedies

The selected remedies and their major components are summarized in this section for the sites selected for a response action. The selected remedies provide the best approach for cost-effective environmental risk reduction.

1.4.1 IC 17 Seasonal Creek and Drainage Ditch, Offbase Creeks, Magpie Creek West of the Runway, and Second Creek

The Air Force and EPA are selecting Excavation and Disposal for Moderate Risk Reduction for the IC 17 Seasonal Creek and Drainage Ditch, Offbase Creeks, Magpie Creek West of the Runway, and Second Creek. Under the selected remedy, contaminated sediment within the creek channels will be excavated and transported for disposal at an appropriate facility either offsite or at the consolidation unit to be constructed at McClellan under the Focused Strategic Sites ROD (AFRPA, 2012). This remedy involves the removal of the most contaminated sediments from within the creek channels. At the IC 17 Seasonal Creek and Drainage Ditch, contaminated sediment on top of the concrete liner will be removed. At Offbase Creeks, Magpie Creek West of the Runway, and Second Creek, contaminated sediments will be removed from unlined sections of creek. In addition, for the lined section of Magpie Creek West of the Runway, the liner will be removed, contaminated sediments beneath the liner will be excavated, and a new liner will be installed. Under the selected remedy, the resulting land use at each site is unrestricted.

Excavation and removal of sediment from the unlined creek channels will physically damage existing habitat and disrupt any wildlife that use the channels for nesting or foraging until the habitat is restored. The estimated recovery time for these creek sites is 3 to 5 years, depending on the level of species diversity, structural complexity, and growth rate of characteristic species at each site.

While an action is being taken to address creek sediments, No Action is being selected for vernal pools at Magpie Creek West of the Runway and Second Creek. Only low levels of contaminants were detected in soil and sediment samples for these vernal pools; therefore, significant impacts to ecological receptors and the environment are not likely. No further action is required for these vernal pools.

1.4.2 Vernal Pools Associated with CS 007 and SAFR and the Former A-1 Metals Facility

The Air Force and EPA are selecting Excavation and Disposal for the Vernal Pools Associated with CS 007 and SAFR and the Former A-1 Metals Facility. For the vernal pools associated with CS 007 and SAFR, contaminated sediment and soil within and immediately adjacent to the vernal pools will be excavated and transported for disposal at an appropriate facility either offsite or at the consolidation unit to be constructed at McClellan under the Focused Strategic Sites ROD (AFRPA, 2012). Excavation and removal of sediment from within the vernal pools will reduce risk for ecological receptors but will destroy completely the sensitive species and habitat that may occur within these features. Because these vernal pools are located immediately adjacent to a disposal pit (CS 007) subject to future remediation, the vernal pool habitat will not be restored onsite. Consultation with the U.S. Fish and Wildlife Service (USFWS) will be conducted to authorize take of federally

listed species and determine habitat mitigation requirements. Existing site controls for CS 007 and surrounding properties (implemented as lease restrictions) will limit exposure to residual contamination beneath the vernal pools until a remedy is selected and implemented for CS 007. It is anticipated that the remedy for CS 007, to be selected in the pending Follow-on Strategic Sites ROD, will either further remediate this area to levels acceptable for unrestricted use or include institutional controls to restrict land use.

As a modification of the selected remedy for the Former A-1 Metals Facility, the Air Force will remove the more contaminated grassland soil at the source site, but will not excavate the vernal pools. Soil and sediment containing concentrations of contaminants of concern (COCs) greater than industrial cleanup levels will be removed. Excavation of soil and sediment to achieve unrestricted use levels was considered, but was not selected because of the significant impacts to sensitive vernal pool habitats that would occur. Based on the low levels of contamination present at the vernal pools, it was determined that the benefit of excavating the vernal pools would not outweigh the significant adverse impacts. Under the selected remedy, the resulting land use is restricted, and institutional controls will be implemented via deed restrictions to prohibit sensitive uses such as residences, daycare centers, healthcare centers, or schools on the property. The site was used for industrial purposes in the past, is within the buffer zone of the runway, and is designated for industrial use in the future. The vernal pools adjacent to the Former A-1 Metals Facility do not have high levels of contamination and provide good habitat quality; therefore No Action is being selected for the vernal pools at the site. The excavation of grassland soils will not negatively affect the vernal pools, so no mitigation will be required.

1.4.3 West Nature Area

The Air Force and EPA are selecting Excavation and Disposal for the tailings piles in the West Nature Area. The tailings piles consist of contaminated sediments dredged from the creeks in 1997 for flood control and placed in piles 2 to 7 feet high along the creek banks in the West Nature Area. Under the selected remedy, all tailings piles will be excavated irrespective of cleanup levels. Based on preliminary discussion and consultation with the resource agencies, all of the piles can be removed without permanent loss of habitat for sensitive species, and the benefit of removing the piles will outweigh the temporary impacts of remedial activities. Excavated soils will be disposed of either offsite or at the consolidation unit to be constructed at McClellan under the Focused Strategic Sites ROD (AFRPA, 2012).

Appropriate avoidance and minimization measures, such as silt fencing and erosion controls, protective mats, designated access and staging areas, seasonal restrictions on construction, worker awareness training, and biological monitoring, will be implemented as determined in consultation with the USFWS and CDFG. In addition, disturbed areas will be replanted and hydroseeded to restore conditions to that of similar adjacent or nearby habitats. The restored habitats will be permanently protected by a conservation easement and will be managed in perpetuity for the protection of threatened and endangered species.

Although an action is being taken to address the tailings piles in the West Nature Area, No Action is being selected for the West Nature Area Creeks. Potential risk to human health associated with ingesting fish or crayfish from the creeks is present. However, the risks

associated with the average concentrations are within the EPA risk management range using very conservative exposure assumptions. The ecological risk assessment determined that adverse risk to ecological receptors is unlikely. In addition, the West Nature Area Creeks are located within a dedicated habitat conservation area without public access, contaminant concentrations are consistent with concentrations reported in sediments in upstream, offbase creeks, and metals concentrations are within the normal range of background. No further action is required for the West Nature Area Creeks.

In addition, No Action is being selected for vernal pools in the West Nature Area. Only low levels of contaminants were detected in soil and sediment samples for these vernal pools; therefore, significant impacts to ecological receptors and the environment are not likely. No further action is required for these vernal pools.

1.4.4 No Action Sites

No Action is being selected for the following sites:

- Former Soils Holding Area
- Robla Creek
- Don Julio Creek West of the Runway
- IC 17 Holding Ponds
- Vernal Pool Associated with PRL S-010

At the Former Soils Holding Area, Robla Creek, Don Julio Creek West of the Runway, and the IC 17 Holding Ponds, only low levels of contaminants were detected, and the sites do not pose a substantive risk to human health, ecological receptors, or the environment. No further action is required.

At the Vernal Pool Associated with PRL S-010, contamination was found to pose a potential threat to ecological receptors. However, contaminant levels are relatively low, and excavation is not justified relative to the habitat damage associated with removal.

1.5 Statutory Determinations

The Air Force is selecting remedies for the Ecological Sites that are protective of human health and the environment, comply with federal and state applicable or relevant and appropriate requirements (ARARs) for the remedial action, are cost effective, and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. The majority of the excavated soil will be sent to a Class II landfill, and treatment will not be required. Therefore, the statutory preference for treatment as a principal element will not be met.

In addition, the hazardous substances at the sites are not considered principal threat wastes because the contaminated soil and sediments do not contain high concentrations of hazardous substances and contaminant mobility is low. Therefore, the sites do not trigger the NCP expectation for treatment of principal threat wastes.

For the Former A-1 Metals Facility, the selected remedy will result in hazardous substances, pollutants, or contaminants remaining onsite above levels that allow for unlimited use and unrestricted exposure. Therefore, reviews will be required every 5 years to determine if the

remedies remain effective and protective of human health, ecological receptors, and the environment.

1.6 Data Certification Checklist

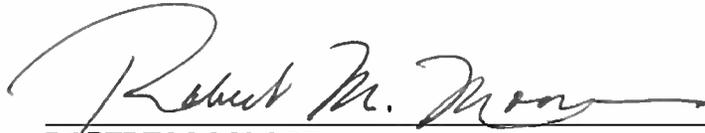
The following information is included in Section 2 of this ROD (additional information can be found in the Administrative Record):

- Site location and description (Section 2.1)
- COCs (Sections 2.5.2 through 2.5.13)
- Risks associated with the COCs (Sections 2.5.2 through 2.5.13 and Figures 3 through 12)
- Cleanup levels established for the COCs (Table 4)
- How source materials constituting principal threats are addressed (Section 2.9)
- Current and reasonably anticipated future land and resource use assumptions (Section 2.5)
- Potential land use that will be available at the site as a result of the selected remedies (Section 2.10.6)
- Key factor(s) that led to selecting the remedies (Sections 2.8.2 through 2.8.4)
- Estimated annual and present worth costs, discount rate, and number of years over which the remedy cost estimate is projected (Sections 2.10.5 and Table 8)

This document was prepared consistent with guidance published by the EPA for preparation of RODs (EPA, 1999).

1.7 Authorizing Signatures

This is the signature sheet for the Ecological Sites ROD. The Air Force and EPA jointly select the remedies described in this ROD.



ROBERT M. MOORE
Director, Installations Center of Excellence
Air Force Civil Engineer Center
U.S. Air Force

7 3 FEB 2013

Date



MICHAEL M. MONTGOMERY
Assistant Director, Superfund Division Region 9
U.S. Environmental Protection Agency

March 7, 2013

Date

The California Department of Toxic Substances Control (DTSC) and Central Valley Regional Water Quality Control Board (Central Valley Water Board) (the State) had an opportunity to review and comment on the Ecological Sites ROD, and their concerns have been addressed.



CHARLES RIDENOUR
Branch Chief
Brownfields and Environmental Restoration
Cleanup Program - Sacramento Office
Department of Toxic Substances Control
California Environmental Protection Agency

3/11/2013

Date

SECTION 2

Decision Summary

2.1 Site Name, Location, and Description

McClellan, which encompasses about 3,000 acres, is located 7 miles northeast of downtown Sacramento, California (CERCLIS Identification Number CA 4570024337 and Superfund Site ID Number 0902759). McClellan is surrounded by the City of Sacramento to the west and southwest, unincorporated areas of Antelope on the north, Rio Linda on the northwest, and North Highlands on the east (see Figure 1).

The 12 Ecological Sites are primarily located in the western and northern portions of the base. The sites include creeks (lined and unlined), vernal pools and seasonal wetlands, and grasslands. The West Nature Area, which includes Magpie and Don Julio creeks, also includes tailings piles located along the creek banks. Varying levels of ecological value exist at the sites ranging from low-quality, heavily developed areas to relatively undisturbed habitat that could support a variety of species. The contaminants at the site vary, but include dioxins/furans, metals, pesticides, PCBs, and PAHs.

The Air Force is the lead agency for environmental cleanup activities at McClellan. The primary supporting agencies are the EPA, DTSC, and Central Valley Water Board. Funding of cleanup activities is provided by the Air Force Environmental Restoration Account.

2.2 Site History and Background

2.2.1 Site History

McClellan has been an active industrial facility since its dedication in 1936, when it was called the Sacramento Air Depot. Operations changed from the maintenance of bombers during World War II and the Korean conflict to the maintenance, repair, modification, and disassembly of jet aircraft in the 1960s. More recently, operations were expanded to include the maintenance and repair of communications equipment and electronics. On base facilities where hazardous substances or hazardous wastes were handled included disposal pits, washracks, fuel and oil storage, electronics repair and testing facilities, aircraft painting facilities, wastewater treatment plants, machine shops, and open storage areas. In 1995, the Congressional Base Realignment and Closure Commission recommended closure of McClellan. On July 13, 2001, McClellan was closed as an active military facility.

2.2.2 Previous Investigations

Several phases of investigation have been conducted at each site. The investigations and data evaluations conducted for each site are listed in Appendix A. Generally, the media collected during the sampling events include soil and sediment, although for investigations of some samples from the creeks, surface water and biota were also collected. Samples were generally collected from biased locations such as within creeks where water velocities decrease and

sediment accumulates and in low spots in vernal pools where sediment is likely to have settled. Sample locations are shown on Figures 3 through 16. Results of the field investigations and data evaluations are provided in Section 2.5 (Summary of Site Characteristics).

2.2.3 Enforcement Activities

On October 15, 1984, the EPA proposed listing McClellan as a candidate site for inclusion on the NPL also known as the Federal Superfund List. McClellan was formally placed on the NPL on July 22, 1987. In 1989, the Air Force, EPA Region 9, and the California Department of Health Services (currently, DTSC) signed an agreement regarding the cleanup process known as an FFA. The FFA was executed in 1990.

2.3 Community Participation

McClellan has had an active community relations/public participation program since the beginning of restoration activities in the early 1980s. The purpose of the program is to help community members understand McClellan's cleanup program and learn how to become involved in the cleanup decision-making process.

Highlights of the community relations activities undertaken by McClellan are as follows:

- **Restoration Advisory Board (RAB).** In 1995, a RAB was formed to increase communication between the Air Force and the neighboring community. Through open communication and the exchange of ideas, interests, and concerns, the RAB supports the search for safe, timely, and effective cleanup solutions so that McClellan may be transferred from Air Force ownership to public/private ownership. RAB meetings are held quarterly. These public meetings include discussions of the RAB's input and advice on particular issues, information on cleanup actions or public interest items, and updates on the status of the cleanup program. The Air Force provides seminars to RAB members to aid in their review of documents and cleanup actions. In addition, the Technical Assistance for Public Participation program is available to provide funds to retain an independent contractor to assist the community members in their reviews.
- **Administrative Record.** McClellan established the Administrative Record at the beginning of its environmental investigation to store all information that supports cleanup decisions at McClellan. An Information Repository was also set up to make all of the information, reports, and reference materials available for public review. More than 20 years of documentation is available for review by the public. This repository is located at the AFCEC office, 3411 Olson Street, McClellan, California 95652. Documents related to the cleanup efforts at McClellan also are available for review at DTSC, Central Valley Water Board, and EPA Region 9 offices.
- **Community Relations Plan.** The first McClellan Community Relations Plan was approved in August 1985. The Community Relations Plan was last updated in 2009. The Community Relations Plan identifies the community's issues, needs, and concerns, and specifies activities, outreach products, or programs used to address the community concerns and expectations. The plan also explains how the community will be involved in site cleanup.

- **Mailing List.** A mailing list of all interested parties in the community is maintained by the Air Force and updated regularly. In 2002, blanket mailings to all residents in the vicinity of McClellan were conducted in an effort to add new/interested parties to the mailing list. Since then, the mailing list is updated as additions, changes, or deletions are requested.
- **Newsletters.** Since May 1984, McClellan's quarterly newsletter, *Environmental Action Update*, has been distributed to interested individuals and organizations. The newsletter includes articles on the status of the Installation Restoration Program (IRP), meeting announcements, listings of recently issued documents, and names of individuals to contact for more information. The newsletter is mailed to more than 2,100 neighbors of the Base, community leaders, businesses, environmental organizations, civic clubs, and the news media.
- **Web Site.** The Air Force has established a Web site to support communication about its environmental program (<http://www.afcec.af.mil/brac/index.asp>). The following information is available on the Web site:
 - A search feature identifying the documents stored in the Administrative Record
 - Announcements for upcoming public meetings and RAB meetings
 - RAB information and meeting minutes
 - Copies of newsletters and fact sheets
- **Fact Sheets.** Since May 1990, the Air Force has published fact sheets to help explain specific topics. Topics have included descriptions of new cleanup technologies, cleanup milestones, and descriptions of removal action plans. Fact sheets are also provided to increase the community's knowledge of technologies or the science of cleanup at McClellan.
- **Public Comment Periods and Public Meetings.** Public comment periods give the community an opportunity to review documents and provide comments verbally or in writing. Public meetings are held to solicit public comment on documents or actions and to address areas of public concern or interest. The final Proposed Plan (CH2M HILL, 2011) and a summary Proposed Plan Fact Sheet for the Ecological Sites were issued on January 28 and February 4, 2011, respectively, and an associated public comment period was held from February 4 through March 7, 2011, to provide the community an opportunity to comment on the proposed action and anticipated future land use at these sites. A public meeting was held on February 15, 2011, to solicit public input on the proposed actions at the Ecological Sites and anticipated future land use at the sites, and to provide the community an additional opportunity to provide comments. The Air Force prepared a written response to the ten public comments pertaining to the Proposed Plan. The responses to significant public comments are included in the Responsiveness Summary section of this ROD. This ROD will be available in the Administrative Record upon publication. The public participation requirements of CERCLA and the NCP were met for the remedy selection process.

2.4 Scope and Role of the Ecological Sites Response Actions

For environmental management purposes, McClellan has subdivided the Base into the following 11 operable units (OUs): A, B, B1, C, C1, D, E, F, G, H, and the Groundwater OU, which encompasses the entire Base.

Because of the complexity of different types of contaminants co-mingling at McClellan, the presence of contamination in different media (soil, sediment, and groundwater), and the large extent of contamination across the Base, the investigation and remediation of contamination at the Base under the IRP are subdivided into several projects. This subdivision allows for more efficient planning and implementation of each project.

Several RODs have been completed at McClellan:

- **Basewide Volatile Organic Compound (VOC) Groundwater ROD (AFRPA, 2007)** – addresses basewide VOC contamination in groundwater and in the vadose zone that threatens groundwater. The remedies under this ROD were previously implemented as removal actions and interim remedies.
- **Non-VOC Amendment to the Basewide VOC Groundwater ROD (AFRPA, 2009a)** – addresses non-VOC contamination in groundwater. The remedies under this ROD Amendment have been implemented.
- **Local Reuse Authority Initial Parcel ROD #1 (AFRPA, 2004)** – addresses non-VOC contaminants in soil at seven sites. The remedies under this ROD have been implemented.
- **Local Reuse Authority Initial Parcel ROD #2 (AFRPA, 2008)** – addresses non-VOC and VOC contaminants in soil and shallow soil gas at 16 sites and VOC contaminants in shallow soil gas at 7 sites included in Initial Parcel ROD #1. The remedies under this ROD were implemented in 2011 under an Environmental Services Cooperative Agreement between the Air Force and Sacramento County.
- **Local Reuse Authority Initial Parcel ROD #3 (EPA, 2012)** – this ROD for 49 sites was completed under an Environmental Services Cooperative Agreement between the Air Force and Sacramento County. The sites are located in the southwestern and eastern portions of the Base.
- **Area of Concern (AOC) G-1 ROD (AFRPA, 2009b)** – addresses non-VOC and VOC contaminants in soil and shallow soil gas at a single site. The remedy has been implemented.
- **Focused Strategic Sites ROD (AFRPA, 2012)** – addresses radiological, non-VOC, and VOC contaminants in soil and shallow soil gas at 11 sites. Collectively, the 11 sites contain the largest volume of wastes at McClellan. The remedies under this ROD will be implemented in 2013. Under that ROD, a consolidation unit will be constructed at McClellan for disposal of contaminated soil and sediment. Excavated soil and sediment from the Ecological Sites remedial actions will likely be disposed of at this onsite consolidation unit. Excavated soil and sediment will be dewatered and treated prior to

disposal in the consolidation unit as necessary to meet the acceptance criteria defined in the Focused Strategic Sites ROD (AFPRA, 2012).

The remaining IRP sites at McClellan are grouped geographically or because of similar attributes into the following RODs:

- **Small Volume Sites ROD** - this ROD or RODs for 124 sites will be completed in the near future under an Environmental Services Cooperative Agreement between the Air Force and Sacramento County. The ROD addresses non-VOC and VOC contaminants in soil and soil gas at the sites in the southeastern portion of the Base.
- **Follow-on Strategic Sites ROD** - this ROD is planned for completion in 2013 and addresses non-VOC and VOC contaminants in soil and soil gas at 80 sites. The sites are located near the flightline and in the northern and western portions of the Base.

This Ecological Sites ROD addresses contaminants in soil and sediment at the 12 Ecological Sites, which are located within portions of OUs C, D, E, F, and G. The Ecological Sites addressed herein, or the affected portions thereof, have been grouped together in this ROD because these sites have common features and thus warranted the evaluation of common remedial strategies and alternatives. The most notable common feature of the sites, and the primary reason for providing a consolidated evaluation, is that each site provides wildlife habitat, or otherwise has the potential to affect ecological resources that may inhabit the sites.

The Ecological Sites are not considered sources of groundwater contamination. However, VOC contamination in groundwater beneath the Ecological Sites is addressed under the Basewide VOC Groundwater ROD that was completed in 2007 (AFRPA, 2007), and non-VOCs that also may be present in groundwater are addressed in the Non-VOC Amendment to the Basewide VOC Groundwater ROD (AFRPA, 2009a). Deed restrictions specified in the Basewide VOC Groundwater ROD protect the integrity of the groundwater monitoring wells at the 12 Ecological Sites and provide for access to the wells. In addition, institutional controls are in place above the groundwater plume to prohibit extraction of groundwater by tenants or subsequent property owners for any purpose other than monitoring. Furthermore, the Sacramento County Well Ordinance, Sacramento County Code, Chapter 6.28 Wells and Pumps, Section G established a consultation zone for groundwater; the 12 Ecological Sites fall within this zone.

2.4.1 Past Removal Actions

Two removal actions have occurred at the Ecological Sites: one within a portion of the SAFR (near the Vernal Pools Associated with CS 007 and SAFR) and one at the Former A-1 Metals Facility. These removal actions are summarized in the following sections. In addition to these removal actions, Magpie and Don Julio creeks west of Patrol Road were dredged for flood control in 1997. However, the dredging was not performed as a removal action under CERCLA, and the tailings were deposited next to the creeks. More information regarding the dredging is provided in Section 2.5.2.

Vernal Pools Associated with CS 007 and SAFR

The SAFR consists of Building 710, Building 712, a large berm used as a backstop for small arms firing exercises, and a soil pile area (CH2M HILL, 2007). The soil piles consist of dirt containing spent ammunition that was periodically scraped from the backstop and deposited into piles at the southeastern end of Building 712 (URS, 2005a). In 2001, 500 cubic yards were removed from the soil piles in the most highly contaminated areas containing lead and copper. The vernal pools associated with CS 007 and SAFR are located south of and are within the watershed of the soil piles.

Former A-1 Metals Facility

From the 1960s through 1978, the Former A-1 Metals Facility was a metals salvage yard (Jacobs Engineering Group, Inc. [Jacobs], 2000). The owner purchased transformers (containing PCB-contaminated oil) and metal machinery to salvage copper and iron for resale. In addition, insulation was burned off of copper wiring in order to salvage the metal. Reportedly, because the transformer oil was not needed, it was often disposed of onto the unpaved ground and/or used for weed control. An initial soil removal was conducted in 1988 with the goal of remediating the site to the PCB cleanup target concentration of 50 milligrams per kilogram (mg/kg) (Toxic Substances Control Act [TSCA] standard). Approximately 333 cubic yards of PCB-contaminated soil was removed from the northern portion of the Former A-1 Metals Facility and 222 cubic yards from the southern portion of the site. In 1988, confirmation samples were collected at the Former A-1 Metals Facility and from offbase drainage areas following the contaminated soil excavation. PCBs were detected in four of the nine samples. Concentrations ranged from 0.17 to 0.88 mg/kg in sediment samples from the drainage areas and from 0.36 to 3.8 mg/kg in soil samples collected within the Former A-1 Metals Facility site (Jacobs, 2000).

2.5 Summary of Site Characteristics

An overview of the conceptual site model and the risk assessment methodologies is provided below, and a summary of the site characteristics for the 12 Ecological Sites included in this ROD is presented in the following sections. Included in the summaries is information regarding potential risks from the COCs to human health and ecological receptors. A summary of the COCs and risks associated with the sites requiring action are presented in Table 2.

The sites included in this ROD consist of creeks, vernal pools, and grassland habitats. The conceptual site model for the creek sites includes transport of contaminated surface soils from upstream source sites into the creeks via surface water runoff. Direct discharges into the creeks or storm drains may also have occurred. COCs generally consist of chemicals that adhere to sediments and do not readily volatilize or biodegrade, including metals, PCBs, SVOCs, PAHs, and dioxins/furans. The conceptual site model for the vernal pools includes transport of contaminated surface soils from upgradient source sites via surface water runoff. In addition, contaminated sediments could have been transported from the creeks to adjacent vernal pools during flood events. The grassland habitats considered in this ROD are limited to the tailings piles in the West Nature Area, which consist of contaminated sediments dredged from the adjacent creeks. COCs for the vernal pools and tailings piles are the same as for the creek sites. Human and ecological receptors may be exposed to

contaminated creek and vernal pool sediments and tailings pile soils via dermal contact, incidental ingestion, or ingestion of contaminated food or prey items.

Human health risk assessments (HHRAs) and ecological risk assessments (ERAs) were prepared for each site based on this conceptual site model. The vernal pools were not evaluated as a separate exposure area for human receptors because the vernal pools represent habitat for a federally listed species and human intrusion into the vernal pools is prohibited by the Endangered Species Act. For the creek sites, it was assumed that the creeks would remain as creeks, and that human exposures would be limited to recreational users (including a fish consumption pathway), construction workers, or creek channel maintenance workers. If the creeks are ever filled or covered over by future development, exposure pathways would be incomplete. Thus, exposure of current or future industrial or residential populations was not evaluated (recreational use of the creeks by workers or nearby residents is covered by the recreational use scenario). The tailings piles are located in the West Nature Area, which will be protected as a permanent wildlife conservation area. Therefore, human exposures to tailings pile soils would be limited to maintenance workers involved in habitat enhancement or restoration activities.

HHRAs were conducted to evaluate potential cancer risks and non-cancer health hazards associated with exposure to site contaminants. Cancer risk is generally expressed as a probability, such as 1-in-1,000,000, or one-in-one million. In other words, for every one million people who are exposed over an assumed period of 30 years, one extra cancer case could occur as a result of exposure to a particular contaminant. The EPA target risk range is between one-in-one-million and one-in-ten-thousand. Non-cancer hazards were evaluated using a hazard index (HI). A HI greater than 1 indicates a potential non-cancer health risk. Non-cancer health risks can include kidney disease, nervous system damage, anemia, dizziness, and headaches.

ERAs were conducted using a hazard quotient (HQ) approach. Based on the evaluation of habitat present at the Ecological Sites, representative ecological receptors (e.g., benthic invertebrates for vernal pools and aquatic birds for creeks) were selected for evaluation of potential risk. Risks were then estimated for each receptor and contaminant by calculating HQs. HQs are calculated by taking an estimated chemical dose and dividing it by a reference value that is considered a "safe" environmental concentration. Both upperbound HQs (using conservative assumptions) and mean HQs (using more realistic assumptions) were calculated to provide a range of risk estimates. Unlike for human health risk evaluations, there is not a clear threshold value that indicates unacceptable risk. HQs greater than 1 indicate a potential for risk, but uncertainties in the risk evaluation process may affect the accuracy of the HQs. Therefore, the relative magnitude of the HQ, as well as general and site-specific uncertainties, must be considered. For example, HQs in the range of 5 to 10 may be acceptable if they are based on conservative assumptions such as maximum site concentrations and 100 percent exposure scenarios that may overestimate risk.

Because of uncertainties associated with the HQ values, Preliminary Cleanup Goals (PCGs) were developed for COCs for various receptors to further evaluate ecological risk levels at the sites. The representative ecological receptors used in developing these PCGs for the creek sites were benthic invertebrates, green heron, and river otter (as applicable for particular sites). Representative ecological receptors used for evaluating potential risk in the vernal pool habitats were benthic invertebrates and birds (mallard and western

meadowlark). Representative ecological receptors used for evaluating potential risk in the upland areas (including the tailings soils) were terrestrial invertebrates, western meadowlark, red-tailed hawk, and deer mouse.

The two sets of PCGs (high and low) were developed to provide varying degrees of risk reduction based on varying exposure and toxicity assumptions. PCGs were developed by calculating a soil or sediment concentration (as appropriate for the receptor) at which the HQs were 1.0 at the low and high toxicity reference values (TRVs). The low PCG (developed from the low TRV), which is more conservative than the high PCG, represents a soil or sediment concentration below which effects are not expected to occur. The high PCG (developed from the high TRV) represents a soil or sediment concentration above which effects are more likely to occur. The ecological risk for each sample location at the Ecological Sites is displayed on Figures 3 to 12, relative to the low and high PCGs.

Sediment samples have been collected from upstream of McClellan to evaluate contaminant concentrations present in sediment moving onto McClellan. The characterization data for the upstream offbase creeks is presented in the Creeks Data Gap Analysis and Field Sampling Plan (URS, October 2005b) and is summarized in the Ecological Sites Feasibility Study (CH2M HILL, 2010a). These data indicate that upstream offbase creeks may be an ongoing source of contamination to the creeks on McClellan. The following analytes were reported at average concentrations between the low and high PCGs for benthic invertebrates in 6 samples collected upstream of McClellan in Magpie Creek and Second Creek:

- Total DDT was detected in 3 samples with an average concentration of 0.031 mg/kg
- Dieldrin was detected in 1 sample at 0.025 mg/kg
- Total PCBs (as aroclors) were detected in 4 samples at 0.087 mg/kg
- gamma-Chlordane was detected in 3 samples with an average concentration of 0.012 mg/kg
- alpha-chlordane was detected in 3 samples at an average concentration of 0.014 mg/kg

In addition, dioxin/furans were detected in 4 samples at an average concentration of 2.85×10^{-5} mg/kg as TCDD TEQ, which is greater than the high PCG for benthic invertebrates.

2.5.1 Current and Potential Future Land and Resource Uses

Two separate areas at McClellan Park were designated for permanent habitat preservation by the USFWS in the *Biological Opinion for the Disposal of McClellan Air Force Base, Sacramento County, California* (USFWS, 2004). The conservation areas are shown on Figures 3 and 14. The West Nature Area is an established conservation area that is approximately 222 acres in size and includes Magpie Creek and Don Julio Creek. The second preserve area follows the alignment of Robla Creek at the northern end of the main runway and is referred to as the North Runway Area. A perpetual conservation easement is planned for the subject properties regardless of CERCLA actions or implementation of institutional controls at these creek sites. The conservation easement will require that the property remain substantially in its natural condition in perpetuity and will prohibit any activities inconsistent with the

protection of federally listed species and their habitats. The North Runway Area is protected by the airfield fencing and security. The West Nature Area is currently fenced from public access, and signs will be installed to inform the public about staying out of the area. A preserve manager will be funded through a self-sustaining endowment and will be responsible for maintaining fencing and signage in perpetuity.

For the remaining Ecological Sites, the current and reasonably anticipated future use is industrial. For one site, the Former A-1 Metals Facility, institutional controls are a portion of the selected remedy. The site was used for industrial purposes in the past, is within the buffer zone of the runway, and is designated for industrial use in the future.

2.5.2 West Nature Area

Site Characteristics

The West Nature Area is a designated natural area; it encompasses the western sections of Magpie and Don Julio creeks, their floodplains, adjacent grasslands and riparian habitat, and the vernal pools adjacent to the creeks from west of Patrol Road to the western (downstream) boundary of the former base. Site features are shown on Figure 3. Magpie Creek and Don Julio Creek are designated as separate sites under McClellan's IRP, SD165 and SD317, respectively. The creek channels are mostly unlined and have a natural bed and bank with riparian vegetation and wider channels in some areas that reduce flow and promote sediment deposition. The floodplain area associated with Magpie and Don Julio creeks within the West Nature Area is extensive but does not cover all of the area between the two creeks.

Magpie and Don Julio creeks serve as primary drainage paths for stormwater collected from throughout the central and southern portions of the base, including current and former industrial use areas, and for water running onto the base from upstream industrial and residential areas. OU B1, the largest drainage ditch discharging into Magpie Creek, originates in the southwestern corner of the base and follows the former base boundary, discharging into Magpie Creek in western OU C within the West Nature Area. Water flowing in Magpie Creek in the West Nature Area also includes treated groundwater generated by an onsite groundwater treatment system designed to remove VOCs and hexavalent chromium from groundwater. The treatment system discharges about 1,500 gallons per minute (gpm) of groundwater on average.

A portion of Magpie Creek in the West Nature Area was rerouted for the construction of Building 783; in this location, two arms of the former creek channel are still present on either side of Building 783, and a rock-lined section of Magpie Creek now directs flow around the northern end of the building. Both the rock-lined section and the abandoned arms of the former creek channel are considered part of the West Nature Area creek sites. Magpie Creek in the West Nature Area includes about 4,000 linear feet of creek. The two abandoned arms are 380 and 775 feet in length. The portion of the abandoned creek beneath Building 783 is not included in this ROD; it was included as AOC 322 in the *Initial Parcel #3 Feasibility Study* (CH2M HILL, 2008).

The easternmost segment of Don Julio Creek in the West Nature Area is lined for approximately 300 feet, where it extends around the eastern and northern sides of the IC 17

holding ponds. The remainder of Don Julio Creek in the West Nature Area is unlined and extends about 3,400 feet to the western base boundary.

Vernal pools are scattered throughout the grassland areas in the West Nature Area (URS, 2009). Numerous vernal pools have formed in depressions along the old rice field check levees that were constructed between the two creeks. Other vernal pools occur in natural depressions in the grassland areas north of Don Julio Creek and south of Magpie Creek in the West Nature Area. Vernal pool fairy shrimp, a federally threatened species, has been identified within the boundaries of the West Nature Area to the south of Don Julio Creek.

In 1997, Magpie and Don Julio creeks west of Patrol Road were dredged for flood control (Radian International [Radian], 1998; URS, 2009). As much as 5,900 linear feet of the creek channels were dredged to prevent water from backing up in the creeks and causing flooding on the base. Dredged material (tailings piles) was piled along the creek banks about 5 to 20 feet from the creek bed, and piles of dredged material (2 to 7 feet high) are present along both creeks west of Patrol Road. The tailings piles from Don Julio Creek are primarily along the southern side of the creek; tailings piles are along both banks of Magpie Creek. All of the tailings piles are currently covered with vegetation.

Summary of Human Health Risk Assessment

Exposure scenarios evaluated included maintenance workers and recreational users of the site. The recreational use scenario included a fish consumption pathway, which assumed regular consumption of fish, crayfish, and other edible biota from the creeks. Because of the current and projected future use as a nature conservation area, construction worker, residential, and industrial use scenarios are not relevant exposure scenarios for the site.

Risks for chemical constituents under the recreational use scenario, which assumed exposure to contaminants in tailings piles, upland soils, surface water, and creek sediments, are within the EPA risk management range of 1×10^{-6} to 1×10^{-4} (at 3×10^{-5} for Don Julio Creek and 2×10^{-5} for Magpie Creek) for cancer risk and all HIs are less than significant (0.3) for non-cancer risks. Arsenic, which is at background levels, is the most significant risk driver. Excluding arsenic, the carcinogenic risks are less than 1×10^{-5} .

Exposure of the recreational user through the biota consumption pathway results in an added cancer risk of 4×10^{-4} and an HI of 3 based on average crayfish concentrations. However, excluding arsenic and other metals which are present at background levels, the carcinogenic risk is less than 1×10^{-4} and the HI is equal to 1 due to PCBs. This exposure scenario assumes the recreational user would consume an 8-oz. meal each week (approximately 10 crayfish per meal) from March to October every year for 30 years. It is unlikely that a recreational user would consume this quantity of fish or crayfish from the creeks in the West Nature Area, particularly given that the area is fenced off from most public access points and is not open for general recreational purposes. Further, as noted in the HHRA (URS, 2009), it is uncertain whether the resident populations of fish or crayfish could replenish sufficiently to maintain the consumption levels assumed under this scenario. In 2003 a crayfish survey was performed for the WNA Creeks (Appendix G of the Creeks Data Gap FSP, URS, October 2005). Two survey locations were established on each creek and traps were set for 24 hours and checked each day for 2 or 3 days. This sampling was repeated during 7 events throughout 2003 for a total of 77 individual sample

counts. For only 2 of the sample counts were 10 or more crayfish trapped, and only 1 of these sample counts contained a sufficient mass of crayfish to obtain an 8-oz meal; on average only 1.5 crayfish were captured each night per trap.

Risks under the maintenance worker (9×10^{-7}) scenario resulting from potential exposures to chemical constituents in tailings piles and creek sediments are all less than the EPA risk management range for cancer risk and less than significant (HI = 0.008) for non-cancer risks.

For radionuclides, the total lifetime risk of cancer incidence associated with radionuclides in Don Julio Creek in the West Nature Area was within the low end of the risk management range for the construction worker (1.7×10^{-6}) and recreational fisherman (6.8×10^{-6}) scenarios. An HHRA was not completed for Magpie Creek in the West Nature Area because all radionuclides were indistinguishable from the reference area.

Summary of Ecological Risk Assessment

The chemical contaminants at the West Nature Area present relatively low risk to ecological receptors (mean HQ values are generally less than 10). Potential risk to benthic invertebrates in Don Julio Creek sediment is from dioxins/furans, PCBs, cadmium, silver, PAHs, and pesticides (primarily total-DDT, alpha and gamma chlordane, and dieldrin) and in Magpie Creek sediment is from dioxins/furans, PCBs, cadmium, silver, and pesticides (primarily total-DDT and dieldrin). Potential risk to benthic invertebrates in the vernal pools is limited to cadmium.

The HQs for silver and cadmium are low (all less than 5 at upperbound concentrations) and may be representative of background. For Don Julio Creek and Magpie Creeks, the mean concentrations in sediments are less than the high PCGs for benthic invertebrates for all COCs. Toxicity tests for *Hyalella azteca* resulted in reduced survival in all but one sample; however, the specific cause of toxicity could not be determined and may be attributable to background levels of metals or non-contaminant factors.

Risk from exposure to soil in the tailings piles is relatively low for terrestrial invertebrates (mean and upperbound HQs less than 10). For terrestrial birds and mammals, upperbound HQs for tetrachlorodibenzo-p-dioxin equivalent (TCDD_{eq}) with dioxin-like PCBs exceeded 10. Risk estimates were also generated for the "tailings only" scenario for benthic invertebrates. This scenario assumes that the tailings have been transported to the creeks or other wetland habitats. The benthic invertebrate HQs were less than 5 for the mean and upperbound concentrations for all contaminants except pesticides. However, the mean concentrations for all pesticides were less than the high PCGs.

The exposure scenario for aquatic receptors incorporated data from sediment, surface water, and tailings piles within 100 feet of the creeks. Mean and upperbound HQs were less than 10 for all COCs, indicating that the risk to aquatic receptors (heron and otter) is relatively low. The maximum COC concentrations are 0.085 g/kg for total PCBs and 1.9×10^{-5} for dioxins/furans.

The results of the ERA for radionuclides in the West Nature Area did not identify any significant risk to terrestrial, riparian, or aquatic biota.

The ecological risk for each sample location in the West Nature Area is displayed on Figures 3 through 5 relative to the low and high PCGs for benthic invertebrates, aquatic wildlife, and terrestrial wildlife, respectively. Pesticides are not shown on the figures, as concentrations are present at levels comparable to upstream, offbase creeks and are likely not attributable to a site release.

- For benthic invertebrates (Figure 3), only three reported concentrations exceeded the high PCGs. Silver exceeded the high PCG at one location each on Don Julio and Magpie Creeks, but the reported concentrations (1.75 and 2 mg/kg) may be representative of background. A single detection of benzo(k)fluoranthene slightly exceeded the high PCG (0.55 versus 0.537 mg/kg) on Don Julio Creek.
- For aquatic wildlife (Figure 4), no detections on Don Julio Creek exceeded the high PCGs, and only a single detection on Magpie Creek exceeded the low PCGs (dioxins/furans for the green heron).
- For terrestrial wildlife (Figure 5), no detections on Magpie Creek exceeded the high PCGs, and on Don Julio Creek, the high PCGs for dioxins/furans were slightly exceeded at three locations for the deer mouse.

Basis for Action

The Air Force and EPA are selecting excavation of the tailings piles in the West Nature Area. The COCs for the tailings piles are dioxin/furans and PCBs. Under the selected remedy, all tailings piles will be excavated irrespective of cleanup levels. Based on preliminary discussion and consultation with the resource agencies, all of the piles can be removed without permanent loss of habitat for sensitive species, and the benefit of removing the piles will outweigh the temporary impacts of remedial activities. The response action selected for the tailings piles in the West Nature Area in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

No Action is being selected for the creeks and vernal pools in the West Nature Area.

- For the creeks, dioxins/furans, pesticides, and PCBs are identified as COCs. Although the human health risk assessment identified a potential risk from the consumption of biota from the creeks, the risks for the average concentrations were within the risk management range for COCs and were conservatively estimated. It is unlikely that an individual would consume biota at the levels used for the risk assessment or that the creeks could sustain those levels of consumption. The mean concentrations of COCs in sediments are less than the high PCGs for benthic invertebrates and are less than those reported in upstream, offbase creeks for dioxins/furans, total-DDT, total chlordane, dieldrin, total PCBs, and cadmium. In addition, the West Nature Area creeks are within an existing conservation easement that excludes public access. No Action is appropriate for the creeks in the West Nature Area as excavation is not justified relative to the associated habitat damage.
- Cadmium was the only COC identified for the vernal pools in the West Nature Area. However, only low levels of cadmium were detected in soil and sediment samples from vernal pools within the West Nature Area. The detected concentrations are likely representative of background, and associated risks to ecological receptors are low.

No Action is appropriate at the vernal pools as excavation is not justified relative to the habitat damage associated with soil removal.

2.5.3 Offbase Creeks

Site Characteristics

The Offbase Creeks area includes portions of Don Julio and Magpie creeks from the western property boundary of the West Nature Area to where the two creeks merge, west of Raley Boulevard, and a small segment of the former Magpie Creek channel beyond this juncture (Figure 6). The creek channels are unlined and have a natural bed and bank with riparian vegetation and wider channels in some areas that reduce flow and promote sediment deposition (URS, 2009). The floodplain area associated with Magpie and Don Julio Creeks in the Offbase Creeks area covers the entire area between the two creeks. In general, the Offbase Creeks are considered comparable habitat to the onbase portions of Don Julio and Magpie creeks within the West Nature Area. However, the upland areas of the Offbase Creeks lack comparable habitat because of weed control and fire suppression activities and do not contain vernal pools.

Magpie and Don Julio creeks exit the West Nature Area at different points along the western base boundary (Figure 6). Don Julio Creek flows west toward Raley Boulevard and becomes channelized and flows south to join Magpie Creek. Magpie Creek flows west from the base boundary to Raley Boulevard, where it is joined by Don Julio Creek.

West of this juncture, Magpie Creek flows northwest into an unlined diversion channel that leads to the Natomas East Main Drainage Canal and then to the American River. This diversion channel was constructed in the 1950s to redirect flow from Magpie Creek to Robla Creek. Until 1995, some of the flow could pass through a floodgate and continue through the original Magpie Creek channel, but construction in the area covered the floodgate, and no water has flowed in the former Magpie Creek channel since that time.

The section of Don Julio Creek east of Raley Boulevard and the Magpie Creek Diversion Channel are both constructed channels with straightened bed and banks. These sections of creek are maintained by the flood control district and typically do not support well developed riparian or wetland habitats.

Summary of Human Health Risk Assessment

As with the creeks in the West Nature Area, the exposure scenarios evaluated for the Offbase Creeks included maintenance workers and recreational users of the site. The recreational use scenario included a fish consumption pathway, which assumed regular consumption of fish, crayfish, and other edible biota from the creeks. Because COCs are limited to the creek sediments, baseline risk assessments were not performed for future residential or industrial use scenarios. If residences or businesses were built in the future, the creeks would either remain as creeks and exposures would continue to be limited to maintenance workers or recreational users, or the creeks would be covered over and exposure pathways would be incomplete. Thus, residential and industrial exposures would not occur.

For the recreational use scenario resulting from potential exposures to chemical constituents in upland soils, surface water, and creek sediments, the risks are within the EPA risk management range (8×10^{-5}), and HIs are less than significant (0.3) for non-cancer risks.

Arsenic, which is at background levels, is the most significant risk driver. Excluding arsenic, the carcinogenic risks are approximately 1×10^{-5} .

Exposure of the recreational user through the biota consumption pathway results in an added cancer risk of 4×10^{-4} and an HI of 3 based on average crayfish concentrations. However, excluding arsenic and other metals which are present at background levels, the carcinogenic risk is less than 1×10^{-4} and the HI is equal to 1 due to PCBs. This exposure scenario assumes that the recreational user would consume an 8-oz. meal each week (approximately 10 crayfish per meal) from March to October every year for 30 years. It is unlikely that a recreational user would consume this quantity of fish or crayfish. Furthermore, as noted in the HHRA (URS, 2009), it is uncertain whether the resident populations of fish or crayfish could replenish sufficiently to maintain the consumption levels assumed under this scenario. In 2003 a crayfish survey was performed for the WNA Creeks (Appendix G of the Creeks Data Gap FSP, URS, October 2005). Two survey locations were established on each creek and traps were set for 24 hours and checked each day for 2 or 3 days. This sampling was repeated during 7 events throughout 2003 for a total of 77 individual sample counts. For only 2 of the sample counts were 10 or more crayfish trapped, and only 1 of these sample counts contained a sufficient mass of crayfish to obtain an 8-oz meal; on average only 1.5 crayfish were captured each night per trap.

Risks under the maintenance worker scenario resulting from potential exposures to contaminants in creek sediments are at the low end (2×10^{-6}) of the EPA risk management range for cancer risk and less than significant (0.02) for non-cancer risks.

The total lifetime risk of cancer incidence associated with radionuclides for the Offbase Creeks was within the low end of the risk management range. An HHRA was completed for the construction worker (2×10^{-6}) and recreational fisherman (8×10^{-5}) scenarios for the low-lying area west of where Don Julio and Magpie creeks merge. All radionuclides upstream of this area to the base boundary were indistinguishable from the reference area.

Summary of Ecological Risk Assessment

Based on the ERA conducted for the Offbase Creeks, the chemical contaminants found at the site present relatively low risk to ecological receptors (mean HQ values are generally less than 10). Potential risk to benthic invertebrates is from dioxins/furans, PCBs, pesticides, cadmium, and silver. The highest ecological risk factors are associated with potential exposures to pesticides. The mean COC concentrations are 3.62 mg/kg for cadmium, 1.63 mg/kg for silver, 0.0585 mg/kg for total DDT, 0.203 mg/kg for total PCBs, and 3.12×10^{-5} mg/kg for TCDDeq with dioxin-like PCBs (fish). Inorganics were either consistent with background concentrations or slightly elevated above background. With the exception of dioxins/furans, the mean concentrations in sediments of the organic contaminants are less than the high PCGs for benthic invertebrates. Three of the four dioxin/furan exceedances of the high PCG are based on historical data collected under EPA Method 8080A. Dioxins reported by the historical method generally exceeded the benchmarks even when all data were non-detect (i.e., when non-detects are calculated as half the method detection limit). When non-detects are calculated as 0, the maximum TCDDeq concentration only slightly exceeds the high PCG for benthic invertebrates and the mean concentration (4.56×10^{-6} mg/kg) is below the high PCG. Further, concentrations of dioxins/furans are consistent with concentrations in the upstream offbase creeks.

The results of the ERA for radionuclides in the Offbase Creeks did not identify any significant risk to terrestrial, riparian, or aquatic biota.

The ecological risk for each sample location for the Offbase Creeks is displayed on Figures 4 and 6 relative to the low and high PCGs for aquatic wildlife and benthic invertebrates. Pesticides are not shown on the figures, as concentrations are present at levels comparable to upstream, offbase creeks and are likely not attributable to a site release.

- For aquatic wildlife (Figure 4), a single detection of dioxins/furans exceeded the high PCG for the green heron. There were no other exceedances of the high PCG for aquatic wildlife.
- For benthic invertebrates (Figure 6), concentrations of metals exceed the high PCGs at five locations; however, the concentrations were either consistent with background concentrations or slightly elevated above background. Concentrations of dioxins/furans (as TCDD TEQ with dioxin-like PCBs for fish) exceed the high PCGs at one location; however, dioxin/furan concentrations are comparable to concentrations reported in sediments in upstream, offbase creeks.

Basis for Action

To secure State acceptance of this ROD, the Air Force and EPA are selecting excavation and disposal for the Offbase Creeks. The COCs for Offbase Creeks include dioxins/furans, pesticides, and PCBs. The excavation area (Figure 6) will target the highest concentrations of COCs in sediments within Don Julio Creek and reduce the average concentrations to less than those reported in upstream, offbase creeks. The response action selected for the Offbase Creeks in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

2.5.4 Magpie Creek West of the Runway

Site Characteristics

Magpie Creek West of the Runway includes the portion of Magpie Creek that extends from the runway in the middle of the base west to Patrol Road. The course of Magpie Creek West of the Runway is about 9,000 feet long. Between 1943 and 1945, the creek channel was altered and lined with concrete and corrugated steel from the southwestern corner of PRL S-031 to PRL 028, a skimming basin. The unlined section is located in the airfield between the runway and PRL S-031. Portions of the creek banks through this section are covered with remnant concrete and asphalt. Vegetation in this section is characterized by moderate to heavy growth of cattails and tules, interspersed with a few small trees. This segment of creek is surrounded by an active taxiway, industrial buildings, and paved areas, and provides relatively low-quality habitat for wildlife. Figure 7 shows the site features. Potential sources of contamination to the creek include contaminated stormwater runoff and potential discharges into the creeks from onbase and upstream sources.

This site also includes Vernal Pool 442 and Vernal Pool 509 located within the floodplain of Magpie Creek. Vernal Pool 442 is a small pool located immediately north of the unlined section of Magpie Creek. Vernal Pool 509 is a somewhat larger pool located adjacent to the taxiway at the eastern end of the unlined portion of Magpie Creek.

Summary of Human Health Risk Assessment

In Magpie Creek West of the Runway, the lined and unlined segments of the creek and nearby vernal pools were evaluated for the construction worker scenario, and the unlined creek sections and vernal pools were evaluated for the maintenance worker scenario. Risks under the maintenance worker scenario (4×10^{-7}) resulting from potential exposures to chemical contaminants in sediments are less than the EPA risk management range for cancer risk and less than significant ($HI = 0.005$) for non-cancer risks. However, for the construction worker scenario (9×10^{-6}), the risks are within the risk management range for cancer risk and are significant ($HI = 3$) for non-cancer risks because of PCBs.

The current and proposed future use of the areas adjacent to Magpie Creek West of the Runway is industrial. Because contamination is confined to the creek sediments, potential exposures are limited to maintenance or construction workers entering the creeks. If the creeks are ever filled or covered over by future industrial development, exposure pathways would be incomplete. Thus, industrial worker exposures would not occur, and a baseline risk assessment was not performed for the industrial use scenario. Recreational use is not likely now or in the future because the creek is lined with concrete for most of its length, and the unlined sections are within the fenced boundaries of the active airfield.

For radionuclides, the total lifetime risk of cancer incidence associated with radionuclides in Magpie Creek West of the Runway was within the low end of the risk management range for the construction worker (1.9×10^{-6}) and recreational fisherman (7.3×10^{-6}) scenarios.

Summary of Ecological Risk Assessment

Chemical contaminants in sediments in the unlined creek section pose a localized ecological hazard to resident benthic invertebrates (HQs ranged from 1.1 to 49), but the potential for adverse effects to vernal pool fairy shrimp at vernal pools in the adjacent floodplain is considered low. Under the conservative assumption that the green heron were to forage exclusively in the unlined creek section and adjacent vernal pools, contaminants in sediment could pose an ecological hazard. The risk is driven primarily by PCB concentrations in creek sediments, with the highest concentrations occurring at the western end of the unlined section.

The results of the ERA for radionuclides for Magpie Creek West of the Runway did not identify any significant risk to terrestrial, riparian, or aquatic biota.

The ecological risk for each sample location along the unlined section of Magpie Creek West of the Runway is displayed on Figure 7 relative to the low and high PCGs for aquatic wildlife (green heron) and benthic invertebrates. The concentrations and risks are highest along the western end of the unlined section where concentrations of PCBs, dioxins/furans, benzo(a)pyrene, benzo(b)fluoranthene, and silver exceed the high PCG for benthic invertebrates and the concentration of PCBs exceed the high PCG for the green heron. In addition, the maximum concentration of total dichlorodiphenyl-trichloroethane (DDT) exceeds the low PCG for green heron and concentrations exceed those found in the upstream, offbase creeks. Contaminant concentrations are higher beneath the lined section of the creek further to the west; however, the pathway to ecological receptors is incomplete in the lined sections.

Basis for Action

COCs for the creek include dioxins/furans, PCBs, benzo(a)pyrene, benzo(b)fluoranthene, total DDT, and silver. Because of elevated potential risks for ecological receptors and construction workers, the Air Force and EPA are selecting excavation and disposal for contaminated creek sediments. The selected response action in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

For the vernal pools, PCBs and metals were identified as COCs. However, only low levels of contaminants were detected in soil and sediment samples from within and adjacent to vernal pools associated with Magpie Creek West of the Runway, and associated risks to ecological receptors are low. No Action is appropriate at the vernal pools as excavation is not justified relative to the habitat damage associated with soil removal.

2.5.5 IC 17 Seasonal Creek and Drainage Ditch

Site Characteristics

The IC 17 Seasonal Creek and Drainage Ditch are located in IC 17 in the western portion of McClellan, in central OU C (Figure 8). The unlined Seasonal Creek flows through IC 17 and merges with Don Julio Creek in northwestern IC 17, collecting surface drainage from the central part of OU C.

The IC 17 Seasonal Creek contains water only during the rainy season, except at its confluence with Don Julio Creek, where water from Don Julio Creek backs up, causing water to stand in the low points in the creek throughout the year. At its eastern extent, the Seasonal Creek has two legs (a northern and a southern) that receive runoff and are connected by storm drains to the area directly west of Shelter Road and the hush houses that line the runway (PRL 066C and D). These two legs converge in the middle of IC 17 and flow west toward Patrol Road and Don Julio Creek.

The drainage ditch portion of the IC 17 Seasonal Creek and Drainage Ditch is a gunite- and steel-lined drainage ditch that flows south from the confluence of Don Julio Creek and the IC 17 Seasonal Creek and parallels the western edge of IC 17 (URS, 2009). This drainage ditch connects Don Julio Creek to Magpie Creek, but a dam across the drainage ditch minimizes flow between the two creeks. The ditch was constructed in 1957 to connect Don Julio Creek to Magpie Creek at the skimming basin (PRL 028) and to allow water from Don Julio Creek to be skimmed for oil (CH2M HILL, 1993). It is likely that the drainage ditch was lined during construction, but no information is available on the date it was lined (URS, 2009). Because of the presence of the lining and the seasonal nature of surface water flows, the drainage ditch provides little to no habitat for aquatic or wetland receptors of concern at McClellan.

Summary of Human Health Risk Assessment

Potential health risks and hazards for maintenance and construction workers, which are the plausible exposure scenarios, given the current and reasonably foreseeable land use, are considered acceptable. For chemical constituents, risks were at the low end of the EPA risk management range for cancer risk (maintenance worker [2×10^{-6}]); construction worker

$[(1 \times 10^{-5})]$), and HIs were 0.008 for the maintenance worker and 1 for the construction worker for non-cancer risks.

The current and proposed future use of the areas adjacent to the IC 17 Seasonal Creek and Drainage Ditch is industrial. Because contamination is confined to the creek sediments, potential exposures are limited to maintenance or construction workers entering the creeks. If the creeks are ever filled or covered over by future industrial development, exposure pathways would be incomplete. Thus, industrial worker exposures would not occur, and a baseline risk assessment was not performed for the industrial use scenario. Recreational use is not likely now or in the future because the creek is located within industrialized areas and partially lined with concrete. The unlined sections are largely contained within the fenced boundary of the airfield and contain water only on an intermittent basis. For radionuclides, an HHRA was not completed for the IC 17 Seasonal Creek and Drainage Ditch because all radionuclides were indistinguishable from the reference area.

Summary of Ecological Risk Assessment

Chemical contaminants in sediment of the IC 17 Seasonal Creek and Drainage Ditch may pose an ecological risk to resident benthic invertebrates at specific locations. However, the benthic community is expected to be limited in terms of diversity and abundance because the creek is dry throughout most of the year and the drainage ditch is entirely lined. The highest chemical concentrations in sediment were generally found in sediment above the liner at the Drainage Ditch in two locations that appear to not have been regularly cleaned out by the County of Sacramento for flood control. The HQs for several contaminants ranged from 1.1 to 77.7.

The ERA for radionuclides did not identify any significant risk to terrestrial, riparian, or aquatic biota.

The ecological risk for each sample location along the IC 17 Seasonal Creek and Drainage Ditch is displayed on Figure 8 relative to the low and high PCGs for benthic invertebrates. Concentrations and risks are relatively low. The only concentration exceeding the high PCG was for silver found in sediments above the liner along the southern end of the lined creek channel.

Basis for Action

Dioxins/furans, silver, and PCBs are COCs for the IC 17 Seasonal Creek and Drainage Ditch. Because of potential risks for ecological receptors, the Air Force and EPA are selecting excavation and disposal for contaminated creek sediments present above the liner. The selected response action in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

2.5.6 Vernal Pools Associated with CS 007 and SAFR

Site Characteristics

CS 007 is located in OU C (Figure 9) and consists of a disposal pit reportedly used for disposal of industrial waste and oil, and for waste burning (CH2M HILL, 2007). The SAFR site is located north of CS 007 and consists of an active firing range (Figure 9). The two sites

are combined together because there are soil piles, consisting of dirt scraped from the backstop of the SAFR, that potentially affect the same vernal pools as CS 007. This ROD is limited to the vernal pools affected by site contaminants. The SAFR was addressed in the *Focused Strategic Sites Feasibility Study* (CH2M HILL, 2006), and CS 007 was addressed in the *Follow-on Strategic Sites FS* (CH2M HILL, 2011b).

It is believed that the CS 007 disposal pit was in use from about 1966 to the mid-1970s, although it is not known exactly when McClellan stopped using it for waste disposal. An open excavation area appears at the site on aerial photographs from 1973 to 1978, and soil disturbances are apparent until about 1987 (URS, 2005a; CH2M HILL, 1993; McLaren Environmental Engineering, Inc. [McLaren], 1986; CH2M HILL, 1981).

Wastes found in the CS 007 disposal pit during previous investigations included plastic, paper, metal, cloth, and wood (URS, 2005a). Much of this waste was unburned. Waste from the Industrial Wastewater Treatment Plant (IWTP), drums of solvents, cyanide, medical supplies, and batteries were reportedly disposed of at CS 007 as well.

The SAFR consists of Building 710, Building 712, a large berm used as a backstop for small arms firing exercises, and a soil pile area (CH2M HILL, 2007). The soil piles consist of dirt containing spent ammunition that was periodically scraped from the backstop and deposited into piles at the southeastern end of Building 712 (URS, 2005a).

The vernal pools (421, 422, 423, and 601) addressed in this ROD are within a field of annual grassland to the north of CS 007. The field is surrounded by a fire training area to the east and south, a concrete-lined section of Don Julio Creek and Patrol Road to the west, and a shooting range to the north. Most of the grassland is mowed, but the immediate area of the vernal pools is separated from the remainder of the field by coir wattles (erosion control material). The entire field may have been graded in the past.

Summary of Human Health Risk Assessment

The Vernal Pools Associated with CS 007 and SAFR represent potential habitat for federally listed vernal pool crustaceans. Human intrusions into the vernal pools are restricted by the Endangered Species Act, and therefore, the vernal pool data were not evaluated for human health risks. HHRAs for CS 007 and the SAFR can be found in the *Follow-on Strategic Sites FS* (CH2M HILL, 2010b) and *Focused Strategic Sites FS* (CH2M HILL, 2006), respectively.

Summary of Ecological Risk Assessment

Only one analyte (chromium) had an HQ above 1 for plants. The maximum chromium concentration was only slightly above its surface soil and sediment background concentrations, while the average chromium concentration was less than both values, suggesting that incremental risk is very low for all ecological receptors (CH2M HILL, 2007).

Three semivolatile organic compounds (SVOCs) had upperbound TRV HQs greater than 1 for birds; however, these values were less than 10 and the three SVOCs were not detected in the samples. The HQs were calculated using one-half the method detection limits for the SVOCs. Because the magnitude of exceedance for these HQs was low and the SVOCs were not detected, population-level effects are unlikely (CH2M HILL, 2007).

Twenty-one SVOCs had TRV-low HQs greater than 1 for benthic invertebrates, of which 13 (seven detected and six non-detected) had HQs greater than 10. The detected SVOCs with TRV-low HQs above 10, ranging from 16 to 130, were all PAHs and all had detection frequencies of 100 percent. PAHs were most elevated in Vernal Pool 421. PAH concentrations were about five times lower in samples from Vernal Pools 422 and 423. Based on concentrations for individual vernal pools, risk in Vernal Pools 422 and 423 is much lower than that in Vernal Pool 421 but are still elevated (HQs > 10) for some PAHs. This suggests that PAHs may pose a risk to special-status benthic invertebrates living in vernal pools near CS 007 and SAFR. Contaminant concentrations in Vernal Pool 601 are assumed to be similar to those in Vernal Pools 421, 422, and 423.

The ecological risk for each sample location within the Vernal Pools Associated with CS 007 and SAFR is displayed on Figure 9 relative to the low and high PCGs for benthic invertebrates. Concentrations and risks are relatively high, with concentrations of PAHs exceeding the high PCGs in all samples collected from the vernal pools.

Basis for Action

PAHs are COCs for the vernal pools associated with CS 007 and SAFR. Because of potential risks for ecological receptors, primarily benthic invertebrates, the Air Force and EPA are selecting excavation and disposal for contaminated soil and sediment in the vernal pools. The selected response action for the vernal pools associated with CS 007 and SAFR in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Because these vernal pools are located within an area planned for future industrial use, the vernal pool habitat will not be restored onsite.

2.5.7 Vernal Pool Associated with PRL S-010

Site Characteristics

PRL S-010 is located in OU E (Figure 10) and consists of a former storage yard for hazardous and low-level radioactive wastes (Jacobs, 2000). The site is about 10,000 square feet and lies within the aircraft movement area. The site was first operated as a storage yard in 1973, when Building 1086 was constructed. The building consists of a 12-by-15-foot galvanized steel structure. Two temporary storage buildings were also constructed at the site sometime before 1990, when they were first visible in aerial photographs of the site. One of these temporary structures is no longer present at the site and is believed to have been removed in 1996 or 1997.

PRL S-010 reportedly provided storage for both hazardous and radioactive wastes, including VOCs, PCBs, inorganics, acids, cyanide sludge, heavy metal sludge, paints, and other wastes (Jacobs, 2000). The OUs E-H Remedial Investigation Characterization Summaries (RICS) indicate that containerized hazardous wastes and low level radioactive wastes from laboratories and other operations were stored in the three storage buildings, as well as in the fenced open area of the site.

Vernal Pool 382 has formed in the corner at the intersection of a service road and a graded pad. The slight elevation rise of the pavement on the northern and eastern sides of Vernal Pool 382 appear to be the cause of inundation. The site and adjacent vernal pool are inside

the footprint of the airfield. California annual grassland borders Vernal Pool 382 to the west and south and is kept mowed. The source of contamination at the vernal pool is likely a result of activities conducted at PRL S-010.

Only Vernal Pool 382 is included in this ROD for PRL S-010. The primary site (PRL S-010) was included in the Follow-on Strategic Sites FS (CH2M HILL, 2010b) and will be included in the ROD. The other vernal pools around PRL S-010 were previously sampled and were determined to not be impacted by contaminants from PRL S-010 as indicated in the Basewide Vernal Pool Tier 2 ERA (CH2M HILL, 2007).

Summary of Human Health Risk Assessment

The Vernal Pool Associated with PRL S-010 represents potential habitat for federally listed vernal pool crustaceans. Human intrusions into the vernal pool are restricted by the Endangered Species Act, and therefore, the vernal pool data were not evaluated for human health risks. The human health risk assessment for PRL S-010 can be found in the Follow-on Strategic Sites FS (CH2M HILL, 2010b). For radionuclides, an HHRA was not completed for PRL S-010 because all radionuclides were indistinguishable from the reference area (an area used to establish the background data set).

Summary of Ecological Risk Assessment

Based on the ERA for chemical constituents, HQs were less than 1 for plants and high TRV-based HQs ranged from 0.1 to 0.2 for birds. No substantive risks for birds and plants were predicted in Vernal Pool 382. Although the low TRV-based HQ for total PCBs was 10 for benthic invertebrates, the high TRV-based HQ was 0.8.

The ERA for radionuclides did not identify any significant risk to terrestrial, riparian, or aquatic biota.

The ecological risk for each sample location within the Vernal Pool Associated with PRL S-010 is displayed on Figure 10 relative to the low and high PCGs for benthic invertebrates. Concentrations and risks are relatively low, with the concentration of PCBs exceeding the low PCG in one of the two samples.

Basis for No Action

PCBs were identified as COCs for the Vernal Pool Associated with PRL S-010. However, relatively low levels of contaminants were detected in soil and sediment samples from Vernal Pool 382 at PRL S-010, and associated risks to ecological receptors are low. No Action is appropriate at the vernal pool as excavation is not justified relative to the habitat damage associated with soil removal.

2.5.8 Second Creek

Site Characteristics

Second Creek is located at the southern boundary of OU G and traverses the central portion of McClellan (Figure 11), conveying water from the eastern side of the base to the western side. Second Creek predominantly flows across the flightline area, and the future land use is not expected to change. It has sections of lined and unlined channel, and sections contained within underground culverts (indicated on Figure 11). Second Creek enters the eastern side

of McClellan at Watt Avenue and James Way, and flows west along the southern side of James Way to the airfield. It then splits into two drainages: the northern and southern branches. The northern branch flows north for approximately 450 feet where it discharges into a 1,000-foot unlined drainage channel. This unlined section feeds into an underground culvert that directs flow to the west for approximately 0.4 mile to the western base boundary. The southern branch flows west under the main runway for approximately 0.4 mile, and then into a 1,200-foot unlined channel. This channel feeds into another underground culvert under the northwest taxiway for about 450 feet and ultimately into a concrete-lined channel for about 1,800 feet. These drainages converge with Don Julio Creek at separate locations (Figure 11) near the western base boundary. Several storm drain lines discharge into the Second Creek channel, as do a few small tributary drainage ditches.

Second Creek is first evident in a 1946 aerial photograph. Prior to that, the area consisted of undeveloped fields (URS, 2009). All facilities contributing surface flow to Second Creek were constructed by 1956. In 1957, a portion (approximately 3,000 feet) of the creek was routed underground as part of the runway extension. Aerial photographs indicate that the section of Second Creek along James Way was unlined until at least 1965 (Jacobs, 1998). In 2004, a creeks-widening project was conducted along the portion of Second Creek that parallels James Way from the eastern base boundary to the airfield. This project involved removal of the concrete creek liner and excavation of soil beneath the liner to widen and deepen the channel. Any contaminated soil encountered beneath the liner was removed, and a new liner was constructed in early 2005. Therefore, studies conducted prior to 2004 in this portion of the site are not representative of the current site characteristics.

Vernal pools (341, 383, 586, 587, 588, 591, and 593) and seasonal wetlands (592 and 671) within the site and addressed in this ROD are shown on Figure 11. The vernal pools exist in relatively disturbed areas and have similar characteristics to the Vernal Pool Associated with PRL S-010 discussed above.

Summary of Human Health Risk Assessment

For Second Creek, the construction worker and maintenance worker scenarios were evaluated. Risks under the maintenance worker (3×10^{-7}) scenario resulting from potential exposures to chemical contaminants in sediments are less than the EPA risk management range for cancer risk and less than significant (HI = 0.006) for non-cancer risks. For the construction worker scenario, the risks (2×10^{-6}) are within the low end of the risk management range for cancer risk because of PAHs but are not significant for non-cancer risks (HI = 0.7).

The current and proposed future use of the areas adjacent to Second Creek is industrial. Because contamination is confined to the creek sediments, potential exposures are limited to maintenance or construction workers entering the creeks. If the creeks are ever filled or covered over by future industrial development, exposure pathways would be incomplete. Thus, industrial worker exposures would not occur, and a baseline risk assessment was not performed for the industrial use scenario. Recreational use is not likely now or in the future because the creek is partially lined with concrete, and the unlined sections are within the fenced boundaries of the active airfield.

For radionuclides, the total lifetime risk of cancer incidence associated with radionuclides in Second Creek was within the low end of the risk management range for the construction worker and recreational fisherman scenarios.

Summary of Ecological Risk Assessment

Contaminants in the eastern and western unlined sections of Second Creek, and at Vernal Pool 341, might pose a localized ecological hazard to resident benthic invertebrates (i.e., HQs are greater than 1). The highest concentrations of contaminants, including some with HQs greater than 10 for benthic invertebrates, were from sediment in the unlined section of Second Creek east of the runway. However, HQs for the unlined section of the creek west of the runway and for Vernal Pool 341 ranged from 1 to 5, indicating a low potential for risk.

The ERA for radionuclides did not identify any significant risk to terrestrial, riparian, or aquatic biota.

The ecological risk for each sample location along Second Creek is displayed on Figure 11 relative to the low and high PCGs for benthic invertebrates. Concentrations of PAHs exceeded the high PCG at only one location along the northern portion of Second Creek immediately west of the tarmac.

Basis for Action

PAHs are COCs for both the creeks and vernal pools at Second Creek. Because of elevated potential risks for ecological receptors, particularly benthic invertebrates in the unlined section of Second Creek east of the runway, the Air Force and EPA are selecting excavation and disposal for contaminated creek sediments. The selected response action in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Only low levels of contaminants were detected in soil and sediment samples from within and adjacent to vernal pools associated with Second Creek, and associated risks to ecological receptors are low. No Action is appropriate at the vernal pools as excavation is not justified relative to the habitat damage associated with soil removal.

2.5.9 Former A-1 Metals Facility

Site Characteristics

The Former A-1 Metals Facility is located in the northwestern corner of the former base, north and west of the runway in OU F, bounded to the north by Elkhorn Boulevard and to the west by 26th Street (Figure 12). The site, which is about 300 feet wide by 250 feet long, is currently undeveloped and unpaved except for the foundation of a former building (A-1 Metals). This foundation is covered with 2 to 3 inches of topsoil (Jacobs, 2000). The area was identified as an AOC because the former landowner, A-1 Metals, reportedly disposed of PCB-contaminated transformer oil on unpaved surfaces at the site. The land was acquired by the Air Force as part of a noise/safety program and was designated as a "clear zone" to provide an area of safety around the northern end of the runway at McClellan. No Air Force activities have been or are currently performed at the Former A-1 Metals Facility. There is no nearby residential use, but commercial buildings are operated adjacent to the site, about

150 feet away. Contamination associated with the Former A-1 Metals Facility extends beyond the boundaries of the site. Vernal pools to the south and southeast of this site (Vernal Pools 262, 267, 270, and 277) receive runoff from the Former A-1 Metals Facility (AOC F-1). Both the site and the contamination beyond the site boundaries (including the vernal pools) are included in this ROD. A removal action was performed at the site in 1988 as discussed in Section 2.4.1. During the subsequent RI conducted in 1997/1998, PCBs were detected up to a maximum concentration of 12 mg/kg. The maximum concentration in surface soil was 2.2 mg/kg.

In August 2010, the DTSC and CDFG requested that the Air Force collect samples from Former A-1 Metals Facility to provide a more definitive thallium analysis for soil samples at the site and confirm that thallium was not present at levels of concern. There was uncertainty associated with the analytical method used for thallium during the previous remedial investigation (RI). The results of the field investigation indicate that thallium is present at the Former A-1 Metals Facility, but at levels consistent with background. The field sampling summary is included as Appendix B to this ROD.

Summary of Human Health Risk Assessment

Estimated potential cancer risks and non-cancer adverse health effects were evaluated in the HHRA (Jacobs, 2000) for residential, occupational, and construction worker scenarios. Cancer risks were within the EPA risk management range for the residential (5.4×10^{-5}) and occupational (5.3×10^{-6}) scenarios, but the non-cancer HI (9.9) exceeded 1 for the residential scenario. Cancer risks under the construction worker scenario (4.3×10^{-7}) were less than the risk management range, and the non-cancer HI (0.7) was less than 1. PCBs are the primary risk driver.

Summary of Ecological Risk Assessment

Based on the results of the Tier 1 and Tier 2 ERAs, the HQs for terrestrial invertebrates, birds, and deer mouse were less than 1. The HQ value for benthic invertebrates was 13; however, the maximum concentration (2.2 mg/kg) was detected at a location that is not classified as a vernal pool in the most recent wetlands delineation (CH2M HILL, 2009). Concentrations of PCBs in surrounding vernal pools and corresponding risks are more than an order of magnitude lower.

The ecological risk for each sample location within and adjacent to the vernal pools located south of the Former A-1 Metals Facility is displayed on Figure 12 relative to the low and high PCGs for benthic invertebrates. Concentrations and risks are relatively low with the concentration of PCBs exceeding the high PCG in only one sample, located approximately 100 feet from the nearest vernal pool.

Basis for Action

PCBs were identified as COCs for the grassland soils at the Former A-1 Metals Facility. Because of potential risks to occupational receptors, the Air Force and EPA are selecting excavation and disposal for the contaminated grassland soils. In addition, the response action will decrease the potential for migration of contaminants in surface soil to the adjacent vernal pools. The selected response action in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

At the vernal pools, PCBs were identified as COCs. However, relatively low levels of contaminants were detected in vernal pool sediment, and associated risks to ecological receptors are low. No Action is appropriate for the vernal pools as excavation is not justified relative to the habitat damage associated with soil removal.

2.5.10 Former Soils Holding Area

Site Characteristics

The Former Soils Holding Area is located in the northwestern portion of McClellan and is bordered by Patrol Road on the east and the McClellan boundary fence line on the west and south (Figure 13). The site is part of an open, undeveloped area that the Air Force obtained to provide a buffer zone around the northern end of the runway. The site is about 300 feet wide by 1,000 feet long (about 7 acres) and includes a large soil mound, about 12 feet high (Vincent, 1996). Occupied residential housing is located offbase, about 250 feet west of the site boundary (Jacobs, 2000).

The Former Soils Holding Area was undeveloped until the runway extension was constructed from 1956 to 1963. A pit about 6 feet wide and 20 to 30 feet deep was observed by McClellan employees in 1955 on the western side of Patrol Road near the northern end of the present runway. The pit may have been used for disposal of unspecified wastes by local chicken farmers before the property was acquired by the Air Force. The exact location of the reported pit was not documented (Radian, 1995). Soil from construction activities was reportedly stored at the Former Soils Holding Area between about 1988 and 1992. The soil was either removed from McClellan or used elsewhere onbase. In addition, stockpiling in the southern portion of the site was observed sometime after 1995 (Arreola, 1997).

Vernal Pools 279 and 281 are located north of the Former Soils Holding Area; Vernal Pool 282 is located west of the site. Surface water runoff from the Former Soils Holding Area generally flows toward the southwest, in the direction of Robla Creek and Vernal Pool 282. However, surface water runoff from the large soil mounds could potentially reach Vernal Pools 279 and 281 to the north during periods of high rainfall.

In August 2010, the DTSC and CDFG requested that the Air Force collect samples from the Former Soils Holding Area to provide a more definitive thallium analysis for soil samples at the site and confirm that thallium was not present at levels of concern. There was uncertainty associated with the analytical method used for thallium during the previous RI. The results of the field investigation indicate that thallium is present at the Former Soils Holding Area, but at levels consistent with background. The field sampling summary is included as Appendix B to this ROD.

Summary of Human Health Risk Assessment

For the Former Soils Holding Area, exposure scenarios associated with residential, outdoor occupational, and construction worker uses of the site were evaluated.

Based on the HHRA, HIs are less than 1 for all scenarios. The total estimated cancer risk is at the low end of the risk management range (2.6×10^{-6}) for the residential scenario because of a single detection of PAHs. The total estimated cancer risk is less than the risk management range for the occupational (2.5×10^{-7}) and construction worker (3.5×10^{-8}) scenarios.

Summary of Ecological Risk Assessment

For the grassland receptors at the Former Soils Holding Area, the HQs for both bird receptors and the deer mouse are below 1. In the Vernal Pool Tier 1 ERA, thallium was the only detected contaminant with HQs ranging from 1.1 to 8.9. However, the ERA concluded that thallium is unlikely to present a substantial risk to ecological receptors given that the HQs for birds were low, and the plant benchmark has a high degree of uncertainty. In addition, subsequent sampling conducted in August 2010 at the request of DTSC and CDFG confirmed that thallium in soil and sediment at the Former Soils Holding Area is present at levels consistent with background.

Basis for No Action

No COCs were identified for the Former Soils Holding Area. Only low levels of contaminants were detected in soil samples adjacent to vernal pools associated with the site, and associated risks to human health and ecological receptors are low and acceptable. No Action is appropriate for the site and the adjacent vernal pools.

2.5.11 Robla Creek

Site Characteristics

Robla Creek comprises the unlined sections of Robla and Rio Linda creeks in OU F at McClellan (URS, 2009). Robla Creek also includes the dredge materials distribution area in northern OU F (Figure 14). Robla Creek enters at the northeastern boundary of McClellan and is then joined by Rio Linda Creek, which enters from the north. Southwest of the point where the two creeks merge, Robla Creek is diverted under Patrol Road, and flows west and then south before exiting the base south of the Former Soils Holding Area. In the RICS for Robla Creek (Jacobs, 2000), the unlined section of creek west of the runway is referred to as Rio Linda Creek. This section of creek is currently known as Robla Creek and is reported as such.

A Dredge Material Deposition Area west of Rio Linda Creek and north of Robla Creek contains dredge materials removed from other creeks onbase (excluding Rio Linda and Robla creeks) (URS, 2009). As reported in the RICS (Jacobs, 2000) for Robla Creek, the materials dredged from Robla and Rio Linda creeks were deposited along the creek banks.

The unlined sections of Robla and Rio Linda creeks have been dredged to remove vegetation that might have hindered flow or caused the creek to fill with sediment (URS, 2009). Vegetation was removed from these creeks most recently in 1994, 1995, and again in 1997, after the October 1997 sampling for Phase 1 of the RI was completed. Neither creek has been dredged since the Phase 2 RI sampling was conducted in 1998.

Robla Creek is within a preserve area that follows the alignment of the creek at the northern end of the main runway and is referred to as the North Runway Area. A perpetual conservation easement is planned for the subject property regardless of CERCLA actions or implementation of institutional controls. The conservation easement will require that the property remain substantially in its natural condition in perpetuity and will prohibit any activities inconsistent with the protection of federally listed species and their habitats.

Summary of Human Health Risk Assessment

The only regular human exposures, now and in the foreseeable future for the Robla Creek exposure area, are adult maintenance workers (URS, 2009). The site is required to be protected by a conservation easement that would prohibit construction or future development in or adjacent to the creek. Recreational use of the creek is unlikely because of its location within the fenced boundary of the active airfield, and the future land use will continue to be as an airfield. Cancer risks for the maintenance worker (8×10^{-9}) scenario were estimated to be less than the risk management range, and non-cancer HIs were less than 1.

Summary of Ecological Risk Assessment

The previous Tier 1 ERA (Jacobs, 2000) reported HQs less than 1 for terrestrial invertebrates, birds, and mammals for grassland soils in the Dredge Material Deposition Area, indicating no potential risk to these receptors. The Tier 2 ERA (CH2M HILL, 2007) reported HQs greater than 1 for pesticides for benthic invertebrates in Robla Creek. However, using the more recent Creeks Data Gap data, no pesticides exceeding screening ecotoxicity values (SEVs) were identified (URS, 2009). Dioxin concentrations detected during the 2005 data gap sampling also did not exceed the SEVs for benthic invertebrates. The previous Tier 2 ERA reported HQs less than 1 for the green heron based on the Phase 1 and Phase 2 RI data. HQs based on detected pesticide and dioxin concentrations from the 2005 sampling program were also less than 1 for the heron and otter. Based on the overall quantitative analysis, and additional lines of evidence, contaminants in the sediment of Robla Creek do not pose unacceptable hazards to ecological receptors.

Basis for No Action

No COCs were identified for Robla Creek or the Dredge Material Deposition Area. Only low levels of contaminants were detected in soil and sediment samples, and associated risks to human health and ecological receptors are low and acceptable. No Action is appropriate for the site.

2.5.12 Don Julio Creek West of the Runway

Site Characteristics

Don Julio Creek flows onto McClellan at the eastern base boundary at 32nd Street, approximately 700 feet north of E Street, and is immediately routed underground through two 5-foot-diameter culverts (URS, 2009). The culverts direct flow 700 feet south of the creek entrance and then west under the airfield, before it reappears on the surface at the western base boundary in OU E. The northern section of Second Creek joins Don Julio Creek at the base boundary where it exits the base in OU E. Don Julio Creek is unlined after it exits the base, and it flows through agricultural and residential areas before flowing back onto McClellan in OU D. At this point, Don Julio is gunite-lined and converges with water diverted from the southern section of Second Creek (also gunite-lined at this point). The date the lining was installed along Don Julio Creek is unknown. In the central portion of OU C, Don Julio Creek takes a final westward turn near the industrial wastewater holding ponds (PRL 051) into the West Nature Area. From there, it flows across the West Nature Area and exits McClellan again at the western base boundary (Figure 15).

Aerial photographs from 1957 to 1985 show a portion of Don Julio Creek approximately 125 feet east of the OU D disposal pits (URS, 2005b). After 1985, Don Julio Creek was realigned and moved eastward, away from the OU D sludge pits, and was referenced as Second Creek in the OU D RI Report (CH2M HILL, 1994). Currently, this section of the creek is referred to as Don Julio Creek (URS, 2009). All of Don Julio Creek from the point where it enters the base in OU D through the West Nature Area is referred to as IRP Site AOC 317. The section of Don Julio Creek referred to as "Don Julio Creek West of the Runway" comprises the segment of the creek from where it reenters the base in OU D to the confluence with the Seasonal Creek in IC 17. The more southerly sections of the lined creek, from the confluence to the check dam with Magpie Creek, are included in the IC 17 Seasonal Creek and Drainage Ditch. The section of Don Julio Creek west of Patrol Road within the West Nature Area is included in this ROD as part of the "West Nature Area" site.

Summary of Human Health Risk Assessment

The only human exposures, now and in the foreseeable future for Don Julio Creek West of the Runway, are construction workers. Estimated risks for the construction worker were an HI of 0.4 for non-carcinogens and within the low end of the risk management range for carcinogens (4×10^{-6}), primarily because of exposure to arsenic at near background levels.

The current and proposed future use of the areas adjacent to Don Julio Creek West of the Runway is industrial. However, because contamination is confined to creek sediments beneath the liner, potential exposures are limited to construction workers who could be exposed to contaminants during construction activities that disturb or remove the liner. If the creeks are ever filled or covered over by future industrial development, exposure pathways would be incomplete. Thus, industrial worker exposures would not occur, and a baseline risk assessment was not performed for the industrial use scenario. Recreational use is not likely now or in the future because the creek is entirely lined with concrete and carries water only on an intermittent basis.

For radionuclides, the total lifetime risk of cancer incidence associated with radionuclides in Don Julio Creek West of the Runway was within the low end of the risk management range for the construction worker (1.8×10^{-6}) and recreational fisherman (6.4×10^{-6}) scenarios.

Summary of Ecological Risk Assessment

An ERA was not performed for Don Julio Creek West of the Runway for chemical contaminants because the creek is entirely lined and sediment is regularly removed from above the liner; therefore, there is no habitat of concern and no potential exposures of ecological receptors to contaminated media (URS, 2009).

The ERA for radionuclides did not identify any significant risk to terrestrial, riparian, or aquatic biota.

Basis for No Action

Only low levels of contaminants were detected in soil and sediment samples for Don Julio Creek West of the Runway. The risk estimates are low and acceptable for ecological receptors and within EPA's risk management range for human health. No COCs were identified. Therefore, no action is necessary at this site under CERCLA.

2.5.13 IC 17 Holding Ponds

Site Characteristics

The IC 17 Holding Ponds are located west of Patrol Road in the central portion of OU C within IC 16 (Radian, 1997). PRL 051 comprises two raised water holding ponds on 3.8 acres that are surrounded by levees topographically higher than the surrounding area (Figure 16). The larger, western pond is earthen lined with vegetation growing on its banks. The smaller, eastern pond is lined with concrete. The capacity of both ponds is reported to be 10 million gallons (Gregory, 1989); depths of the ponds are estimated to be about 11 feet.

The ponds were built for a reclamation project that used treated effluent from the IWTP for irrigation (CH2M HILL, 1993); the project was stopped in 1985. During high flow periods (rainfall events) from 1985 to 1989, the ponds held treated IWTP effluent before it was discharged to Magpie Creek (Radian, 1997). The effluent was reportedly pumped to the smaller, eastern pond. When that pond was full, the water was pumped into the larger pond (Gregory, 1989). After 1989, the ponds held rainwater on a seasonal basis and may have been used by the IWTP for effluent storage during peak water periods (Radian, 1997). Currently, and for the foreseeable future, the ponds are used on occasion to hold treated water from the groundwater treatment plant and for stormwater retention. The ponds have been modified for stormwater retention by breaching the upper portion of the western pond along Don Julio Creek. The stormwater is then discharged by a pipe to a former borrow pit located southwest of the site.

Summary of Human Health Risk Assessment

At the IC 17 Holding Ponds, the calculated cancer risks are less than the risk management range for the hypothetical residential (7×10^{-8}) and occupational (8.1×10^{-9}) scenarios, and the calculated HIs are less than 1 (Radian, 1997). Because subsurface soil contamination was not reported, the construction worker scenario was not applicable.

Summary of Ecological Risk Assessment

A quantitative ERA was not performed for the IC 17 Holding Ponds because habitat quality was classified as marginal in the scoping assessment performed by Jacobs (1995). The site consists of two industrial holding ponds, one of which is concrete-lined and the other characterized by ruderal grassland vegetation. Both ponds contain water only during the rainy season or during peak water periods and are surrounded by raised levees and chain-link fencing, which separate them from the higher quality permanent aquatic habitats nearby in Don Julio and Magpie creeks.

Basis for No Action

Only low levels of contaminants were detected in soil and sediment samples from the IC 17 Holding Ponds and no COCs were identified. No Action is appropriate for the site.

2.6 Remedial Action Objectives

Remedial Action Objectives (RAOs) define the extent to which the sites will require cleanup to meet the objectives of protecting human health and the environment and are listed in

Table 3 by site. These RAOs reflect the COCs, exposure routes and receptors, and acceptable contaminant concentrations or range of concentrations for contaminants in affected media.

The Ecological Sites have varying degrees of ecological risk and ecological habitat value. The types of habitat at the sites generally fall within three categories: (1) creeks (lined and unlined), (2) vernal pools, and (3) upland habitats (including creek tailings piles). The RAOs are organized with respect to each of these habitat types. The RAOs specify cleanup of soil and sediment to protect humans and ecological receptors. While surface water is not targeted as a medium requiring action in this ROD, the selected remedies will need to be implemented in a manner that is protective of surface water quality. Appropriate storm water pollution protection measures will be implemented during and after construction or other ground-disturbing activities to protect surface water quality.

2.7 Description of Alternatives

Following is a summary of the alternatives evaluated for the six Ecological Sites requiring further action. Different alternatives were developed for each of the major features of the Ecological Sites, including the creeks, vernal pools and seasonal wetlands, and tailings piles (soil). Each of the Ecological Sites may contain one or more of these types of features. For example, the West Nature Area contains creek channels, vernal pools, and tailings piles.

2.7.1 Creeks Alternatives

Four alternatives were developed for the creek sites (Offbase Creeks, Magpie Creek West of the Runway, IC 17 Seasonal Creek and Drainage Ditch, and Second Creek).

Common Elements and Distinguishing Features

Four alternatives were developed for the creek sites to evaluate a range of cleanup options:

- Alternative Creeks-1: No Action
- Alternative Creeks-2: Institutional Controls
- Alternative Creeks-3: Excavation and Disposal of Sediment for Moderate Risk Reduction (Low Habitat Impact)
- Alternative Creeks-4: Excavation and Disposal of Sediment for Higher Risk Reduction (High Habitat Impact)

Under Alternative Creeks-1 and -2, no removal or treatment of contaminated sediments would be performed. Alternative Creeks-2 incorporates the use of institutional controls to restrict land use and to limit the consumption of edible biota by restricting access to the creeks, posting "No Fishing" signs, and issuing fish consumption warnings. Under Alternative Creeks-3, the contaminants would be excavated and disposed of, but the habitats and associated sensitive species would be negatively affected.

Alternative Creeks-4 also includes excavation of contaminated sediments with disposal. However, under Alternative Creeks-4, more contaminated sediments would be excavated for greater risk reduction, but greater habitat impacts would occur than for Alternative Creeks-3.

Alternative Creeks-2, -3, and -4 also include monitoring of sediments and surface water to assess the effectiveness of the selected remedies and evaluate the potential for recontamination of the remediated creeks from upstream non-point sources and other IRP sites. Monitoring frequencies and analyte lists will be identified during the remedial design. Monitoring stations will be located upgradient, within, and downgradient of affected creeks and surface water and sediment monitoring will be performed for at least 3 years per the ARAR. The monitoring data will be provided in a report to the regulatory agencies annually. The intent is to apply the monitoring component of the selected remedies on a basewide scale that would assess the effectiveness of the selected remedies for the sites as well as for creek sections upstream and downstream of the remediated sites.

Alternative Creeks-1: No Action

CERCLA and NCP require the evaluation of a No Action alternative to establish a basis for comparison with other alternatives. No remedial activities within the creek channels would be implemented under this alternative. No cost is associated with this alternative. The No Action alternative does not reduce risk to human health or ecological receptors and is therefore unacceptable for Magpie Creek West of the Runway, Offbase Creeks, IC 17 Seasonal Creek and Drainage Ditch, and Second Creek.

Alternative Creeks-2: Institutional Controls

Institutional controls would be used under this alternative to eliminate or limit exposure pathways to human receptors where site contamination levels would not allow for unrestricted use and unlimited exposure. Because of the potential risk to human health associated with ingesting fish or crayfish from some areas of the creeks, institutional controls under this alternative would also act to limit the consumption of edible biota by restricting access to the creeks, posting "No Fishing" signs, and issuing fish consumption warnings. Monitoring of creek sediment and surface water would be performed to evaluate the effectiveness of the remedy. In addition, monitoring will provide data about natural conditions that may also influence sediment concentrations over time. The alternative does not reduce risk to ecological receptors from existing contamination or prevent downstream migration of contaminants from unlined portions of the creek. Alternative Creeks-2 is therefore protective only for sites with low levels of ecological risk or for sites where contaminant concentrations are comparable to concentrations reported in sediments in upstream, offbase creeks.

Institutional Controls. Several of the alternatives developed to address contaminants within the Ecological Sites include an institutional controls element, either as a stand-alone remedial alternative or used in combination with an active remedial alternative to enhance remedy effectiveness. In support of prior decision documents prepared for remedial actions at McClellan, AFCEC and the state regulatory agencies have agreed on institutional control implementation procedures. The institutional controls proposed as remedial alternatives or components of remedial alternatives herein will be implemented in a manner consistent with the agreed upon implementation provisions provided below.

The institutional controls alternative includes enforceable use restrictions in the form of institutional controls on the use of certain properties. The Air Force is responsible for implementing, operating and maintaining, and monitoring the remedial actions (including the institutional controls) at the sites in this ROD before and after property transfer.

Although the Air Force may transfer responsibilities to a transferee and its successors by provisions to be included in the deed(s) transferring title to the property and may contractually arrange for third parties to perform any or all of the actions associated with the institutional controls, the Air Force is ultimately responsible for the remedies (including institutional controls) before and after property transfer. The Air Force will exercise this responsibility in accordance with CERCLA and the NCP.

Meeting the RAOs will be the primary and fundamental indicator of institutional control performance, the ultimate aim of which is to protect human health and the environment. Performance measures for the institutional controls are the RAOs plus the actions necessary to achieve those objectives. It is anticipated that successful implementation, operation, maintenance, and completion of these measures will achieve compliance with all legal requirements and protect human health and the environment.

Implementation of the institutional controls, including monitoring, maintenance, and review, will be continued until the institutional controls are no longer necessary. Institutional controls shall be maintained until the concentrations of hazardous substances in the soil are at such levels as to allow for unlimited use and unrestricted exposure.

The Ecological Site for which institutional controls is being selected is currently leased by the Air Force to the LRA. During the time between the adoption of this ROD and deeding of the property, equivalent restrictions will be implemented pursuant to the terms of the existing lease, which requires the approval of the Air Force and the regulators for construction or soil disturbance activity by use of an encroachment permit. The lease restrictions are in place and operational and will remain in place until the property is transferred by deed. At the time of deed transfer, lease restrictions will be superseded by equivalent use restrictions to be included in the federal deed and the SLUC as described in this ROD.

The term "monitoring" in the following subsections refers to monitoring of the institutional controls (not monitoring of sediments or surface water).

Deed Restriction and Reservation of Access. The federal deed(s) for any property containing one or more of the Ecological Sites will include a description of the residual contamination on the property, if any, consistent with the Air Force's obligations under CERCLA Section 120(h). The federal deeds may require additional specific restrictions from RODs addressing other residual contamination on the property. Institutional controls, in the form of deed restrictions, are "environmental restrictions" under California Civil Code Section 1471 (Section 1471). The deeds will include legal description of the property to which the institutional controls apply and will contain the provisions required by Section 1471 to qualify the institutional controls as "environmental restrictions" so that they run with the land and are binding on all subsequent transferees.

The Air Force and regulatory agencies may conduct inspections of the institutional controls and the affected property. The deeds or associated transaction documents will also contain a reservation of access to the property for the Air Force, EPA, and the State of California, and their respective officials, agents, employees, contractors, and subcontractors for purposes consistent with the Air Force IRP or the FFA. The Air Force will provide such access to regulatory agencies prior to transfer.

The environmental restrictions are the basis for the part of the CERCLA Section 120(h)(3) covenant that the United States is required to include in the deed for any property that has had hazardous substances stored for 1 year or more or where hazardous substances are known to have been released or disposed of on the property.

For any deed (non-federal entity) or letter of transfer (federal entity) transferring all or part of any parcel containing an Ecological Site where land use will be restricted, institutional controls will be incorporated in the deed as a grantee covenant, in substantially the following language:

- Grantee covenants and agrees that it will not use the site for residential purposes, hospitals for human care, public or private schools for persons under 18 years of age, or daycare centers for children. Such controls shall remain in effect in perpetuity, or until such time as it can be demonstrated that contaminant concentrations allow for unrestricted uses and unlimited exposures.

Notice of Institutional Controls. The Air Force will include the specific deed restriction language set forth in the Ecological Sites ROD in the deed for any parcel subject to institutional controls, and will provide a copy of the deed or other transfer documentation containing the use restrictions to the regulatory agencies as soon as practicable after transfer of fee title. The Air Force will inform the property owner(s) of these specific institutional controls and deed restrictions in the draft deed. The signed deed(s) and/or transfer document(s) legally binding between the Air Force and the transferee will also include these specific land use restrictions as well as a condition that the transferee execute and record a State Land Use Covenant (SLUC), within 10 days of transfer, to address any State obligations pursuant to State law, including 22 California Code of Regulations (CCR), Section 67391.1. Any letter of transfer (to a federal entity) will include a condition that future deeds to a non-federal entity include this requirement. The Air Force will ensure that the transferee has met this condition. Concurrent with the transfer of fee title from the Air Force to the transferee, the Finding of Suitability for Early Transfer and the location of the Administrative Record file will be communicated in writing to the property owners and to appropriate state and local agencies (with a copy to EPA) with authority regarding any of the activities or entities addressed in the controls to ensure that such agencies can factor the information into their oversight, approval, and decision-making activities regarding the property.

The Air Force will provide notice to EPA and DTSC at least 6 months prior to any transfer or sale of property so that EPA and DTSC can be involved in discussions to ensure that appropriate provisions are included in the transfer terms or conveyance documents to maintain effective institutional controls. If it is not possible for the facility to notify EPA and DTSC at least 6 months prior to any transfer or sale, then the facility will notify EPA and DTSC as soon as possible but no later than 60 days prior to the transfer or sale of any property subject to institutional controls. Additionally, the Air Force further agrees to provide EPA and DTSC with similar notice, within the same timeframes, as to federal-to-federal transfers of property.

Prior to conveyance of any Air Force property subject to institutional controls, EPA and DTSC representatives will be given reasonable opportunity to review and comment on the applicable deed language described in this section and associated rights of entry for purposes of institutional control oversight and enforcement.

Annual Evaluations/Monitoring. Prior to property transfer, the Air Force will conduct annual monitoring; provide annual reports describing whether property use has conformed to institutional controls or use restrictions; and undertake prompt action to address activity that is inconsistent with the institutional control objectives or use restrictions, or any action that may interfere with the effectiveness of the institutional controls. The monitoring results will be included in a separate report or as a section of another environmental report, if appropriate, and will be provided to EPA and the State. The annual monitoring reports will be used in preparation of the five-year review to evaluate the effectiveness of the remedies. Prior to transfer, the annual monitoring report submitted to the regulatory agencies by the Air Force will evaluate the status of the institutional controls and how any institutional control deficiencies or inconsistent uses have been addressed.

Upon the effective date of property conveyance, the transferee (or other entity accepting such obligations [which may include, without limitation, subsequent transferees]) or subsequent property owner(s) will conduct annual physical inspections of property including the Ecological Sites for which institutional controls have been selected to confirm continued compliance with all institutional control objectives unless and until the institutional controls at the site are terminated. The transferee or subsequent property owner(s) will provide to the Air Force, EPA, and DTSC an annual monitoring report on the status of the institutional controls and how any institutional control deficiency or inconsistent uses have been addressed, whether use restrictions and controls were communicated in the deed(s) for any property transferred in the reporting period, and whether use of the property encompassing the area subject to institutional controls has conformed to such restrictions and controls. The Air Force will place these transferee obligations in the deed or other transfer documentation.

If a transferee fails to provide an annual monitoring report as described above to the Air Force, the Air Force will notify EPA and DTSC as soon as practicable. If EPA or DTSC does not receive the annual monitoring report from the transferee, it will notify the Air Force as soon as practicable. Within 30 days of the report's due date, the Air Force will take steps to determine whether institutional controls are effective and remain in place and advise the regulators of its efforts. In any event, within 90 days of the report's due date, the Air Force will determine the status of institutional controls and provide its written findings, with supporting evidence sufficient to confirm the reported status, based on the use restrictions/institutional controls and site conditions, to EPA and DTSC unless either EPA or DTSC, in its sole discretion, acts to confirm the status of the institutional controls independently.

The five-year reviews conducted by the Air Force will also address whether the institutional controls in the ROD were inserted in the deed, if property was transferred during the period covered, whether the owners and State and local agencies were notified of the institutional controls affecting the property, and whether use of the property has conformed to such institutional controls. Five-year reviews will make recommendations on the continuation, modification, or elimination of annual reports and institutional control monitoring frequencies. Five-year reviews are submitted by the Air Force to the regulatory agencies for review and comment.

Although the Air Force is transferring procedural responsibilities to the transferee and its successors by provisions to be included in the deed(s) transferring title to property subject to

institutional controls, and may contractually arrange for third parties to perform any and all of the actions associated with the institutional controls, the Air Force is ultimately responsible for the remedies.

Response to Violations. Prior to property transfer, the Air Force will notify EPA and DTSC as soon as practicable but no more than 10 days after discovery of any activity that is inconsistent with the institutional control objectives or use restrictions, or any other action that may interfere with the effectiveness of the institutional controls. The Air Force will notify EPA and DTSC regarding how the Air Force has addressed or will address the breach within 10 days of sending EPA and DTSC notification of the breach.

The deed will require that, post-transfer, the transferee will notify the Air Force, EPA, and DTSC of any activity that is inconsistent with the institutional control objectives or use restrictions, or any other action that may interfere with the effectiveness of the institutional controls, and will address such activity or condition as soon as practicable, but in no case will the process be initiated later than 10 days after the transferee becomes aware of the breach. Post-transfer, if the transferee fails to satisfy its obligations pursuant to the SLUC, DTSC may enforce such obligations against the transferee. If there is failure of the selected remedy or a violation of selected remedy obligations (e.g., an activity inconsistent with institutional control objectives or use restrictions, or any action that may interfere with the effectiveness of the institutional controls), DTSC will notify the Air Force and EPA in writing of such failure as soon as practicable (but no longer than 14 days) upon discovery of the inconsistent activity or action that interferes with the effectiveness of the institutional control, and initially seek corrective action or other recourse from the transferee. If, after diligent efforts, DTSC is unable to enforce the obligations of the SLUC or remedy obligations against the transferee, within 21 days following DTSC's notification, the parties will confer to discuss re-implementation of the selected remedy or other necessary remedial actions to address the breach of the institutional control. Once DTSC reports that the transferee is unwilling or unable to undertake the remedial actions, the Air Force will within 10 days inform the other parties of measures it will take to address the breach.

Approval of Land Use Modification. Prior to transfer, the Air Force will not modify or terminate institutional controls or implementation actions, or modify land use or land use restrictions that are part of the selected remedies without approval by EPA and DTSC. The Air Force will seek prior concurrence before any anticipated action that may disrupt the effectiveness of the institutional controls or any action that may alter or negate the need for institutional controls and will provide at least 45 days for review of such proposals by EPA and DTSC.

Any grantee of property constrained by the institutional controls imposed through their transfer document(s) may request modification or termination of an institutional control. Modification or termination of an institutional control, except the SLUC (discussed below), requires Air Force, EPA, and DTSC approval.

State Land Use Covenant Modification. Any modification or termination of the SLUC must be undertaken in accordance with State law and will be the responsibility of the transferee or then-current owner or operator.

Alternative Creeks-3: Excavation and Disposal of Sediment for Moderate Risk Reduction (Low Habitat Impact)

Under this alternative, contaminated sediment within the creek channels would be excavated and transported for disposal at an appropriate facility. This alternative involves the removal of the most contaminated sediments from within the creek channels. The estimated total volume of sediment removed under this alternative is about 10,000 cubic yards.

This alternative would include removal of sediment using conventional excavation, with potential use of specialty hydraulic dredge equipment in submerged areas. The dry season between June and October is the most favorable period for implementation of this alternative because it maximizes the potential to use dry excavation methods. Removal of contaminated sediment from the creeks would be implemented one segment at a time, starting upstream and proceeding downstream. The creeks on the base flow generally from east to west. Portable levees would be used to prevent water from impacting downstream reaches during excavation of sediment in submerged conditions. Temporary levees may also be used to prevent upstream water from impacting dry removal areas. Additionally, in some areas, surface water may be removed before excavating contaminated sediment by pumping water out of the creek or diverting it to downstream segments. The temporary levees would consist of water-filled tubular dams placed with light equipment and would cause less habitat damage than traditional earthen levees or sheet pile dams. The temporary levee would be moved from one area to the next as the cleanup progresses along the creek. It is assumed that it will be necessary to dewater some of the sediment removed in preparation for disposal or reuse, in particular, sediment removed from submerged areas of the creeks. Upon excavation of wet sediment, the excavators would transfer the sediment to trucks for subsequent transfer to a sediment dewatering facility onsite. Water from the dewatering area would be pumped into the onsite holding tank for subsequent testing, treatment (if necessary), and disposal. The location of the dewatering facilities will be determined during remedial design.

Excavated areas would be backfilled as necessary to keep the flow gradients comparable to baseline conditions. In areas susceptible to high velocities and increased potential for erosion, sand or gravel may be used as backfill as opposed to native soils. However, naturally occurring backfill materials are preferred to aid active recolonization of the backfilled areas by benthic organisms.

Implementing Alternative Creeks-3 would include clearing and grubbing around the stream channels, construction of laydown areas, placement of decontamination pads, construction of access roads, placement of modular water storage tanks, and placement of portable levees to allow for sediment removal. This alternative assumes that newly constructed access roads and bridges will be required to access portions of the creeks. The proposed network of access roads is assumed to be similar to the roads and bridges proposed under Alternative Soil-3 described below in Section 2.7.3. In addition to the access roads described in Alternative Soil-3, road panels or regrading of existing dirt roads may be necessary.

Site controls, such as fencing, signage, and security, would be implemented to restrict access as necessary during construction. Stormwater pollution prevention and sensitive habitat protection measures would also be implemented. It is assumed that Alternative Creeks-3

would also result in reduced human health risks associated with consumption of crayfish or fish caught in the creeks.

Monitoring would be performed to assess the effectiveness of the selected remedies. Low levels of contaminants are left in place and therefore long-term monitoring for at least 3 years would be necessary to determine the effectiveness of the remedies. Pre-remedial action and post-remedial action monitoring would include a combination of physical, chemical, and biological parameters; however, the specific monitoring plan would be developed during the remedial design.

As a modification of this alternative for Magpie Creek West of the Runway, the Air Force also considered removal of over 3,000 linear feet of old corrugated metal liner and the layer of contaminated soil beneath the liner. Cleanup levels would be the same as for the unlined creek sections. Once the old liner and layer of contaminated soil are removed, the excavation would be backfilled and a new liner would be constructed. At the Offbase Creeks, the modified alternative will target the highest contaminant concentrations in Don Julio Creek. The stretch to be excavated is approximately 1,300 feet and extends upstream and downstream of the point where Don Julio Creek crosses beneath Raley Boulevard (Figure 6). At the IC 17 Drainage Ditch, the alternative would be limited to removal of only the sediment on top of the liner. The liner in this area is in good shape, but sediment on top of the liner has not been removed from two locations in recent years. Removed sediment would be tested and then disposed of as hazardous or nonhazardous waste as appropriate. Offsite disposal would entail hauling and disposing of soil and sediment wastes at either a hazardous (Class I) or nonhazardous (Class II) permitted disposal facility. Onsite disposal would entail hauling and disposing of soil and sediment wastes at the consolidation unit to be constructed at McClellan under the Focused Strategic Sites ROD (AFRPA, 2012). If testing reveals that the waste is suitable for discharge without treatment, the wastewater would be discharged back into the creek. If treatment is required, the wastewater would be disposed of at the onbase CERCLA treatment plant.

Alternative Creeks-4: Excavation and Disposal of Sediment for Higher Risk Reduction (High Habitat Impact)

All elements under this alternative are the same as described for Alternative Creeks-3, except under this alternative, additional contaminated sediment would be removed when compared with Alternative Creeks-3. The estimated total volume of sediment removed under this alternative is about 16,240 cubic yards. This removal action is likely to achieve contaminant levels that would support unrestricted exposure and unlimited use of the creek channels. Thus, institutional controls would not be necessary under this alternative. Monitoring would be performed to assess the effectiveness of the selected remedy. This alternative would result in a greater reduction in risk for both human and ecological receptors when compared with Alternative Creeks-3; however, it would also result in greater habitat damage and disruption.

2.7.2 Vernal Pool and Seasonal Wetland Alternatives

Three alternatives were developed for the vernal pools and seasonal wetlands (Vernal Pools Associated with CS 007 and SAFR, and the Former A-1 Metals Facility).

Common Elements and Distinguishing Features

Three alternatives were developed for the vernal pools to evaluate a range of cleanup options:

- Alternative Vernal Pool-1: No Action
- Alternative Vernal Pool-2: Institutional Controls
- Alternative Vernal Pool-3: Excavation and Disposal

Under Alternatives Vernal Pool-1 and -2, no removal or treatment of contaminated soil or sediments would be performed. Under Alternative Vernal Pool-2, institutional controls would be used to limit human access to the contaminants in the vernal pools. Under Alternative Vernal Pool-3, the contaminants would be excavated and disposed of, but the vernal pools and associated sensitive species would be negatively affected, or may be destroyed completely. Consultation with the USFWS would be conducted to assess potential impacts to federally listed species and determine mitigation requirements.

Alternative Vernal Pool-1: No Action

No remedial activities within or adjacent to the vernal pools or seasonal wetlands are implemented under this alternative. No cost is associated with this alternative. The No Action alternative does not reduce risk to human health or ecological receptors.

Alternative Vernal Pool-2: Institutional Controls

Under this alternative, institutional controls (deed restrictions) would be implemented to notify future owners of the presence of sensitive habitats and contaminated soil and sediment. The institutional controls would prohibit human intrusion and other ground-disturbing activities that could mobilize soils and cause runoff into adjacent vernal pools. Other site controls such as fencing or signage would be implemented as necessary. Monitoring would be performed to assess the effectiveness of the selected remedy. This alternative does not protect ecological receptors from contaminants already present within the vernal pools.

Under Alternative Vernal Pool-2, institutional controls would be implemented in the same manner as described for Alternative Creeks-2 (Section 2.7.1).

Alternative Vernal Pool-3: Excavation and Disposal

Alternative Vernal Pool-3 would involve sediment removal, including contaminated soil that may be acting as a source to the vernal pools, and is designed to reduce potential ecological risks by achieving point-by-point sediment concentrations less than the low cleanup goal for benthic invertebrates (for example, 0.0598 mg/kg for PCBs and 0.15 mg/kg for benzo(a)pyrene). Under Alternative Vernal Pool-3, the resulting land use is unrestricted.

Removal of contaminated sediment and vegetation from the vernal pools and seasonal wetlands would take place in the dry weather season. Conventional track-mounted or rubber-tire excavators would be used to minimize impact to surrounding areas. An average excavation depth of no more than 1 foot is anticipated for most of the sites. Excavation would take place in 0.5-foot increments; care would be taken to avoid impacts to the underlying hardpan layer for sites where the vernal pools are proposed to be restored onsite. The estimated volume of soil to be removed is 92 cubic yards for the Vernal Pools

Associated with CS 007 and SAFR, and 1,052 cubic yards for the Former A-1 Metals Facility. Excavated sediment would be moved to a laydown area where dewatering would take place, if required, before disposal.

Removed sediment would be tested and then disposed of. Dump trucks would be used to transport the removed sediment to an appropriate, designated disposal facility. Offsite disposal would entail hauling and disposing of solid wastes at either a hazardous (Class I) or nonhazardous (Class II) permitted disposal facility. Disposal of contaminated sediments at an appropriate offsite landfill depends on the types and concentrations of chemicals in the sediment. Onsite disposal would entail hauling and disposing of soil and sediment wastes at the consolidation unit to be constructed at McClellan under the Focused Strategic Sites ROD (AFRPA, 2012).

Post-excavation sampling and chemical analyses of sediment would be conducted to confirm that COC concentrations are less than the low cleanup goal for benthic invertebrates. Depending on the planned future use of the area, the site would either be restored as vernal pool habitat or leveled and backfilled with clean soil. If the site is identified for habitat restoration, a restoration plan would be prepared and submitted to the USFWS, U.S. Army Corps of Engineers, and CDFG for review and approval prior to implementation of the removal action. The plan would include ecological monitoring to evaluate the success of vernal pool restoration. In addition, consultation with USFWS would be conducted to determine whether additional habitat preservation, restoration, or enhancement is required to mitigate for the impacted vernal pool.

Pursuant to USFWS interpretation of “take” as it applies to vernal pool crustacean habitat, even the removal of a limited amount of soil from the pool (i.e., removal of a hot spot) may constitute an impact to the entire pool. The vernal pool alternatives included in this ROD reflect this situation. However, based on recent discussions with the USFWS, a remedial action could potentially be conducted in a manner that avoids or minimizes impacts to vernal pool crustaceans.

As a modification of this alternative for the Former A-1 Metals Facility, the Air Force would remove only grassland soil greater than industrial cleanup levels, but would not excavate the vernal pools. The vernal pools do not have high levels of contamination, and they provide good habitat quality. The removal of contaminated grassland soil would not negatively affect the vernal pools, so no mitigation would be required. For the modified Alternative Vernal Pool-3 for the Former A-1 Metals Facility, the resulting land use is restricted, and institutional controls will be implemented via deed restrictions to prohibit sensitive uses such as residences, daycare centers, healthcare centers, or schools on the property. The institutional controls would be implemented in the same manner as described in Section 2.7.1.

2.7.3 Soil (Tailings Piles) Alternatives

Three alternatives were developed for soil in the tailings piles along the banks of Magpie and Don Julio creeks in the West Nature Area.

Common Elements and Distinguishing Features

Three alternatives were developed for the contaminated tailings piles to evaluate a range of cleanup options:

- Alternative Soil-1: No Action
- Alternative Soil-2: Institutional Controls
- Alternative Soil-3: Excavation and Disposal

Under Alternatives Soil-1 and -2, no removal or treatment of contaminated tailings piles would be performed. Under Alternative Soil-2, institutional controls would be used to prohibit any uncontrolled excavation or other activities that could mobilize soils within the tailings piles and cause migration of contaminants into adjacent creeks or sensitive habitats. The planned conservation easement for the West Nature Area prohibits use of the site for anything other than preservation of federally listed species and their habitats. Under Alternative Soil-3, all of the tailing piles would be excavated and transported to an appropriate disposal facility.

Alternative Soil-1: No Action

No remedial activities for soil within the tailings piles are implemented under this alternative. No cost is associated with this alternative. The No Action alternative does not reduce risk to human health or ecological receptors.

Alternative Soil-2: Institutional Controls

Institutional controls would be used under this alternative for soil in the tailings piles to prohibit any uncontrolled excavation or other activities that could mobilize soils within the tailings piles and cause migration of contaminants into adjacent creeks or sensitive habitats. Institutional controls in the form of deed restrictions could also be used to provide an additional layer of protection for human receptors by prohibiting recreational or residential exposure. Monitoring would be performed to assess the effectiveness of the selected remedy. This alternative does not protect terrestrial ecological receptors from exposure to contaminants within the tailings piles.

Under Alternative Soil-2, institutional controls would be implemented in the same manner as described for Alternative Creeks-2 (Section 2.7.1).

Alternative Soil-3: Excavation and Disposal

This alternative consists of the removal and disposal of all tailing piles from the banks of Magpie and Don Julio creeks in the West Nature Area, irrespective of cleanup levels. The tailings piles cover a surface area of approximately 60,000 square feet in 62 separate piles (URS, 2005a). It is estimated that approximately 7,000 cubic yards of soil would be removed and disposed of under this alternative. Similar to alternatives that address the creeks and vernal pools, the optimal time to implement this alternative is in the dry weather months between June and October. It is assumed that the area would be dry and provide a firm surface for remediation activities.

The accessible tailings piles would be removed using a backhoe, and the area beneath each pile excavated as needed to meet the established cleanup levels. All disturbed areas would then be backfilled with clean soils to match existing grade and restored to the original

ground survey contour. Soils would be disposed of in a similar manner as described under other alternatives. Removed soils would be tested and then disposed of as hazardous or nonhazardous waste as appropriate. Offsite disposal would entail hauling and disposing of soil wastes at either a hazardous (Class I) or nonhazardous (Class II) permitted disposal facility. Onsite disposal would entail hauling and disposing of soil and sediment wastes at the consolidation unit to be constructed at McClellan under the Focused Strategic Sites ROD (AFRPA, 2012). Based on current data, special disposal facilities for radiologically impacted soils should not be needed but would be used as necessary based on waste characterization sampling results.

Monitoring would include preconstruction baseline monitoring and construction monitoring. The tailings piles would be delineated using global positioning system (GPS) data obtained in 1998 and by visual observations of the toe of the slope of each pile. Each tailings pile or grouping of piles (up to 300 cubic yards) would be pre-sampled to determine soil staging and disposal criteria, as well as worker health and safety requirements. Post-removal confirmation samples would be collected in locations that were immediately beneath the removed tailings piles to determine residual contaminant levels and the need for excavation of subsurface soil.

The Air Force will conduct pre-construction surveys for special-status species prior to implementation of the selected remedy for the tailings piles and will consult with the USFWS (for federal special-status species) and CDFG (for State special-status species) concerning avoidance, minimization, and mitigation requirements. Appropriate avoidance and minimization measures, such as silt fencing and erosion controls, protective mats, designated access and staging areas, seasonal restrictions on construction, worker awareness training, and biological monitoring, will be implemented as determined in consultation with the USFWS and CDFG. In addition, disturbed areas will be replanted and hydroseeded to restore conditions to that of similar adjacent or nearby habitats. The restored habitats will be permanently protected by a conservation easement and will be managed in perpetuity for the protection of threatened and endangered species.

Based on preliminary discussion and consultation with the resource agencies, all of the piles can be removed without permanent loss of habitat for sensitive species, and the benefit of removing the piles will outweigh the temporary impacts of remedial activities.

2.8 Summary of Comparative Analysis of Alternatives

In accordance with the NCP, the remedial alternatives are evaluated against the nine EPA criteria (Section 300.430 (f)(5)(i)). These criteria are categorized into the following three groups:

- Threshold criteria
- Primary balancing criteria
- Modifying criteria

Threshold criteria are requirements that each alternative must meet to be eligible for selection as the preferred alternative. The criteria include overall protection of human health and the environment and compliance with ARARs. Primary balancing criteria are used to weigh effectiveness and cost tradeoffs among alternatives. The balancing criteria include

long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost. The primary balancing criteria represent the main technical criteria upon which the alternative evaluation is based. Modifying criteria include State acceptance and community acceptance, and may be used to modify aspects of the preferred alternative when preparing this ROD.

2.8.1 Description of Evaluation Criteria

Following is a brief description of what each of the evaluation criteria addresses followed by the comparative analysis of the alternatives:

- **Criterion 1: Overall Protection of Human Health and the Environment** – This criterion addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.
- **Criterion 2: Compliance with ARARs** – Section 121(d) of CERCLA and NCP 300.430(f)(1)(ii)(B) require that remedial actions at CERCLA sites attain ARARs, unless such ARARs are waived under CERCLA Section 121(d)4.
- **Criterion 3: Long-term Effectiveness and Permanence** – Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once cleanup levels have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.
- **Criterion 4: Reduction of Toxicity, Mobility, or Volume through Treatment** – Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.
- **Criterion 5: Short-term Effectiveness** – Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community, and the environment during construction and operation of the remedy until cleanup levels are achieved.
- **Criterion 6: Implementability** – Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other government entities are also considered.
- **Criterion 7: Cost** – The cost of an alternative addresses all engineering, construction, and operation and maintenance costs incurred over the life of the project. The assessment against this criterion is based on the estimated present worth of these costs for each alternative. Present worth is used to estimate expenditures that occur over different lengths of time.
- **Criterion 8: State Acceptance** – This assessment evaluates the technical and administrative issues, concerns, and preferences the State may have regarding each of the alternatives. Resource agencies have reviewed the site documents and have agreed with the selected remedies.

- **Criterion 9: Community Acceptance** – This assessment evaluates the issues, concerns, and preferences the public may have regarding each of the alternatives.

2.8.2 Comparative Analysis for the Creeks Alternatives

This section contains a comparative analysis of the alternatives for the creek channels within the Ecological Sites. The creek segments evaluated for cleanup include Magpie Creek West of the Runway, Offbase Creeks, Second Creek, and the IC 17 Seasonal Creek and Drainage Ditch. The comparative analysis for the creek alternatives is summarized in Table 5.

Overall Protection of Human Health and the Environment

Human Health Protection. Throughout the creeks, human health risks resulting from sediment exposures are lower than, or within, the EPA risk management range of 1×10^{-6} to 1×10^{-4} for cancer risks and less than significant for non-cancer HIs under likely future use conditions. The relevant human exposure scenario throughout most of the creek areas is the maintenance or construction worker.

Alternative Creeks-1 would not provide additional protection of human health; however, as just described, health risks are already lower than, or within, the EPA risk management range for current and anticipated land use exposure scenarios. Alternative Creeks-2 (institutional controls and monitoring) would include monitoring to provide additional information on sediment contaminants and sources for the purpose of ensuring that conditions remain within acceptable ranges of risk. Alternative Creeks-3 (removal and disposal) would reduce risks by reducing concentrations of COCs in sediment. Alternative Creeks-4 would provide the greatest level of risk reduction by removing the highest volume of contaminated sediments from the creek channels.

Environmental Protection. Ecological risk to benthic invertebrates and aquatic birds and mammals exists in the creeks from COCs at low levels (HQs generally between 1 and 10). Alternative Creeks-1 would not provide risk reduction for protection of ecological receptors from exposures to COCs, nor would it cause any habitat loss or injuries to ecological receptors in the short term. Alternative Creeks-1 may provide acceptable environmental protection through natural recovery processes such as sediment burial and mixing; however, an overall mass reduction is not expected because most of the contaminants present in the creeks are persistent. Alternative Creeks-1 would not provide for ongoing assessment of conditions to verify risk levels and monitor potential ongoing sources. Alternative Creeks-2 provides somewhat better environmental protection than Alternative Creeks-1 because monitoring would be conducted to evaluate the ability of natural creek processes and source control to lower the COC concentrations in sediments over time. Although Alternative Creeks-2 would not reduce the risk to ecological receptors resulting from COCs in the short term as quickly as Alternative Creeks-3, risks are currently low, and significant impacts to currently established ecosystems would be entirely avoided. Alternative Creeks-3 would reduce ecological risk levels in the short term, but would result in significant short-term damage to sensitive wetland and riparian habitats, which would be avoided under the former creeks alternatives. Alternative Creeks-4 would provide the greatest level of risk reduction but also the most short-term damage to sensitive wetland and riparian habitats. Long-term risk reductions would depend on the ability to prevent sediments from being recontaminated by ongoing onbase and offbase sources.

Applicable or Relevant and Appropriate Requirements

Alternative Creeks-2, -3, and -4 would comply with the chemical-, action-, and location-specific ARARs. Alternative Creeks-3 and -4 would require significant mitigation to comply with ARARs governing protection of sensitive habitats, endangered species, and impacts to wetlands.

Long-term Effectiveness and Permanence

This criterion addresses the long-term effectiveness and permanence of maintaining protection of human health and the environment after implementation of the remedial action. The primary component of this criterion is the magnitude of residual risk after RAOs have been achieved. Alternative Creeks-1 received the lowest rating for long-term effectiveness because this alternative did not include removal to reduce risk or sediment monitoring to verify the long-term effectiveness of natural creek processes for lowering COC concentrations in sediment. Alternative Creeks-1 also did not include institutional controls warning the public against consuming crayfish and fish. Alternative Creeks-4 was rated the highest because under this alternative, COCs that exceed the lowest cleanup levels would be removed from the contaminated creek reaches, resulting in low residual risk. Alternative Creeks-3 provides slightly less long-term effectiveness because higher cleanup levels are used and more low-level contamination remains in the creeks. Alternative Creeks-2 provides less long-term effectiveness than Alternative Creeks-3 because the levels of contamination remaining in the creeks would be higher than those included in Alternative Creeks-3. However, over the long term, Alternative Creeks-2 and -3 may provide equivalent long-term effectiveness because natural stream processes and source controls could potentially achieve long-term recovery and risk reduction.

Reduction of Toxicity, Mobility, and/or Volume through Treatment

This criterion evaluates whether the alternatives meet the EPA's preference for treatment. None of the alternatives uses treatment because the levels of contamination are relatively low; therefore, no alternative meets the preference for treatment. In the unlikely event that the landfill facility uses treatment for stabilizing the sediments disposed of under Alternative Creeks-3 or -4, these alternatives would rate the highest under this criterion.

Short-term Effectiveness

Short-term effectiveness is generally evaluated for the period during which active remediation is taking place, but before the RAOs are achieved. Under Alternative Creeks-1, no remedial action would take place; therefore, there would be no short-term risks to the community, to the environment, or to construction workers. However, sediment contamination would not be addressed, and the time for natural creek processes to lower the COC concentrations in sediment is not certain.

Alternative Creeks-2 rated the highest for short-term effectiveness because the alternative would result in few to no effects on the community and minimal risk to the environment. The community would not be affected by truck traffic transporting disposal waste, activities that would occur under Alternative Creeks-3. No habitat loss would occur under Alternative Creeks-2 from invasive remedial activities. However, this alternative does not achieve short-term risk reduction by removal of COCs in sediment.

Alternative Creeks-3 and -4 were rated the lowest for short-term effectiveness. The short-term risks to the community and construction workers would be the greatest for these alternatives because they include active remediation. Transportation of excavated dirt from the site to a licensed disposal facility could potentially affect the neighboring community. Risks to the environment are the greatest under these alternatives because habitat would be destroyed and would take years to recover. Although mitigation measures would be implemented during construction, there is potential for adverse impacts to protected species such as the giant garter snake and vernal pool fairy shrimp under this alternative.

Implementability

Implementability is evaluated to determine the relative feasibility of implementation. Alternative Creeks-1 would be the easiest to implement because no action would be taken. Alternative Creeks-3 and -4 would be readily implementable and are rated as moderate. Excavation equipment and contractors would be readily available. However, these alternatives would be difficult to implement with respect to minimizing disruption to wildlife and sensitive habitats and would likely require mitigation and extensive consultation with resource agencies. Alternative Creeks-2 rated higher than Alternative Creeks-3 and -4 because monitoring is straightforward and requires minimal labor, equipment, and agency approvals as compared with Alternative Creeks-3 and -4.

Cost

The present-worth cost at 30 years for implementation of Alternative Creeks-2 is \$1,084,000 for Offbase Creeks, Magpie Creek West of the Runway, IC 17 Seasonal Creek and Drainage Ditch, and Second Creek. For Alternative Creeks-3, the present-worth cost at 30 years is \$2,316,000. For Alternative Creeks-4, the present-worth cost at 30 years is \$5,824,000. The costs for Alternative Creeks-3 and Creeks-4 are higher because of the additional cost of removal and disposal of contaminated sediment.

State Acceptance

The State has had an opportunity to review and comment on the Ecological Sites ROD and finds each of the alternatives generally acceptable except for Alternative Creeks-1, No Action. Based on input from the State and public comments on the preferred remedy for the Offbase Creeks in the Proposed Plan, the Air Force has selected excavation (a modified Alternative Creeks 3) for the Offbase Creeks.

Community Acceptance

A public comment period on the Proposed Plan was held from February 4 through March 7, 2011, and a public meeting was held on February 15, 2011. Ten public comments were received (see the Responsiveness Summary in Section 3). One comment was a request for additional information, four of the comments supported the Air Force's selection of remedial actions overall, four provided alternative suggestions for cleanup, and one expressed general distrust of the Air Force. Three public comments (two from the same commenter) expressed a preference to excavate and dispose of additional contaminated sediment at the creek sites, especially the Offbase Creeks. Based on these comments and input from the State, the Air Force has selected excavation (a modified Alternative Creeks 3) for the Offbase Creeks. One public comment expressed a preference to cap the sites.

2.8.3 Comparative Analysis for the Vernal Pool Alternatives

This section contains a comparative analysis of the alternatives for vernal pool sediments within the Ecological Sites. The vernal pools evaluated for remedial action included the Vernal Pools Associated with CS 007 and SAFR, and the Former A-1 Metals Facility. The comparative analysis for the vernal pool alternatives is summarized in Table 6.

Protection of Human Health and the Environment

Human Health Protection. The overall human health risk presented by contaminants found in vernal pools throughout the Ecological Sites is low because vernal pools are a protected habitat and significant human intrusion and disturbance are prohibited. In addition, the vernal pools represent a small potential exposure area for human health risk, and levels of COCs are generally low since the source of contamination at the vernal pools is surface water runoff from the primary release sites. Thus, all of the alternatives could be protective of human health, although levels of uncertainty in risk make Alternative Vernal Pool-1 least protective. One sample location in soils adjacent to vernal pools in the Former A-1 Metals Facility contains PCB levels that exceed risk-based screening criteria for industrial exposures. This limited area has been included for removal in Alternative Vernal Pool-3 because it poses a potential risk to vernal pools through surface water runoff; removal of this limited soil area would reduce human health risks as well.

Alternative Vernal Pool-2 would provide assurances that exposures to vernal pool sediments remain controlled by notifying future deed holders of the presence of sensitive habitats and the requirements to protect those habitats from human intrusion and other ground-disturbing activities. Alternative Vernal Pool-3 is expected to remove contaminants to levels that would support unrestricted use and unlimited exposure. The current and planned future use of all of the vernal pools sites is for industrial uses. In the unlikely case that vernal pool sites were developed for residential uses and that people were allowed to come in contact with the vernal pool sediments, then Alternative Vernal Pool-3 would provide human health protection.

Environmental Protection. Alternative Vernal Pool-1 would not reduce risks from COCs in the vernal pools. Risks to benthic invertebrates exposed to COCs in vernal pool sediments are generally low; however, the COC levels are likely to have some adverse effects as indicated by HQ values above 1. PAHs in the Vernal Pools Associated with CS 007 and SAFR result in HQs above 10, thus impacts to sensitive species are more likely to be significant. These vernal pools exist in a generally disturbed, active area of the base and are of relatively low quality.

Alternative Vernal Pool-2 would not provide any direct protection of the environment because institutional controls are directed at prohibiting human intrusion into the pools. Indirectly, restricted uses, such as prohibitions against digging or performing earthwork in the pools, may help to preserve the current, established habitats.

Alternatives Vernal Pool-1 and -2 would not destroy the existing vernal pool habitats or the federally threatened vernal pool fairy shrimp that may be present there. Alternative Vernal Pool-3 would remove COCs in vernal pool sediments but would also result in taking of listed species and temporarily impacting or destroying the vernal pool habitats. Some low quality pools may recover to the current level of service, but the recovery of high quality,

established vernal pools is uncertain or would, at a minimum, take several years to occur. For vernal pools with low levels of COCs, the benefit to the environment (i.e., protection of benthic invertebrates) achieved through removal of contaminated sediments is likely offset by the significant adverse impacts that would occur.

Applicable or Relevant and Appropriate Requirements

Except for the No Action alternative, all other alternatives would comply with the chemical-, action-, and location-specific ARARs. Alternative Vernal Pool-3 would require mitigation to comply with ARARs governing protection of sensitive habitats, endangered species, and impacts to wetlands.

Long-term Effectiveness and Permanence

This criterion addresses the long-term effectiveness and permanence of maintaining protection of human health and the environment after implementation of the remedial action. Alternatives Vernal Pool-1 and -2 would not reduce the current level of ecological risk at the vernal pools. Alternative Vernal Pool-3 provides the best long-term risk reduction by removing COCs in sediment. However, Alternative Vernal Pool-3 also has potential long-term impacts if the habitat cannot be fully restored. In addition, vernal pools affected by PAHs may be recontaminated if runoff from paved areas (roads, runway, and taxiways) continues to be an ongoing source, which is expected under current planned land uses.

Unlike the creek sediments, COC concentrations in the vernal pool sediments are not likely to change significantly over time as a result of natural processes. Thus, Alternative Vernal Pool-3 is the only alternative that would reduce COC concentrations over the long term, provided that runoff and potential industrial sources of contaminants are controlled.

Reduction of Toxicity, Mobility, and/or Volume through Treatment

This criterion evaluates whether the alternative meets the EPA's preference for treatment. None of the alternatives uses treatment because the levels of contamination are relatively low; therefore, no alternative meets the preference for treatment. In the unlikely event that the landfill facility uses treatment for stabilizing the sediments disposed of under Alternative Vernal Pool-3, this alternative would rate the highest under this criterion.

Short-term Effectiveness

Under Alternative Vernal Pool-1, no remedial action would take place; therefore, there would be no short-term risks to the community, to the environment, or to construction workers. However, contamination would not be addressed, and ecological risks would remain at current levels.

Alternative Vernal Pool-2 would prohibit disturbance of vernal pools and prevent possible human exposures to contaminants in vernal pool sediments. This alternative would also result in no effects to the community, to workers, or the environment. No habitat damage or loss would occur under either Alternative Vernal Pool-1 or -2, but COCs would remain in place and potential ecological risks would not be reduced.

Alternative Vernal Pool-3 was rated the lowest for short-term effectiveness. The short-term risks to the community and construction workers would be the greatest for this alternative

because it includes active remediation. It also includes transportation of excavated dirt from the site to a licensed disposal facility, activities potentially affecting the neighboring community. Risks to the environment are the greatest under this alternative because, although COC concentrations would be reduced, habitat would be destroyed and could take years to recover. Full recovery of some high quality habitats may not be feasible. Although mitigation measures would be implemented during construction, significant impacts to protected species such as the vernal pool fairy shrimp are unavoidable under this alternative.

Implementability

Alternative Vernal Pool-1 would be the easiest to implement because no action would be taken. Alternative Vernal Pool-2 would only involve implementation and enforcement of institutional controls, which are commonly implemented at McClellan sites. Alternative Vernal Pool-3 would be readily constructible but may be difficult to implement with respect to minimizing disruption to wildlife and sensitive habitats, and would likely require mitigation and extensive consultation with resource agencies.

Cost

The present-worth cost at 30 years for implementation of Alternative Vernal Pool-2 is \$182,000 for the Vernal Pools associated with CS 007 and SAFR and the Former A-1 Metals Facility. For Alternative Vernal Pool-3, the present-worth cost at 30 years is \$268,000. The costs for Alternative Vernal Pool-3 are higher because of the additional cost of removal and disposal of contaminated sediment.

State Acceptance

The State has had an opportunity to review and comment on the Ecological Sites ROD and finds each of the alternatives generally acceptable except for Alternative Vernal Pool-1, No Action.

Community Acceptance

A public comment period on the Proposed Plan was held from February 4 through March 7, 2011, and a public meeting was held on February 15, 2011. Public comments were received (see the Responsiveness Summary in Section 3). No specific comments were received regarding vernal pools. However, four general comments were provided that supported the Air Force's selection of remedial actions overall. Of the remaining comments, one requested additional information, four provided alternative suggestions for cleanup, and one expressed general distrust of Air Force information and decisions.

2.8.4 Comparative Analysis for the Soils (Tailings Piles) Alternatives

This section contains a comparative analysis of the alternatives for the tailings piles in the West Nature Area. No COCs were identified for upland soils at the other sites, with the exception of a limited area of PCB contamination at the Former A-1 Metals Facility, which was addressed as part of the vernal pool alternatives because of its proximity to vernal pools at the Former A-1 Metals Facility. A summary of the comparative analysis for the soils alternatives is presented in Table 7.

Protection of Human Health and the Environment

Protection of Human Health. The anticipated land use for the West Nature Area is a conservation area. A perpetual conservation easement will require that the property remain substantially in its natural condition in perpetuity and will prohibit activities inconsistent with the protection of federally listed species and their habitats. Therefore, maintenance workers are the only potentially exposed human population. Cancer risks from exposures to tailings by a hypothetical maintenance worker were below the risk management range at 5×10^{-7} , and the HI value was 0.008. Thus, there is no significant risk to human health. Alternatives Soil-1, Soil-2, and Soil-3 are therefore equally protective of the hypothetical maintenance worker. Alternative Soil-2 provides institutional controls that could include restrictions on recreational or residential type exposure scenarios to supplement the conservation easement.

Protection of the Environment. Dioxins/furans and PCBs pose potential risk to terrestrial wildlife (deer mouse and western meadowlark) based on conservative risk assumptions. Dioxins and PCBs were reported in samples throughout the upland areas surrounding Don Julio Creek and were sporadically detected in areas around Magpie Creek in the West Nature Area. The distribution of dioxin concentrations suggests aerial deposition throughout the West Nature Area, perhaps supplemented by dioxins carried into the area by the creeks and deposited in the floodplain during periods of high flow. The Creeks RICS (URS, 2009) notes that the dioxin method used for the tailings was Method 8280A, which has higher (less sensitive) detection limits and may elevate risk estimates. PCBs are widespread throughout the creeks in the West Nature Area and the base, as PCBs were commonly used for dust control many years ago and are highly persistent in the environment. Thus, the tailings piles contain PCBs that were present in the sediments dredged from the creeks.

Removal of the tailings piles under Alternative Soil-3 is the only alternative evaluated that would reduce COC risks to terrestrial wildlife. Alternatives Soil-1 and -2 would not reduce risks associated with COCs. Alternative Soil-3 is the most protective of ecological receptors from contaminant concentrations. However, Alternative Soil-3 would also have the greatest short-term adverse impacts to the existing ecosystem in the West Nature Area.

Applicable or Relevant and Appropriate Requirements

Except for the No Action alternative, all other alternatives would comply with the chemical-, action-, and location-specific ARARs. Alternative Soil-3 would require habitat restoration to comply with ARARs governing protection of sensitive habitats, endangered species, and impacts to wetlands.

Long-term Effectiveness and Permanence

Alternative Soil-1 and -2 would not reduce the current level of ecological risk to terrestrial receptors from the tailings piles. However, Alternative Soil-2 would provide institutional controls to prevent disturbance of the tailings by humans and the subsequent migration of contaminants into adjacent sensitive habitat areas. Although the tailings are heavily vegetated, migration of contaminants could be possible during a large flood event. Alternative Soil-3 provides the best long-term risk reduction by removing COCs and disposing of removed soil. Based on preliminary discussion and consultation with the

resource agencies, all of the piles can be removed without permanent loss of habitat for sensitive species, so residual risk would be minimal. The tailings piles are not exposed to ongoing sources of contamination, as are creek sediments, so long-term risk reductions would be permanent.

Reduction of Toxicity, Mobility, and/or Volume through Treatment

This criterion evaluates whether the alternative meets the EPA's preference for treatment. None of the alternatives uses treatment because the levels of contamination are relatively low; therefore, no alternative meets the preference for treatment. In the unlikely event that the landfill facility uses treatment for stabilizing the soils disposed of under Alternative Soil-3, this alternative would rate the highest under this criterion.

Short-term Effectiveness

Under Alternative Soil-1, no remedial action would take place; therefore, there would be no short-term risks to the community, to the environment, or to construction workers. However, contamination would not be addressed, and ecological risks would remain at current levels.

Alternative Soil-2 would provide institutional controls to prevent migration of contaminants into adjacent sensitive habitat areas and could provide an additional layer of protection for human receptors by prohibiting recreational or residential exposure. However, these exposures are unlikely and would be addressed by the pending conservation easement. This alternative would also result in no effects to the community, workers, or the environment. No habitat damage or loss would occur under either Alternative Soil-1 or -2, but COCs would remain in place, and potential ecological risks would not be reduced.

Alternative Soil-3 was rated the lowest for short-term effectiveness. The short-term risks to the community and construction workers would be the greatest for this alternative because it includes active remediation. It also includes transportation of excavated tailings from the site to a licensed disposal facility, an activity that may potentially affect the neighboring community. Risks to the environment are the greatest under this alternative because, although COC concentrations would be reduced, habitat would be adversely affected. The habitat types directly affected by Alternative Soil-3 are generally less valuable and more apt to recover in a reasonable time than those habitat types evaluated for the creeks and vernal pools. Based on preliminary discussion and consultation with the resource agencies, all of the piles can be removed without permanent loss of habitat for sensitive species.

Implementability

Alternative Soil-1 would be the easiest to implement because no action would be taken. Alternative Soil-2 would only involve implementation and enforcement of institutional controls. Institutional controls are readily implementable because they are commonly implemented at McClellan sites. Alternative Soil-3 would be readily constructible but may be difficult to implement with respect to minimizing disruption to wildlife and sensitive habitats, and would require habitat restoration and extensive consultation with resource agencies.

Cost

The present-worth cost at 30 years for implementation of Alternative Soil-2 is \$181,000. For Alternative Soil-3, the present-worth cost at 30 years is \$2,426,000. The costs for Alternative Soil-3 are higher because of the additional cost of removal and disposal of the tailings piles.

State Acceptance

The State has had an opportunity to review and comment on the Ecological Sites ROD and finds Alternative Soil-3 generally acceptable. The State believes Alternatives Soil-1 and Soil-2 are not acceptable, as they do not protect ecological receptors from exposure to contaminants within the tailings piles.

Community Acceptance

A public comment period on the Proposed Plan was held from February 4 through March 7, 2011, and a public meeting was held on February 15, 2011. Public comments were received (see the Responsiveness Summary in Section 3). No specific comments were received regarding tailings piles in the West Nature Area. However, four general comments were provided that supported the Air Force's selection of remedial actions overall. Of the remaining comments, one requested additional information, four provided alternative suggestions for cleanup, and one expressed general distrust of Air Force information and decisions.

2.9 Principal Threat Wastes

The NCP establishes an expectation that EPA will use treatment to address the principal threats posed by a site wherever practicable. The principal threat concept applies to source materials that are highly mobile or highly toxic and cannot be reliably controlled in place, or would present a significant risk to human health or the environment should exposure occur. A source material is material that includes or contains hazardous substances, pollutants, or contaminants that act as a reservoir for migration of contamination to groundwater, surface water, or air, or acts as a source for direct exposure.

Contaminants in soil and sediment at seven of the Ecological Sites have been determined through risk assessments to pose a threat to human health and the environment. However, the contaminants at these sites would not be considered a principal threat waste because the contamination is not highly mobile and toxicity is low or moderate. Therefore, the NCP expectation for treatment of principal threat wastes is not applicable to these sites.

2.10 Selected Remedies

Alternative Creeks-3 (Excavation and Disposal) is selected to address contamination in IC 17 Seasonal Creek and Drainage Ditch, Offbase Creeks, Magpie Creek West of the Runway, and Second Creek.

Alternative Vernal Pool-3 (Excavation and Disposal) is selected to address contamination at the Vernal Pools Associated with CS 007 and SAFR, and the Former A-1 Metals Facility. At the former A-1 Metals facility, only the more contaminated grassland soils would be removed, and the vernal pools would not be impacted.

One soil remedy is selected to address soil (tailings piles) contamination: Alternative Soil-3 (Excavation and Disposal) for the West Nature Area.

In the following sections, a detailed description of the remedies, the estimated costs, and the expected outcomes of the remedies are provided.

2.10.1 IC 17 Seasonal Creek and Drainage Ditch, Offbase Creeks, Magpie Creek West of the Runway, and Second Creek

The Air Force and EPA are selecting Alternative Creeks-3 for these four sites. Under this alternative, contaminated sediment within the creek channels would be excavated and transported for disposal at an appropriate facility. Disposal would occur either offsite or at the consolidation unit to be constructed under the Focused Strategic Sites ROD (AFRPA, 2012). This alternative involves the removal of contaminated sediments from within the creek channels that exceed the cleanup level concentrations listed in Table 4. At the IC 17 Seasonal Creek and Drainage Ditch, all contaminated sediment on top of the concrete liner would be removed. The liner in this area is in good condition, but sediment on top of the liner has not been removed from two locations in recent years. At Magpie Creek West of the Runway, the Offbase Creeks, and Second Creek, contaminated sediments would be removed from unlined sections of creek. In addition, for the lined section of Magpie Creek West of the Runway, approximately 3000 feet of corrugated metal liner will be removed, contaminated sediments beneath the liner will be excavated, and a new liner will be installed.

The target volumes are approximately 181, 925, 2,118, and 470 cubic yards for the IC 17 Seasonal Creek and Drainage Ditch, Offbase Creeks, Magpie Creek West of the Runway, and Second Creek, respectively. The target volumes are shown on Figures 8, 6, 7, and 11, respectively.

Monitoring of sediments and surface water will be conducted to assess the effectiveness of the selected remedies for Magpie Creek West of the Runway, Offbase Don Julio Creek, and Second Creek, and evaluate the potential for recontamination of the remediated creeks from upstream non-point sources and other IRP sites. Monitoring frequencies and analyte lists will be identified during the remedial design. Monitoring stations will be located upgradient, within, and downgradient of affected creeks and are shown on Figure 17. The intent is to apply the monitoring component of the selected remedies on a basewide scale that would assess the effectiveness of the selected remedies for the sites as well as for creek sections downstream of the remediated sites. Contributions from upstream offbase sections of creek will also be evaluated as part of the monitoring program. Therefore, monitoring of sediment entering the base and in the creeks up-gradient and down-gradient of the remediated creek sections, including creeks in the West Nature Area and downstream offbase area, will be performed. The monitoring will be performed to:

- Collect data to allow comparison of sediment and surface water concentrations from upstream off-base creeks to concentrations within remediated creek sections and in the downstream West Nature Area Creeks and Offbase Creeks
- Evaluate the effectiveness of the selected remedies by comparing reported concentrations with cleanup levels specified in the ROD

- Evaluate and attempt to identify, via additional toxicity tests and/or toxicity identification evaluation (TIE) procedures, the cause of *Hyalella* mortality observed in West Nature Area bioassays
- Demonstrate that sediment and surface water within remediated creek sections and in the West Nature Area and Offbase Creeks do not present an unacceptable ecological risk, and are not being re-contaminated above levels found in upstream offbase creeks

A minimum of 3 years of monitoring will be required to demonstrate attainment of these objectives. Monitoring beyond this initial 3-year time period will be conducted if cleanup levels are exceeded and the data demonstrate that re-contamination is occurring at concentrations greater than the upstream offbase contributions and those concentrations pose an unacceptable ecological risk. The monitoring data will be provided in a report to the regulatory agencies annually. If the additional monitoring and toxicity tests and/or TIE demonstrates that the remedial actions selected in the ROD are not protective, this ROD will be modified or amended.

While an action is being taken to address creek sediments, No Action is being selected for vernal pools at Magpie Creek West of the Runway and Second Creek. Only low levels of contaminants were detected in soil and sediment samples for these vernal pools; therefore, significant impacts to ecological receptors and the environment are not likely. No further action is required for these vernal pools.

2.10.2 Vernal Pools Associated with CS 007 and SAFR and the Former A-1 Metals Facility

The Air Force and EPA are selecting Alternative Vernal Pool-3 for these two sites. For the vernal pools associated with CS 007 and SAFR, contaminated sediment and soil within the vernal pools would be excavated and transported for disposal at an appropriate facility. Disposal would occur either offsite or at the consolidation unit to be constructed at under the Focused Strategic Sites ROD (AFRPA, 2012). The former vernal pools will be backfilled and graded such that no ponding will occur. Final remediation of any contaminants remaining beneath and around the former vernal pools will be addressed in the pending Follow-on Strategic Sites ROD for CS 007. Excavation and removal of sediment from within the vernal pools will reduce risk for ecological receptors but will destroy completely the sensitive species and habitat. Consultation with the USFWS will be conducted to assess potential impacts to federally protected species and determine mitigation requirements.

As a modification of this alternative for the Former A-1 Metals Facility, the Air Force will remove the more contaminated grassland soil at the source site, but will not excavate the vernal pools. Soil containing concentrations of COCs greater than industrial cleanup levels as listed in Table 4 will be removed. Excavation of soil and sediment to achieve unrestricted use levels was considered, but was not selected because of the significant impacts to sensitive vernal pool habitats that would occur. Under the selected remedy, the resulting land use is restricted, and institutional controls will be implemented via deed restrictions to prohibit sensitive uses such as residences, daycare centers, healthcare centers, or schools on the property. The site was used for industrial purposes in the past, is within the buffer zone of the runway, and is designated for industrial use in the future. The vernal pools adjacent to the site do not have high levels of contamination and provide good habitat quality; therefore No Action is selected for the vernal pools at the site. The Air Force will conduct

pre-construction surveys for special-status species prior to implementation of the selected remedy and will consult with the USFWS (for federal special-status species) and DFG (for State special-status species) concerning avoidance, minimization, and mitigation requirements.

The target volumes are approximately 92 cubic yards for the Vernal Pools Associated with CS 007 and SAFR and 1,052 cubic yards for the Former A-1 Metals Facility. The target volumes are shown on Figures 11 and 14, respectively.

2.10.3 West Nature Area

The Air Force and EPA are selecting Alternative Soil-3 for the tailings in the West Nature Area. Under the selected remedy, all of the tailings will be excavated irrespective of cleanup levels. Within tailings pile excavation areas, subsurface soils will be removed where concentrations exceed those listed in Table 4 and backfilled with clean soil. Based on preliminary discussion and consultation with the resource agencies, all of the piles can be removed without permanent loss of habitat for sensitive species, and the benefit of removing the piles will outweigh the temporary impacts of remedial activities. Appropriate avoidance and minimization measures will be implemented to protect sensitive habitats to the extent possible during construction.

Monitoring of sediments and surface water in creeks down-gradient of the tailings piles (i.e., West Nature Area Creeks and Offbase Creeks) will be conducted to assess the effectiveness of the tailings pile removal. Monitoring frequencies and analyte lists will be identified during the remedial design. Monitoring will be performed in coordination with that proposed under Alternative Creeks-3 for Magpie Creek West of the Runway and Second Creek as described in Section 2.10.1 and shown on Figure 17.

Although an action is being taken to address the tailings piles in the West Nature Area, No Action is the selected remedy for West Nature Area Creeks. Potential risk to human health associated with ingesting fish or crayfish from the creeks is present. However, the risks associated with the average concentrations are within the EPA risk management range using very conservative exposure assumptions. In addition, the West Nature Area Creeks are located within a dedicated habitat conservation area without public access, and the contaminant concentrations are consistent with concentrations reported in sediments in upstream, offbase creeks. No further action is required for the West Nature Area Creeks.

In addition, No Action is being selected for vernal pools in the West Nature Area. Only low levels of contaminants were detected in soil and sediment samples for these vernal pools; therefore, significant impacts to ecological receptors and the environment are not likely. No further action is required for these vernal pools.

2.10.4 No Action Sites

No Action is being selected as the remedy for the following sites:

- Former Soils Holding Area
- Robla Creek

- Don Julio Creek West of the Runway
- IC 17 Holding Ponds
- Vernal Pool Associated with PRL S-010

At the Vernal Pool Associated with PRL S-010, contamination was found to pose a potential threat to ecological receptors. However, contaminant levels are relatively low, and excavation is not justified relative to the habitat damage associated with removal.

2.10.5 Summary of Estimated Remedy Costs

The cost estimates are based on the best available information regarding the anticipated scope of the remedial alternative. A detailed cost analysis for the selected remedies for these sites is presented in Table 8. Costs were estimated in accordance with EPA guidelines (EPA, 2000). Per the guidelines, the discount rate used for the calculations was 2.7 percent and was taken from Appendix C of the Office of Management and Budget Circular A-94 (February 2008) for real discount rates over a 30-year period. Costs for mobilization, demobilization, engineering design, and construction oversight, as well as a 15 percent contingency, are included in the cost estimate.

Changes in the cost elements are likely to occur as a result of new information during the engineering design of the remedial action. Actual costs for implementation of the alternatives are expected to be within +50/-30 percent of the cost estimates. Major changes may be documented in the form of a memorandum in the Administrative Record file, an Explanation of Significant Difference, or a ROD amendment. The costs associated with the selected remedies for each of the seven six sites requiring an action are summarized in Table 8.

No costs are associated with the No Action sites (Former Soils Holding Area, Robla Creek, Don Julio Creek West of the Runway, and the IC 17 Holding Ponds). There are also no costs associated with No Action for the West Nature Area Creeks, the Vernal Pool Associated with PRL S-010, and the vernal pools at the West Nature Area, Magpie Creek West of the Runway, and Second Creek.

2.10.6 Expected Outcomes of Selected Remedies

Under Alternative Creeks-3: Excavation and Disposal of Sediment for Moderate Risk Reduction (Low Habitat Impact) for Magpie Creek West of the Runway, the Offbase Creeks, the IC 17 Seasonal Creek and Drainage Ditch, and Second Creek, removal of contaminated sediments would achieve the RAOs by reducing risks for both ecological and human receptors. Removal of the contaminated sediment in the creeks would provide permanent and long-term effectiveness as long as remaining sediments are protected from recontamination above levels representative of concentrations reported in sediments in upstream, offbase creeks. Post-construction confirmation sampling would be conducted to confirm that RAOs have been achieved, and post-remediation monitoring would also be performed. In addition, remediated areas would include an ecological maintenance and monitoring plan to re-establish vegetation for unlined sections. Habitat recovery in unlined sections of Magpie Creek West of the Runway, Offbase Creeks, and Second Creek is estimated to require up to 10 years in some areas. Future land use in the areas adjacent to Magpie Creek West of the Runway, the IC 17 Seasonal Creek and Drainage Ditch, and

Second Creek will be industrial; however, no land use restrictions will be required for the creeks.

Under Alternative Vernal Pool-3: Excavation and Disposal for the Vernal Pools Associated with CS 007 and SAFR and Former A-1 Metals Facility, excavation would provide protection of potential future human and ecological receptors by removing contaminated soil and sediment. The site will be backfilled with clean soil and mitigated by offsite habitat compensation. The vernal pools will not be reconstructed at this location. Future land use in the areas adjacent to these sites will be industrial. Existing site controls for CS 007 and surrounding properties (implemented as lease restrictions) will limit exposure to residual contamination beneath the vernal pools until a remedy is selected and implemented for CS 007. It is anticipated that the remedy for CS 007, to be selected in the pending Follow-on Strategic Sites ROD, will either further remediate this area to levels acceptable for unrestricted use or include institutional controls to restrict land use. For the Former A-1 Metals Facility, the site would be remediated to levels that support occupational use and are protective of ecological receptors. Institutional controls prohibiting residential use would continue in perpetuity to protect human health from COCs left in place above levels that support unlimited use and unrestricted exposure. The vernal pools at the site will not be disturbed. Post-construction confirmation sampling would be conducted to confirm that RAOs have been achieved. Long-term monitoring would not be required.

Under Alternative Soil-3 for the soil (tailings piles) at the West Nature Area, the removal and disposal of the tailings piles from the West Nature Area would reduce the risk to ecological receptors. Because the West Nature Area is an established conservation area, the property will remain substantially in its natural condition in perpetuity. Risks to human health resulting from exposures to tailing soils are currently below the EPA risk management range for the maintenance worker exposure scenario, and removal of the contaminated tailings soils would further reduce the risk to human receptors. Residential and recreational uses are not plausible exposure scenarios because of the required conservation easement. Post-construction confirmation sampling would be conducted to confirm that RAOs have been achieved. All remediated areas would include a habitat restoration plan and an ecological maintenance and monitoring plan as part of the Removal Action Work Plan to evaluate and ensure reestablishment of vegetation, as required by USFWS and CDFG. Long-term monitoring would not be required because all piles would be removed and subsurface soil excavated as needed to achieve the cleanup levels.

2.11 Statutory Determinations

Under CERCLA Section 121 and the NCP, the lead agency must select remedies that are protective of human health and the environment, comply with ARARs (unless a statutory waiver is justified), are cost effective, and use permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable. In addition, remedies that employ treatment as a principal element to permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances, pollutants, or contaminants are preferred. The following sections discuss how the selected remedies meet the statutory requirements of CERCLA Section 121 and the NCP.

2.11.1 Protection of Human Health and the Environment

Magpie Creek West of the Runway, Offbase Creeks, IC 17 Seasonal Creek and Drainage Ditch, and Second Creek

Under Alternative Creeks-3, removing contaminated sediments will achieve the RAOs and reduce risks for both ecological and human receptors. The contaminated sediment would be removed from the creeks and disposed of at an approved landfill. The risk remaining at the site would be acceptable for ecological receptors and within the EPA risk management range for human health. Habitat in the unlined sections that are excavated will require restoration, but implementation of the remedy will not create unacceptable short-term risks.

Vernal Pools Associated with CS 007 and SAFR and Former A-1 Metals Facility

Under Alternative Vernal Pool-3, protection of potential future human and ecological receptors would be achieved by removing contaminated soil and sediment. Institutional controls would be required at the Former A-1 Metals Facility to prohibit sensitive uses such as residences, daycare centers, healthcare centers, or schools on the property. The risks remaining at the sites will be acceptable for ecological receptors and below or within the EPA risk management range for human health. Offsite mitigation will be required because the vernal pools associated with CS 007 and SAFR will be removed, but implementation of the remedy will not create unacceptable short-term risks.

West Nature Area

Under Alternative Soil-3, risk to ecological receptors and human health would be reduced by removal of soil contaminated with COCs. The risks remaining at the sites will be acceptable for ecological receptors and less than the EPA risk management range for human health. This alternative would achieve permanent risk reduction by removing all tailings piles and excavating subsurface soil as needed to meet the cleanup levels. Implementation of the remedy will not create unacceptable short-term risks.

2.11.2 Compliance with Applicable or Relevant and Appropriate Requirements

Section 121(d) of CERCLA states that remedial actions on CERCLA sites must attain (or justify the waiver of) any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be ARARs. Applicable requirements are those cleanup standards, criteria, or limitations promulgated under federal or state law that specifically extend to the situation at a CERCLA site. A requirement is applicable if the jurisdictional prerequisites of the environmental standard show a direct correspondence when objectively compared with the conditions at the site. Relevant and appropriate requirements are federal or state cleanup standards, requirements, criteria, or limitations that, while not "applicable" to a hazardous substance, action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those found at the sites that their use is well suited to the particular sites. The selected remedies comply with ARARs for protection of human health and the environment. ARARs are presented in Table 9.

In addition, the remedial actions will comply with the requirements of 40 CFR 300.440 (National Oil and Hazardous Substances Contingency Plan – Procedures for Planning and Implementing Offsite Response Actions). The offsite transfer of any hazardous substance,

pollutant, or contaminant for treatment, storage, or disposal will be to an EPA-approved facility. Onsite disposal at the consolidation unit to be constructed at McClellan will be compliant with the ARARs identified in the Focused Strategic Sites ROD (AFRPA, 2012).

The State and the Air Force disagree on the status of State Water Resources Control Board Resolutions 68-16 and 92-49 as ARARs. However, both the Air Force and the State agree that the matter is effectively resolved by the Air Force using soil removal, management practices, and stormwater controls to minimize migration to surface water and by Air Force compliance with the California Toxics Rule (CTR). The Air Force and the State considered Resolution 68-16 and 92-49 and concluded that the ecological risk assessment and compliance with CTR criteria, which are federal requirements, results in an action that is at least as stringent as actions required by Resolutions 68-16 and 92-49.

The Air Force adopted the surface water beneficial uses defined in the Central Valley Water Board's Water Quality Control Plan (Basin Plan) for the Sacramento River and San Joaquin River Basins as the basis for the selected remedial actions.

2.11.3 Cost Effectiveness

In the Air Force's judgment, the selected remedies for the Ecological Sites are cost-effective and represent a reasonable value for the money to be spent. In making this determination, the following definition was used: "A remedy shall be cost-effective if its costs are proportional to its overall effectiveness" (NCP 300.430(f)(1)(ii)(D)). This was accomplished by evaluating the "overall effectiveness" of those alternatives that satisfied the threshold criteria (i.e., protective of human health and the environment and ARAR compliant). Overall effectiveness was further evaluated by assessing the balancing criteria (long-term effectiveness and permanence; reduction in toxicity, mobility, and volume through treatment; short-term effectiveness; and implementability). Overall effectiveness was then compared with costs to determine cost effectiveness.

Costs for the selected remedies are provided in Section 2.10.5. In addition, Table 8 summarizes the costs and provides the information needed to evaluate the cost effectiveness of the selected remedies for each site.

2.11.4 Use of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies

The selected remedies include excavation and disposal (Alternative Creeks-3 for Magpie Creek West of the Runway, Offbase Creeks, IC 17 Seasonal Creek and Drainage Ditch, and Second Creek; Alternative Vernal Pool-3 for the Vernal Pools Associated with CS 007 and SAFR and Former A-1 Metals Facility; and Alternative Soil-3 for the West Nature Area). The remedies are permanent but do not apply alternative treatment technologies or resource recovery technologies. However, the Air Force and EPA have determined that the selected remedies represent the maximum extent to which permanent solutions and treatment technologies or resource recovery technologies can be used in a practicable manner at these sites. The selected remedies provide the best balance of trade-offs in terms of the five balancing criteria and State and community acceptance. Overall, contaminant concentrations are relatively low, and the contaminated soil and sediment at these sites do not constitute principal threat wastes as discussed in Section 2.9.

2.11.5 Preference for Treatment as a Principal Element

The selected remedies do not satisfy the statutory preference for treatment as a principal element. Overall, contaminant concentrations at the sites are relatively low. The contaminated soil and sediment at these sites do not constitute principal threat wastes as discussed in Section 2.9 and do not trigger the NCP expectation for treatment of principal threat wastes.

2.11.6 Five-year Review Requirements

Because the selected remedies will result in hazardous substances remaining onsite above levels that allow for unrestricted uses and unlimited exposures at the Former A-1 Metals Facility, reviews will be required every 5 years to determine if the remedies remain effective and protective of human health and the environment. Typical information recorded during the review process will include the status of the institutional controls, any changes in the land use, any changes to the site, and how the changes were addressed. Reviews will continue until all COCs are reduced to levels that are safe for unrestricted use and unlimited exposure.

2.12 Documentation of Significant Changes

Three significant changes have occurred subsequent to the Proposed Plan that was released for public comment in February 2011.

For the West Nature Area Creeks and Offbase Creeks, the Preferred Alternative identified in the Proposed Plan was Alternative Creeks-2 (Institutional Controls). Alternative 1 (No Action) was also considered. State comments on Alternative Creeks-2 emphasized the difficulty of placing institutional controls and fishing restrictions on the creeks, particularly for the Offbase Creeks. To secure State acceptance of this ROD and in response to public comments, the Air Force has selected Alternative Creeks-3 (excavation and disposal for moderate risk reduction) for the Offbase Creeks. The remedy will target the highest contaminant concentrations in Don Julio Creek. The stretch to be excavated is approximately 1,300 feet and extends upstream and downstream of the point where Don Julio Creek crosses beneath Raley Boulevard.

Upon reevaluation of the site data and risk assessments for the West Nature Area Creeks, the Air Force has determined that selection of Alternative 1 (No Action) is justified for these creeks. The most significant risk pathway for human health for these creeks was consumption of biota. However, the risks were within the EPA risk management range for the average concentrations using very conservative exposure assumptions, and the assumed level of biota consumption likely cannot be supported by the creeks. While the contaminants in sediment do present some risk to ecological receptors, the concentrations are consistent with concentrations found in upgradient, offbase creeks.

The alternatives including excavation as described in the *Ecological Sites FS* (CH2M HILL, 2010a) and the Proposed Plan envisioned offsite disposal. However, the Air Force and the regulatory agencies have recently completed the *Focused Strategic Sites ROD* (AFRPA, 2012). Under that ROD, a consolidation unit will be constructed at McClellan for disposal of contaminated soil and sediment. Excavated soil and sediment from the Ecological Sites remedial actions will likely be disposed of at this onsite consolidation unit. Excavated soil

and sediment will be dewatered and treated prior to disposal in the consolidation unit as necessary to meet the acceptance criteria defined in the Focused Strategic Sites ROD (AFPRA, 2012).

SECTION 3

Responsiveness Summary

3.1 Background of Community Involvement

Prior to release of the Proposed Plan, the Air Force conducted several outreach efforts to educate the community about the Ecological Sites and to solicit public input throughout the process. These efforts included presentations to the McClellan RAB in 2008 and 2009, a RAB tour of the ecological sites in 2010, presentations to Habitat 2020 in 2008 and 2010, a presentation to Physicians for Social Responsibility in 2009, a presentation to the Environmental Council of Sacramento 2009, an article in the Urban Creeks Council Newsletter in 2010, and two articles in *Environmental Action Update* (the Air Force's quarterly newsletter about cleanup activities at McClellan) in 2010.

The Proposed Plan for the Ecological Sites was available for review during a 30-day public comment period from February 4 through March 7, 2011. A public notice in *The Sacramento Bee* on February 4, 2011, announced the start of the public comment period. The Proposed Plan was provided to key stakeholder groups including the regulatory agencies and RAB members. The Proposed Plan and FS were also placed at the North Highlands Library. A Fact Sheet summarizing the information in the Proposed Plan was distributed to individuals on the McClellan mailing list. In addition, a public meeting was held on February 15, 2011, to explain the Proposed Plan and solicit comments from the public. The public was encouraged to review the documents and provide verbal or written comments about the cleanup alternatives presented in the Proposed Plan. The Proposed Plan and public comment period are key parts of the decision-making process because the Air Force uses community input when making cleanup decisions.

3.2 Summary of Comments Received

The Air Force received two verbal comments from members of the public during the public meeting and eight written comment from members of the public during the public comment period. The comments and Air Force responses are provided below. The public comments did not result in modification of the recommended cleanup alternatives presented in the Proposed Plan.

3.2.1 Verbal Comments Received during the February 15, 2011, Public Meeting

Mr. Gary Collier: *If we're going to do any excavation it would make sense to me that they would go in and take out one creek at a time, one year after another, and allow all this to repopulate. Back in...I think it was the '90s perhaps, I can't remember exactly when, we had a major spill up in Northern California in Dunsmuir and it totally devastated all life all the way down into Shasta Lake. Now it repopulated and it's like nothing ever happened.*

Now we're not talking about destroying the life forever, it's going to repopulate. It would be better just to send in a bulldozer, go down the creeks and take that dirt, soil, or muck or whatever you want to call it and put it in CS-10 and be done with it. This money that is being spoken of is crazy.

It would be better to just go in and bulldoze the stuff out and make a potential safe habitat for the animals and at the same time have substantial improvement in that we would have less problems with flooding in the area. As everybody knows there is an issue, particularly off creek -- off-base creeks of substantial flooding where Raley Boulevard is totally shut down.

That's my comment basically.

Air Force Response: As shown in Figure 3 of the Proposed Plan, the estimated costs for excavation and disposal of creek sediments (Alternative Creeks-3 and -4) are substantially higher than the costs for No Action or Institutional Controls (Alternative Creeks-1 and -2). For example, the cost of excavating and disposing of sediments in the creeks in the West Nature Area for moderate risk reduction (Alternative Creeks-3) is over \$2 million, while the cost for Institutional Controls (Alternative Creeks-2) is \$361,000.

As noted by the commenter, natural recovery does occur in creek and wetland habitats. However, natural recovery can take many years, especially in habitats with well developed vegetation and wildlife communities. In addition, excavation could result in significant impacts to sensitive species. For creeks where contaminants are present at levels similar to those found in the upstream offbase creeks, the creeks may be recontaminated to at or near present levels. Therefore, depending on the level of contamination present at each creek site, the costs and impacts of excavation can outweigh the potential benefits. For those creek sites, Alternative Creeks-1 is being selected as the preferred alternative.

Flood control is beyond the scope of this project. While excavation and disposal could temporarily alleviate downstream flooding, sediment accumulation and other factors that contribute to flooding are ongoing issues that require routine maintenance and oversight. Flood control services for the creeks at McClellan are provided by the Sacramento County Department of Water Resources.

Mr. Glenn Jorgensen: *My comment is regarding the actual question that was asked about the mitigation. I would like to request further and more detailed information on mitigation, perhaps at a later meeting or even printed out in a handout. But mitigation is a question I have had for some time and I would appreciate more information.*

Air Force Response: Specific mitigation measures, as needed, for this project are addressed in the Final ROD. In addition, the Air Force prepared written information on mitigation for the public and presented it at the May 2011 RAB meeting.

3.2.2 Written Comments Received during the Public Comment Period

Mr. Glenn Jorgenson: *Thank you for sending me the proposed plan for the Ecological Sites. I have reviewed it and find that I do have a comment on one part of the plan.*

I am in agreement on the preferred alternatives for each of the different sites except for the Offbase Creeks site. The choice of Alternative Creeks-2, while relatively inexpensive, is clearly inappropriate. My reasons are as follows:

1. *Regarding the Offbase Creeks, In Table 1, the rationale given to justify the choice of Alternative Creeks-2 states "Contaminants of concern do not substantially exceed the high preliminary cleanup goals... It also states "The relatively low ecological risk levels... do not justify the habitat damage associated with removal. Institutional controls will prohibit fishing to protect recreational user.*

Table 1 shows the ecological risk for Benthic Invertebrates is high. On pg. 7, Section E, we find the description of risk assessments for both human and ecological risks. In defining ecological risks, it identifies low, medium and high risks and correlates them to low or high preliminary cleanup goals. There is NO mention, definition, nor reference to any requirement or correlation to a level that "substantially exceed the high cleanup goals".

Given the high ecological risk for Benthic Invertebrates, I do not understand how the Air Force can claim the "relatively low ecological risk levels" as a justification for its choice of alternatives.

- 2. In reviewing the nine CERCLA criteria shown in figure 3, I find that the second threshold criteria is relevant to this issue. It refers to compliance with ARARs. Under the Alternative Creeks-2 column it states "yes, for sites with low ecological risk". As previously mentioned, this site has a high ecological risk. Therefore under CERCLA, this alternative is unacceptable.*

I recommend that Alternative Creeks-3 be used for the Offbase Creeks site. Under CERCLA, it is the alternative that has the lowest impact on the habitat and meets the ARARs requirement.

Air Force Response: The commenter is correct that some contaminants in the Offbase Creeks (i.e., dioxins/furans, cadmium, and silver) were detected at concentrations exceeding the high PCGs for benthic invertebrates. However, it is important to note that only one concentration results in a slight exceedance of the high PCGs for aquatic birds and mammals. In addition, contaminant concentrations do not substantially exceed the maximum concentrations detected in the upstream offbase creeks, which represent the levels at which the creeks may become re-contaminated from upstream urban sources. Only one sample location in the Offbase Creeks exceeded the maximum upstream concentration of dioxins/furans. For cadmium, all locations were below the maximum upstream offbase concentration. No upstream offbase data are available for silver; however, the maximum silver concentration in the Offbase Creeks does not exceed the maximum, naturally occurring concentration detected in soil in a study of 12 Air Force installations across California.

In response to this and other public comments and to secure State acceptance of the ROD, the Air Force has selected Alternative Creeks-3 (excavation and disposal for moderate risk reduction) for the Offbase Creeks. The remedy will target the highest contaminant concentrations in Don Julio Creek. The stretch to be excavated is approximately 1,300 feet and extends upstream and downstream of the point where Don Julio Creek crosses beneath Raley Boulevard.

Ms. Lida Cibeles: I live in N. Highlands. And at McClellan, more clean up is needed like removal and putting a compacted clay cap so wind and rain runoff won't move the remaining contaminants. Putting 2 feet of clean soil and with good planning for the long term, could make it safe for wildlife and people at McClellan and downstream. If not done for the long term, DON'T WASTE THE MONEY!!!

Air Force Response: As discussed in the Proposed Plan, there are more than 300 sites that have been investigated for potential soil contamination at McClellan. Because of the large number of sites, they have been organized into groups based on similar characteristics or proximity. Three RODS have been completed for sites at McClellan with contaminated soil, and at least five more are planned.

Capping is one of several alternatives that have been evaluated. Typically, capping is most applicable for non-creek sites. For example, in 1985 and 1986, the Air Force constructed a clay cap over several former waste disposal pits in the northwestern portion of the base. The cap was constructed to reduce the potential for surface water infiltration, which could cause leaching of contaminants into groundwater. The entire area covered by the cap is now known the "OU D cap."

Capping was evaluated as a possible alternative for the creek sites in the Ecological Sites Feasibility Study. However, capping was determined to be infeasible or not readily implementable in the creek environment. Natural sediment or clay caps could be used, but would reduce the hydraulic capacity of the creek channel and would be subject to erosion from flowing water in the creek. An AquaBlok® cap was considered but was eliminated as a feasible alternative because of uncertainty regarding its long-term effectiveness. Capping of creek sediments would also result in adverse impacts to sensitive species and their habitats.

Long-term effectiveness is one of the nine CERCLA criteria that must be evaluated for each cleanup alternative being considered. Figures 3, 4, and 5 in the Proposed Plan describe the long-term effectiveness of the various alternatives evaluated. The Air Force's preferred alternatives are those that are protective of human health and the environment, comply with state and federal environmental requirements, and provide the best balance with respect to long-term effectiveness vs. cost and short-term impacts. Note that the Air Force has changed the remedy for the Offbase Creeks from Alternative 2 (Institutional Controls) to Alternative Creeks-3 (excavation and disposal for moderate risk reduction).

Mr. Mannard G. Gaines: I agree with all the statements about the cleanup of the sites at the former McClellan Air Force Base. I am interested in Magpie Creek because of our church and all the other property along Magpie Creek and on the Base.

Air Force Response: Thank you.

Mr. Eugene A. Hayes: After reviewing the proposals and alternatives, I say go with the Air Force's. Though more expensive, everything that needs to be done will be done. This hopefully, should satisfy all and eliminate any future litigation and mitigations on this problem. I think the lesser alternative proposals are just that - lesser and will result in future problems, complaints and costs.

Air Force Response: Thank you.

Mr. Albert Green: I am the son of two ex-employees of McClellan AFB. We moved to No. Highlands in 1951. I maintain contact with No. Highlands until 2007.

As an engineer I recognize it is almost impossible to remove all contamination. The Air Force's Preferred Clean Up Alternative appears to remove most risks to personnel. I would recommend with proceeding with the Air Force Proposal.

Air Force Response: Thank you.

Mr. Thomas L Browning: I am taking this time to respond to the comments from Air Force Spokesman. I have followed the clean-up pamphlets for the cleanup and I DONT TRUST THEM AS FAR AS I CAN SPIT. I have personal knowledge that they have lied about the whole thing. I was among the first to be interviewed about what we buried out there. I worked with four other men on the "Fire fighting school" we were told that the only thing there was burned fuel residue. There was never any mention of Radioactive material until the county took control of the site. The other four

men are all dead from one or more kinds of cancer, and I have six different cancers. Colon, Intestine, Lung, Liver, Leukemia, and Skin cancer.

When the VA wrote to the Air Force to ask what they had buried out there, the response was "A small amount of Radium to paint the instruments and gun sites with." I have a copy of the letter signed by an Air Force Colonel. So you can see why I don't trust any of them and I highly advise you to check, double check and then doubt anything that they tell you. I am sick and dying from cancer and they still deny that there ever was any radioactive material on the base.

So, my comments are don't trust anything that they have to say. I know that this will probably go in the round file, but at least I made my comments known and hopeful it might make a difference.

Air Force Response: Yes, there is radiologic and other chemical contamination at McClellan. These contaminants are a result of past industrial practices when McClellan AFB served as a repair depot starting in 1936. Chemical contamination was first discovered in the groundwater in 1979. In 1987, McClellan AFB was placed on the EPA's NPL, or "Superfund," for cleanup under CERCLA.

Under CERCLA, the Air Force established the McClellan Administrative Record, a publicly available repository (in person and online at <https://afarpaar.lackland.af.mil/ar/docsearch.aspx>) containing all documents relating to the identification, investigation, and eventual cleanup of radiological and other chemical contaminants at McClellan. The McClellan AFB Administrative Record shows that (1) radioactive material was used, stored, and disposed of at McClellan AFB, (2) some "low-level radioactive waste" was released to the environment at McClellan AFB, (3) the nature and extent of radioactive contamination at McClellan AFB has been investigated, and (4) the risks from radioactive contamination at McClellan AFB have been evaluated. The term "low-level radioactive waste" is a legal term that means that the waste is not from irradiated reactor fuel, reprocessing of irradiated reactor fuel, or uranium mill tailings.

In addition to the Administrative Record, the Air Force has published newsletters that provide information about contamination and cleanup for the community multiple times a year since 1984 and has routinely held quarterly community meetings. The Air Force has also given many presentations to community groups about the environmental cleanup program at McClellan, including the chemical and radiological contaminants present and the risks they present.

Regarding the "Fire Fighting School" mentioned in the comment, it is not clear whether the reference is to the old Air Force fire training area, where open air burning of waste fuel and solvents occurred, or the current fire training tower and adjacent structures. However, both areas are near former disposal pits referred to as CS 010, CS 011, CS 012, CS 013, and CS 014. Radium-226 waste (i.e., one type of low-level radioactive waste) and very small quantities of other low-level radioactive wastes are known to have been buried at CS 010. The other disposal pits in the area (CS 011-014) have been identified as potentially containing low-level radioactive waste. For its environmental cleanup program, the Air Force has bundled these sites together as the Focused Strategic Sites.

Actions to address radioactive contamination at CS 010 (the site closest to the fire training school at which radioactive contamination is known to be present) began in the mid-1990s while the base was still active. The Air Force restricted access to CS 010 as soon as radioactive

contamination was found at the site. Access also has been restricted to all other McClellan AFB sites where radioactive waste has been confirmed. Locked, chain link fences with signs with the radiation symbol are clearly visible to any member of the public in the area.

From 2000 to 2003, the Air Force performed a removal action at CS 010, excavating the site to remove waste with the highest concentrations of radioactive contamination. Approximately half of the waste excavated from CS 010 has been shipped offsite for disposal at licensed radioactive waste disposal sites. The remaining half of the waste excavated from CS 010 is soil contaminated with radium-226. It has been retained at McClellan AFB in a controlled area (i.e., behind a fence with locked gates to prevent exposure of the public and covered by a weatherization tent to prevent spreading of the contaminated soil). The contaminated soil remaining at CS 010 will be disposed of in accordance with the final remedy for CS 010, which will be selected in the Focused Strategic Sites ROD.

Prior to this removal action, the Air Force undertook an extensive program to inform the community about the site, the radiological contaminants present, and the removal action. Public comment was actively solicited through notices, fact sheets, and public meetings.

The Air Force has retained title to and responsibility for all radiological contaminated sites at McClellan, even after base closure. With oversight from state and federal regulatory agencies, the Air Force will remediate all sites at which radioactive waste is present. These properties will not be released from the Air Force until they are determined, by state and federal regulatory agencies, to be protective of human health and the environment.

The remedial actions for those sites will be documented in the Focused Strategic Sites ROD, the Small Volume Sites ROD, and the Follow-on Strategic Sites ROD. The public was invited to comment on the Focused Strategic Sites Proposed Plan, which presented the Air Force's preferred remedies for those sites in 2006. Public comment was actively solicited through notices, fact sheets, and public meetings; and several comments were received. Likewise, the public will be invited to review and comment on the Proposed Plans for the Small Volume Sites and Follow-on Strategic Sites when they are finalized.

The public comment period in which this commenter responded was for the Proposed Plan for the Ecological Sites at the Former McClellan Air Force Base. Following extensive investigations of historical records and analysis of environmental samples, radioactive contaminants were determined by the Air Force and state and federal regulatory agency to not be present at levels above the EPA's risk management range for human health risk. Therefore, while radiological contamination is a concern at some sites at McClellan, it is not considered to be a COC for the 12 specific sites addressed in the Ecological Sites ROD.

Mr. Gary Collier: *These comments are in addition to my oral comments at the February public meeting.*

I am opposed to any adoption of no action as it poses a risk for emergency personnel; particularly during fire events. Well it does not seem that the plan to use institutional controls was not well thought out. Such a plan could be viewed as an unfair taking with substantial risk of legal actions by off-site landowners. It does not appear that it will be effective at controlling access to the creeks or other off base as projected. Signage would be needed in several languages as several immigrant groups may consider the offbase areas.

As I indicated during February it appears far more protective to the environment to dredge the creeks and remove liners to improve water flow condones and capacity than let the contaminants of concern reach the delta after being washed downstream. History has shown that flooding in these creeks have been impacted by development in other counties. It is certain to increase as the upstream owners don't care if we can't use Raley Boulevard in the winter. The environmental specimens have been contaminated for years and that is likely why they have declined. We the people are once again being picked upon for our releases of sewage, possibly making people homeless whom are on a fixed income.

Air Force Response: Please refer to the response to comments above regarding costs and benefits of dredging the creeks.

For the West Nature Area Creeks and Offbase Creeks, the Preferred Alternative identified in the Proposed Plan was Alternative Creeks-2 (Institutional Controls). Alternative 1 (No Action) was also considered. State comments on Alternative Creeks-2 emphasized the difficulty of placing institutional controls and fishing restrictions on the creeks, particularly for the Offbase Creeks. In response to this and other public comments and to secure State acceptance of the ROD, the Air Force has selected Alternative Creeks-3 (excavation and disposal for moderate risk reduction) for the Offbase Creeks. The remedy will target the highest contaminant concentrations in Don Julio Creek. The stretch to be excavated is approximately 1,300 feet and extends upstream and downstream of the point where Don Julio Creek crosses beneath Raley Boulevard.

Upon reevaluation of the site data and risk assessments for the West Nature Area Creeks, the Air Force has determined that selection of Alternative 1 (No Action) is justified for these creeks. The most significant risk pathway for human health for these creeks was consumption of crayfish and fish. However, the risks were within the EPA risk management range for the average concentrations using very conservative exposure assumptions, and the assumed level of crayfish and fish consumption likely cannot be supported by the creeks. While the contaminants in sediment do present some risk to ecological receptors, the concentrations are consistent with concentrations found in upgradient, offbase creeks.

Mr. Kent Craney: *Thanks for sending the "Proposed Plan Fact Sheet". I will not be able to attend the meeting this evening, but I would like to provide some comments.*

- 1. Could you add Stephen Kenning, of Sacramento County Stormwater Utility Department, to your mailing list? And send him an 8 page "Plan" brochure which I recently received? Or a PDF copy via e-mail may be better. Stephen is the Stormwater Utility Supervisor and as such is responsible for McClellan public drainage maintenance and operation. His address is 3847 Branch Center Road, Sacramento CA 95827, phone # 875-7142.*
- 2. The "Plan" has site descriptions for several McClellan drainage courses which the Sacramento County Stormwater Utility has maintenance and operation responsibility. Generally I do not think there will be any significant Utility objections to the plan and its alternative analysis or preferred alternatives, but I do want to make sure the Utility is aware of the Plan.*
- 3. It appears that the Alternative 3 - "Excavation and Disposal" - is the preferred alternative for most sites which the Utility provided M&O services. If this alternative is chosen and executed, the sediment removal and, possible, removal of channel liner should be coordinated with the Utility's current standard for maintenance and operation of drainage channels.*

4. *I can help to coordinate any needed discussions with County staff. Please feel free to contact me at 876-4120 work or 764-9923 cell if you have any questions.*

Air Force Response: The Air Force has added Stephen Kenning to the mailing list and has forwarded him a copy of the Fact Sheet for the Ecological Sites Proposed Plan. Any excavation or other work within the creek channels will be coordinated with the Sacramento County Stormwater Utility Department.

SECTION 4

Works Cited

- Air Force Real Property Agency (AFRPA). 2012. *Focused Strategic Sites Record of Decision*. Final. February. AR #7522
- Air Force Real Property Agency (AFRPA). 2010. *Area of Concern G-1 Record of Decision*. Final. January. AR #7114
- Air Force Real Property Agency (AFRPA). 2009a. *Non-VOC Amendment to the Basewide VOC Groundwater Record of Decision*. Final. July. AR #7055
- Air Force Real Property Agency (AFRPA). 2008. *Local Reuse Authority Initial Parcel Record of Decision #2*. Final. October. AR #6576
- Air Force Real Property Agency (AFRPA). 2007. *Basewide VOC Groundwater Record of Decision*. Final. August. AR #6475
- Air Force Real Property Agency (AFRPA). 2004. *Local Reuse Authority Initial Parcel Record of Decision #1 (7 Sites)*. Final. June. AR #5488
- Arreola, Diane. 1997. Personal communication with Richard Howard/Jacobs Engineering. September 2 (as cited in Jacobs 2000).
- CH2M HILL. 2011. *Proposed Plan for the Ecological Sites*. Prepared for the former McClellan Air Force Base. Final. January. AR #7252
- CH2M HILL. 2010a. *Ecological Sites Feasibility Study*. Prepared for the former McClellan Air Force Base. Final. March. AR #7141
- CH2M HILL. 2010b. *Follow-on Strategic Sites Remedial Investigation Characterization Summaries Addenda and Feasibility Study*. Prepared for the former McClellan Air Force Base. Draft. April.
- CH2M HILL. 2009. *Update to the Wetlands Delineation for the Former McClellan Air Force Base*. Prepared for the former McClellan Air Force Base. Final. May. AR #7145
- CH2M HILL. 2008. *Initial Parcel #3 Feasibility Study*. Prepared for the former McClellan Air Force Base. Final. December. AR #6564
- CH2M HILL. 2007. *Basewide Vernal Pool Tier 2 Ecological Risk Assessment and Remedial Investigation Characterization Summaries Addenda*. Prepared for the former McClellan Air Force Base, California. Final. August. AR #6524
- CH2M HILL. 2006. *Focused Strategic Sites Feasibility Study*. Prepared for the former McClellan Air Force Base, California. Final. May. AR #6010
- CH2M HILL. 1994. *Operable Unit D Remedial Investigation Report*. Prepared for the former McClellan Air Force Base, California. Final. June. AR #2345, 2346, 2347

- CH2M HILL. 1993. *Operable Unit C Preliminary Assessment*. Volume II, Technical Memorandums. Prepared for McClellan Air Force Base, Environmental Management. July. AR #2152
- CH2M HILL. 1981. Installation Restoration Program Records Search for McClellan Air Force Base, California. July. AR #41
- Gregory, George/Plant Foreman, McClellan Air Force Base Civil Engineering, Wastewater Unit. 1989. Personal communication with Kirk Henning, Radian Corporation. January 19.
- Jacobs Engineering Group, Inc. (Jacobs). 2000. *Interim Basewide Remedial Investigation Report Parts 2E-2H – Remedial Investigation Characterization Summaries 2*. Prepared for the Department of the Air Force, McClellan Air Force Base. Final. June. AR #3837 - 3844
- Jacobs Engineering Group, Inc. (Jacobs). 1998. *Interim Basewide Remedial Investigation Report, Parts 2E-2H – Remedial Investigation Characterization Summaries*. Prepared for the Department of the Air Force, McClellan Air Force Base. Final. October. AR #904, 905, 906
- Jacobs Engineering Group, Inc. (Jacobs). 1995. *McClellan Air Force Base Operable Unit C Basewide Ecological Risk Assessment*. Prepared for McClellan Air Force Base Environmental Management. Final. October. AR #2566
- McLaren Environmental Engineering (McLaren). 1986. *Technical Memorandum for the Shallow Investigation Program in Areas A, B, C, and Other Sites*. Part V – Technical Memorandum – Area C. Volume I of III, Site Characterization Studies. May. AR #1001
- Radian International (Radian). 1998. *Data Gap Field Sampling Plan: Magpie Creek and Don Julio Creek*. Final. November. AR #910
- Radian International (Radian). 1997. *Interim Basewide Remedial Investigation Report Part 2C – Site Characterization Summary/Field Sampling Plan and Remedial Investigation Characterization Summaries*. Final. August. AR #3404 - 3407
- Radian International (Radian). 1995. *Remedial Investigation Characterization Summary for Special Study Area 3*. Final. November.
- URS Group, Inc. (URS). 2009. *Creeks Remedial Investigation Characterization Summaries and Addenda*. Final. February. AR #6577
- URS Group, Inc. (URS). 2005a. *Interim Basewide Remedial Investigation Report – Operable Unit C Remedial Investigation Characterization Summaries and Addenda*. Final. May. AR #6238
- URS Group, Inc. (URS). 2005b. *Creeks Data Gap Analysis and Field Sampling Plan*. Final. October. AR #6015
- URS Group, Inc. (URS). 2005c. *Creek Tailings Removal Action Engineering Evaluation/Cost Analysis*. Final. March. AR #6146
- U.S. Environmental Protection Agency (EPA). 2012. *Local Reuse Authority Initial Parcel ROD #3*. Final. September.
- U.S. Environmental Protection Agency (EPA). 2000. *A Guide to Developing and Documenting Cost Estimates During the Feasibility Study*. OSWER 9355.0-75. July.

U.S. Environmental Protection Agency (EPA). 1999. *Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*. OSWER Memorandum 9200.1-23P, EPA 540-R-98-031. July.

U.S. Fish and Wildlife Service (USFWS). 2004. *Biological Opinion: Section 7 Consultation for the Disposition of McClellan Air Force Base, Sacramento County, California*. December 10. AR #6026 - 6027

Vincent, Jerry/McClellan Air Force Base Environmental Management. 1996. Personal Communication with Radian Corporation Employee. August (as cited in Jacobs 2000).

Tables

TABLE 1
Ecological Sites
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Site Name	Site ID	WIMS ID	OU	Site Features/Media Addressed in this ROD
West Nature Area	N/A	SD165 and SD317	C	Creek sediments in Magpie and Don Julio creeks, upland soils in tailings piles, and sediment in Vernal Pools 103, 104, 106, 107, 121, 123, 128, 129, and 198, and Seasonal Wetlands 105, 122, 124, and 191
Offbase Creeks	SSA 003	SD301	C	Creek sediments in Magpie and Don Julio creeks
Magpie Creek West of the Runway	N/A	SD165	C	Creek sediments and sediment in Vernal Pools 442 and 509
Don Julio Creek West of the Runway	N/A	SD317	C	Creek sediments
IC 17 Seasonal Creek and Drainage Ditch	AOC 316	SD316	C	Creek and ditch sediments
Vernal Pools Associated with CS 007 and SAFR*	CS 007 SAFR	SD007 FR299	C	Sediment in Vernal Pools 421, 422, 423, and 601
Vernal Pool Associated with PRL S-010*	PRL S-010	SS095	E	Sediment in Vernal Pool 382
Second Creek	PRL P-007	SD083	G	Creek sediments and sediment in Vernal Pools 341, 383, 586, 587, 588, 591, 593, and Seasonal Wetlands 592 and 671
IC 17 Holding Ponds	PRL 051	WP049	C	Pond soils and sediments
Former A-1 Metals Facility Site	AOC F-1	SS315	F	Upland soils within AOC F-1 site boundary and sediment in Vernal Pools 262, 267 (east and west), 270, 272, and 277 south of site
Former Soils Holding Area	AOC F-2	CF260	F	Uplands soils within site boundary and sediment in Vernal Pool 282
Robla Creek	AOC F-6	SD 264	F	Creek sediments in Robla Creek and upland soils in former dredge material deposition area

*IRP Sites CS 007 and PRL S-010 are being addressed in the Follow-on Strategic Sites FS and ROD, while the Small Arms Firing Range IRP site is being addressed in the Focused Strategic Sites FS and ROD. Only the potentially impacted vernal pools adjacent to these sites are addressed in this ROD.

Notes:

AOC = Area of Concern

CS = Confirmed Site

FS = feasibility study

IC = Investigation Cluster

IRP = Installation Restoration Program

N/A = not available

OU = operable unit

PRL = Potential Release Location

ROD = record of decision

SSA = Special Study Area

SAFR = Small Arms Firing Range

WIMS = Work Information Management System Identification Number (Air Force Site Identification Code)

TABLE 2
 Contaminants of Concern and Risks for the Ecological Sites Evaluated for Further Action
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Site	Site Features			Contaminants of Concern	Ecological Risk			Human Health Risk		
	Creeks	Tailings Piles (Soil)	Vernal Pools and Seasonal Wetlands		Benthic Invertebrates	Birds	Mammals	Residential	Recreational*	Maintenance/Construction
West Nature Area (Magpie Creek and Don Julio Creek)	X	X	X	Creek Sediment: Dioxins/furans, cadmium, silver, PAHs, and PCBs, pesticides	●	●	●	--	●	○
				Tailings Piles (Soil): PCBs, dioxins/furans, and pesticides	●	●	●	--	--	○
				Vernal Pool Sediment: Cadmium	○	○	--	--	--	--
Magpie Creek West of the Runway	X		X	Creek Sediment: Dioxins/furans, PCBs, PAHs, total DDT, bis(2-ethylhexyl)phthalate, cadmium, and silver	●	●	--	●	--	●
				Vernal Pool Sediment: PCBs and metals	●	○	--	--	--	--
Offbase Creeks	X			Creek Sediment: Dioxins/furans, pesticides, and PCBs	●	●	●	--	●	○
IC 17 Seasonal Creek and Drainage Ditch	X			Creek Sediment: Dioxins/furans, silver, and PCBs	●	○	--	●	--	●
Vernal Pools Associated with CS 007 and SAFR			X	Vernal Pool Sediment: PAHs	●	○	--	--	--	--

TABLE 2
 Contaminants of Concern and Risks for the Ecological Sites Evaluated for Further Action
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Site	Site Features			Contaminants of Concern	Ecological Risk			Human Health Risk		
	Creeks	Tailings Piles (Soil)	Vernal Pools and Seasonal Wetlands		Benthic Invertebrates	Birds	Mammals	Residential	Recreational*	Maintenance/Construction
Second Creek	X		X	Creek Sediment: PAHs	●	○	--	◐	--	◐
				Vernal Pool Sediment: PAHs	◐	○	--	--	--	--
Former A-1 Metals Facility			X	Vernal Pool Sediment and Adjacent Grassland Soil: PCBs	◐	○	--	◐	--	◐

*Recreational risk for the West Nature Area and Offbase Creeks is associated with consumption of fish and other biota from the creeks.

Notes:

AOC = Area of Concern
 CS = Confirmed Site
 DDT = dichlorodiphenyltrichloroethane
 IC = Investigation Cluster
 PAH = polycyclic aromatic hydrocarbon
 PCB = polychlorinated biphenyl
 PRL = Potential Release Location
 SAFR = Small Arms Firing Range
 SSA = Special Study Area

○ = low risk (ecological risk is less than low preliminary cleanup goals; human health cancer risk is less than 1×10^{-6} and $HI < 1$)

◐ = medium risk (ecological risk is between the low and high preliminary cleanup goals; human health cancer risk is within the risk management range of 1×10^{-6} to 1×10^{-4} and $HI < 1$)

● = high risk (ecological risk is greater than the high preliminary cleanup goals; human health cancer risk is greater than 1×10^{-4} and/or $HI > 1$)

-- = not evaluated

TABLE 3

Remedial Action Objectives

Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Site	Habitat Type	RAO
West Nature Area (Magpie Creek and Don Julio Creek)	Tailings Piles	Reduce the potential risks to terrestrial and aquatic receptors from contaminants in tailings piles through excavation and disposal of all tailings piles. Within tailings pile excavation areas, remove subsurface soils where concentrations exceed those listed in Table 4 and backfill with clean soil. Current conditions do not present unacceptable risks to humans.
Magpie Creek West of the Runway	Creeks	Reduce the potential risks to aquatic receptors from contaminants in sediments through excavation and disposal of sediments with concentrations exceeding those protective of aquatic receptors as listed in Table 4. For the lined section, the liner will be removed, contaminated sediments beneath the liner will be excavated, and a new liner will be installed. This remedy will result in acceptable risks under the maintenance and construction worker scenarios.
Offbase Creeks	Creeks	Reduce the potential risks to aquatic receptors from contaminants in sediments in the targeted section of Don Julio Creek through excavation and disposal of sediments with concentrations exceeding those protective of aquatic receptors as listed in Table 4. This remedy will result in acceptable risks under the maintenance and construction worker scenarios.
IC 17 Seasonal Creek and Drainage Ditch	Creeks	Reduce the potential risks to aquatic receptors from contaminants in sediments through excavation and disposal of all sediments above the concrete liner. This remedy will result in acceptable risks under the maintenance and construction worker scenarios.
Second Creek	Creeks	Reduce the potential risks to aquatic receptors from contaminants in sediments through excavation and disposal of sediments with concentrations exceeding those protective of aquatic receptors as listed in Table 4. This remedy will result in acceptable risks under the maintenance and construction worker scenarios.
Vernal Pools Associated with CS 007 and SAFR	Vernal Pools	Eliminate the potential risks to benthic invertebrates from contaminants in soil and sediment through excavation and disposal of soil and sediment within the vernal pools to a depth of 1 foot below surface. This remedy will destroy completely the sensitive species and habitat that occur within these features. Because this location is planned for future industrial use, the vernal pools will not be restored at this location. This remedy does not address contaminants at the adjacent sites CS 007 and the SAFR. This remedy will result in acceptable risks under the industrial use scenario.
Former A-1 Metals Facility	Vernal Pools	Reduce the potential risks to human health at the site from contaminants in soil through excavation and disposal of soil with concentrations exceeding those protective of industrial receptors as listed in Table 4 and backfill with clean soil. This remedy would also reduce potential risks to sensitive species and habitat that occur within adjacent vernal pools. For contaminated soil remaining onsite at concentrations greater than those acceptable for unrestricted use, a prohibition on sensitive uses would be implemented. The land use control objective is to prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities, playgrounds, and hospitals for human care. Such controls shall remain in effect in perpetuity, or until such time as it can be demonstrated that contaminant concentrations allow for unrestricted uses and unlimited exposures. The institutional control will be established as described in Section 2.7.1.

Notes:

CS = Confirmed Site

IC = Investigation Cluster

RAO = Remedial Action Objective

SAFR = Small Arms Firing Range

TABLE 4
 Cleanup Levels for Contaminants of Concern
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Contaminant	Cleanup Level ^{a,b} (mg/kg)	Basis
Creeks / Alternative Creeks-3: Magpie Creek West of the Runway^d		
Benzo(a)pyrene	1.45	HQ = 1 for benthic invertebrates using the high TRV
Sum DDE ^e	0.0313	HQ = 1 for benthic invertebrates using the high TRV
Dioxin/furan/PCB-TEQ	0.0000215	HQ = 1 for benthic invertebrates using the high TRV
PCBs (Total)	0.52	HQ = 1 for the green heron using the low TRV
Silver	1.1	HQ = 1 for benthic invertebrates using the high TRV
Creeks / Alternative Creeks-3: Offbase Creeks		
Sum DDE ^e	0.0313	HQ = 1 for benthic invertebrates using the high TRV
Dioxin/furan/PCB-TEQ	0.0000215	HQ = 1 for benthic invertebrates using the high TRV
PCBs (Total)	0.52	HQ = 1 for the green heron using the low TRV
Creeks / Alternative Creeks-3: Second Creek		
Benzo(g,h,i)perylene	0.497	HQ = 1 for benthic invertebrates using the high TRV
Benzo(k)fluoranthene	0.537	HQ = 1 for benthic invertebrates using the high TRV
Fluoranthene	2.23	HQ = 1 for benthic invertebrates using the high TRV
Indeno(1,2,3-c,d)pyrene	0.488	HQ = 1 for benthic invertebrates using the high TRV
Pyrene	1.52	HQ = 1 for benthic invertebrates using the high TRV
Vernal Pools / Modified Alternative Vernal Pool-3 / Former A-1 Metals Facility		
PCBs (Total)	0.528	Human health risk based at 1×10^{-6} carcinogenic risk for industrial receptor
Tailings Piles / Alternative Soil-3 / West Nature Area^c		
Sum DDE	0.0078	25% of the high TRV for benthic invertebrates
Dioxin/furan/PCB-TEQ	6.7E-06	EPA anthropogenic background level for open space
PCBs (Total)	0.169	25% of the high TRV for benthic invertebrates

^a Cleanup levels have been selected for the risk drivers at each site.

^b There are no cleanup levels for IC 17 Seasonal Creek and Drainage Ditch (Alternative Creeks-3). The RAO will be met when the sediment above the liner is removed. Similarly, there are no cleanup levels for the Vernal Pools associated with CS007 and SAFR. The RAO will be met when the contaminated sediment is removed with the vernal pool.

^c All tailings piles will be removed irrespective of cleanup levels. Within tailings pile excavation areas, subsurface soils will be excavated if concentrations exceed those listed in the table.

^d The single detection of benzo(b)fluoranthene above the high TRV based cleanup level is co-located with benzo(a)pyrene and will be addressed by the remediation of benzo(a)pyrene as the representative PAH COC.

^e The SUM DDE high TRV value was selected as the representative cleanup level for Total DDT and its metabolites because the TRV for Sum DDE is more reliable.

Notes:

DDE = dichlorodiphenyldichloroethylene
 DDT = dichlorodiphenyltrichloroethane
 HQ = hazard quotient
 mg/kg = milligram(s) per kilogram
 PCB = polychlorinated biphenyl
 TEQ = toxicity equivalent
 TRV = toxicity reference value

TABLE 5
 Comparative Analysis Summary for Creek Alternatives
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Criteria	Alternative Creeks-1 (No Action)	Alternative Creeks-2 (Institutional Controls)	Alternative Creeks-3 (Excavation and Disposal for Moderate Risk Reduction [Low Habitat Impact])	Alternative Creeks-4 (Excavation and Disposal for Higher Risk Reduction [High Habitat Impact])
Threshold Criteria				
Protection of Human Health and Environment	Would not reduce risks to humans or ecological receptors. Would be appropriate for sites with no risks, and may be appropriate for sites with only low risks.	Risk to human health would be reduced by prohibiting residential use, controlling access, and/or prohibiting fishing. There would be no reduction in risk to ecological receptors.	Risks reduced for humans and ecological receptors by removing the most contaminated sediments.	Greater risk reduction for humans and ecological receptors by removing more contamination.
Compliance with ARARs	Would be compliant for sites with no risks. May be compliant for sites with only low risk.	Yes, for sites with low ecological risk.	Yes	Yes
Primary Balancing Criteria				
Long-term Effectiveness and Permanence	No action would be taken. Exposure to contaminants may be reduced over time through sediment burial and mixing.	Institutional controls would limit exposures for humans. Risks to ecological receptors would remain at existing levels. Exposure to contaminants may be reduced over time through sediment burial and mixing.	Risks to human health and ecological receptors would be reduced by removing contamination. Recontamination from upgradient sources (onbase and offbase) is possible.	Greater risk reduction to human health and ecological receptors by removing more contamination. Recontamination from upgradient sources (onbase and offbase) is possible.
Reduction in Toxicity, Mobility, and Volume through Treatment	None	None	None	None
Short-term Effectiveness	No construction-related short-term exposures. No loss or disturbance of existing moderate- to high-quality habitat. Potential impacts to sensitive species and their habitats would be avoided.	No construction-related short-term exposures. No loss or disturbance of existing moderate- to high-quality habitat. Potential impacts to sensitive species and their habitats would be avoided.	Would result in disruption of habitat with moderately long recovery time and potential impacts to sensitive species and their habitats. Short-term risks to workers and surrounding community during excavation and transport would be managed.	Would result in greater disruption of habitat with moderately long recovery time and more extensive potential impacts to sensitive species and their habitats. Short-term risks to workers and surrounding community during excavation and transport would be managed.

TABLE 5
 Comparative Analysis Summary for Creek Alternatives
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Criteria	Alternative Creeks-1 (No Action)	Alternative Creeks-2 (Institutional Controls)	Alternative Creeks-3 (Excavation and Disposal for Moderate Risk Reduction [Low Habitat Impact])	Alternative Creeks-4 (Excavation and Disposal for Higher Risk Reduction [High Habitat Impact])
Implementability	Yes	Yes	Removal is implementable. Agency coordination and mitigation likely required constructing access roads and excavating creek sediments for some sites.	Removal is implementable. More mitigation likely required relative to Alternative Creeks-3 to construct access roads and excavate creek sediments.
Cost ^{a,b}	\$0	Magpie Creek West of the Runway: \$271,000 Offbase Creeks: \$271,000 IC 17 Seasonal Creek and Drainage Ditch: \$271,000 Second Creek: \$271,000	Magpie Creek West of the Runway: \$1,635,000 Offbase Creeks: \$454,000 IC 17 Seasonal Creek and Drainage Ditch: \$63,000 Second Creek: \$164,000	Magpie Creek West of the Runway: \$2,089,000 Offbase Creeks: \$1,738,000 IC 17 Seasonal Creek and Drainage Ditch: \$888,000 Second Creek: \$1,109,000

^aPresent-worth cost.

^bThe cost for institutional controls is based on a 30-year timeframe.

Notes:

ARAR = applicable or relevant and appropriate requirement

IC = Investigation Cluster

TABLE 6
Comparative Analysis Summary for Vernal Pool Alternatives
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Criteria	Alternative Vernal Pool-1 (No Action)	Alternative Vernal Pool-2 (Institutional Controls)	Alternative Vernal Pool-3 (Excavation and Disposal)
Threshold Criteria			
Protection of Human Health and Environment	Would not reduce risks to humans or ecological receptors. Would be appropriate for sites with no risks, and may be appropriate for sites with only low risks.	Risks to human health would be reduced by controlling access and prohibiting ground disturbance. There would be no reduction in risk to ecological receptors.	Risks reduced by removing contamination (for humans and ecological receptors).
Compliance with ARARs	Would be compliant for sites with no risk. May be compliant for sites with only low risk.	Yes, for sites with low ecological risk.	Yes
Primary Balancing Criteria			
Long-term Effectiveness and Permanence	No action would be taken.	Institutional controls would limit exposures for humans. Risks to ecological receptors would remain at existing levels.	Risks to ecological receptors and human health would be reduced by removing contamination.
Reduction in Toxicity, Mobility, and Volume through Treatment	None	None	None
Short-term Effectiveness	No construction-related short-term exposures. No loss or disturbance of existing moderate- to high-quality habitat. Potential impacts to sensitive species and their habitats would be avoided.	No construction-related short-term exposures. No loss or disturbance of existing moderate- to high-quality habitat. Potential impacts to sensitive species and their habitats would be avoided.	Would result in disruption of habitat with moderately long recovery time and potential impacts to sensitive species and their habitats. Short-term risks to workers and surrounding community during excavation and transport would be managed.
Implementability	Yes	Yes	Yes
Cost ^{a, b}	\$0	Vernal Pools Associated with CS 007 and SAFR: \$91,000 Former A-1 Metals Facility: \$91,000	Vernal Pools Associated with CS 007 and SAFR: \$59,000 Former A-1 Metals Facility: \$209,000

^aPresent worth cost.

^bThe cost for institutional controls is based on a 30-year timeframe.

Notes:

ARAR = applicable or relevant and appropriate requirement

CS = confirmed Site

SAFR = Small Arms Firing Range

TABLE 7
 Comparative Analysis Summary for Soils (Tailings Piles) Alternatives
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Criteria	Alternative Soil-1 (No Action)	Alternative Soil-2 (Institutional Controls)	Alternative Soil-3 (Excavation and Disposal)
Threshold Criteria			
Protection of Human Health and Environment	Would not reduce risks to humans or ecological receptors. Would be appropriate for site with no risks, and may be appropriate for sites with only low risks.	Risk to human health would be reduced by prohibiting residential use, controlling access, and prohibiting ground disturbance. Risk to aquatic ecological receptors would also be reduced by prohibiting soil disturbance, which could result in migration of contaminants to adjacent wetland habitats. There would be no reduction in risk to terrestrial ecological receptors.	Risks reduced for human and ecological receptors by removing contamination.
Compliance with ARARs	Would be compliant for sites with no risk. May be compliant for sites with only low risk.	Yes, for sites with low ecological risk.	Yes
Primary Balancing Criteria			
Long-term Effectiveness and Permanence	No action would be taken.	Institutional controls would limit exposures for humans and aquatic ecological receptors. Risks to terrestrial ecological receptors would remain at existing levels.	Risks to ecological receptors and human health would be reduced by removing contamination.
Reduction in Toxicity, Mobility, and Volume through Treatment	None	None	None
Short-term Effectiveness	No construction-related short-term exposures. No loss or disturbance of existing moderate-to high-quality habitat. Potential impacts to sensitive species and their habitats would be avoided.	No construction-related short-term exposures. No loss or disturbance of existing moderate-to high-quality habitat. Potential impacts to sensitive species and their habitats would be avoided.	May result in potentially significant impacts to sensitive species and their habitats. Short-term risks to workers and surrounding community during excavation and transport would be managed.
Implementability	Yes	Yes	Yes
Cost	\$0	\$181,000 ^{a,b}	\$2,426,000 ^a

^aPresent-worth cost for tailings pile soils in the West Nature Area.

^bThe cost for institutional controls is based on a 30-year timeframe.

Note:

ARAR = applicable or relevant and appropriate requirement

TABLE 8

Summary of Costs for the Selected Remedies^a*Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California*

	Magpie Creek West of the Runway	Offbase Creeks	IC 17 Seasonal Creek and Drainage Ditch	Second Creek
Alternative Creeks-3				
Volume (cy)	2,118	925	181	470
Institutional Controls – Capital Cost	\$2,000	\$1,000	\$1,000	\$1,000
Institutional Controls – Annual Cost ^b	\$11,767	\$8,267	\$8,267	\$8,267
Portable Levees – Capital Cost	\$622	\$3,458	\$0	\$1,203
Vegetation Removal – Capital Cost	\$191	\$1,063	\$0	\$370
Excavation – Capital Cost ^c	\$97,466	\$113,168	\$7,997	\$20,823
Dewatering – Capital Cost ^c	\$100,267	\$15,941	\$2,130	\$5,546
Hauling and Disposal – Capital Cost ^c	\$426,417	\$104,613	\$13,977	\$36,394
Vegetation Restoration – Capital Cost	\$1,037	\$5,764	\$0	\$2,005
Vegetation Restoration – Annual Cost	\$2,245	\$12,482	\$0	\$4,343
Surface Completion ^d	\$420,188	\$0	\$0	\$0
Monitoring – Capital Cost ^c	\$466,025	\$144,131	\$0	\$50,143
Sediment Monitoring – Annual Cost	\$2,653	\$14,752	\$0	\$5,132
Reports – Capital Cost ^c	\$90,000	\$15,000	\$15,000	\$15,000
Reports – Annual Cost	\$14,220	\$14,220	\$14,220	\$14,220
Total Alternative Cost	\$1,635,000	\$454,000	\$63,000	\$164,000

	Vernal Pools Associated with CS 007 and SAFR	Former A-1 Metals Facility
Alternative Vernal Pool-3		
Volume (cy)	92	1,052
Institutional Controls – Capital Cost	\$1,000	\$1,000
Institutional Controls – Annual Cost ^b	\$3,457	\$37,471
Vegetation Removal – Capital Cost	\$177	\$2,020
Excavation – Capital Cost	\$4,060	\$46,421
Hauling and Disposal – Capital Cost	\$7,092	\$81,100
Vegetation Restoration – Capital Cost	\$958	\$10,955
Vegetation Restoration – Annual Cost	\$683	\$7,805
Monitoring – Capital Cost	\$862	\$9,859
Reports – Capital Cost	\$12,500	\$12,500
Mitigation Fees for Directly Impacted Vernal Pools (with restoration) – Capital Cost	\$28,500	\$0
Total Alternative Cost	\$59,000	\$209,000

TABLE 8

Summary of Costs for the Selected Remedies^a*Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California*

West Nature Area	
Alternative Soil-3	
Volume (cy)	7,000
Tailings Removal – Capital Cost	\$2,001,700
Disposal – Capital Cost	\$401,500
Vegetation Restoration – Annual Cost	\$22,800
Total Alternative Cost	\$2,426,000

^aCosts are present-worth costs.^bThe costs for institutional controls are based on a 30-year timeframe.^cThese costs for Magpie Creek West of the Runway include both the unlined and lined areas. Pre- and post-construction monitoring and post-excavation sampling are also included. The monitoring costs also include mitigation costs.^dSurface completion includes removal and disposal of the corrugated metal liner in the area of excavation and resurfacing with concrete.

Notes:

CS = Confirmed Site

cy = cubic yard(s)

IC = Investigation Cluster

SAFR = Small Arms Firing Range

TABLE 9
 State and Federal ARARs
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Location/Action/Chemical	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description
Location-specific ARARs			
Ecological Sites Area	50 CFR 222, 226, 227, and 402 Substantive Portions of the Federal and California Endangered Species Act Substantive Portions of the Native Plant Protection Act	Applicable	All remedial actions must be planned and executed to ensure that substantive regulatory requirements are followed to avoid or mitigate impacts to endangered or threatened species. Endangered/threatened wildlife species that are known or have potential to occur within the ecological sites include valley elderberry longhorn beetle, vernal pool fairy shrimp, vernal pool tadpole shrimp, and giant garter snake.
Wetlands	33 CFR 330, Subsection C, Appendix A	Applicable	The following conditions/practices must be followed: any structure or fill shall be maintained, including maintenance to ensure public safety; erosion and siltation controls must be used and maintained during construction and all fills must be permanently stabilized at the earliest practicable date; heavy equipment working in wetlands must be placed on mats, or other measures must be taken to minimize soil disturbances; and no activity conducted under a nationwide permit may jeopardize the continued existence of a threatened or endangered species or a species proposed for designation.
Wetlands	40 CFR 6.302(a); 40 CFR Part 6, Appendix A	Applicable	Requires federal agencies to take action to avoid adversely affecting wetlands, to minimize wetlands destruction, and to preserve the value of wetlands.
Streambeds	Fish and Game Code Sections 1602 and 1603	Relevant and Appropriate	Regulates construction by, or on behalf of, any state or local agency or public utility that will change the natural flow, use material from the stream beds, or result in disposal into designated waters.
Waters of the United States	Clean Water Act (Section 404)— Dredge or Fill Requirements (33 USC 1251-1376; 40 CFR 230)	Applicable	Establishes requirements that limit the discharge of dredged or fill material into waters of the United States, including wetlands. EPA guidelines for discharge of dredged or fill materials in 40 CFR 230 specify consideration of alternatives that have fewer adverse impacts and prohibit discharges that would result in exceedance of surface water quality standards, exceedance of toxic effluent standards, or jeopardy of threatened or endangered species. Under this remedy, vernal pool wetlands will be filled adjacent to CS 007 and SAFR.

TABLE 9
 State and Federal ARARs
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Location/Action/Chemical	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description
Ecological Sites Area	Migratory Bird Treaty Act, 50 CFR 10 and 20; California Fish and Game Code Section 3511; Title 14 CCR Section 460	Relevant and Appropriate	The Migratory Bird Treaty Act and California law and regulation prohibiting the "take" of certain species are of unquantified relevance to this action. Pre-construction surveys will be conducted and the USFWS and/or DFG will be consulted, as applicable, regarding appropriate minimization and avoidance measures.
Action-specific ARARs			
Treatment, Storage, or Disposal of PCB Wastes	40 CFR 761.60 to 761.79	Applicable	PCB wastes (exceeding 50 ppm) must be disposed of within 1 year after being placed in storage. Storage areas are required to be constructed to meet PCB storage requirements. If PCB wastes are stored in a manner that does not comply with the PCB storage requirements, the containers can be stored temporarily for 30 days from the date of removal.
Cleanup of Spilled PCB Wastes	40 CFR 761.120 to 761.139	Relevant and Appropriate	Requirements for cleanup of spills containing 50 ppm of PCBs or greater occurring after May 4, 1987; relevant and appropriate as presenting health-based cleanup levels for PCBs spilled in soil.
Generation, Handling, Transportation, and Offsite Disposal of Hazardous Wastes	Title 22 CCR, Division 20, Chapter 6.5	Applicable	California regulations implementing the state's delegated RCRA program are applicable to hazardous waste activities related to wastes that will be transported and disposed of offsite or placed in an area outside a CAMU, treatment unit, or staging pile.
Control of Air Emissions	SAQMD Rule 403, Fugitive Dusts	Applicable	Limits visible particulate emissions (e.g., fugitive dust from remedial actions) to the property line.
Corrective Action (Staging Piles)	40 CFR 264.554	Applicable	During corrective action, remediation waste can be placed in piles without triggering LDRs or MTRs. Must not operate piles for more than 2 years.
Discharges of Storm Water from Industrial Areas	40 CFR Parts 122, 123, 124, NPDES, substantive portions of California Storm Water Permits for Industrial Activities, State Water Resources Control Board 97-03-DWQ	Relevant and Appropriate	Regulates pollutants in discharge of storm water associated with industrial areas. The CERCLA permit exemption applies, but remedies should meet the substantive requirements of the NPDES Program.

TABLE 9
 State and Federal ARARs
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Location/Action/Chemical	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description
Discharges of Storm Water from Construction Areas	40 CFR Parts 122, 123, 124, NPDES, substantive portions of California Storm Water Permits for Construction Activities, State Water Resources Control Board Orders 2010-0014-DWQ	Relevant and Appropriate	Regulates pollutants in discharge of storm water associated with construction activity (clearing, grading, or excavation) disturbing 1 acre or more. The CERCLA permit exemption applies, but remedies should meet the substantive requirements of the NPDES Program.
Groundwater Monitoring	Title 27 CCR, Section 20410 Title 23 CCR, Section 2550.6	Relevant and Appropriate	Requires monitoring for compliance with remedial action objectives for 3 years from the date of achieving cleanup levels.
Identify Point of Compliance	Title 27 CCR, Section 20405(a) Title 23 CCR, Section 2550.5 (a)	Relevant and Appropriate*	Requires the identification of the point of compliance in surface water hydraulically down-gradient of the area where waste was discharged to land.
Surface Water Monitoring	Title 27 CCR, Section 20385 Title 23 CCR, Section 2550.1	Relevant and Appropriate*	Requires surface water monitoring of authorized waste management units and unauthorized discharges of wastes.
	Title 27 CCR, Section 20415(c) Title 23 CCR, Section 2550.7(c)	Relevant and Appropriate*	Requires general surface water monitoring.
	Title 27 CCR, Section 20420 Title 23 CCR, Section 2550.8	Relevant and Appropriate*	Requires detection monitoring to determine if a release has occurred as it pertains to surface water and sediment monitoring.
Investigation and Characterization	Title 27 CCR, Section 20425 Title 23 CCR, Section 2550.9	Relevant and Appropriate*	Requires an assessment of the nature and extent of the release, including a determination of the spatial distribution and concentration of each constituent in the event that an unknown source is identified and further investigation and characterization is needed.
Waste Characterization and Disposal	23 CCR 2520 and 2521	Applicable	Specifies that waste be characterized and that hazardous wastes shall be discharged only to Class I waste management units.
	27 CCR 20200(c) and 20210, 20220, and 20230	Applicable	Requires that wastes must be characterized and if identified as designated nonhazardous, or inert solid waste (27 CCR 20210, 20220, 20230) be allowed only at waste management units that have been approved and classified.

TABLE 9
 State and Federal ARARs
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Location/Action/Chemical	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description
Waste Management Unit Closure	27 CCR 20950(a)(2)(B)	Relevant and appropriate	For units that are clean-closed, the goal of closure is to physically remove all waste and contaminated materials from the unit and from its underlying and surrounding environs, such that the waste in the unit no longer poses a threat to water quality. Successful completion of clean closure eliminates the need for any post-closure maintenance period and removes the unit from being subject to the State Water Resources Control Board–promulgated requirements of this subdivision.
Land Use Covenant	CCR Title 22, Section 67391.1(a), (b), (d), and (e)	Relevant and Appropriate	When waste is left in place above standards for unrestricted use, an appropriate land use covenant must be recorded. As applied to federal agencies, while the land remains in United States ownership, the law recognizes that the federal government will use other mechanisms, such as institutional controls. Upon transfer to a nonfederal entity, this section and the land use covenant requirement will apply.
	California Civil Code Section 1471(a)	Relevant and Appropriate	Environmental covenants must contain specified elements if they are to run with the land.
Chemical-specific ARARs			
California HWCL Hazardous Waste Determination	Title 22 CCR, Division 4.5, Chapter 11, 66261.21, 66261.22(a)(1), 66261.22(a)(2), 66261.23, and 66261.24(a)(1) or Article 4, Chapter 11	Applicable	A solid waste is considered a hazardous waste if it exhibits any of the characteristics of ignitability, corrosivity, reactivity, or toxicity, or if it is listed as a hazardous waste.
	22 CCR 66261.24(a)(2)	Applicable	Wastes can be classified as non-RCRA, state-only hazardous wastes if they exceed the Soluble Threshold Limit Concentration or Total Threshold Limit Concentration values. California hazardous wastes previously released into the environment are considered hazardous substances under California law. California hazardous wastes generated in the course of the response action must be properly managed as hazardous wastes, including manifesting, storage, treatment, and/or disposal.

TABLE 9
 State and Federal ARARs
Ecological Sites Record of Decision, Former McClellan Air Force Base, Sacramento, California

Location/Action/Chemical	Standard, Requirement, Criterion, or Limitation	ARAR Status	Description
California Land Disposal Restrictions	22 CCR 66268.48	Applicable to RCRA or California Hazardous Waste	This requirement establishes numeric universal treatment standards by chemical constituent that may not be exceeded under LDRs. Following excavation, contaminated soil determined to be hazardous waste in accordance with state and federal regulations may be subject to LDRs if placed on land in a waste management unit (other than a CAMU) for which treatment requirements have been waived outside of the Area of Contamination from which the waste was generated.
Water Quality Criteria	California Toxics Rule (CTR) 40 CFR Part 131	Applicable	Establishes numeric aquatic life and human health criteria for priority toxic pollutants. This regulation is applicable to inland surface waters, bays, and estuaries in California.

*The State believes these are applicable but has agreed to include them as relevant and appropriate.

Notes:

ARAR = applicable or relevant and appropriate requirement
 CAMU = Corrective Action Management Unit
 CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
 CCR = California Code of Regulations
 CFR = Code of Federal Regulations
 DWQ = Department of Water Quality
 EPA = U.S. Environmental Protection Agency
 HWCL = Hazardous Waste Control Law
 LDR = land disposal restriction
 MTR = minimum technological requirement
 NPDES = National Pollutant Discharge Elimination System
 PCB = polychlorinated biphenyl
 ppm = part(s) per million
 RCRA = Resource Conservation and Recovery Act
 SAFR = Small Arms Firing Range
 SAQMD = State Air Quality Management District
 USC = U.S. Code

Figures

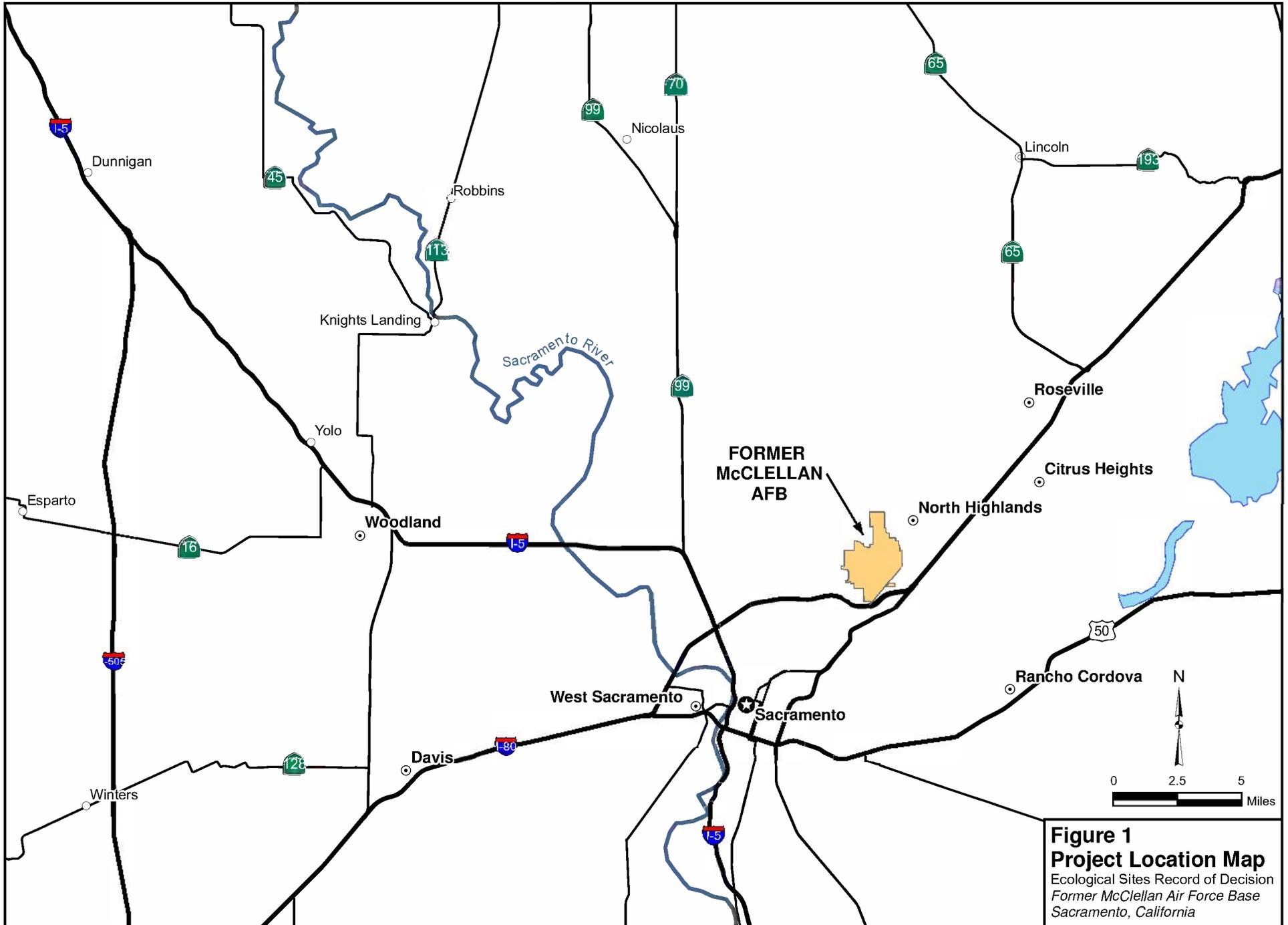
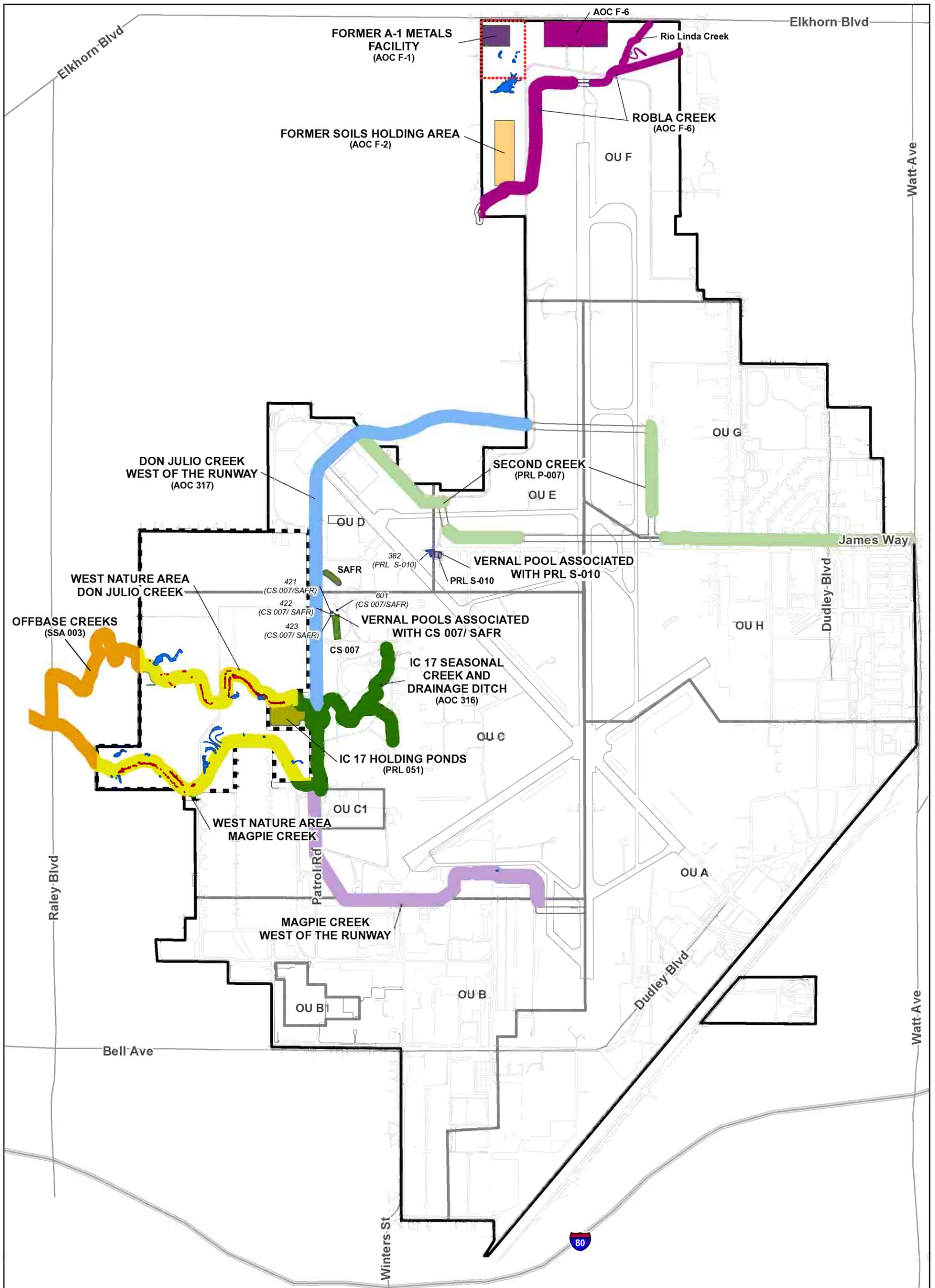


Figure 1
Project Location Map
Ecological Sites Record of Decision
Former McClellan Air Force Base
Sacramento, California



- LEGEND**
- Tailings Pile
 - Vernal Pool
 - West Nature Area Boundary
 - OU Boundary
 - Institutional Control Boundary

Note:
Each Ecological Site in the Record of Decision is labeled and identified by a unique color on the figure.

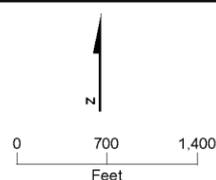


FIGURE 2
Ecological Sites
Ecological Sites Record of Decision
Former McClellan Air Force Base
Sacramento, California

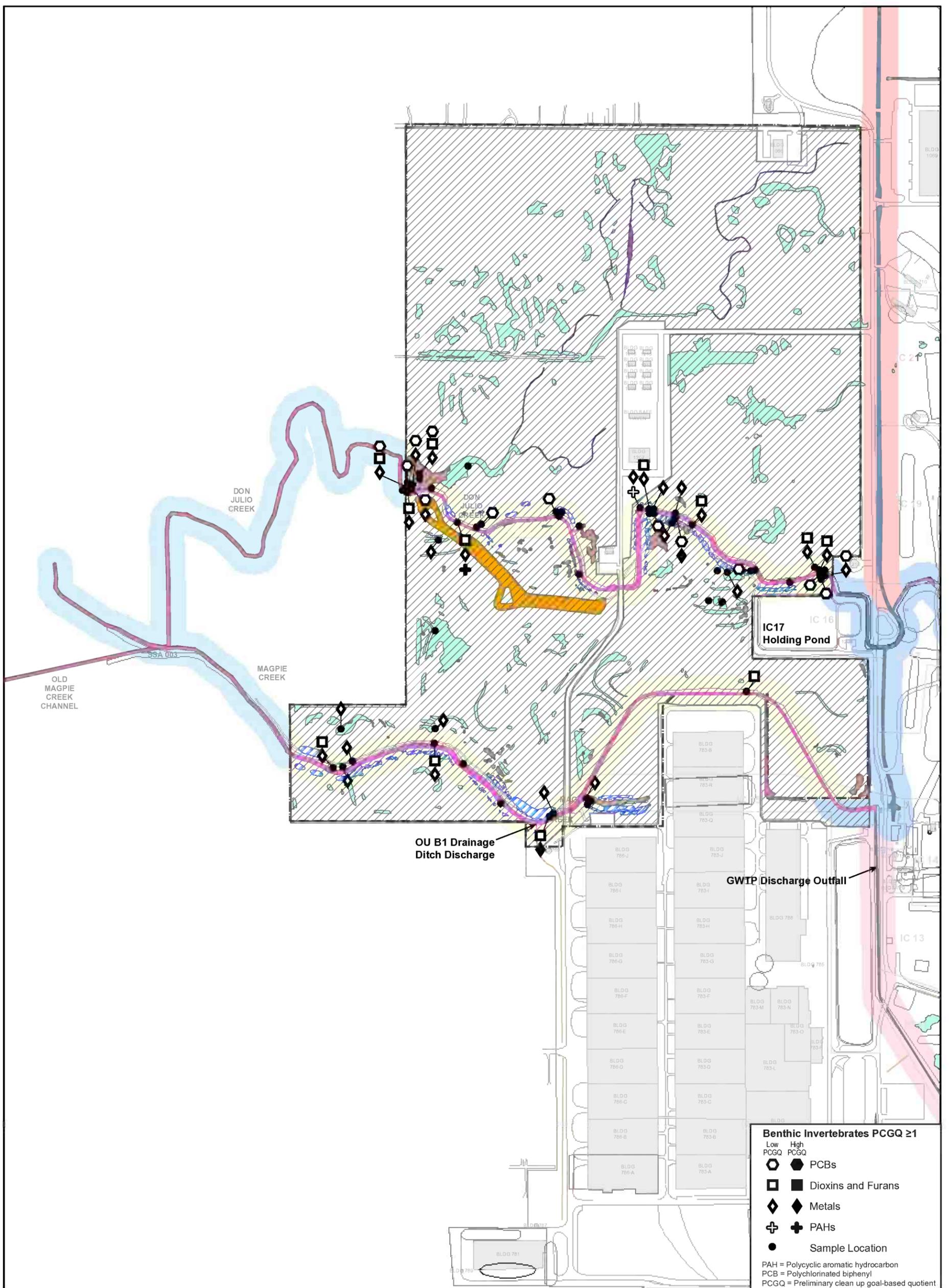
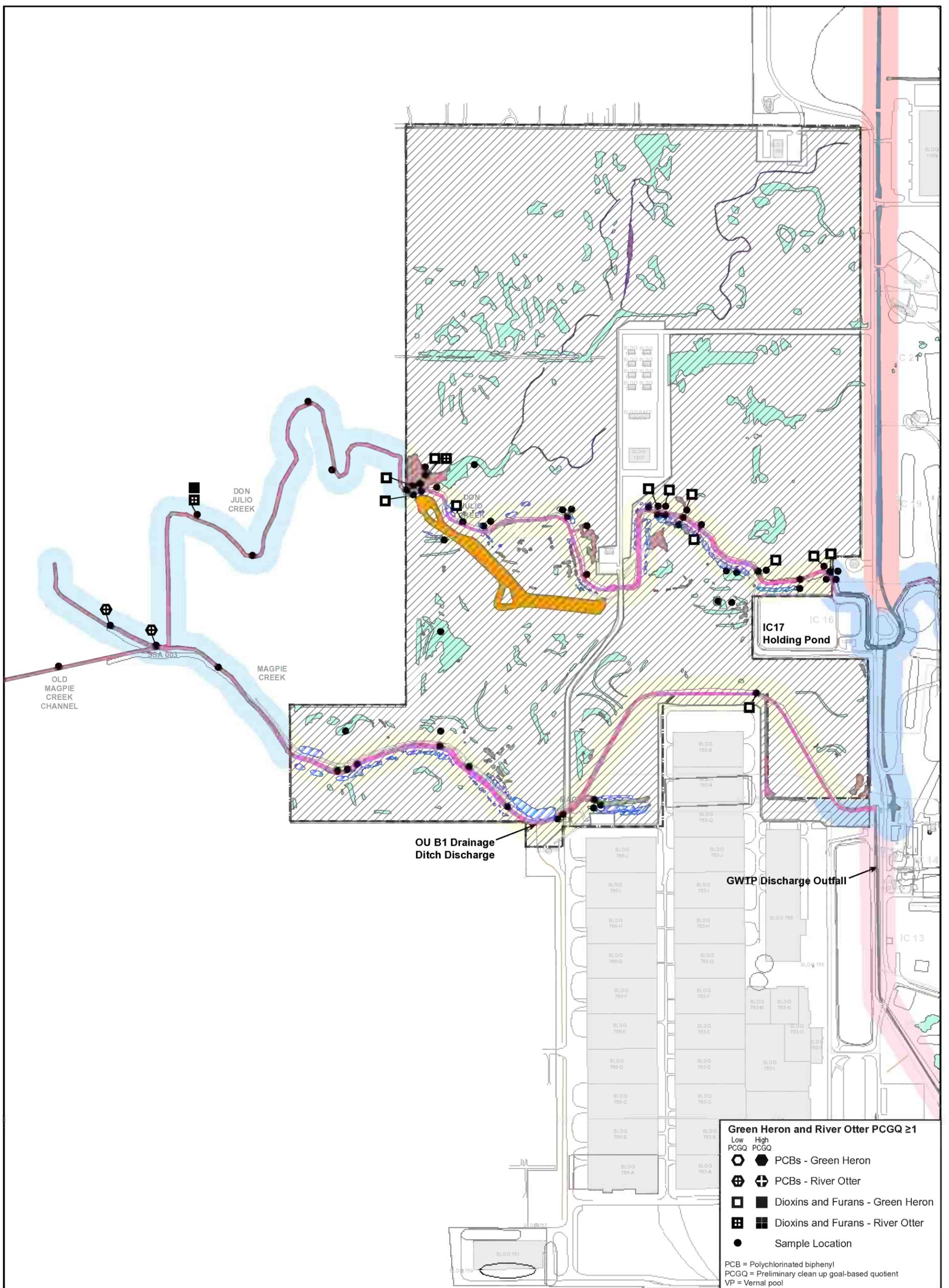


FIGURE 3
West Nature Area, Risks from Contaminants of Concern in Surface and Subsurface Sediments/Soil Samples (Benthic Invertebrates)
 Former McClellan Air Force Base
 Sacramento, California



LEGEND
 Creek Study Area
 Don Julio Creek West of Runway
 IC 17 Seasonal Creek
 Magpie Creek West of Runway
 West Nature Area
 Offbase Creeks
 Conservation Easement

Wetland Type
 Lined Creek
 Unlined Creek
 Drainage Ditch
 Vernal Pool

Seasonal Wetland
 Wetland Swale
 Palustrine
 West Nature Area
 Tailings Pile
 Buildings
 Roads

0 175 350
 Feet

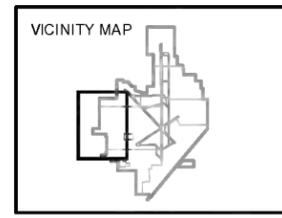
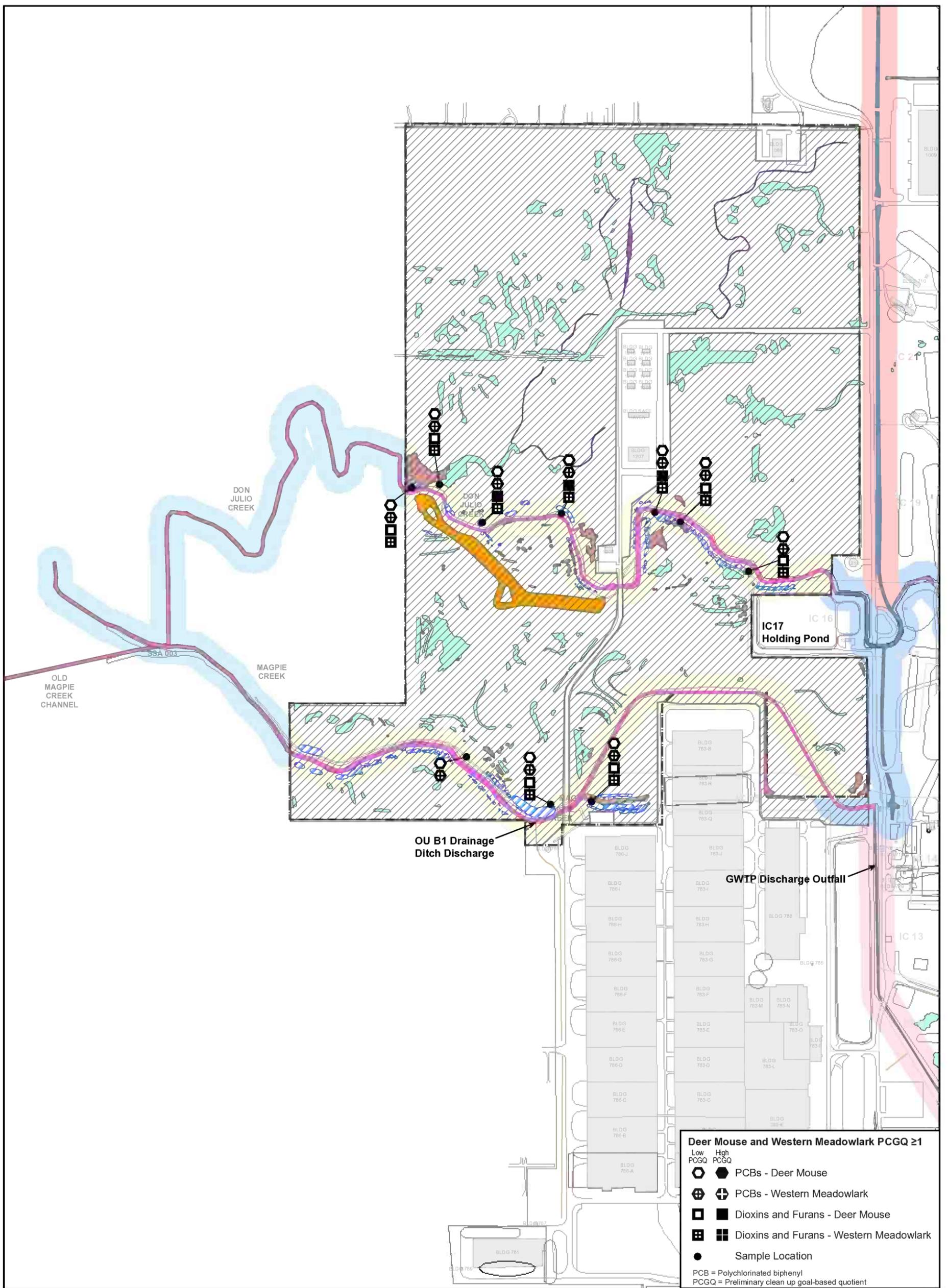
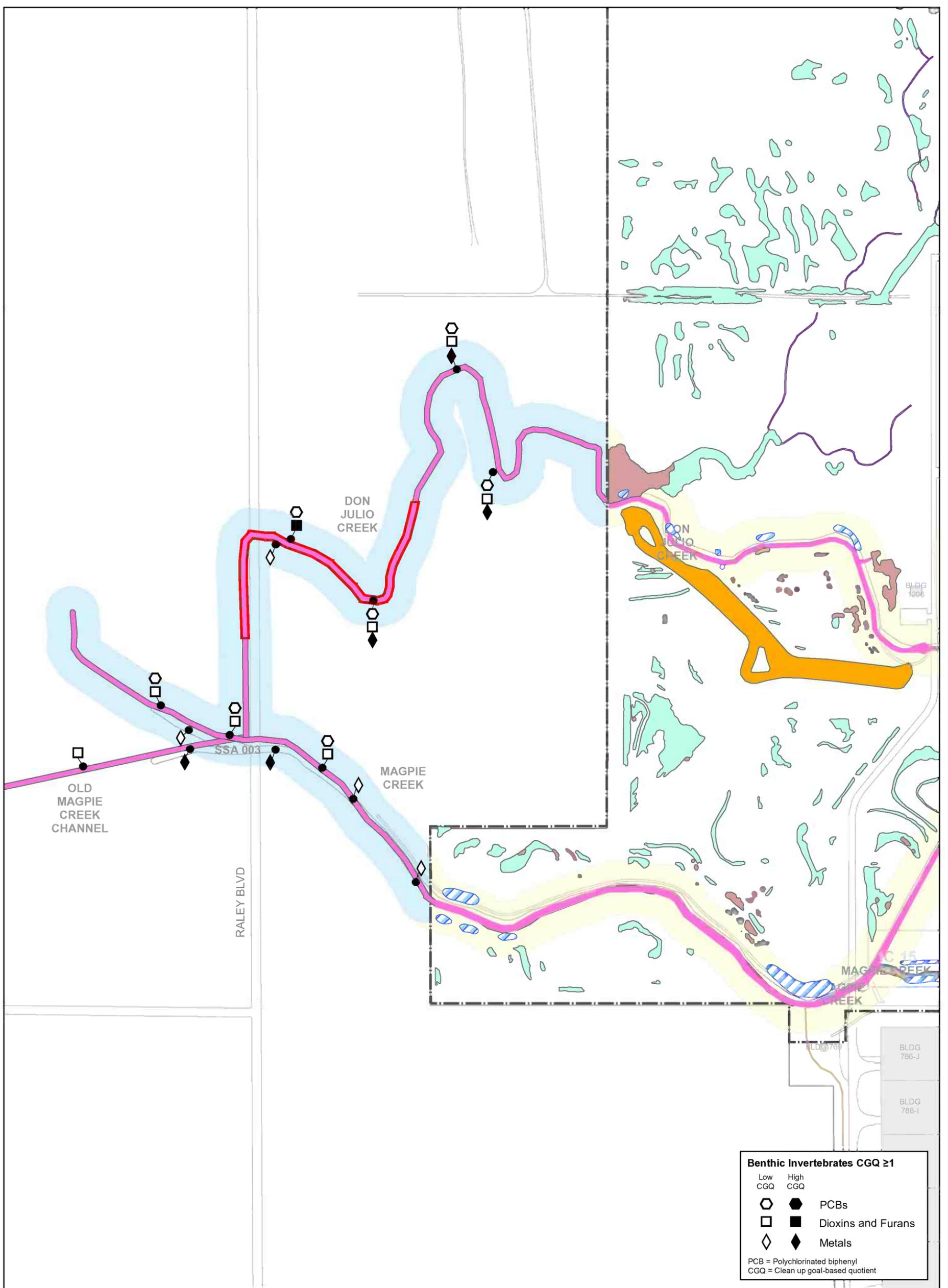
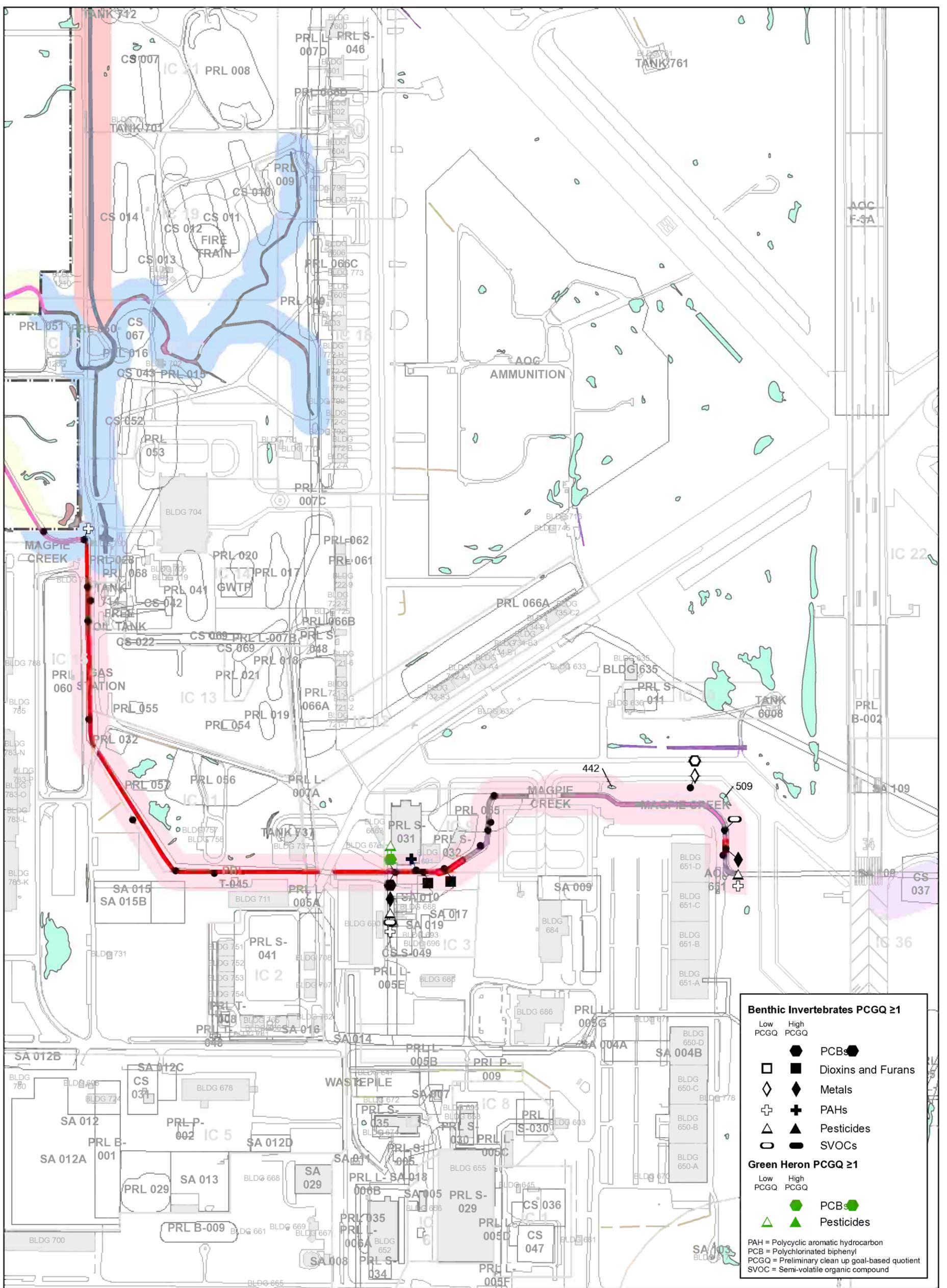


FIGURE 4
West Nature Area, Risks from Contaminants of Concern in Surface and Subsurface Sediments/Soil Samples (Aquatic Wildlife)
 Former McClellan Air Force Base
 Sacramento, California







LEGEND

- Sample Location
- ▭ 1.0-Foot Depth Target Volume Creek Study Area
- ▭ Don Julio Creek West of Runway
- ▭ IC 17 Seasonal Creek
- ▭ Magpie Creek West of Runway
- ▭ Magpie Creek East of Runway
- ▭ West Nature Area

Wetland Type

- ▭ Lined Creek
- ▭ Unlined Creek
- ▭ Drainage Ditch
- ▭ Vernal Pool
- ▭ Wetland Swale
- ▭ Seasonal Wetland

West Nature Area

- ▭ Buildings
- ▭ Roads

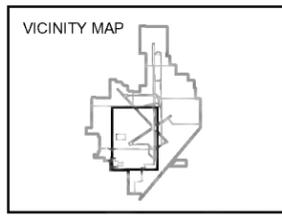
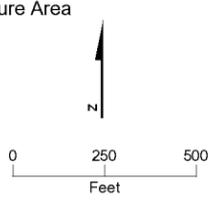
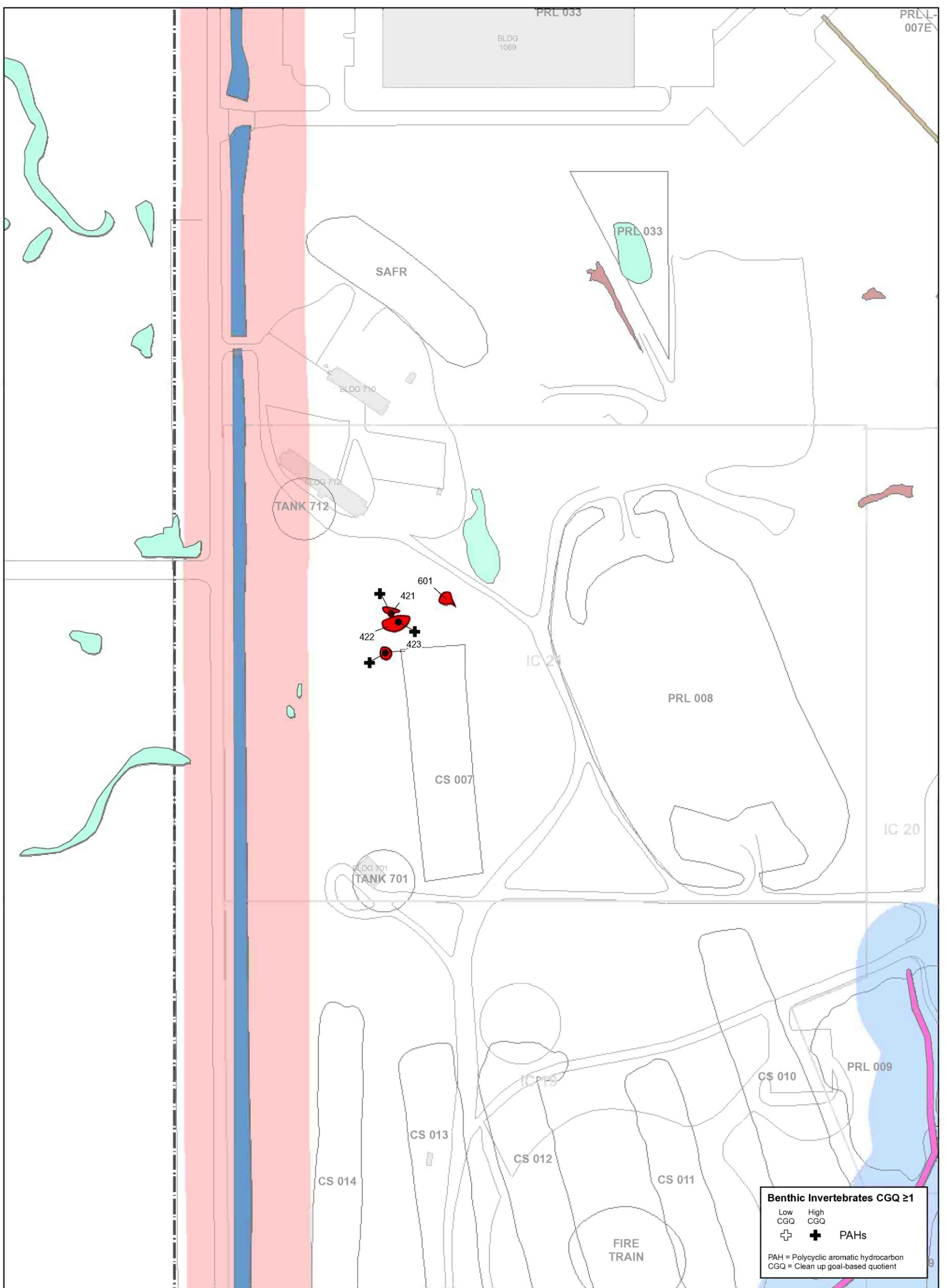


FIGURE 7
Magpie Creek West of the Runway, Site Features, Risks from Contaminants of Concern, and Target Volumes (2,118 cy)
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



LEGEND

- Sample Locations
- Vernal Pool Removal Area
- Creek Study Area
 - Don Julio Creek
 - West of Runway
 - IC 17 Seasonal Creek

Wetland Type

- Lined Creek
- Unlined Creek
- Drainage Ditch
- Vernal Pool
- Seasonal Wetland

West Nature Area

- Buildings
- Roads

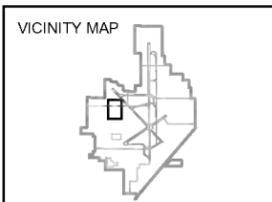
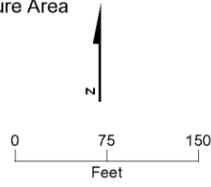
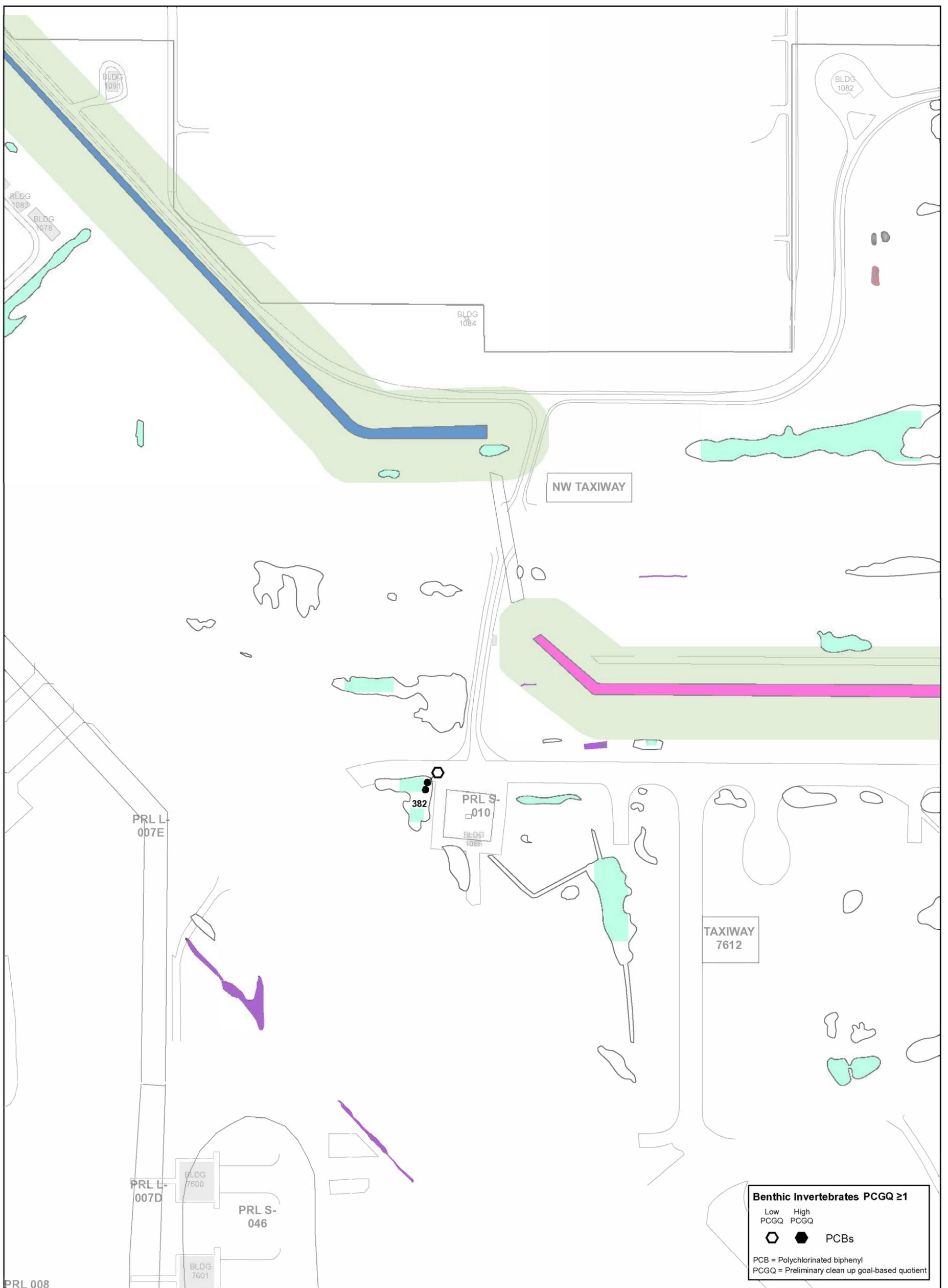


FIGURE 9
Vernal Pools Associated with CS 007 and SAFR Site Features, Risks from Contaminants of Concern, and Target Volumes (92 cy)
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



LEGEND

- Sample Location
- █ Creek Study Area
- █ Second Creek
- Note: Vernal Pool 382 is the only Vernal Pool at PRL S-010 that is addressed in this ROD.

Wetland Type	█ Buildings
█ Lined Creek	█ Roads
█ Unlined Creek	
█ Vernal Pool	
█ Wetland Swale	
█ Seasonal Wetland	

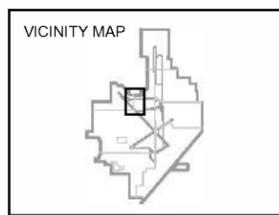
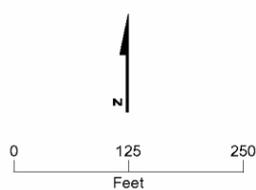
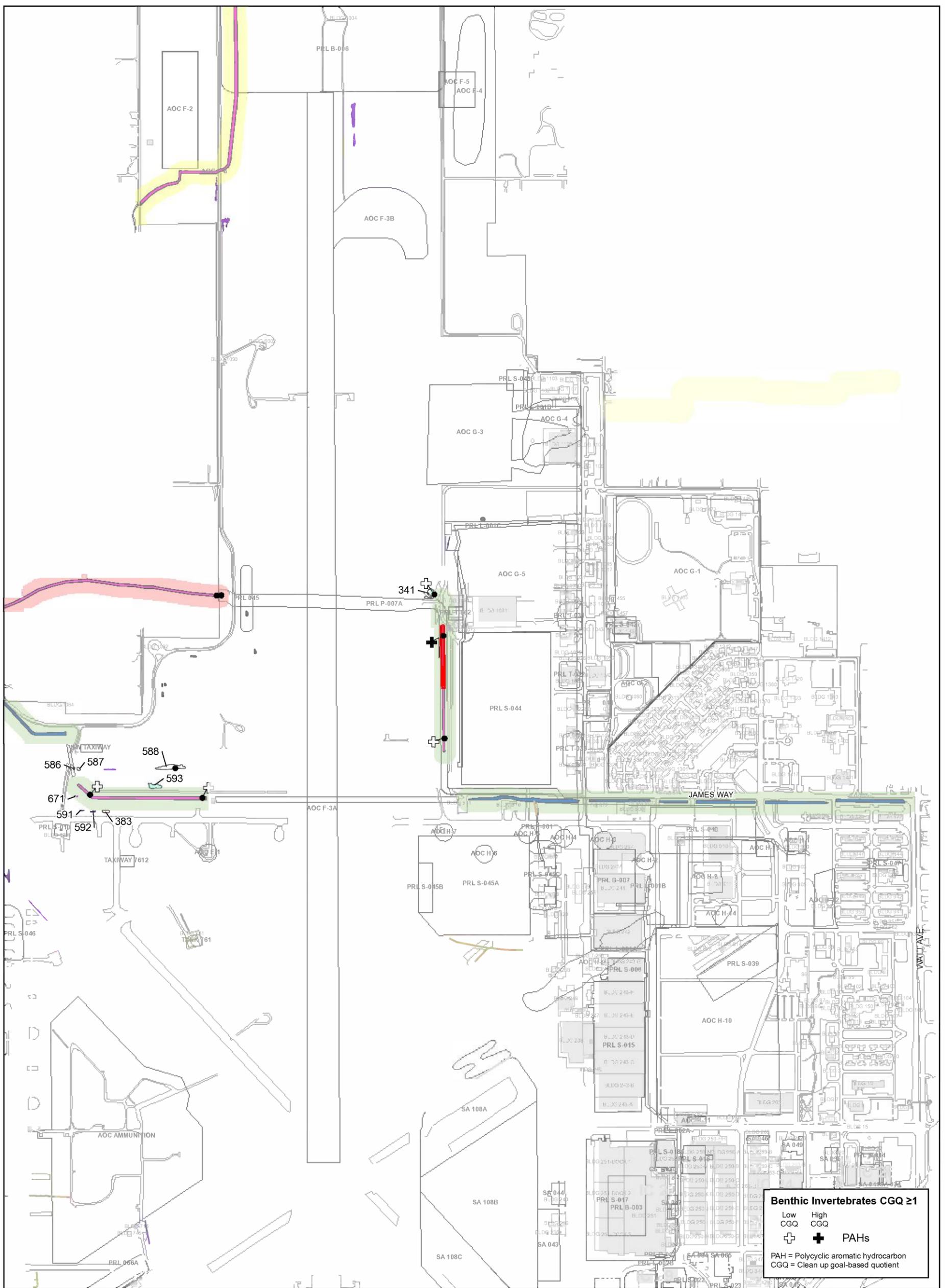


FIGURE 10
Vernal Pool at PRL S-010
Site Features and Risks from
Contaminants of Concern
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



LEGEND

- Sample Location
- ▭ 1.0-Foot Depth Target Volume
- ▭ Buildings
- ▭ Roads
- ▭ Creek Study Area
 - ▭ Don Julio Creek West of Runway
 - ▭ Robla Creek
 - ▭ Offbase Creeks
 - ▭ Second Creek
- ▭ Wetland Type
 - ▭ Lined Creek
 - ▭ Unlined Creek
 - ▭ Drainage Ditch
 - ▭ Vernal Pool
 - ▭ Wetland Swale
 - ▭ Seasonal Wetland

Wetland Type

- ▭ Lined Creek
- ▭ Unlined Creek
- ▭ Drainage Ditch
- ▭ Vernal Pool
- ▭ Wetland Swale
- ▭ Seasonal Wetland

0 400 800 Feet

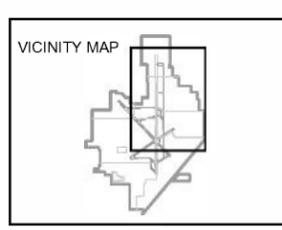


FIGURE 11
Second Creek (PRL P-007) Site Features, Risks from Contaminants of Concern, and Target Volumes (470 cy)
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



LEGEND

- Sample Location
- Removal Area
- Creek Study Area
- Robla Creek
- Wetland Type
- Unlined Creek
- Vernal Pool
- Buildings
- Roads
- ▨ Approximate Facility Location and Previous Excavation Area
- ⋯ Institutional Control Boundary

(Source: PCB Sampling Results, Letter. RWQCB, July, 1988)

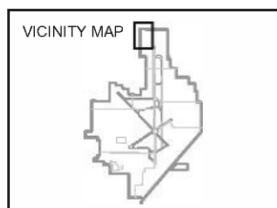
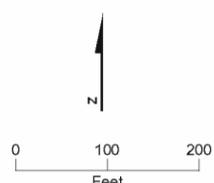
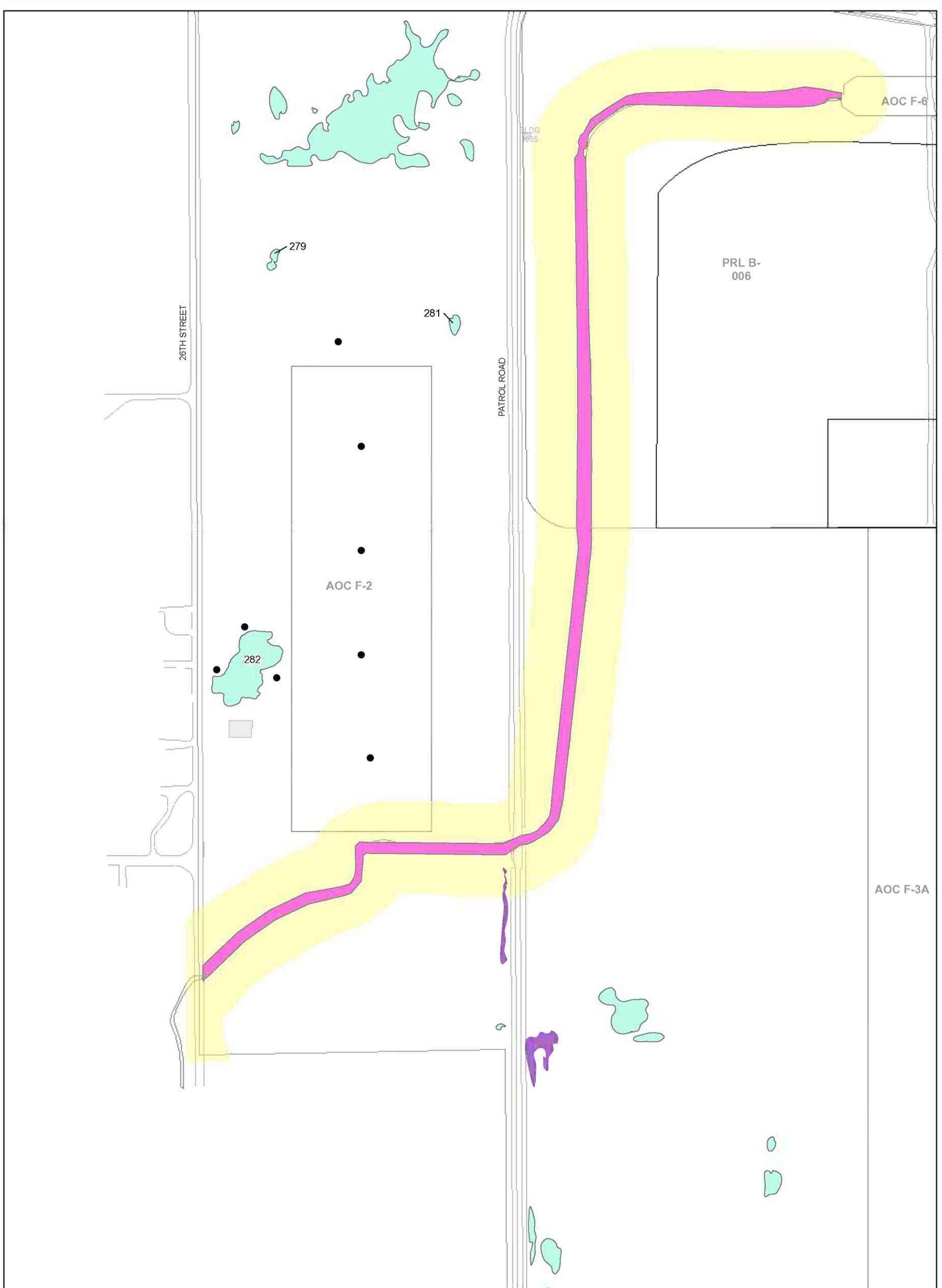


FIGURE 12
Former A-1 Metals Facility (AOC F-1)
Site Features, Risks from Contaminants of Concern, and Target Volumes (1,052 cy)
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



- LEGEND**
- Sample Location
 - █ Buildings
 - █ Wetland Type
 - █ Unlined Creek
 - █ Vernal Pool
 - █ Wetland Swale
 - █ Robla Creek
 - █ Roads

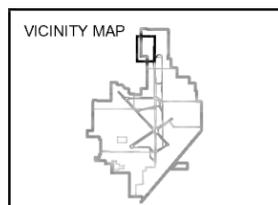
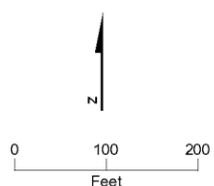
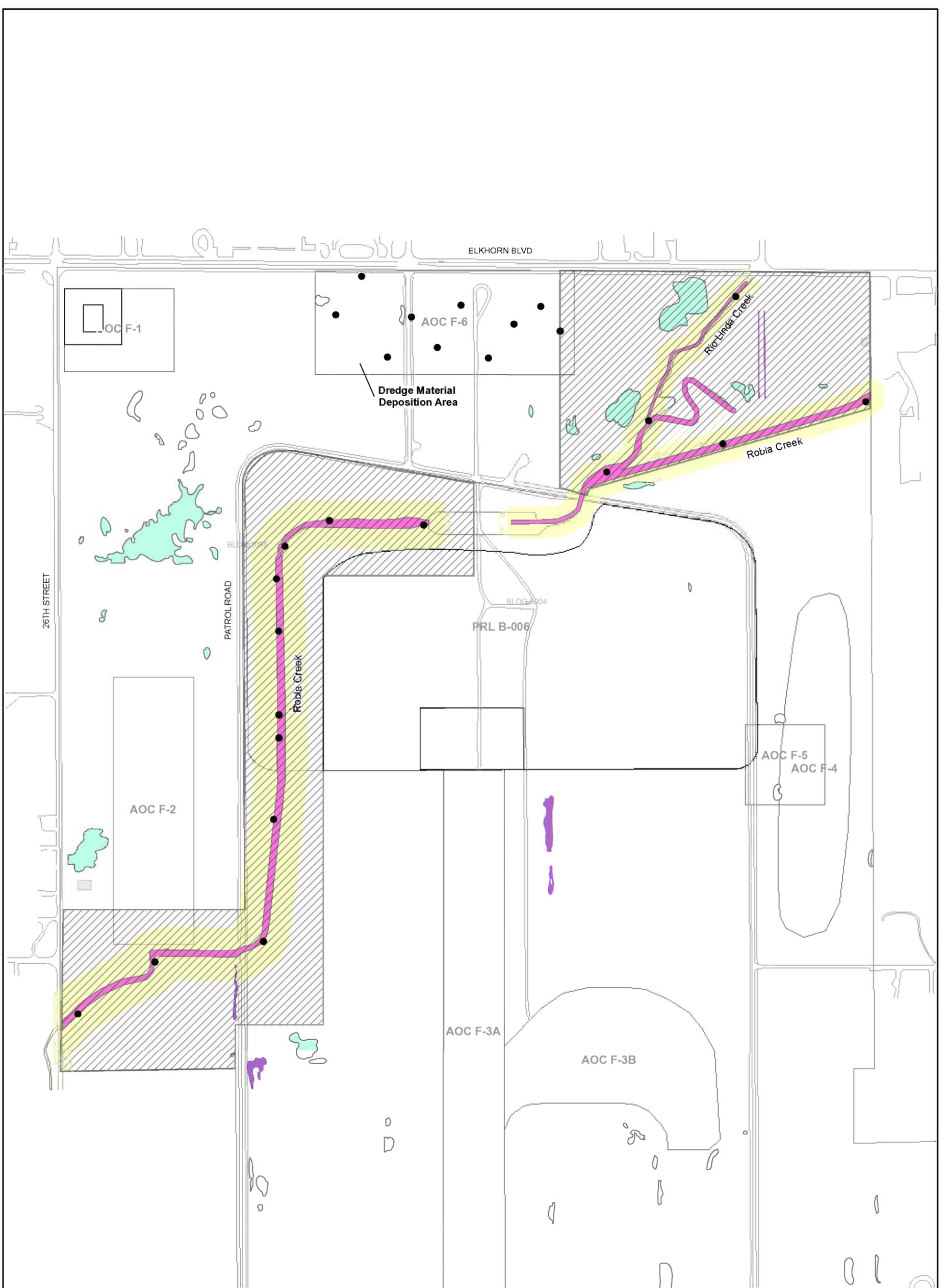


FIGURE 13
Former Soils Holding Area (AOC F-2)
Site Features

Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



- LEGEND**
- Sample Location
 - █ Conservation Easement
 - █ Wetland Type
 - █ Unlined Creek
 - █ Vernal Pool
 - █ Wetland Swale
 - ▭ Buildings
 - ▬ Roads

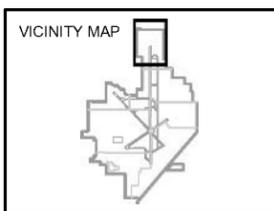
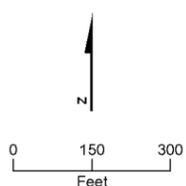
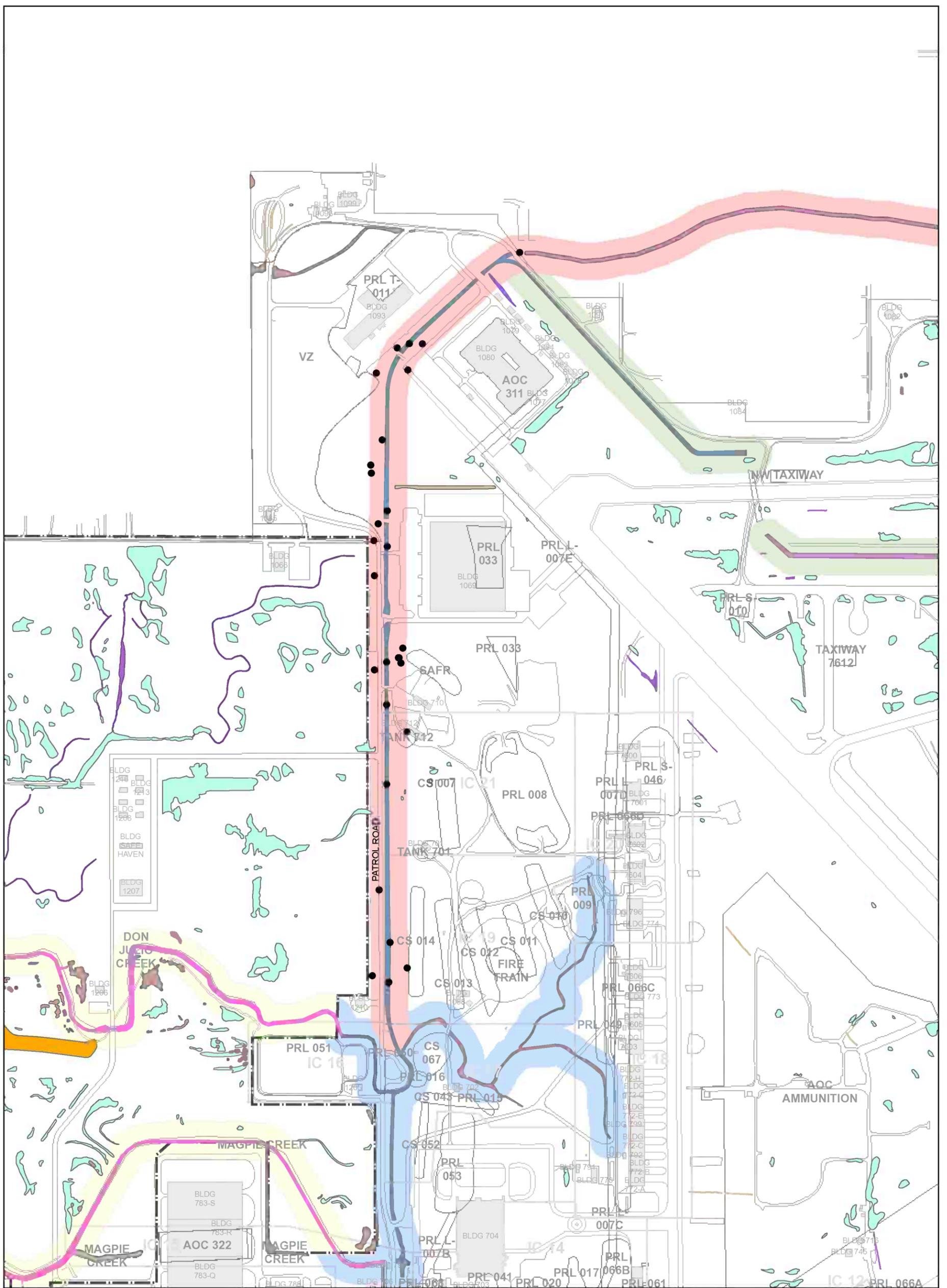


FIGURE 14
Robla Creek (AOC F-6) Site Features
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



- LEGEND**
- Sample Location
 - █ Creek Study Area
 - █ Don Julio Creek West of Runway
 - █ IC 17 Seasonal Creek
 - █ West Nature Area
 - █ Second Creek

- Wetland Type**
- █ Lined Creek
 - █ Unlined Creek
 - █ Drainage Ditch
 - █ Vernal Pool
 - █ Wetland Swale
 - █ Seasonal Wetland
 - █ Palustrine

- West Nature Area**
- █ Buildings
 - █ Roads

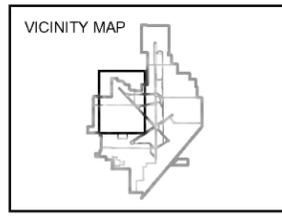
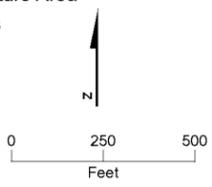
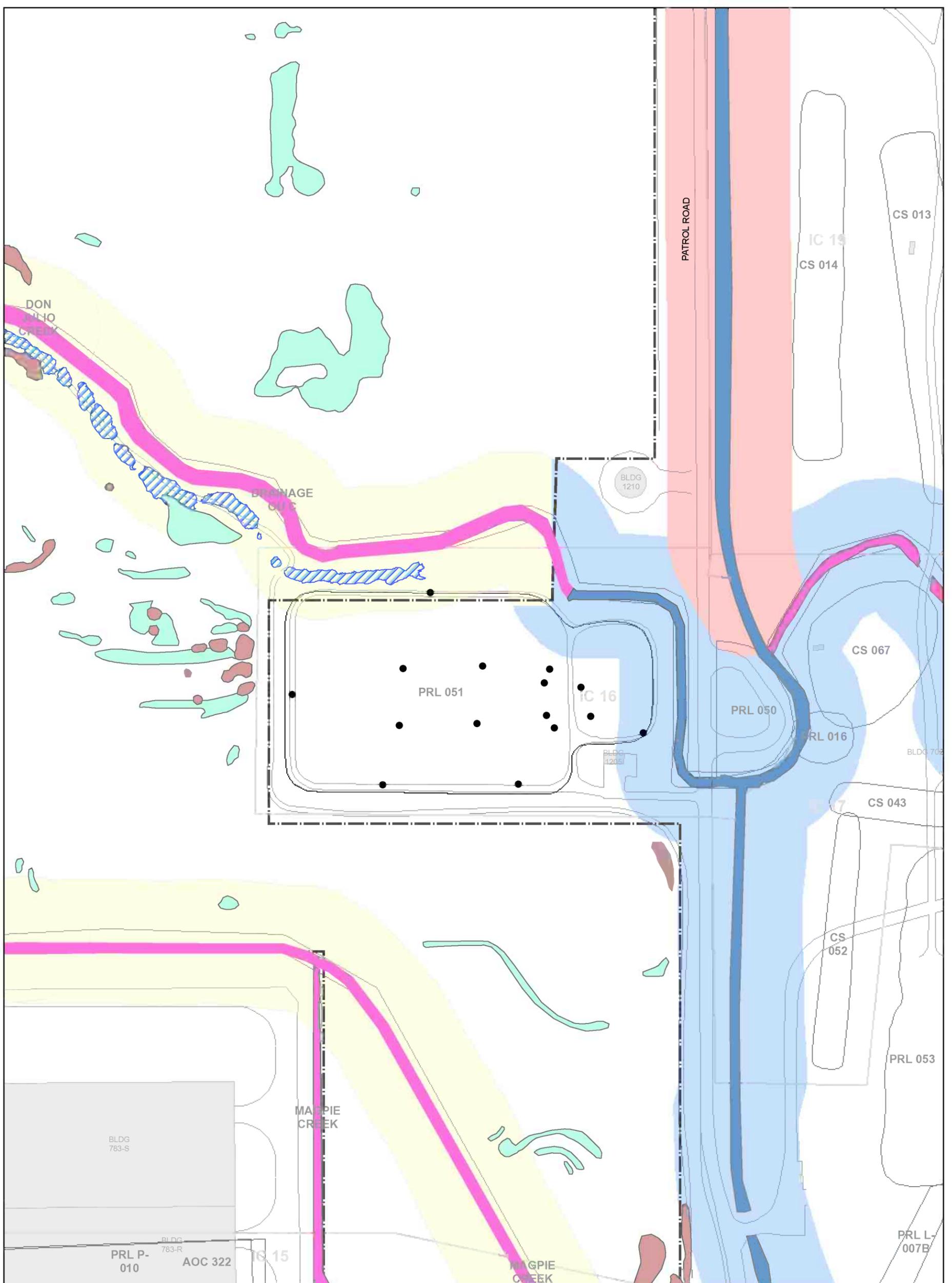


FIGURE 15
Don Julio Creek West of the Runway,
(AOC 317) Site Features
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



LEGEND

- Sample Location
- █ Creek Study Area
- █ Don Julio Creek West of Runway
- █ IC 17 Seasonal Creek
- █ West Nature Area

Wetland Type

- █ Lined Creek
- █ Unlined Creek
- █ Vernal Pool
- █ Seasonal Wetland

- █ Tailings Pile
- █ West Nature Area
- █ Buildings
- █ Roads

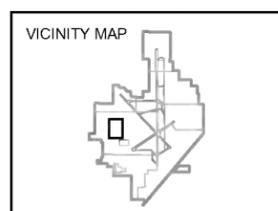
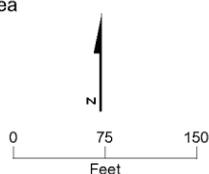
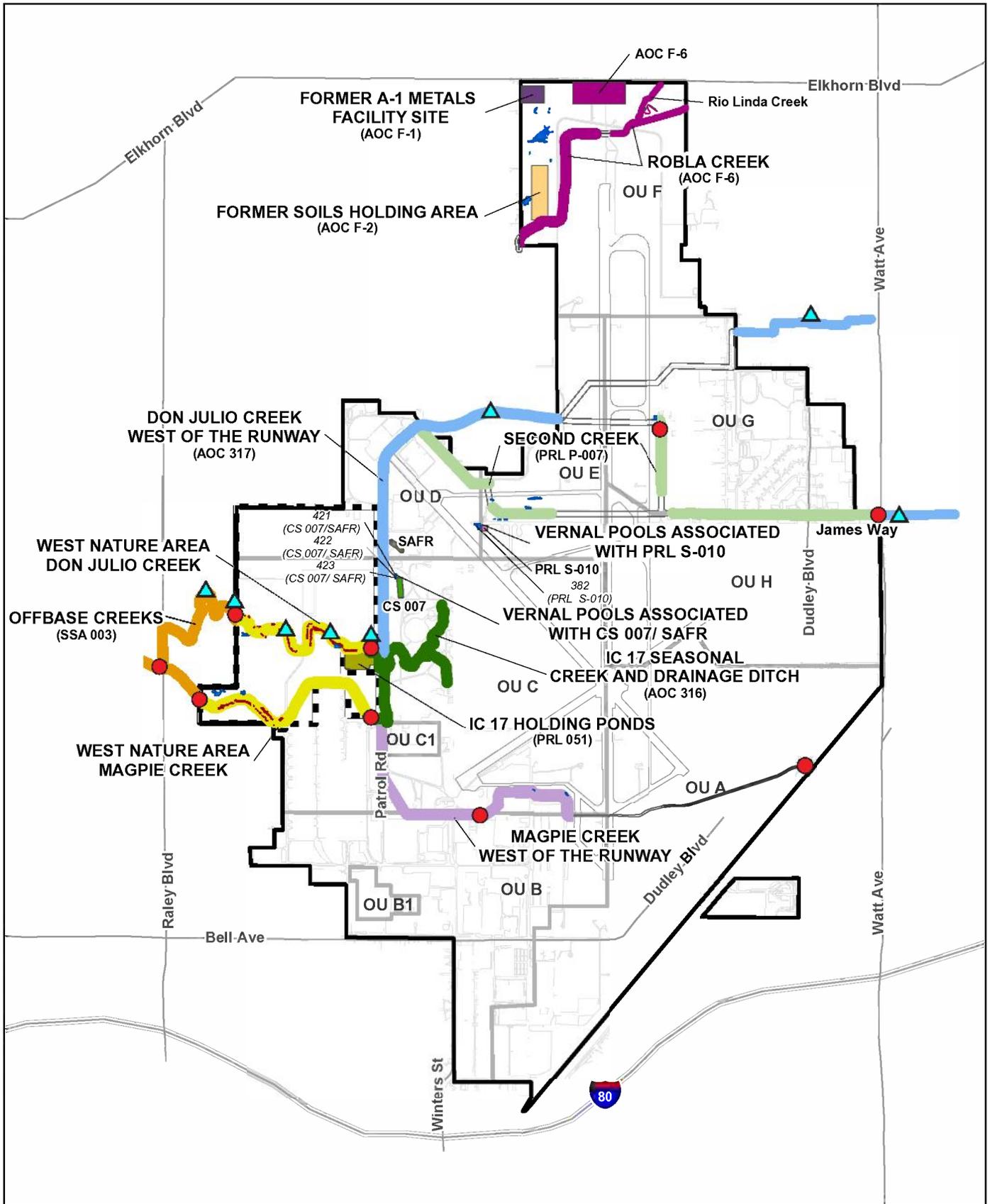


FIGURE 16
IC 17 Holding Pond (PRL 051)
Site Features
 Ecological Sites Record of Decision
 Former McClellan Air Force Base
 Sacramento, California



LEGEND

- Tailings Pile
- Vernal Pool
- West Nature Area Boundary
- OU Boundary
- Creek Monitoring Location

▲ Conceptual Toxicity Test Locations

NOTE:
Each Ecological Site in the Proposed Plan is labeled and identified by a unique color on the figure.

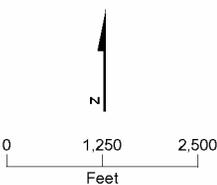


FIGURE 17
Creeks Monitoring Locations

Ecological Sites Record of Decision
Former McClellan Air Force Base
Sacramento, California

Appendix A
Previous Investigations and Data Evaluations

APPENDIX A

Previous Investigations and Data Evaluations

West Nature Area

Recharacterization of Magpie Creek and Don Julio Creek. *Data Gap Field Sampling Plan: Magpie Creek and Don Julio Creek* (Radian, 1998a, pp 33-57).

Data Gap 5 RI – 1999. *Data Gap 5 Field Sampling Plan Addendum: Magpie Creek and Don Julio Creek* (Radian, 1999a, pp 40-57).

Creeks Data Gap RI – 2005. *Creeks Data Gap Analysis and Field Sampling Plan* (URS, 2005b, pp 4-13 to 4-66).

Final Creek Tailings Removal Action Engineering Evaluation/Cost Analysis (URS, 2005)

Human Health Risk Assessment for the West Nature Area and Offbase Creeks, Appendix C to the Creeks RICS (URS, 2009).

Ecological Risk Assessment for the West Nature Area and Offbase Creeks, Appendix G to the Creeks RICS (URS, 2009).

Radiological RI. Radiological Remedial Investigation of Multiple Existing CERCLA Sites, Remedial Investigation Characterization Summaries Addendum (Cabrera, 2011 – final pending).

Offbase Creeks (SSA 003)

Special Study Area (SSA) 3 RI. Remedial Investigation Characterization Study for Special Study Area 3 (Radian, 1995).

Recharacterization of Magpie Creek and Don Julio Creek. *Data Gap Field Sampling Plan: Magpie Creek and Don Julio Creek* (Radian, 1998a, pp 33-57).

Data Gap 5 RI – 1999. *Data Gap 5 Field Sampling Plan Addendum: Magpie Creek and Don Julio Creek* (Radian, 1999a, pp 40-57).

Creeks Data Gap RI – 2005. *Creeks Data Gap Analysis and Field Sampling Plan* (URS, 2005b, pp 4-13 to 4-66).

Human Health Risk Assessment for the West Nature Area and Offbase Creeks, Appendix C to the Creeks RICS (URS, 2009).

Ecological Risk Assessment for the West Nature Area and Offbase Creeks, Appendix G to the Creeks RICS (URS, 2009).

Radiological RI. Radiological Remedial Investigation of Multiple Existing CERCLA Sites, Remedial Investigation Characterization Summaries Addendum (Cabrera, 2011 – final pending).

Magpie Creek West of the Runway

Phase 1 RI. *Operable Unit C Remedial Investigation/Feasibility Study Sampling and Analysis Plan* (Radian, 1994; IC 9, pp 5.1-2 to 5.1-13; IC 11, pp 5.3-9 to 5.3-12; IC 15, pp 5.7-2 to 5.7-15; IC 19, pp 5.11-12 to 5.11-25; IC 21, pp 5.13-12 to 5.13-18; and PRL 053, pp 5.14-8 to 5.14-13).

Recharacterization of Magpie Creek and Don Julio Creek. *Data Gap Field Sampling Plan: Magpie Creek and Don Julio Creek* (Radian, 1998a, pp 33-57).

Data Gap 4 RI. *Data Gap Field Sampling Plans - 4 (Data Gap 4 FSP)* (Radian, 1999b, PRL S-032, pp 17-21).

Data Gap 5 RI—1999. *Data Gap 5 Field Sampling Plan Addendum: Magpie Creek and Don Julio Creek* (Radian, 1999a, pp 40-57).

Creeks Data Gap RI—2005. *Creeks Data Gap Analysis and Field Sampling Plan* (URS, 2005b, pp 4-13 to 4-66).

Human Health Risk Assessment for Don Julio Creek West of Runway and Magpie Creek West of Runway, Appendix C to the Creeks RICS (URS, 2009).

Tier 1 Ecological Risk Assessment for Magpie Creek West of Runway, Appendix G to the Creeks RICS (URS, 2009).

Radiological RI. *Radiological Remedial Investigation of Multiple Existing CERCLA Sites, Remedial Investigation Characterization Summaries Addendum* (Cabrera, 2011 - final pending).

IC 17 Seasonal Creek and Drainage Ditch (AOC 316)

Basewide Sediment Sampling—1989. *McClellan AFB Preliminary Pathways Assessment, Surface Water and Stream Sediment Samples* (Radian, 1989, pp 3-1 to 3-15).

Phase 1 and 2 RIs—1994-1997. *Interim Basewide Remedial Investigation Report, Part 2C (Northern) - Remedial Investigation Characterization Summaries for Investigation Clusters 17, 19, and 21* (Radian, 1998b, IC 17, pp 32-35).

Data Gap 4 RI—1999. *Data Gap Field Sampling Plans - 4* (Radian, 1999b, Drainage Ditch, pp 16-20).

OU C RICS—2005. *Interim Basewide Remedial Investigation Report, Operable Unit C - Remedial Investigation Characterization Summaries and Addenda* (URS, 2005a, pp 17-22).

Creeks Data Gap RI—2005. *Creeks Data Gap Analysis and Field Sampling Plan* (URS, 2005b, pp 4-37 to 4-53).

Human Health Risk Assessment for AOC 316, Appendix C to the Creeks RICS (URS, 2009).

Ecological Risk Assessment for the AOC 316, Appendix G to the Creeks RICS (URS, 2009).

Radiological RI. Radiological Remedial Investigation of Multiple Existing CERCLA Sites, Remedial Investigation Characterization Summaries Addendum (Cabrera, 2011 – final pending).

Vernal Pools Associated with CS 007 and SAFR

OU C Northern RICS. Interim Basewide Remedial Investigation Report: Part 2C (Northern) - Remedial Investigation Characterization Summaries for Investigation Clusters 17, 19, and 21 (Radian, 1998b).

OU C RICS Addenda. Interim Basewide Remedial Investigation Report – Operable Unit C Remedial Investigation Characterization Summaries Addenda (URS, 2005a).

Tier 1 ERA. Basewide Scoping Level/Tier 1 Ecological Risk Assessment (Parsons, 2005).

Tier 2 ERA. Basewide Vernal Pool Tier 2 ERA and RICS Addenda (CH2M HILL, 2007).

Vernal Pool at PRL S-010

OUs E-H RICS 2. Interim Basewide Remedial Investigation Report Parts 2E-2H - Remedial Investigation Characterization Summaries 2 (Jacobs, 2000).

Tier 1 ERA. Basewide Scoping Level/Tier 1 Ecological Risk Assessment (Parsons, 2005).

Tier 2 ERA. Basewide Vernal Pool Tier 2 ERA and RICS Addenda (CH2M HILL, 2007).

Second Creek (PRL P-007)

Basewide Sediment Sampling. McClellan AFB Preliminary Pathways Assessment, Surface Water and Stream Sediment Samples (Radian, 1989, pp 3-1 to 3-15).

Basewide Background Study. McClellan AFB Surface Soil and Stream Sediment Basewide Background Study Field Sampling Plan (Radian, 1993, Appendix D).

Phase 1 RI. Interim Basewide Remedial Investigation Report, Parts 2E-2H – Remedial Investigation Characterization Summaries (Jacobs, 1998, PRL P-007).

Data Gap 5 RI. Data Gap 5 Field Sampling Plan Addendum: Magpie Creek and Don Julio Creek (Radian, 1999a, pp 16-17).

Creeks Data Gap RI. Creeks Data Gap Analysis and Field Sampling Plan (URS, 2005b, pp 4-13 to 4-66).

Human Health Risk Assessment for PRL P-007 – Second Creek, Appendix C to the Creeks RICS (URS, 2009).

Ecological Risk Assessment for the PRL P-007 – Second Creek, Appendix G to the Creeks RICS (URS, 2009).

Radiological RI. Radiological Remedial Investigation of Multiple Existing CERCLA Sites, Remedial Investigation Characterization Summaries Addendum (Cabrera, 2011 – final pending).

Former A-1 Metals Facility (AOC F-1)

The OUs E-H RICS 2 (Jacobs, 2000) contains a comprehensive summary of prior investigations at AOC F-1.

An HHRA and ERA were conducted as part of the RICS 2.

AOC F-1 and AOC F-2 Field Sampling Summary Supporting the Ecological Sites Feasibility Study, Former McClellan AFB, (CH2M HILL, August 2010).

Former Soils Holding Area (AOC F-2)

Prior to the RI, provided in the Interim Basewide Remedial Investigation Report Parts 2E-2H - Remedial Investigation Characterization Summaries 2, there had been no investigations at AOC F-2 (Jacobs, 2000).

Basewide Vernal Pool Scoping Level/Tier 1 Ecological Risk Assessment (Parsons, 2005).

AOC F-1 and AOC F-2 Field Sampling Summary Supporting the Ecological Sites Feasibility Study, Former McClellan AFB, (CH2M HILL, August 2010)

Robla Creek (AOC F-6)

Basewide Sediment Sampling – 1989. McClellan AFB Preliminary Pathways Assessment, Surface Water and Stream Sediment Samples (Radian, 1989, pp 3-1 to 3-15).

Basewide Background Study – 1993. McClellan AFB Surface Soil and Stream Sediment Basewide Background Study Field Sampling Plan (Radian, 1993, Appendix D).

Phase 1 RI – 1997. Interim Basewide Remedial Investigation Report, Parts 2E-2H, – Remedial Investigation Characterization Summaries (Jacobs, 1998a, pp 6–8).

Phase 2 RI – 1998. Interim Basewide Remedial Investigation Report, Parts 2E-2H – Remedial Investigation Characterization Summaries 2 (Jacobs, 2000, pp 6–9).

Data Gap Evaluation 5 – 1999. Data Gap 5 Field Sampling Plan Addendum, Magpie Creek and Don Julio Creek (Radian, 1999a, pp 16–17).

Creeks FSP – 2005. Creeks Data Gap Analysis and Field Sampling Plan (URS, 2005b).

Human Health Risk Assessment for Area of Concern F-6 (SD264) – Robla Creek, Appendix C to the Creeks RICS (URS, 2009).

Ecological Risk Assessment for Area of Concern F-6 (SD264) – Robla Creek, Appendix G to the Creeks RICS (URS, 2009).

Don Julio Creek West of the Runway (AOC 317)

Phase 1 RI. *Operable Unit C Remedial Investigation/Feasibility Study Sampling and Analysis Plan* (Radian, 1994; IC 9, pp 5.1-2 to 5.1-13; IC 11, pp 5.3-9 to 5.3-12; IC 15, pp 5.7-2 to 5.7-15; IC 19, pp 5.11-12 to 5.11-25; IC 21, pp 5.13-12 to 5.13-18; and PRL 053, pp 5.14-8 to 5.14-13).

Recharacterization of Magpie Creek and Don Julio Creek. *Data Gap Field Sampling Plan: Magpie Creek and Don Julio Creek* (Radian, 1998a, pp 33-57).

Creeks Data Gap RI – 2005. *Creeks Data Gap Analysis and Field Sampling Plan* (URS, 2005b, pp 4-13 to 4-66).

Human Health Risk Assessment for Don Julio Creek West of Runway and Magpie Creek West of Runway, Appendix C to the Creeks RICS (URS, 2009).

Radiological RI. Radiological Remedial Investigation of Multiple Existing CERCLA Sites, Remedial Investigation Characterization Summaries Addendum (Cabrera, 2011 – final pending).

IC 17 Holding Ponds (PRL 051)

Investigation of potential contamination at PRL 51. Investigated in 1985 by McLaren.

Basewide investigation of stream water and sediments for potential organic and inorganic contamination. *Analytical Data Summary, Preliminary Pathways Assessment – Surface Water and Stream Sediment Samples* (Radian, 1990).

Surface soil gas investigation. Investigated in 1989 by Radian.

Preliminary assessment of sites and location in OU C. Assessed in 1993 by CH2M HILL.

Smaller eastern pond at PRL 051 was dredged and the material was sampled and analyzed for COPCs. Sampled in 1994 by McClellan AFB Environmental Management.

Appendix B
Field Sampling Summary for AOC F-1
and AOC F-2



DEPARTMENT OF THE AIR FORCE
AIR FORCE REAL PROPERTY AGENCY

MEMORANDUM FOR SEE DISTRIBUTION

AUG 30 2010

FROM: AFRPA Western Region Execution Center
3411 Olson Street
McClellan CA 95652-1003

SUBJECT: Letter Report for Thallium Sampling at Area of Concern (AOC) F-1 and AOC F-2,
former McClellan Air Force Base

1. Attached for your files is a letter report documenting the results of thallium sampling conducted in August 2010 at AOC F-1 and AOC F-2. The data indicate that thallium is not present at levels of concern at either site. These data support the conclusions in the Ecological Sites Feasibility Study and no further evaluation is warranted.

2. If you have any questions, please contact Molly Lenoe at (916) 643-0830, ext. 231.



STEVEN K. MAYER, P.E.
BRAC Environmental Coordinator

Attachment:
Letter Report for Thallium Sampling at AOC F-1 and AOC F-2

DISTRIBUTION LIST

<u>ADDRESS</u>	<u>NUMBER OF COPIES</u>
AFRPA WREC Attn: Administrative Record Mr. Paul Bernheisel (AFCEE) Mr. Buddy Walser (Noblis) Ms. Molly Enloe (Parsons) 3411 Olson Street McClellan CA 95652-1003	4
U.S. Environmental Protection Agency Region 9 Attn: Ms. Yvonne Fong (SFD-8-1) 75 Hawthorne Street San Francisco CA 94105	2
Dept. of Toxic Substances Control Attn: Mr. John Harris 8800 Cal Center Drive Sacramento CA 95826-3200	1
Regional Water Quality Control Board Attn: Mr. James Taylor 11020 Sun Center Drive # 200 Rancho Cordova CA 95670-6114	1
U.S. Fish and Wildlife Service Attn: Terry Adelsbach Endangered Species Program 2800 Cottage Way, Suite W-2605 Sacramento CA 95825	1
California Department of Fish and Game Attn: Mr. Allen Tsao Office of Spill Prevention and Response 1700 K Street, Suite 250 Sacramento CA 95814	2
TechLaw Inc. Attn: Mr. Rich Howard 921 11th Street, Suite 800 Sacramento CA 95814	1

AOC F-1 and AOC F-2 Field Sampling Summary Supporting the Ecological Sites Feasibility Study Former McClellan Air Force Base, August 2010

This report presents the results from the surface and subsurface soil sampling at Installation Restoration Program sites Area of Concern (AOC) F-1 and AOC F-2 at the former McClellan Air Force Base. The field sampling effort was conducted in accordance with the procedures outlined in the *Field Sampling Plan for AOC F-1 and AOC F-2* (FSP) (CH2M HILL, 2010a). The purpose of the sampling effort was to provide more definitive thallium analysis for soil samples at the sites and confirm that thallium was not present at levels of concern. Data collected from this sampling effort will be used to resolve the dispute initiated by the Department of Toxic Substances Control (DTSC) and the California Department of Fish and Game (CDFG) regarding the uncertainty associated with the analytical method used for thallium during the remedial investigation.

Site Description and History

AOC F-1 was used as a metal recycling facility prior to the Air Force purchasing the property in 1978. The site is now open grassland and several vernal pools are located immediately south of the site. While the site is contaminated with polychlorinated biphenyls (PCBs), there is no known source of thallium contamination.

AOC F-2 was a soils holding area and reportedly the location of a disposal pit for chicken farmers prior to becoming part of McClellan. The site is now open grassland, and vernal pools are located immediately west and north of the site. There is no known source of thallium contamination.

Previous Investigations

At AOC F-1, 37 soil samples from 15 borings and hand-auger locations were analyzed for metals, including thallium, by Method SW6010. All thallium concentrations were less than the background values established for subsurface soil using Method SW6010 (21.5 milligrams per kilogram [mg/kg] for silts and clays, and 12.9 mg/kg for sands). Consequently, thallium was not identified as a potential contaminant of concern at AOC F-1.

At AOC F-2, 21 soil samples from 5 borings were analyzed for metals, including thallium, by Method SW6010. All thallium concentrations were less than the background values established for subsurface soil using Method SW6010. Two of the seven samples with thallium detections were in surface soil and were reported as being above background because a background concentration for thallium in surface soil was not available. However, the thallium dataset was determined to be within the range of normal variance of background based on a statistical analysis, and consequently, thallium was not identified as a potential contaminant of concern at AOC F-2.

AOC F-1 and F-2 Field Investigation

Surface and subsurface sampling data were needed to confirm that thallium was not present at levels of concern. The new data were to be evaluated against the established background value by Method SW7841 and human health and ecological risk-based screening levels.

These data needs were used to develop the data quality objectives (DQOs) for AOC F-1 and AOC F-2, which are presented in Table 1. Four samples and one field duplicate were collected at AOC F-1 at biased locations selected by DTSC and CDFG. At AOC F-2, two samples and a field duplicate were collected at biased locations also selected by the regulatory agencies. Sample locations are shown on Figures 1 and 2.

TABLE 1

Data Quality Objectives

AOC F-1 and AOC F-2 Field Sampling Summary, Former McClellan Air Force Base, Sacramento, California

Data Quality Objective	Sample Location(s)	Objective Met?
Determine if thallium is present near AF01SB003 where it was detected at 10.9 J mg/kg at 6 feet below ground surface (bgs) by Method SW6010.	AF01SB003-R	Yes
Determine if thallium is present near AF01SB004 where it was detected at 8.2 J mg/kg at 1.5 feet bgs by Method SW6010.	AF01SB004-R	Yes
Determine if thallium is present near AF01HA004. It was previously not detected by Method SW6010.	AF01HA004-R	Yes
Determine if thallium is present near AF02SB002 where it was detected at 8.9 J mg/kg at surface by Method SW6010.	AF02SB002-R	Yes
Determine if thallium is present near AF02SB003 where it was detected at 6.6 J mg/kg at surface by Method SW6010.	AF02SB003-R	Yes

The following activities were performed during the AOC F-1 and AOC F-2 investigation to satisfy the DQOs:

- Collected three surface and one subsurface soil samples at three locations at AOC F-1 (AF01SB003-R, AF01SB004-R, and AF01HA004-R).
- Collected two surface soil samples at two locations at AOC F-2 (AF02SB002-R and AF02SB003-R).
- Analyzed all surface and subsurface samples for thallium by Method SW6020.

Soil samples were collected and analyzed during August 2010. The fieldwork was conducted in accordance with the procedures outlined in the FSP (CH2M HILL, 2010a) and the *Basewide Quality Assurance Project Plan, Revision 5 (QAPP)* (URS Corporation ([URS], 2003).

Data Quality

Analytical data from the AOC F-1 and AOC F-2 field investigation were assessed in accordance with the procedures and specifications contained in the QAPP (URS, 2003). All soil samples were collected according to the FSP (CH2M HILL, 2010a). This section summarizes the overall results and quality of the data. Data flags were assigned according to the QC acceptance limits defined in the QAPP as follows:

- J = Analyte concentration was considered an estimated value because one or more quality control (QC) specifications were not met, or concentration was greater than the method detection limit (MDL) but less than the project quantitation limit (low-level detects).
- J + = Analyte concentration was estimated, potentially biased high.
- J - = Analyte concentration was estimated, potentially biased low.
- R = Rejected result; identification and/or quantitation could not be verified because critical QC specifications were not met.
- U = Analyte was not detected.
- UJ = Analyte was not detected. The sample quantitation limit was estimated.

The data collected from AOC F-1 and AOC F-2 during this investigation were of acceptable quality. There were no data points qualified or rejected because of QC exceedances. The data were 100 percent complete, and the quality of the analytical program and laboratory data were sufficient to meet the project DQOs.

Summary of Data

AOC F-1 and AOC F-2 are open grasslands located near several vernal pools in the northern section of the base. Soil samples were collected to determine if thallium was present at levels of concern at locations where previous concentrations of thallium were reported. Eight soil samples were collected from five different sampling locations (AF01SB003-R, AF01SB004-R, AF01HA004-R, AF02SB002-R, and AF02SB003-R) on August 5, 2010. At AF01SB004-R, a subsurface sample was collected at 3 feet bgs. All other samples, including duplicate samples collected at two locations (AF01HA004-R and AF02SB002-R), were collected at surface. All samples were analyzed using Method SW6020 for thallium.

Because background values are not available for Method SW6020, the established background concentration by Method SW7841 was used as an initial screening value. Concentrations of thallium were detected in all samples below the background value with the exception of one sample collected from AF01HA004 where the thallium concentration (0.21 J mg/kg) slightly exceeded the background value of 0.20 mg/kg. However, in the duplicate sample from the same location, the concentration of thallium (0.11 mg/kg) was detected well below the background value. All thallium concentrations were "J" flagged as estimated values. The results are summarized in Table 2.

TABLE 2

Sampling Results from AOC F-1 and AOC F-2

AOC F-1 and AOC F-2 Field Sampling Summary, Former McClellan Air Force Base, Sacramento, California

Location ID	Analyte	Depth (feet bgs)	Result (mg/kg)
AF01SB003-R	Thallium	surface	0.13 J
AF01SB004-R	Thallium	surface	0.11 J
	Thallium	2.75	0.12 J
AF01HA004-R	Thallium	surface	0.21 J
	Thallium	surface (dup)	0.11 J
AF02SB002-R	Thallium	surface	0.13 J
	Thallium	surface (dup)	0.11 J
AF02SB003-R	Thallium	surface	0.13 J

Notes:

dup = duplicate sample

J = estimated value

Conclusion

The results of the field investigation indicate that thallium is present at AOC F-1 and AOC F-2, but at levels consistent with background. Therefore, these data will be considered sufficient to support the conclusions made in the *Ecological Sites Feasibility Study* (CH2M HILL, 2010b).

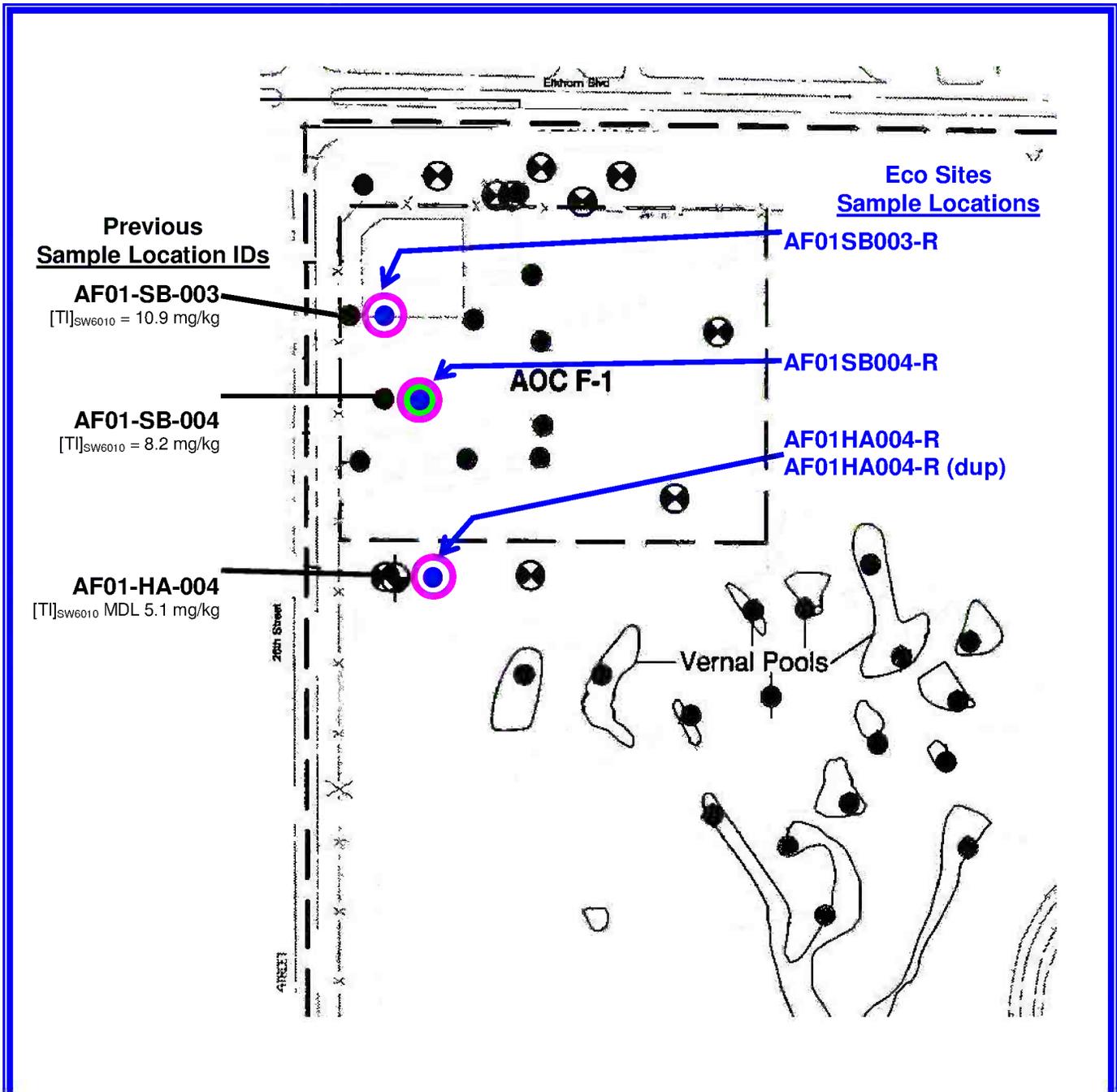
Works Cited

CH2M HILL, 2010a. *Field Sampling Plan for AOC F-1 and AOC F-2 Supporting the Ecological Sites Feasibility Study*. Prepared for the former McClellan Air Force Base, California. Final. July.

CH2M HILL. 2010b. *Ecological Sites Feasibility Study*. Prepared for the former McClellan Air Force Base, California. Final. March.

URS Corporation (URS). 2003. *Basewide Quality Assurance Project Plan, Revision 5*. Final. September.

Figures



Previous Sample Location IDs

AF01-SB-003
[Tl]_{sw6010} = 10.9 mg/kg

AF01-SB-004
[Tl]_{sw6010} = 8.2 mg/kg

AF01-HA-004
[Tl]_{sw6010} MDL 5.1 mg/kg

Eco Sites Sample Locations

AF01SB003-R

AF01SB004-R

AF01HA004-R
AF01HA004-R (dup)

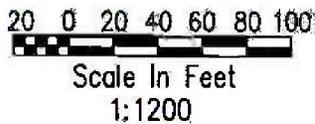
AOC F-1

Vernal Pools

20th Street

4th Street

Elkhorn Blvd

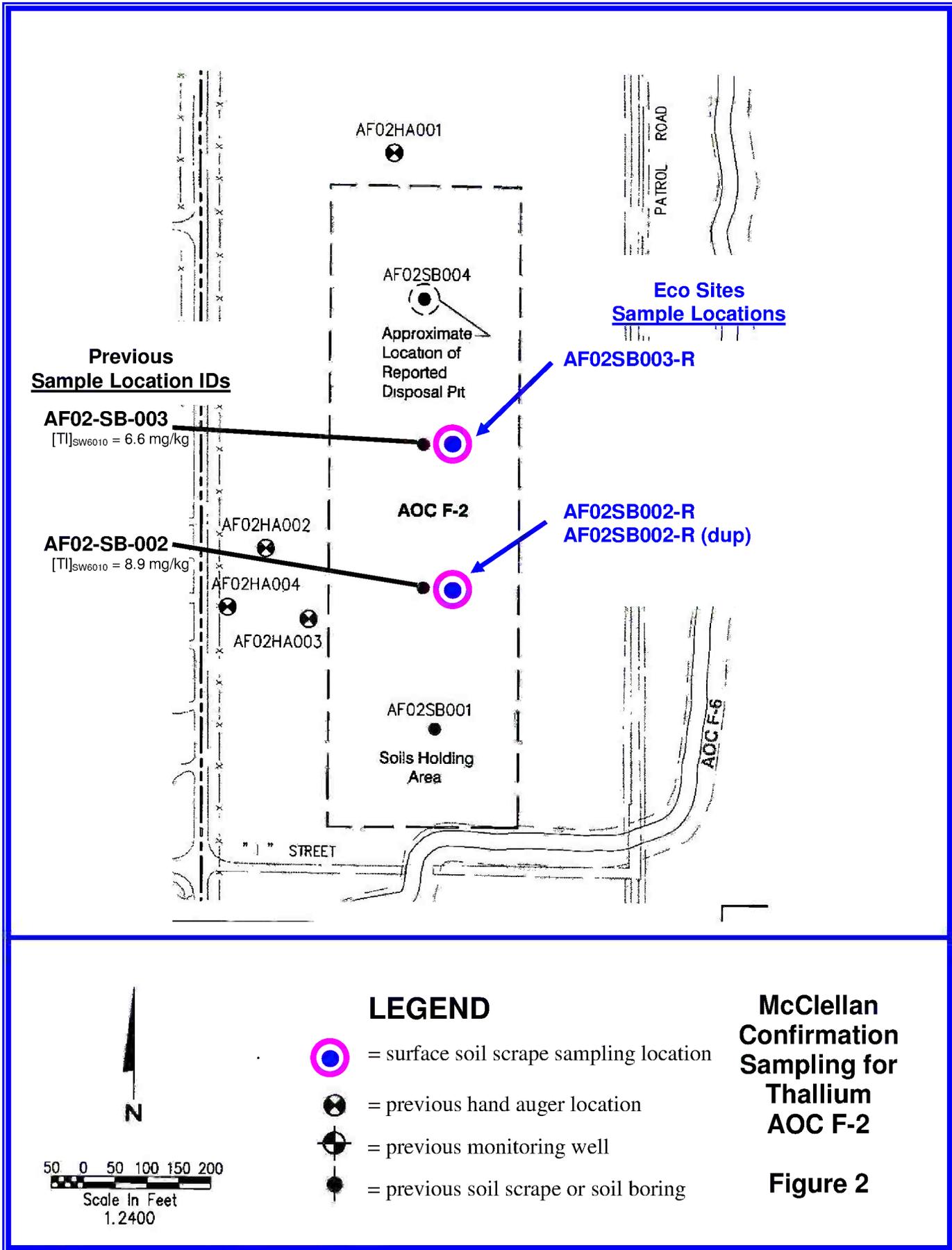


LEGEND

- = surface scrape sampling location for surface soil
- = hand auger sampling location for subsurface soil
- = previous hand auger location
- = previous monitoring well
- = previous soil scrape or soil boring

McClellan Confirmation Sampling for Thallium AOC F-1

Figure 1



Appendix C
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APPENDIX C

Administrative Record Index

TABLE C-1
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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
Offbase Creeks (SSA 003)			
3/1/1985	Base Level Report, Site Characterization, OU-A, OU-B, OU-C, OU-D	McLaren Environmental Engineering	570
9/20/1985	Newspaper Article, "Moving up McClellan's Sewer Order, Necessary Changes to Cost an Estimated \$6 Million"	Gretchen Kell	649
5/1/1986	Technical Memorandum, Shallow Investigation Program, Analytical Soil Results, Part V, Appendix 1, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	732.2
5/1/1986	Technical Memorandum, Shallow Investigation Program, Analytical Soil Results, Part V, Appendix 1, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	732.1
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Appendices 1, 2, and 3, Vol. I - III, OU-B, OU-C	McLaren Environmental Engineering	708, 709.1, 709.2, 710.1, 710.2
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Appendices 2 and 3, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	710.1
2/7/1989	CSAPCD Letter to Base Concerning Preliminary Pathways Assessment Work Plan	Eric P. Skelton	1352
4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediment Samples, Appendix A	Radian Corp.	1372
7/18/1989	CDHS Letter to Base Concerning Removal Action, Area B	Anthony J. Landis	1403
4/19/1990	CRWQCB Letter to Base Concerning Comments on PA Summary Report, OU-B	Alexander M. MacDonald	1512
7/27/1990	CRWQCB Letter to Base Concerning Review Comments on Soil Gas Investigation Report, OU-B	Alexander M. MacDonald	1562
2/1/1991	Stage 3, EA, EE/CA, Final Report, Disposal and Reuse, OU-B	Radian Corp.	1654.1
2/1/1991	Soil Gas Investigation, QA/QC Report, Vol. III of III, OU-B	Radian Corp.	1644.1
10/1/1991	PA, Stage 3, Summary Report, Vol. II of III, OU-B	Radian Corp.	1794
11/18/1991	Base Letter to EPA Concerning RI, Final SAP, OU-B	Elaine S. Anderson,	2997
4/2/1993	CRWQCB Letter to Base Concerning Review of FSP, OU-B	Alexander M. MacDonald	2112
9/1/1993	Stage 7, Final FSP, Surface Soil and Stream Sediment Basewide Background Study	Radian Corp.	2197
2/1/1994	Basewide Background Study Technical Memorandum	Radian Corp.	2254
2/1/1994	FS, Final Report, Magpie Creek	Nolte and Associates, Inc.	2250

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TABLE C-1
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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
3/22/1994	CRWQCB Letter to Base Concerning Basewide Background Study Technical Memorandum on Background Levels for Surface Soils and Sediments	Alexander M. MacDonald	2278
8/16/1994	CDTSC Letter to Base Concerning Comments on Basewide Ecological Risk Assessment Draft Final Scoping Report, OU-B, OU-D	John Harris	2420
7/1/1995	RI, Interim Basewide Draft Final Report, Characterization Summaries, Part 2B Continued, OU-B	Radian Corp.	2675, 2678
12/1/1995	RI, Interim Basewide Final Report, Characterization Summaries, Part 2B, Vol. VIII of IX, Appendix C, OU-B	Radian Corp.	2833
2/14/1996	CDTSC Letter to Base Concerning CDTSC Comments on Final Basewide EA Summary Scoping Report, OU-A, OU-B, OU-C, OU-D	Mark Malinowski	3032
9/12/1996	Newspaper Article, "McClellan Closes Treatment Plant"	The Sacramento Bee	3160
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. III of IV, Appendices, OU-C	Radian Corp.	3406.2
8/17/1998	CDTSC Letter to Base Concerning Comments on RI, Draft Report, Characterization Summary, OU-C	Randy S. Adams	1817
6/8/2000	CRWQCB Letter to Base Concerning No Comments on Draft Technical Memorandum, Ecological Risk Assessment, Data Gap 5, Magpie and Don Julio Creek	James D. Taylor	3851
7/24/2000	EPA Letter to Base Concerning Comments on Draft EA, Data Gap 5, Technical Memorandum, Magpie and Don Julio Creeks	Joseph B. Healy, Jr.	3876
9/5/2000	CDTSC Letter to Base Concerning Ecological Risk Assessment, Draft Data Gap 5	William Kilgore	3899
11/14/2000	Base Letter to USFWS Concerning Additional Information Required, Initiation of Section 7, Proposed Conveyance	Paul G. Brunner	3959
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013, 6013.1
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013
11/29/2005	EPA Comments on Draft West Nature Area Human Health Risk Assessment Protocol	Glenn Kistner/EPA, Region IX	6354
9/14/2006	RWQCB Comments on Draft Human Health Risk Assessment (HHRA) and Ecological Risk Assessment (ERA) for the West Nature Area and Off-Base Creeks	James Taylor/RWQCB	6341
12/24/2008	Final Remedial Investigation Feasibility Study for Non VOCs in Groundwater	Campbell McLeod/CH2M HILL	6563.2
2/26/2009	Final Creeks Remedial Investigation Characterization Summaries and Addenda	Corinne Marks/URS Group, Inc.	6577
7/13/2009	McClellan Five-year Review	Douglas Christensen/MWH	7089.1
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2MHILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
3/8/2012	Ecological Sites Record of Decision Informal Dispute	John Harris/DTSC	7513

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
IC 17 Seasonal Creek and Drainage Ditch (AOC 316)			
8/1/2002	Soil Vapor Extractions Systems Removal Quarterly Monitoring Report and Closure Considerations	URS	4951
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	5058
6/25/2004	Final Addendum to the 1999 McClellan Air Force Base Basewide Volatile Organic Compound Feasibility Study (VOC FS)	Paul G. Brunner/AFRPA/ DD-McClellan BRAC Environmental Coordinator	5487
5/16/2005	Environmental Programs BRAC Completion Plan, Volume 1, (Sections 1, 2, and 3 only), Former McClellan AFB, Version 05-16-05	AFRPA	5863
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013
9/19/2005	Preliminary Assessment And Sampling for Non-VOCs In Groundwater, Former McClellan AFB, Final	Amir Matin; Stephanie K. Benedict	5936
10/27/2005	Final Creeks Data Gap Analysis and Field Sampling Plan	Joy Rogalla/URS	6015
12/31/2005	Final Radiological Historical Site Assessment for the Former McClellan AFB		5942
5/8/2006	Final Site Inspection Work Plan for Non-VOCs in Groundwater	Andy Cramer/CH2M HILL	6021
8/1/2007	Final Basewide VOC Groundwater Record of Decision (ROD)	Andy Cramer/CH2M HILL	6475
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089.1
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
2/1/2012	Focused Strategic Sites Record of Decision, Former McClellan AFB	AFRPA	7522
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Second Creek (PRL P-007)			
8/1/1993	Final Work Plan, Field Investigation, OU-D	CH2M HILL	2176
4/1/1994	RI, Basewide Report, Revision 0, Vol. I		3502
6/1/1994	RI, Final Report, Vol. I - III, OU-D	CH2M HILL	2345, 2346, 2347
11/1/1994	RI, Interim Basewide Final Report, Part 1, General Framework		2480
1/1/1996	Vadose Zone Monitoring Well Letter Report, Soil Gas Investigation, OU-D	CH2M HILL	2868

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
11/1/1996	Final BRAC Cleanup Plan (BCP)		3199, 3477
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	3313.1, 3313.2
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I - II, Appendices, Revision 1	Radian Corp.	3355, 3356
7/1/1997	Final Supplemental Environmental Baseline Survey (EBS), Vol. II of II, Appendices		3550
11/1/1997	Final Radiation Summary Report		3476
8/12/1998	Technical Memorandum Report, Using On-Site-Only Sampling to Adequately Determine Radionuclide Background Concentrations	SM-ALC/EMR	943
10/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Parts 2e-2h, I - V of V, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	903, 904.1, 904.2, 905, 906.1, 906.2, 907
4/1/1999	RI, Final Audit Report, OU-E, OU-F, OU-G, OU-H	URS Greiner Woodward Clyde, Inc.	947
9/17/1999	Final Basewide Data Gap Field Sampling Plans 4 (Data Gap FSP 4)	Stephanie K. Benedict; Victor T. Auvinen/Radian International	5496
2/1/2000	Final Work Plan, Remedial Process Optimization Evaluation, OU-D	Parsons Engineering Science, Inc.	4050
4/1/2000	RI, Final Report, Addenda, Vol. V of V, OU-D	Radian Corp.	3801, 3804, 3805.1, 3805.2
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I - VIII, Appendix D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	3837, 3838, 3839.1, 3839.2, 3840.1, 3840.2, 3841.1, 3841.2, 3842, 3843.1, 3843.2, 3844
7/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Group 4	Radian Corp.	3866
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	3884.1, 3884.2
8/30/2000	Supplemental FOSL, Group 4 Facilities	Albert F. Lowas, Jr.	4328
5/20/2002	Final Initial Parcel Data Gaps FSP and HSP	CH2M HILL	4450
8/1/2002	Soil Vapor Extractions Systems Removal Quarterly Monitoring Report and Closure Considerations	URS	4951
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	5058
3/25/2004	Installation Restoration Program Former McClellan Air Force Base Interview Database Summary 2003	Laurie Brajkovich; Stephanie Benedict/URS Group, Inc.	5411
6/25/2004	Final Addendum to the 1999 McClellan Air Force Base Basewide Volatile Organic Compound Feasibility Study (VOC FS)	Paul G. Brunner/AFRPA/DD-McClellan BRAC Environmental Coordinator	5487
5/13/2005	Designation Of Expanded Installation Restoration Program Sites: AOC 317, AOC 316, AOC F-6, PRL P-007, SSA 003, SA 109, And Magpie Creek	Paul G. Brunner	5789
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013, 6013.1

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
9/19/2005	Preliminary Assessment And Sampling for Non-VOCs In Groundwater, Former McClellan AFB, Final	Amir Matin; Stephanie K. Benedict	5936
10/27/2005	Final Creeks Data Gap Analysis and Field Sampling Plan	Joy Rogalla/URS	6015
12/31/2005	Final Radiological Historical Site Assessment for the Former McClellan AFB		5942
5/8/2006	Final Site Inspection Work Plan for Non-VOCs in Groundwater	Andy Cramer/CH2M HILL	6021
8/1/2007	Final Basewide VOC Groundwater Record of Decision (ROD)	Andy Cramer/CH2M HILL	6475
2/26/2009	Final Creeks Remedial Investigation Characterization Summaries and Addenda	Corinne Marks/URS Group, Inc.	6577
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089.1
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
2/1/2012	Focused Strategic Sites Record of Decision, Former McClellan AFB	AFRPA	7522
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Former A-1 Metals Facility (AOC F-1)			
7/1/1981	Site Clean-up Report, A-1 Metals	2852 ABG/CEV	42
6/10/1988	CRWQCB Memo Concerning A-1 Metals PCB Sampling	Alexander M. MacDonald	1263
7/22/1994	SMWA Letter to Base Concerning Possible Contamination on Northeast Side of Base Runway Strip, OU-E, OU-F, OU-G, OU-H	Kelly Hymes	2385
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	3313.1, 3313.2
8/12/1998	Technical Memorandum Report, Using On-Site-Only Sampling to Adequately Determine Radionuclide Background Concentrations	SM-ALC/EMR	943
10/1/1998	Final Site Characterization Summary, FSP, Vol. I - IV, Appendices A - C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	899.1, 899.2, 900.1, 900.2, 901, 902
4/1/1999	RI, Final Audit Report, OU-E, OU-F, OU-G, OU-H	URS Greiner Woodward Clyde, Inc.	947
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I - VIII, Appendix A - D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	3837, 3838, 3839.1, 3839.2, 3840.1, 3840.2, 3841.1, 3841.2, 3842, 3843.1 3844
7/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Group 4	Radian Corp.	3866
8/30/2000	Supplemental FOSL, Group 4 Facilities	Albert F. Lowas, Jr.	4328

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	5058
9/19/2005	Preliminary Assessment And Sampling for Non-VOCs In Groundwater, Former McClellan AFB, Final	Amir Matin; Stephanie K. Benedict	5936
5/8/2006	Final Site Inspection Work Plan for Non-VOCs in Groundwater	Andy Cramer/CH2M HILL	6021
6/12/2006	Ecological Sites Decision-Making Roadmap for Former McClellan AFB, Final	Stephanie Benedict/URS Group, Inc.	5683
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
8/1/2010	Final Field Sampling Plan for Area of Concern (AOC) F-1 and AOC F-2	CH2M HILL	7218
8/30/2010	Letter Report for Thallium Sampling at Area of Concern (AOC) F-1 and AOC F-2	CH2M HILL	7222
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
2/1/2012	Focused Strategic Sites Record of Decision, Former McClellan AFB	AFRPA	7522
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Former Soils Holding Area (AOC F-2)			
7/22/1994	SMWA Letter to Base Concerning Possible Contamination on Northeast Side of Base Runway Strip, OU-E, OU-F, OU-G, OU-H	Kelly Hymes	2385
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	3313.1, 3313.2
5/7/1997	Base Letter to Regulators Concerning Appropriate Modeling to Determine Potential Water Quality Impacts From Metals Contaminated Soil	Elaine S. Anderson	3339
8/12/1998	Technical Memorandum Report, Using On-Site-Only Sampling to Adequately Determine Radionuclide Background Concentrations	SM-ALC/EMR	943
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I - VIII, Appendix A - D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	3837, 3838, 3839.1, 3839.2, 3840.1, 3840.2, 3841.1, 3841.2, 3842, 3843.1 3844
4/1/1999	RI, Final Audit Report, OU-E, OU-F, OU-G, OU-H	URS Greiner Woodward Clyde, Inc.	947
6/25/1999	EPA Letter to Base Concerning Non-VOC, FS, EE/CA Staging Pile Technical	Lisa Hanusiak	3622
7/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Group 4	Radian Corp.	3866
8/1/2000	FS, Draft, Non-VOC and Landfill	CH2M HILL	3884.1, 3884.2
8/30/2000	Supplemental FOSL, Group 4 Facilities	Albert F. Lowas, Jr	4328

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	5058
4/22/2004	Final Five-Year Review Report for McClellan	MWH Americas, Inc.	5402
6/25/2004	Final Addendum to the 1999 McClellan Air Force Base Basewide Volatile Organic Compound Feasibility Study (VOC FS)	Paul G. Brunner/AFRPA/ DD-McClellan BRAC Environmental Coordinator	5487
9/19/2005	Preliminary Assessment And Sampling for Non-VOCs In Groundwater, Former McClellan AFB, Final	Amir Matin; Stephanie K. Benedict	5936
5/8/2006	Final Site Inspection Work Plan for Non-VOCs in Groundwater	Andy Cramer/CH2M HILL	6021
6/12/2006	Ecological Sites Decision-Making Roadmap for Former McClellan AFB, Final	Stephanie Benedict/URS Group, Inc.	5683
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
8/1/2010	Final Field Sampling Plan for Area of Concern (AOC) F-1 and AOC F-2	CH2M HILL	7218
8/30/2010	Letter Report for Thallium Sampling at Area of Concern (AOC) F-1 and AOC F-2	CH2M HILL	7222
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Robla Creek (AOC F-6)			
4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediment Samples, Appendix A and B	Radian Corp.	1371, 1372, 1373
8/1/1989	Preliminary Pathways Assessment, Stage 5, Technical and Analytical Data Letter Report	Radian Corp.	1414
4/1/1990	Stage 5, Final Preliminary Pathways Assessment, Analytical Data Summary Report, Surface Water and Stream Sediment Samples	Radian Corp.	1506
5/21/1990	Base Memo Transmitting Analytical Data Summary, Preliminary Pathways Assessment	Mario E. Ierardi, Capt.	1528
9/1/1993	Stage 7, Final FSP, Surface Soil and Stream Sediment Basewide Background Study	Radian Corp.	2197
2/1/1994	Basewide Background Study Technical Memorandum	Radian Corp.	2254
4/1/1997	Final FSP, OU-E, OU-F, OU-G, OU-H	Radian Corp.	3313.1, 3313.2
8/12/1998	Technical Memorandum Report, Using On-Site-Only Sampling to Adequately Determine Radionuclide Background Concentrations	SM-ALC/EMR	943
10/1/1998	Final Site Characterization Summary, FSP, Vol. I - IV, Appendix A-C, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	899.1, 899.2, 900.1, 900.2, 901, 902
12/1/1998	Final FSP, Addendum, OU-E, OU-F, SS-095, SD-264	Jacobs Engineering Group, Inc.	926

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I - VIII, Appendix A - D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	3837, 3838, 3839.1, 3839.2, 3840.1, 3840.2, 3841.1, 3841.2, 3842, 3843.1 3844
7/1/2000	Final Supplemental Environmental Baseline Survey (EBS), Group 4	Radian, Corp.	3866
8/30/2000	Supplemental FOSL, Group 4 Facilities	Albert F. Lowas, Jr.	4328
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	5058
5/20/2004	Summary of POL Sources Technical Memorandum	Stephanie K. Benedict; Jacqueline C. Shulters/URS	5397
5/13/2005	Designation Of Expanded Installation Restoration Program Sites: AOC 317, AOC 316, AOC F-6, PRL P-007, SSA 003, SA 109, And Magpie Creek	Paul G. Brunner	5789
9/19/2005	Preliminary Assessment And Sampling for Non-VOCs in Groundwater, Former McClellan AFB, Final	Amir Matin; Stephanie K. Benedict	5936
10/27/2005	Final Creeks Data Gap Analysis and Field Sampling Plan	Joy Rogalla/URS	6015
12/31/2005	Final Radiological Historical Site Assessment for the Former McClellan AFB		5942
5/8/2006	Final Site Inspection Work Plan for Non-VOCs in Groundwater	Andy Cramer/CH2M HILL	6021
6/12/2006	Ecological Sites Decision-Making Roadmap for Former McClellan AFB, Final	Stephanie Benedict/URS Group, Inc.	5683
9/24/2008	Final Groundwater Radiological Summary Report	Jacqueline Shulters/URS Group, Inc.	6562
12/24/2008	Final Remedial Investigation Feasibility Study for Non VOCs in Groundwater	Campbell McLeod/CH2M HILL	6563
2/26/2009	Final Creeks Remedial Investigation Characterization Summaries and Addenda	Corinne Marks/URS Group, Inc.	6577
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Don Julio Creek West of the Runway (AOC 317)			
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	5058
3/18/2003	Fishing and Access Controls for West Nature Area	Molly S. Enloe/AFRPA	4554
3/18/2003	Fishing and Access Controls for West Nature Area	Molly S. Enloe/AFRPA	4570

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013
10/27/2005	Final Creeks Data Gap Analysis and Field Sampling Plan	Joy Rogalla/URS	6015
12/31/2005	Final Radiological Historical Site Assessment for the Former McClellan AFB		5942
5/8/2006	Final Site Inspection Work Plan for Non-VOCs in Groundwater	Andy Cramer/CH2M HILL	6021
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089.1
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2MHILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
IC 17 Holding Ponds (PRL 051)			
5/1/1986	Technical Memorandum, Shallow Investigation Program, Analytical Soil Results, Part V, Appendix 1, Vol. III of III, OU-B, OU-C	McLaren Environmental Engineering	732.1, 732.2, 1001
5/1/1986	Technical Memorandum Report, Shallow Investigation Program, Part V, Appendices 1, 2, and 3, Vol. I - III, OU-B, OU-C	McLaren Environmental Engineering	708, 709.1, 709.2, 710.1, 710.2
6/1/1986	Report of Contamination, Area C	McLaren Environmental Engineering	1010
6/1/1986	FS and RA Plan, Source Control, Area C	McLaren Environmental Engineering	1009
3/27/1987	Preliminary Natural Resources Survey Study	USFWS	1099
12/1/1987	Hydrogeologic Assessment Report, Surface Impoundments, Vol. I - III, Area C	EG&G Idaho, Inc.	1217, 1218, 1219
4/1/1988	Hydrogeologic Assessment Revised Report, Surface Impoundments, Area C	EG&G Idaho, Inc.	1241
4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediment Samples, Appendix B	Radian Corp.	1373
4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediment Samples, Appendix A	Radian Corp.	1372
4/1/1989	Stage 5, ITIR, Surface Water and Stream Sediments	Radian Corp.	1371
4/1/1990	Stage 5, Final Preliminary Pathways Assessment, Analytical Data Summary Report, Surface Water and Stream Sediment Samples	Radian Corp.	1506
8/1/1990	RI/FS, Stage 4, Planning Network Report	Radian Corp.	1567
3/1/1991	ROD, RI/FS, Stage 7, Final, Groundwater Extraction System, OU-C	Radian Corp.	1664
2/17/1993	Consensus Statement, Background Inorganic Constituents in Subsurface Soils	Radian Corp.	2084

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
7/1/1993	PA, Report, Vol. I - III, Appendix A - B, OU-C	CH2M HILL	2151, 2152, 2153.1, 2153.2, 2154, 2155.1, 2155.2
9/1/1993	Stage 7, Final FSP, Surface Soil and Stream Sediment Basewide Background Study	Radian Corp.	2197
2/1/1994	Basewide Background Study Technical Memorandum	Radian Corp.	2254
4/1/1994	RI, Basewide Report, Revision 0, Vol. I		MCCLN_AR_ 3502.pdf
5/1/1994	RI/FS, Final Report, SAP, OU-C	Radian Corp.	2314
9/1/1994	PA/SI, Final Technical Summary Report	Radian Corp.	2427
11/1/1994	RI, Interim Basewide Final Report, Part 1, General Framework		2480
12/1/1994	Final Management Action Plan (MAP), Vol. I of II		MCCLN_AR_ 2494.1.pdf
3/1/1995	Final Scoping Report, Basewide Ecological Risk Assessment, OU-C	Jacobs Engineering Group, Inc.	2566
4/1/1995	Surface Radiological Characterization Summary, OU-C	Radian Corp.	3513
5/5/1995	Final Presumptive Remedy EE/CA		MCCLN_AR_ 2645.pdf
7/1/1995	Final Surface Soil Radiological Characterization Report, OU-C	Radian Corp.	3518
11/1/1995	RI, Interim Basewide Final Report, Site Characterization Summary and FSP, Part 2C, Vol. I of III, OU-C		2801
7/30/1996	Draft, EE/CA, SVE, OU-C	Jacobs Engineering Group, Inc.	3531
11/27/1996	Final Environmental Baseline Survey (EBS), Vol. II of II, Appendices		3537
12/1/1996	RI, Draft Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. I - IV, Appendices, OU-C	Radian Corp.	3215, 3216, 3217, 3218
6/1/1997	RI, Final Interim Basewide Report, Part 1, Vol. I - II, Appendices, Revision 1	Radian Corp.	3355, 3356
6/1/1997	Final Ecological Risk Assessment Strategy Report	Radian Corp.	3354
7/1/1997	Final EIS, Disposal and Reuse, Vol. II of II		4030
8/1/1997	RI, Final Interim Basewide Report, Characterization Summary, FSP, Part 2c, Vol. I - IV, Appendices, OU-C	Radian Corp.	3404, 3405, 3406.1, 3406.2, 3407
11/1/1997	Final BRAC Cleanup Plan (BCP)		MCCLN_AR_ 3477.pdf
1/1/1998	RI, Final Interim Basewide Report, Characterization Summary, Part 2c, Vol. I of III, IC-17, IC-19, IC-21		2452
4/1/1998	Final Basewide Removal Action Work Plan, SVE	URS Greiner, Inc.	823
8/12/1998	Technical Memorandum Report, Using On-Site-Only Sampling to Adequately Determine Radionuclide Background Concentrations	SM-ALC/EMR	943

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Document Date	Subject or Title	Author/ Corporate Affiliation	AR Number
9/17/1999	Final Basewide Data Gap Field Sampling Plans 4 (Data Gap FSP 4)	Stephanie K. Benedict; Victor T. Auvinen/Radian International	5496
11/1/2002	Former McClellan Air Force Base Field Sampling Plan for Petroleum, Oils, and Lubricants (POL) and Shallow Soil Gas (SSG) at Selected Sites 5.	URS	5058
3/25/2004	Installation Restoration Program Former McClellan Air Force Base Interview Database Summary 2003	Laurie Brajkovich; Stephanie Benedict/URS Group, Inc.	5411
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013
9/19/2005	Preliminary Assessment And Sampling for Non-VOCs in Groundwater, Former McClellan AFB, Final	Amir Matin; Stephanie K. Benedict	5936
12/31/2005	Final Radiological Historical Site Assessment for the Former McClellan AFB		5942
5/8/2006	Final Site Inspection Work Plan for Non-VOCs in Groundwater	Andy Cramer/CH2M HILL	6021
6/12/2006	Ecological Sites Decision-Making Roadmap for Former McClellan AFB, Final	Stephanie Benedict/URS Group, Inc.	5683
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089.1
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
West Nature Area			
7/9/1999	USFWS Letter to Base Concerning Informal Endangered Species Consultation, Data Gap 5 Field Sampling, Magpie and Don Julio Creek	Karen J. Miller/USFWS	3643
8/1/1999	Final Data Gap FSP 5, Addendum, Magpie Creek, Don Julio Creek		934
4/19/2000	Creek Risk Management Memo, Soil Contaminant Concentrations, West Nature Area, Sacramento Valley	Stephanie Benedict/Radian Corp.	3815
2/22/2002	Base Letter to County of Sacramento Concerning Comments About On-Site Vernal Pool Preservation	Thomas B. Kempster/AFBCA/DM McClellan	4390
8/30/2002	Basewide Conceptual Model For Radiation at the Former McClellan Air Force Base	Mitretek Systems, Inc.	4984
3/18/2003	Fishing and Access Controls for West Nature Area	Molly S. Enloe/AFRPA	4554, 4570
6/30/2003	Draft, GWOU Phase III Field Sampling Plan (FSP) Modifications for Data Gap 13, (DSR# 1059-1)	Paul Brunner/AFRPA	4926
8/1/2003	Final LRA Initial Parcel Feasibility Study #1 (7 Sites) Volume 2	CH2M HILL	4942.1, 4942.2
9/25/2003	Biological Opinion for Disposal and Reuse of McClellan (Formally McClellan Air Force Base)	Cay C. Goude/AFRPA	4874

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10/1/2003	2003 Base Realignment and Closure Cleanup Plan	URS Group	4949
1/1/2004	Final Technical Memorandum On-Base GWOU Phase III VOC Data Gaps Investigation	John D. Scott/MWH Americas, Inc.	5211.1
2/11/2004	Former McClellan Air Force Base Ecological Creek Tailings Removal Action Engineering Evaluation/ Cost Analysis Project Management Plan Final	URS Group, Inc.	5205
3/29/2004	Final Addenda to the Final GWOU Phase III VOC Data Gap Field Sampling Plan	AFRPA	5278
7/6/2004	Radiological Findings in Creek Tailings and Potential Long-term Storage	Paul G. Brunner/AFRPA/ DD-McClellan	5615
12/10/2004	Section 7 Consultation for the Disposal of McClellan AFB	Kenneth Sanchez/USFWS	5929
2/23/2005	Draft Action Memorandum for the Creeks Tailings Removal Action (DSR# 1553-1), Former McClellan AFB	James D. Taylor/CRWQCB	5881
5/2/2005	OU C RICS and Addenda	URS Group	6238.7
5/16/2005	Environmental Programs BRAC Completion Plan, Volume 1, (Sections 1, 2, and 3 only), Former McClellan AFB, Version 05-16-05	AFRPA	5863
5/19/2005	Basewide Vernal Pool Scoping Level/Tier 1 Ecological Risk Assessment	Parsons	6236
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013
9/22/2005	Former McClellan AFB Interim Basewide Remedial Investigation Report, Part 1, General Framework Revision 2, Final (DSR# 381-7)		5934
9/26/2005	Section 7 Consultation for the Proposed Creeks and Floodplain Sampling Project at the Former McClellan AFB	Kenneth Sanchez; Peter A. Cross/USFWS	5928
10/27/2005	Final Creeks Data Gap Analysis and Field Sampling Plan	Joy Rogalla/URS	6015
12/31/2005	Final Radiological Historical Site Assessment for the Former McClellan AFB		5942
4/6/2006	Final Basewide Vernal Pool Field Sampling Plan/Health and Safety Plan (FSP/HSP)	CH2M HILL	6018
6/12/2006	Ecological Sites Decision-Making Roadmap for Former McClellan AFB, Final	Stephanie Benedict/URS Group, Inc.	5683
7/6/2006	Ecological Creeks Tailings Removal Action Work Plan	Kent Zenobia/URS Group, Inc	6251
7/20/2006	Amendment to Section 7 Consultation for Creeks and Floodplain Sampling (Biological Assessment)	Molly S. Enloe/AFRPA	6161
10/6/2006	Draft Biological Opinion for the Disposal of McClellan AFB	Paul Brunner/AFRPA	6028
10/16/2006	Final Initial Parcel #3 Work Plan	Andy Cramer/CH2M HILL	6253
8/1/2007	Final Basewide VOC Groundwater Record of Decision (ROD)	Andy Cramer/CH2M HILL	6475
8/27/2007	Final Basewide Vernal Pool Tier 2 Ecological Risk Assessment and Remedial Investigation Characterization Summaries Addenda	Karen Parker/CH2M HILL	6524

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8/31/2007	Final Work Plan for Waters of the United States Jurisdictional Delineation Update and Health and Safety Plan	Andy Cramer/CH2M HILL	6526
9/30/2007	Background Survey for Radionuclides Report	Science Applications	7004
6/1/2008	Remedial Investigation/Feasibility Study for Non-VOCs in Groundwater		6506
10/1/2008	Local Reuse Authority Initial Parcel Record of Decision #2	Andy Cramer/CH2M HILL	6576
10/3/2008	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites RICS Addendum Initial Parcel #3	Scott Hay/Cabrera Services	6565
12/24/2008	Final Remedial Investigation Feasibility Study for Non-VOCs in Groundwater	Campbell McLeod/CH2M HILL	6563
6/5/2009	Final Status Survey Reports	Ryan Ford/Cabrera Services	6594
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089
7/22/2009	Final 2009 McClellan Base Realignment and Closure (BRAC) Cleanup Plan	Douglas Self/AFRPA WREC	6589
7/22/2009	Final Non-VOC Amendment to the Basewide VOC Groundwater Record of Decision	Steve Mayer/AFRPA	7055
8/14/2009	Final follow-on Strategic Sites Work Plan	Campbell McLeod/CH2M HILL	6881
8/18/2009	Amendment #2 to Section 7 Consultation for Creeks and Floodplain Sampling	Steven Mayer/AFRPA	7042
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
3/8/2012	Ecological Sites Record of Decision Informal Dispute	John Harris/DTSC	7513
2/1/2012	Focused Strategic Sites Record of Decision, Former McClellan AFB	AFRPA	7522
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Magpie Creek West of the Runway			
9/1/1995	RI, Interim Basewide Draft Report, Site Characterization Summary and FSP, Part 2C, Vol. II of II, Appendices, OU-C	Radian Corp.	2741
9/1/1995	RI, Interim Basewide Draft Report, Site Characterization Summary and FSP, Part 2C, Vol. I of II, OU-C	Radian Corp.	2740
8/1/1999	Final Data Gap FSP 5, Addendum, Magpie Creek, Don Julio Creek	Radian, Corp.	934
9/17/1999	Final Basewide Data Gap Field Sampling Plans 4 (Data Gap FSP 4)	Stephanie K. Benedict; Victor T. Auvinen,	5496
7/1/2005	Final Radiological Remedial Investigation of Multiple Existing CERCLA Sites Sampling and Analysis Plan	Tony Mason/Cabrera Services	6013
10/27/2005	Final Creeks Data Gap Analysis and Field Sampling Plan	Joy Rogalla/URS	6015

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12/31/2005	Final Radiological Historical Site Assessment for the Former McClellan AFB	Mitretek Systems, Inc.; Cabrera Services	5942
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089.1
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
2/1/2012	Focused Strategic Sites Record of Decision, Former McClellan AFB	AFRPA	7522
3/8/2012	Ecological Sites Record of Decision Informal Dispute	John Harris/DTSC	7513
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Vernal Pools Associated with CS 007/SAFR			
1998	Interim Basewide Remedial Investigation Report: Part 2C (Northern) - Remedial Investigation Characterization Summaries for Investigation Clusters 17, 19, and 21	Radian	unknown
5/1/2005	Interim Basewide Remedial Investigation Report – Operable Unit C Remedial Investigation Characterization Summaries Addenda	URS	6238
5/19/2005	Basewide Vernal Pool Scoping Level/Tier 1 Ecological Risk Assessment	Parsons	6236
8/27/2007	Final Basewide Vernal Pool Tier 2 Ecological Risk Assessment and Remedial Investigation Characterization Summaries Addenda	Karen Parker/CH2M HILL	6524
1/1/2009	Update to the Wetlands Delineation for the Former McClellan Air Force Base	CH2M HILL	7145
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089.1
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
2/1/2012	Focused Strategic Sites Record of Decision, Former McClellan AFB	AFRPA	7522
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521
Vernal Pools Associated with PRL S-010			
6/1/2000	RI, Final Basewide Report, Characterization Summaries 2, Parts 2E- 2H, Vol. I - VIII, Appendix A - D, OU-E, OU-F, OU-G, OU-H	Jacobs Engineering Group, Inc.	3837, 3838, 3839.1, 3841.1, 3842, 3843.1, 3844
5/19/2005	Basewide Vernal Pool Scoping Level/Tier 1 Ecological Risk Assessment	Parsons	6236
2007	Radiological Remedial Investigation of Multiple Existing CERCLA Sites, Remedial Investigation Characterization Summaries Addendum	Cabrera	unknown

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8/27/2007	Final Basewide Vernal Pool Tier 2 Ecological Risk Assessment and Remedial Investigation Characterization Summaries Addenda	Karen Parker/CH2M HILL	6524
1/1/2009	Update to the Wetlands Delineation for the Former McClellan Air Force Base	CH2M HILL	7145
7/13/2009	McClellan Five-Year Review	Douglas Christensen/MWH	7089.1
4/1/2010	Final Ecological Sites Feasibility Study	LaTonya Coleman/CH2M HILL	7141
1/27/2011	Final Ecological Sites Proposed Plan (DSR #524-5)	Stephen Mayer	7252
4/1/2012	Responses to Regulatory Agency Comments on the Draft and Draft Final Ecological Sites Record of Decision, Former McClellan AFB	AFRPA	7521

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