FORA ESCA REMEDIATION PROGRAM

FINAL

Group 3

Remedial Investigation / Feasibility Study

Volume 3: Feasibility Study

Del Rey Oaks / Monterey, Laguna Seca Parking, and Military Operations in Urban Terrain Site Munitions Response Areas

Former Fort Ord
Monterey County, California

July 31, 2012

Prepared for:

FORT ORD REUSE AUTHORITY

920 2nd Avenue, Suite A
Marina, California 93933

Prepared under:

Environmental Services Cooperative Agreement
No. W9128F-07-2-01621
and
FORA Remediation Services Agreement (3/30/07)

Document Control Number: 09595-10-079-013

Prepared by:

ARCADIS

WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

This effort was sponsored by the Army, Assistant Chief of Staff Installation Management. The content of the information does not necessarily reflect the position or policy of the Government and no official endorsement should be inferred.

Group 3 Remedial Investigation/Feasibility Study
Volume 3: Feasibility Study
Former Fort Ord
Monterey County, California

Reviewed and Approved By:	Stan Cook FORA ESCA Program Manager Fort Ord Reuse Authority	Jul. 31, 2012 Date
Prepared By:	Christopher G. Spill, P.G. ESCA Technical Project Manager ARCADIS U.S., Inc.	Jul. 31, 2012 Date
Prepared By:	Linda Temple ESCA Remediation Project Manager Weston Solutions, Inc.	Jul. 31, 2012 Date
Approved By:	Nelline Kowbel, P.E. ESCA Remediation Project Engineer Weston Solutions, Inc.	Jul. 31, 2012 Date
Approved By:	Kristie Reimer ESCA Remediation Program Manager ARCADIS U.S., Inc.	Jul. 31, 2012 Date

[this page was intentionally left blank]

CONTENTS

TABLES

FIGURES

[this page was intentionally left blank]

ACRONYMS AND ABBREVIATIONS

ACES	Areas Covered by Environmental Services
AOC	Administrative Order on Consent
ARAR	applicable or relevant and appropriate requirement
Army	United States Department of the Army
BAADT	best available and appropriate detection technology
bgs	below ground surface
BO	biological opinion
BRA	Basewide Range Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CIOP	Community Involvement and Outreach Program
CRP	Community Relations Plan
CRUP	Covenant to Restrict the Use of Property
CSUMB	California State University at Monterey Bay
CTS	California tiger salamander
DDESB	Department of Defense Explosives Safety Board
DMM	discarded military munitions
DOD	United States Department of Defense
DQO	Data Quality Objective
DRO	Del Rey Oaks
DTSC	Department of Toxic Substances Control
EPA	United States Environmental Protection Agency
ESA	Endangered Species Act
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FS	Feasibility Study
FFA	Federal Facility Agreement
FORA	Fort Ord Reuse Authority
FOSET	Finding of Suitability for Early Transfer
ft	feet
HA	historical area
HMP	Habitat Management Plan
LUC	Land Use Control
LUCI	Land Use Covenant Implementation
LTM	long-term management
MEC	Munitions and Explosives of Concern

MOA	Memorandum of Agreement
MOUT	Military Operations in Urban Terrain
MD	munitions debris
MR	munitions response
MRA	Munitions Response Area
MRS	Munitions Response Site
msl	mean sea level
NCP	National Contingency Plan
NRMA	natural resource management area
NPL	National Priorities List
NPV	net present value
O&M	Operations and Management
OSWER	Office of Solid Waste and Emergency Response
PES	potential explosion site
RA	Risk Assessment
RAO	remedial action objective
RD/RA WP	Remedial Design/Remedial Action Work Plan
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RQA	Residential Quality Assurance
RWQCB	Regional Water Quality Control Board
SEDR	Summary of Existing Data Report
SS/GS	SiteStats/GridStats
TCRA	time-critical removal action
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance

GLOSSARY

Anomaly
Any item that is seen as a subsurface irregularity after geophysical investigation. This irregularity should deviate from the expected subsurface ferrous and non-ferrous material at a site (i.e., pipes, power lines, etc.).

Anomaly Avoidance
Techniques employed by unexploded ordnance (UXO) personnel at sites with known or suspected munitions and explosives of concern (MEC) to avoid any potential surface MEC and any subsurface anomalies. This usually occurs at mixed hazard sites when hazardous, toxic, and radioactive waste investigations must occur prior to execution of an MEC removal action. Intrusive anomaly investigation is not authorized during ordnance avoidance operations.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980
CERCLA authorizes federal action to respond to the release or threatened release of hazardous substances into the environment or a release or threatened release of a pollutant or contaminant into the environment that may present an imminent or substantial danger to public health or welfare.

Construction Support
Assistance provided by DOD explosive ordnance disposal (EOD) or UXO-qualified personnel and/or by personnel trained and qualified for operations involving chemical agents (CA), regardless of configuration, during intrusive construction activities on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or CA, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive or CA hazards.

Covenant Deferral Request
A letter along with a supporting information package known as a Covenant Deferral Request (CDR) is assembled by the Federal landholding to formally request deferral of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) covenant until that all remediation has been accomplished prior to transfer. United States Environmental Protection Agency (EPA) requires that the information is: 1) of sufficient quality and quantity to support the request for deferral of the CERCLA Covenant; and 2) that it provides a basis for EPA to make its determination. This information is submitted to EPA in the form of a CDR.

Deferral period
The period of time that the CERCLA covenant warranting that all remedial action is complete before transfer, is deferred through the Early Transfer Authority.

Discarded Military Munitions (DMM)

Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include UXO, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations. (10 U.S.C. 2710[e][2])

Early Transfers

The transfer by deed of federal property by United States Department of Defense (DOD) to a nonfederal entity before all remedial actions on the property have been taken. Section 120 (h)(3)(C) of the CERCLA allows Federal agencies to transfer property before all necessary cleanup actions have been taken. This provision, known as early transfer authority, authorizes the deferral of the CERCLA covenant when the findings required by the statute can be made and the response action assurances required by the statute are given. The Governor of the state where the property is located must concur with the deferral request for property not listed on the National Priorities List (NPL). For NPL property, the deferral must be provided by the EPA with the concurrence of the Governor. Upon approval to defer the covenant, DOD may proceed with the early transfer.

ESCA RP Team

ARCADIS U.S., Inc. (formerly LFR Inc.), Weston Solutions, Inc., and Westcliffe Engineers, Inc.

Exclusion Zone

A safety zone established around an MEC work area. Only essential project personnel and authorized, escorted visitors are allowed within the exclusion zone. Examples of exclusion zones are safety zones around MEC intrusive activities and safety zones where MEC is intentionally detonated.

Explosive

A substance or a mixture of substances that is capable by chemical reaction of producing gas at such temperature, pressure, and speed as to cause damage to the surroundings. The term “explosive” includes all substances variously known as high explosives and propellants, together with igniters, primers, initiators, and pyrotechnics (e.g., illuminant, smoke, delay, decoy, flare, and incendiary compositions).

Feasibility Study (FS)

The primary objective of the FS is “to ensure appropriate remedial alternatives are being developed and evaluated and an appropriate remedy selected” (NCP 40 CFR 300.430[e]).

Geophysical Reacquisition

Geophysical Reacquisition involves utilizing both a positioning method (i.e., Global Positioning System [GPS], ultrasonic, or tape from corners) and geophysical instruments to reacquire and pinpoint anomaly locations selected by the geophysical processors. The geophysical instruments include the original instrument used for the digital survey of the grid and the analog instrument being utilized by the UXO teams for intrusive activities. The

intended result of this method is to pinpoint the location where the intrusive teams will find the subsurface item causing the anomaly.

Intrusive Activity

An activity that involves or results in the penetration of the ground surface at an area known or suspected to contain MEC. Intrusive activities can be of an investigative or removal action nature.

Mag and dig

Utilizing hand held geophysical instruments to detect anomalies and immediately investigating the anomalies (without using collection of digital data and post processing to determine which anomalies to dig) by manual digging or with the assistance of heavy equipment.

Material Potentially Presenting an Explosive Hazard (MPPEH)

Material that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or potentially contains a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization, or disposal operations). Excluded from MPPEH are munitions within the DOD established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions.

Memorandum of Agreement (MOA)

"Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxic Substances Control Concerning Monitoring and Reporting of Environmental Restrictions on the Former Fort Ord, Monterey County, California."

Military Munitions

All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DOD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components of the above. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the

Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101[e][4][A through C]).

Military Munitions Response Program (MMRP)
Department of Defense-established program that manages the environmental, health and safety issues presented by munitions of explosives concern.

Minimum Separation Distance (MSD)
Minimum distance between a potential explosion site (PES) and personnel, assets, or structures, required to provide the appropriate level of protection from a detonation (either intentional or unintentional) at the PES.

Munitions and Explosives of Concern (MEC)
This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) UXO, as defined in 10 U.S.C. 101(e)(5)(A) through (C); (B) Discarded military munitions (DMM), as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions Constituents (MC)
Any materials originating from UXO, discarded military munitions, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710).

Munitions Debris (MD)
Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal.

Munitions Response Area (MRA)
Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites.

Munitions Response Site (MRS)
A discrete location within an MRA that is known to require a munitions response.

Ordnance and Explosives (OE)
See MEC.

Potential Explosion Site (PES)
The location of a quantity of ammunitions and explosives that will create a blast, fragment, thermal, or debris hazard in the event of an accidental explosion of its contents.

Quality Assurance (QA)
An integrated system of management activities involving planning, implementation, assessment, reporting, and quality improvement to ensure that a process, item, or service is of the type and quality needed to meet project requirements.

Quality Control (QC)
The overall system of operational techniques and activities that measures the attributes and performance of a process, item, or service against defined standards that are used to fulfill requirements for quality.

Record of Decision (ROD)
A ROD is the document used to record the remedial action decision made at a National Priorities List property. The ROD will be maintained in the project Administrative Record and project file.

Remedial Investigation (RI)
The RI is intended to "adequately characterize the site for the purpose of developing and evaluating an effective remedial alternative" (NCP, 40 CFR 300.430[d]). In addition, the RI provides information to assess the risks to human health, safety, and the environment that were identified during risk screening in the site investigation.

Remedial Actions
Those actions consistent with a permanent remedy taken instead of or in addition to removal actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health, welfare, or the environment. The term includes but is not limited to such actions at the location of the release as storage; confinement; perimeter protection using dikes, trenches, or ditches; clay cover; neutralization; cleanup of released hazardous substances and associated contaminated materials; recycling or reuse; diversion; destruction; segregation of reactive wastes; dredging or excavations; repair or replacement of leaking containers; collection of leachate and runoff; on-site treatment or incineration; provision of alternative water supplies; and any monitoring reasonably required to assure that such actions protect the public health, welfare, and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President of the United States determines that, alone or in combination with other measures, such relocation is more cost-effective and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition off site of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

Response Action
Action taken instead of or in addition to a removal action to prevent or minimize the release of MEC so that it does not cause substantial danger to present or future public health or welfare or the environment.

Unexploded Ordnance (UXO)
Military munitions that (A) have been primed, fuzed, armed, or otherwise prepared for action; (B) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101[e][5][A] through [C]).

UXO-Qualified Personnel

Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.

UXO Technicians

Personnel who are qualified for and filling Department of Labor, Service Contract Act, Directory of Occupations, contractor positions of UXO Technician I, UXO Technician II, and UXO Technician III.

1.0 INTRODUCTION

The former Fort Ord is located on Monterey Bay in northwestern Monterey County, California (Figure 1). Since 1917, portions of the former Fort Ord were used by the United States Department of the Army (Army) for maneuvers, target ranges, and other purposes. Military munitions were fired into, fired upon, or used on the facility. As a result, a wide variety of conventional munitions and explosives of concern (MEC), consisting of unexploded ordnance (UXO) and discarded military munitions (DMM) items, have been encountered at the former Fort Ord.

This Group 3 Remedial Investigation/Feasibility Study (RI/FS) Report was prepared by the Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team on behalf of the Fort Ord Reuse Authority (FORA) in accordance with an Administrative Order on Consent (AOC), which addresses cleanup of portions of the former Fort Ord in Monterey County, California. The ESCA RP Team consists of ARCADIS U.S., Inc. (formerly LFR Inc.), Weston Solutions, Inc., and Westcliffe Engineers, Inc.

The AOC was entered into voluntarily by the United States Environmental Protection Agency (EPA) Region 9, the California Department of Toxic Substances Control (DTSC), FORA, and the United States Department of Justice Environment and Natural Resources Division (EPA Region 9 CERCLA Docket No. R9-2007-03). The AOC was issued under the authority vested in the President of the United States by Sections 104, 106, and 122 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 United States Code (U.S.C.) §§ 9604, 9606, and 9622.

As described in the Summary of Existing Data Report (SEDR; ESCA RP Team 2008a), Group 3 includes the Del Rey Oaks (DRO)/Monterey Munitions Response Area (MRA), the Laguna Seca Parking MRA, the Military Operations in Urban Terrain (MOUT) Site MRA, and the Interim Action Ranges MRA (Figure 2). The Interim Action Ranges MRA has been removed from this Group 3 RI/FS report for further evaluation as agreed upon by FORA, the EPA, DTSC, and the Army. The Interim Action Ranges MRA will be presented in a separate RI/FS Report.

This Group 3 RI/FS Report: 1) describes the nature and extent of MEC; 2) assesses explosives safety risk that may be present; and 3) develops, screens, and evaluates alternatives to reduce the potential explosives safety risk to current and future property owners and the general public. The Group 3 RI/FS Report will be used by the Army in developing the Proposed Plan and making a decision on remedial actions. The report is based on the evaluation of previous work conducted for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs according to the guidance provided in the Group 3 RI/FS Work Plan (ESCA RP Team 2009).

The Group 3 RI/FS is divided into three parts: the Remedial Investigation (RI) is Volume 1, the Risk Assessment (RA) is Volume 2, and the Feasibility Study (FS) is Volume 3. This FS,

Volume 3 of the Group 3 RI/FS, identifies preferred remedial alternatives to address MEC risks at the DRO/Monterey MRA, Laguna Seca Parking MRA, and the MOUT Site MRA.

1.1 Purpose of the Feasibility Study

The purpose of this FS is to develop and select remedial alternatives to address any potential MEC risks remaining at the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRA reuse areas. Potential human health and ecological risks related to soil contamination from small arms and military munitions ranges are being addressed under the Basewide Range Assessment (BRA; Shaw/MACTEC 2009). The objectives of this FS are to describe the process used to develop, evaluate, compare, and select preferred alternatives that will meet the remedial action objectives (RAOs) based on the results of the RI and RA for these areas.

1.2 Former Fort Ord Military Munitions Response Program

This section summarizes the munitions response program related to MEC cleanup that was previously implemented at the former Fort Ord by the Army and the subsequent program that was implemented to continue MEC remediation in portions of the former Fort Ord by FORA.

1.2.1 Cleanup Program Under the Army

The former Fort Ord was placed on the National Priorities List (NPL) in 1990 primarily because of chemical contamination in soil and groundwater that resulted from past Army use. To oversee the cleanup of the base, the Army, EPA, DTSC, and Central Coast Regional Water Quality Control Board (RWQCB) entered into a Federal Facility Agreement (FFA). One of the purposes of the FFA was to ensure that the environmental impacts associated with past and present activities at the former Fort Ord were thoroughly investigated and appropriate remedial action taken as necessary to protect public health and the environment. In accordance with the FFA, the Army was designated as the lead agency under CERCLA for conducting environmental investigations, making cleanup decisions, and taking cleanup actions at the former Fort Ord. The EPA was designated as the lead regulatory agency for the cleanup, while the DTSC and RWQCB were designated as supporting agencies.

The Army has conducted a number of MEC survey and clearance activities, including geophysical surveys. The Army has conducted its activities pursuant to the President of the United States' authority under CERCLA Section 104, as delegated to the Army in accordance with Executive Order 12580 and in compliance with CERCLA Section 120.

In November 1998, the Army agreed to evaluate MEC at the former Fort Ord and perform a basewide munitions response (MR) RI/FS consistent with CERCLA. The basewide MR RI/FS program addressed MEC hazards at the former Fort Ord and evaluated past removal actions as well as recommended future remedial actions deemed necessary to protect

human health and the environment under future uses. In April 2000, an agreement was signed between the Army, EPA, and DTSC to evaluate MEC at the former Fort Ord subject to the provisions of the FFA. The signatories agreed that the FFA provided the appropriate framework and process to address the Army's MEC activities. The FFA established schedules for performing RIs and FSs, and required that remedial actions be completed expeditiously.

The basewide MR RI/FS program is described in the Draft Final Ordnance and Explosives RI/FS Work Plan (USACE 2000). Elements of the MR RI/FS program include a literature review, preparation of a Sampling and Analysis Plan for additional MEC characterization activities, evaluation of MEC work by previous contractors, performance of an Ordnance Detection and Discrimination Study, identification of applicable or relevant and appropriate requirements (ARARs), evaluation of risks, and development of long-term risk management measures, a community relations plan, and a health and safety plan. The MR RI/FS program only addresses the physical risk from MEC. The potential for soil contamination from munitions constituents at the former Fort Ord is being addressed under the Army's BRA Program (Shaw/MACTEC 2009).

The Army's approach to categorizing areas within the former Fort Ord includes track groupings consisting of Track 0 through Track 3. Specifically, track definitions are as follows:

- Track 0: Areas that contain no evidence of MEC and have never been suspected of having been used for military munitions-related activities. In June 2002, the Army signed a Track 0 Record of Decision (ROD) (Army 2002). The Track 0 ROD addresses selected land parcels, and also provides a Plug-In process to address future land parcels that are considered eligible for inclusion in the Track 0 process.
- Track 1: Sites where military munitions were suspected to have been used but, based on results, the sites fall into one of three categories: 1) sites with no evidence to indicate that military munitions were used; 2) sites used for training but military munitions used do not pose an explosive hazard; or 3) sites used for training but military munitions potentially remaining do not pose an unacceptable risk. In April 2005, the Army signed a Track 1 ROD (Army 2005a). The Track 1 ROD addresses selected land parcels, and also provides a Plug-In process to address future land parcels that are considered eligible for inclusion in the Track 1 process.
- Track 2: Sites where MEC were present and MEC removal has been conducted.
- Track 3: Sites where MEC are known or suspected but investigations have not been initiated or completed.

In addition, to remain consistent with the federal Endangered Species Act (ESA), the Army has completed consultations with the United States Fish and Wildlife Service (USFWS) on the Army's predisposal actions, including cleanup of MEC. These consultations have resulted in the development of biological opinions (BOs) that include endangered species incidental take statements. These BOs allow impacts to and incidental takes of listed species during MEC cleanup activities, but require mitigation measures to

be implemented before, during, and after the MEC cleanup activities to reduce and minimize impacts to the protected species and their habitats.

1.2.2 Early Transfer Property and Environmental Services Cooperative Agreement

The transfer of a portion of the former Fort Ord, pursuant to CERCLA Section 120(h)(3)(C), was requested by FORA in a letter dated May 18, 2005. Under CERCLA Section 120(h)(3), the United States is required to provide a covenant in deeds conveying the property warranting that all remedial action necessary to protect human health and the environment has been taken before the date of transfer. For a federal facility listed on the NPL, CERCLA Section 120(h)(3)(C) allows the EPA administrator, with concurrence of the governor of the state, to defer the CERCLA covenant requirement. These types of transfers under CERCLA Section 120(h)(3)(C) are typically called "early transfers," in which the United States provides the warranty after transfer of the property when all of the response actions necessary to protect human health and the environment have been taken. The period between the transfer of title and the making of this final warranty is known as the "deferral period." Early transfers allow productive reuse of the property through access while final remediation work is being conducted. In addition, United States Department of Defense (DOD) and Army policy require that the military department proposing to transfer property prepare a Finding of Suitability for Early Transfer (FOSET).

The Army has completed the final "Finding of Suitability for Early Transfer (FOSET), Former Fort Ord, California, Environmental Services Cooperative Agreement (ESCA) Parcels and Non-ESCA Parcels (Operable Unit Carbon Tetrachloride Plume) (FOSET 5)" (Army 2007). The Army has requested deferral of the CERCLA covenant and EPA has approved, with the concurrence of the Governor of the State of California, the Covenant Deferral Request associated with the early transfer of the property.

On March 31, 2007, the Army and FORA entered into an ESCA to provide MEC remediation services during the deferral period, thereby allowing the Army to transfer approximately 3,340 acres of property and the responsibility of removing MEC to FORA as an Economic Development Conveyance. The former Fort Ord property transferred under the ESCA is collectively referred to as the Areas Covered by Environmental Services (ACES). In accordance with the ESCA, FORA is responsible for addressing response actions for the property except for those responsibilities retained by the Army. The ESCA and the AOC identify the Army-retained conditions for which the Army assumes responsibility. If these conditions are encountered, FORA is required to notify the Army of their presence in accordance with the guidelines set forth in the ESCA and the Army assumes responsibility. Included in the Army-retained conditions are:

- Radiological material
- Chemical or biological warfare agents
- Natural resource injuries or damages occurring as a result of contamination releases that have occurred due to Army ownership or activities except to the extent such injuries are a direct result of FORA's activities

- Unknown uninsured conditions, which include the management and cleanup of non-MEC-related hazardous and toxic wastes above insurance parameters
- Perchlorate contamination in soil or groundwater

To accomplish this effort, FORA entered into an agreement with the ESCA RP Team, to assist in the completion of the MEC cleanup activities in accordance with the ESCA and the AOC. During the ESCA RP, FORA is responsible for administrative and management program elements, while the ESCA RP Team conducts the MEC cleanup work under FORA oversight.

1.2.3 FORA ESCA Remediation Program

The purpose of the ESCA RP is to provide the necessary environmental services to FORA, which include characterization, assessment of explosive risk, FS, remediation alternatives analysis, and performance of remediation of hazardous substances, including but not limited to MEC (excluding the Army-retained conditions described in Section 1.2.2). The primary objective of the ESCA RP is timely cleanup of the property in accordance with the ESCA and AOC. The potential for soil contamination from munitions constituents at the former Fort Ord is being addressed under the Army's BRA Program (Shaw/MACTEC 2009). As stated in FOSET 5, based on the BRA Program, no further action has been recommended for historical areas (HAs) within the Laguna Seca Parking, MOUT Site, and DRO/Monterey MRAs. In addition, Laguna Seca Parking and MOUT Site MRAs are part of Installation Restoration Program Site 39 at the former Fort Ord. Previous soil remediation activities were conducted as part of the Site 39 program, which has an existing ROD.

The SEDR was completed for the ACES as required under Task 2 of the AOC Scope of Work (ESCA RP Team 2008a). In the SEDR, the ACES were combined into nine MRAs to facilitate the implementation of the AOC. The SEDR provided a site overview, evaluation of existing data, identification of data gaps, a conceptual site model including an initial assessment of explosives safety risks, and proposed future use for each MRA. The SEDR also presented conclusions and recommendations for further actions and formed the basis for the RI planning efforts.

The nine MRAs were consolidated into four groups, according to similar pathway-to-closure characteristics (Figure 2). Group 1 consists of the Parker Flats and Seaside MRAs. Group 2 consists of the California State University at Monterey Bay (CSUMB) Off-Campus and County North MRAs. Group 3 consists of the DRO/Monterey, Laguna Seca Parking, MOUT Site, and Interim Action Ranges MRAs. Group 4 consists of the Future East Garrison MRA. The Interim Action Ranges MRA has been removed from this Group 3 RI/FS report for further evaluation as agreed upon by FORA, the EPA, DTSC, and the Army. The Interim Action Ranges MRA will be presented in a separate RI/FS report.

1.3 Report Organization

This FS report is organized into eight sections as follows:

- **Section 1 – Introduction.** This section describes the purpose and objectives of the FS and presents background information on the Group 3 RI/FS process.
- **Section 2 – Remedial Approach.** This section presents the ongoing and future MEC-related activities that are occurring at the former Fort Ord; the long-term management measures that will be applied to implement and manage the remedial alternatives identified for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs; a summary of the results of the RI and RA and definition of the areas for which remedial alternatives are developed; and the RAOs, potential ARARs, and land use control guidelines that will be considered in the development and analysis of remedial alternatives.
- **Section 3 – Identification of Applicable Response Actions.** This section identifies the range of applicable general response actions for MEC risk management at the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs and a screening of general response actions and process options.
- **Section 4 – Development of Remedial Alternatives.** This section presents long-term management measures specific to implementation and management of the remedial alternatives identified for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, and includes development of remedial alternatives and identification of potential ARARs associated with implementation.
- **Section 5 – Evaluation and Comparison of Remedial Alternatives.** This section presents an evaluation and comparison of remedial alternatives for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs.
- **Section 6 – Identification of Preferred Remedial Alternative.** This section presents and summarizes the preliminary preferred remedial alternative for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs.
- **Section 7 – Approval Process.** This section describes the approval process for documenting the preferred alternative(s) for implementation at the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs in the RI/FS Proposed Plan and ROD.
- **Section 8 – References.** This section provides a list of references for pertinent documents cited in the report.

2.0 REMEDIAL APPROACH

This section describes the general remedial approach applied at the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, including (1) ongoing and future MEC-related activities that are occurring at the former Fort Ord; (2) long-term management measures that will be applied to implement and manage the remedial alternatives identified for the MRAs; (3) a summary of the results of the RI and RA and definition of the areas for which remedial alternatives are developed; and (4) the RAOs, potential ARARs, and land use control guidelines that will be considered in the development and analysis of remedial alternatives.

The RI/FS process as outlined in EPA's Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA ("EPA's RI/FS Guidance"; EPA 1988) represents the methodology that the Superfund program has established for characterizing the nature and extent of risk posed by contaminated sites and for evaluating potential remedial options. This FS was prepared based on the process outlined in the EPA's RI/FS Guidance; however, it was adapted to fit the unique circumstances of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, as described in applicable sections of this volume of the Group 3 RI/FS.

2.1 Ongoing and Future MEC-Related Activities

This section describes ongoing and future MEC-related activities at the former Fort Ord that are components of the ESCA RP and the Army's basewide efforts to promote MEC safety.

2.1.1 Residential Quality Assurance Pilot Study

FORA and the ESCA RP Team have conducted a residential quality assurance (RQA) pilot study within portions of the ESCA parcels. The Group 1 RI/FS Work Plan included an RQA Pilot Study Work Plan, which was presented in Volume II of the Group 1 RI/FS Work Plan (ESCA RP Team 2008b). It is recognized that an MEC removal action may not successfully acquire and recover all MEC at the site. The regulatory agencies have expressed concern regarding the residual risk that remains after MEC removals have taken place, particularly in areas that are specified for residential development (i.e., unrestricted land use). In an effort to satisfy regulatory agency concerns, a QA process was developed that will allow the regulators to assess the previous removal actions and the acceptability of a parcel, where MEC removal was conducted, for residential use. The relevance and usefulness of this RQA process is being tested during the RQA Pilot Study. As of the writing of this Group 3 RI/FS Report, the initial field activities have been completed and the ESCA RP Team is preparing a report to present the results of the RQA Pilot Study, which will further describe the RQA process.

2.1.2 Five-Year Review

A review of the former Fort Ord Superfund site will be conducted within five years after implementation of the identified remedy(s). The purpose of the five-year review is to

determine whether the selected remedies continue to be protective of human health and the environment within a period of five years from the time the remedy was implemented (or from the time of a previous five-year review). The methods, findings, and conclusions of the five-year review are documented in a five-year review report. In addition, the five-year review report documents newly identified site-related data or issues that are identified during the review, and makes recommendations to address them, as appropriate. The next five-year review will occur in 2017.

2.1.3 Administrative Controls

A number of administrative controls were imposed on the ESCA parcels (including the Group 3 MRAs) at the time of early property transfer from the Army to FORA. The administrative controls imposed include land use covenants, city and county ordinances, FORA resolutions, a memorandum of agreement between FORA and the DTSC, habitat-related requirements, and BOs. The applicable administrative controls are described in more detail in Table 2-1. These administrative controls are enforceable and place constraints on field-related activities and future development activities until such time that remediation has been completed and the regulatory agencies have made a determination as to the closure status of the MRA.

2.1.3.1 Deed Clause

The following clause is included in the deeds for transferring any of the ESCA parcels:

"The Grantee is hereby notified that, due to the former use of the Property as a military installation, the Property may contain munitions and explosives of concern (MEC). The term MEC means specific categories of military munitions that may pose unique explosives safety risks and includes: (1) Unexploded Ordnance (UXO), as defined in 10 U.S.C. §101(e)(5); (2) Discarded military munitions (DMM), as defined in 10 U.S.C. §2710(e)(2); or (3) Munitions constituents (e.g., TNT, RDX), as defined in 10 U.S.C. §2710(e)(3), present in high enough concentrations to pose an explosive hazard. For the purposes of the basewide Military Munitions Response Program being conducted for the former Fort Ord and this EPP, MEC does not include small arms ammunition (i.e. ammunition without projectiles containing explosives, other than tracers, that is .50 caliber or smaller, or for shotguns)."

2.1.3.2 Local and State Ordinances

The local jurisdictions have established ordinances to monitor or control intrusive activities in specified areas of the former Fort Ord to manage risks of encountering potential MEC. These ordinances require landowners, or landowner representatives, wishing to conduct intrusive activities on the former Fort Ord to apply for a permit prior to conducting activities that disturb 10 cubic yards or more of soil.

The MOUT Site and Laguna Seca Parking MRAs are wholly contained within the jurisdiction of Monterey County. The DRO/Monterey MRA is contained within the jurisdictional boundaries of the City of Del Rey Oaks and the City of Monterey.

Monterey County has adopted Ordinance No. 5012, amending the County Code to include Chapter 16.10, titled "Digging and Excavation on the Former Fort Ord." The City of Del Rey Oaks adopted Ordinance No. 259 amending the Municipal Code to add Chapter 15.48. The City of Monterey adopted Ordinance No. 3384, amending the Municipal Code to add Chapter 9, Article 8. Prior to any ground-disturbing or intrusive activities, an owner or user of the property within the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs wishing to conduct intrusive activities involving displacement of 10 cubic yards or more of soil must first go through a notification and permitting process per the appropriate jurisdictional ordinances. Once an application for a permit is received by the local jurisdiction, the appropriate jurisdictional office will review the permit to verify the location of the proposed excavation and ensure compliance with the permit procedures and requirements.

2.1.4 MEC Incident Reporting

There is a potential for MEC to be present on the former Fort Ord because military munitions were used throughout the former Fort Ord's history. In the event MEC is discovered by a future user of former Fort Ord land, a process has been developed by the Army for reporting such finds to an appropriate local law enforcement agency. The local law enforcement agency will arrange a response by UXO-qualified personnel, who will promptly be dispatched to dispose of any discovered MEC. This process is documented in the Army's Ordnance and Explosives Site Security Program and must be acknowledged by the future grantee, its successors, or assigns. A Safety Alert pamphlet and the Ordnance and Explosives Incident Reporting Form are provided to the property users. Such responses will be reviewed during subsequent five-year reviews, which assess the ongoing protectiveness of the remedial action.

2.1.5 MEC Recognition and Safety Training

The Army offers MEC recognition and safety training to anyone conducting ground-disturbing activities (e.g., digging holes, excavating trenches, repairing underground utilities, etc.) at the former Fort Ord. The Army or the Army's representative conducts the training session. FORA is currently developing a system to offer this type of training for work conducted on the ESCA parcels. This training includes a lecture on what types of MEC might be found and the procedure to follow if something is found. Trained workers (e.g., construction personnel) will contact an appropriate local law enforcement agency if a potential military munitions item is encountered. The local law enforcement agency will then arrange a response by UXO-qualified personnel. The following organizations have received MEC recognition and safety training from the Army: CSUMB, United States Army Corps of Engineers (USACE) contractors, Pacific Gas & Electric, Pacific Bell, and the Bureau of Land Management.

2.1.6 Community Relations

Community relations activities for work conducted by FORA, including the work conducted in Group 3, are intended to keep communities informed of MEC-related activities at the

former Fort Ord, and to help supporting agencies respond to community concerns. Community relations activities for the ESCA RP are described in the Community Involvement and Outreach Program (CIOP) Plan (ESCA RP Team 2008c) or updated version. The CIOP Plan has been approved by the EPA in consultation with the DTSC and is an addendum to the Army's Community Relations Plan (CRP) Update No. 3 (Army 2006).

The CIOP Plan outlines communication techniques that will be used to keep the affected communities informed throughout the RI/FS process at Group 3. Public participation activities, including fact sheets, public notices, and press releases, will be conducted in accordance with CERCLA.

The following sections summarize the approach outlined for community relations activities in the CIOP Plan that will be used during the RI/FS process.

2.1.6.1 Community Involvement

The CIOP Plan summarizes the community profile surrounding the former Fort Ord as described in the CRP. The community is considered to consist of:

- residents both on the former Fort Ord and in nearby communities
- present business owners, employees, and students on the former Fort Ord property
- elected local representatives and public agencies
- environmental and special interest groups
- students, faculty, and staff at the CSUMB campus
- recreational users including runners, hikers, bikers, and equestrians

Continuing community involvement will be achieved through a combination of communication, participation, and outreach to affected stakeholders. To achieve this, FORA will use newsletters, community involvement workshops, fact sheets, project announcements, public notices, communication through social media, and website updates to provide information about the RI/FS process. In addition, a dedicated phone line has been established for the FORA ESCA RP Team as referenced in the CIOP Plan. Callers are able to obtain project updates and leave messages regarding questions or comments they may have.

2.1.6.2 Community Relations Strategy

Implementation of community relations for the RI/FS focuses on providing information regarding the timeline, reporting, field activities, and scheduling of RI/FS work. As outlined in the CIOP Plan, several objectives for the CIOP apply to the RI/FS. FORA will do the following:

- Provide timely and accurate FORA ESCA RP information

- Provide opportunities for the public for comment and provide input on technical documents
- Be transparent in decision-making processes, and demonstrate respect for all viewpoints
- Meet all regulatory requirements
- Address community concerns in a collaborative fashion

2.1.7 Programs Conducted by the Army

The following additional activities are conducted by the Army as part of their ongoing and future MEC-related activities at the former Fort Ord and are components of the Army's basewide efforts to promote MEC safety because of Fort Ord's history as a military base. The Army's Ordnance and Explosives Site Security Program (Army 2005b) describes many of these efforts.

2.1.7.1 School Education

Since 1997, the former Fort Ord has had a MEC Safety Education Program that is offered to local schools annually. The objective of this program is to provide school-age children with the ability to recognize the visible attributes of various MEC items likely to exist on the former Fort Ord, associate danger with MEC items and former Fort Ord MEC areas, and understand the actions to be taken when a possible item is observed. This program has a three-tiered approach that includes distribution of the Safety Alert to organizations and agencies who provide information to the local community, a one-hour MEC safety presentation for local elementary and middle schools for 5th, 6th, and 7th grade students, and distribution of the Safety Alert to high school students and the parents of children in the local schools. Representatives from the Army conduct the MEC safety presentation.

2.1.7.2 Community Involvement

The Army is committed to developing opportunities to assist community members in understanding and participating in the cleanup decision-making process at the former Fort Ord. The Army holds public meetings, Community Involvement Workshops, Technical Review Committee meetings, open houses, and tours, and conducts public information sessions through booths or tables at local community events. The Army provides public and media tours of former Fort Ord cleanup activities, distributes fact sheets, and makes presentations to special interest and community groups as necessary to address specific community concerns or explain significant cleanup activities. The Army also maintains document repositories available to the public including the administrative record and several information repositories at local libraries. Additionally, the Army administers a public environmental cleanup website and mails monthly cleanup updates. The website provides background information, a description of current activities, documents available for public comment, maps, notices, and agendas for upcoming public meetings. The monthly cleanup update includes information on recent cleanup activities, and recently published documents and fact sheets, and is mailed to those who have requested to be on the community relations

mailing list. It is also distributed at community involvement events. Community involvement activities are documented in the CRP.

2.2 Long-Term Management Measures Specific to the Group 3 MRAs

This section describes the long-term management measures that are specific to the Group 3 MRA reuse areas. These measures will be applied to implement and manage the remedial alternatives identified for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, and as such, are not risk management measures or response actions and are not screened or evaluated for reuse area-specific applicability. These measures will be described in further detail in the Remedial Design/Remedial Action Work Plan (RD/RA WP), or similar document.

2.2.1 Deed Clause

The Army has established a MEC-related clause that (1) informs future property owners that MEC was found and removed at the reuse area; (2) specifies requirements that must be met prior to performing certain activities at the area; (3) specifies that any modifications to these requirements must be approved by the Army and EPA, and be coordinated with DTSC prior to implementation; and (4) outlines appropriate procedures to be followed in the event that MEC is encountered during development or reuse.

2.2.2 Annual Monitoring and Five-Year Review Reporting

FORA or FORA's representative will monitor the Group 3 MRA reuse areas on an annual basis, and collect and report any MEC-related data that may be discovered after transfer of the property. FORA or FORA's successor will report results of the annual monitoring on an annual basis. If MEC is encountered in the area during reuse, (1) MEC incident reporting will be performed; (2) the project team (the Army, EPA, and DTSC) will be notified; and (3) the need for reevaluation of the protectiveness of the area under the current remedy will be assessed by the project team.

CERCLA five-year reviews are conducted as a basewide effort at the former Fort Ord. All remedies at the former Fort Ord are reviewed together, including the remedies identified for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRA reuse areas. The purpose of the five-year review is to determine whether the remedy at a reuse area continues to be protective of human health and the environment (1) within a period of five years from the time the remedy was implemented, or (2) five years from the time of a previous five-year review. The results of annual monitoring and the methods, findings, and conclusions of the five-year review will be documented in a five-year review report, which will identify any recommendations to address them, as appropriate. The next five-year review will occur in 2017.

2.3 Results of Remedial Investigation and Risk Assessment and Definition of Areas for FS Analysis

The following sections present a summary of the results of the RI and RA and provide the definition of the reuse areas for the FS analysis.

2.3.1 Summary of Remedial Investigation Results

The general premise of the RI process is that MEC exists at a site for which an investigation is required to define the nature and extent of the MEC. For the Group 3 MRAs being evaluated in this RI/FS, MEC was known or suspected to be present in these areas and MEC investigations and removal actions were completed by the Army and/or the Army's subcontractors over the majority of the areas according to contractual and/or work plan requirements in place at the time the work was conducted (Volume 1 of this Group 3 RI/FS Report). Therefore, the purpose of the RI in this case was to evaluate the completeness of the previous MEC investigations and/or removal actions conducted by the Army and to verify adequate MEC-related data was available to perform the RA and FS. The RI determined adequate MEC-related data was available to perform the RA and FS for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. The following sections describe the conclusions of the RI specific to each of these MRAs.

2.3.1.1 DRO / Monterey MRA

To facilitate previous MEC investigations and removal actions, the DRO/Monterey MRA was divided into Munitions Response Sites (MRSs). The MRSs were identified through a review of former Fort Ord records completed for the Revised Fort Ord Archive Search Report (USACE 1997a). The MRA is comprised of two non-contiguous portions of MRS-43 and a portion of South Boundary Road, which is located along the southern boundary of MRS-15 DRO.1 (Figures 3 and 4). The boundaries of the two non-contiguous portions of MRS-43 include a large portion of Parcel L6.2 and all of Parcel E29.1 for a combined area of approximately 29 acres (Figure 4). The South Boundary Road portion of the DRO/Monterey MRA includes Parcels L20.13.1.2 and L20.13.3.1 for a total area of approximately 5 acres (Figure 4).

Based on the results of the literature review, investigations, and removal action, the MRA was impacted during military training with the 37 millimeter projectile used prior to World War II. Some of the items found may have the potential to penetrate deeper than the depth of detection. These findings are consistent with the historical use of this MRA as a weapons and troop training area as indicated in the SEDR (ESCA Team 2008a). The removal actions were conducted across the entire MRA with the exception of the westernmost 50 feet (ft) of the MRA (in the habitat reserve area, Parcel L6.2) and the southern side of the road east of Parcel E29.1 (Figure 3). The initial phase of the removal action was conducted using analog instruments to depths of 4 ft below ground surface (bgs). The subsequent phase of the removal action was conducted using digital geophysical equipment to the depth of detection. While the two small portions of the MRA that have not been subjected to removal actions constitute data gaps, they are bounded by one or more of the following: approved Track 1

site, a road, or an area of DRO/Monterey MRA in which few MEC or munitions debris (MD) items were found. In addition, MEC and MD were not found in the SitesStats/GridStats (SS/GS) grids located partially in Parcel L6.2 or near the south side of South Boundary Road east of Parcel 29.1. Therefore, it is expected that finding MEC in either of these two areas would not be likely.

2.3.1.2 Laguna Seca Parking MRA

The vicinity of Laguna Seca Parking MRA was identified as a training area on historical maps for the 1st Brigade and Division Artillery. A review of available documentation indicated the potential presence of 7- and 8-inch naval rounds within the MRA (USACE 1997a). To facilitate previous MEC investigations and removal actions, the MRA was divided into four MRSs. The four MRSs were designated as MRS-14A, MRS-29, MRS-30, and MRS-47 (Figure 5). The MRA encompasses approximately 276 acres and contains the following six USACE property transfer parcels: L20.3.1, L20.3.2, L20.5.1, L20.5.2, L20.5.3, and L20.5.4 (Figure 6).

Removal actions were conducted using analog instruments across the entire MRSs within the MRA. The removal actions were conducted to a depth of 4 ft bgs with a couple of exceptions: along the western and eastern slopes of MRS-14A the removal action was conducted to a depth of 1 ft bgs; and six whole and partial grids in MRS-14A did not receive a removal action due to terrain-related inaccessibility. Based upon the results of the removal action conducted immediately surrounding these grids, it is not anticipated that MEC items would remain in these six grids that could pose a significant risk. Some of the items found in the MRA may have the potential to penetrate deeper than the depth of detection. The majority of MEC and MD encountered are consistent with its documented historical use. Some items encountered in the MRA were likely the result of the area being at the edge of the adjacent historical Impact Area.

2.3.1.3 MOUT Site MRA

The MRA includes two areas: the MOUT training area consisting of Impossible City, which is a mock city training area that is currently used for tactical training of military, federal, and local law enforcement agencies; and a portion of Barloy Canyon Road located along the eastern boundary of the historical impact area (Figure 7). To facilitate previous MEC investigations and removal actions, the MOUT training area was designated as MRS-28 (Figure 7), which corresponds to USACE Parcel F1.7.2 (Figure 8). The Barloy Canyon Road portion of the MRA was designated as USACE Parcel L20.8, and borders a former military training area to the east (MRS-14D) in the southern portion of the parcel and the historical impact area to the west. The northern portion of Parcel L20.8 passes through former training sites (MRS-27O).

A 4-ft grid sampling investigation and a SS/GS sampling investigation were conducted over a small percentage of grids in MRS-28. The recommendation of the After-Action Report for SS/GS and grid sampling investigations were that further site characterization was needed in the northern central and southern portions of MRS-28 to ascertain the extent of MEC

removal operations necessary to support current and future reuse of the property (USA 2001b). A visual surface time-critical removal action (TCRA) was conducted over a large portion of the MOUT Site MRA with the exception of a small area in the southwestern portion of MRS-28 and the southern portion of Barloy Canyon Road along the eastern side of the roadway. No recommendations were made in the TCRA report (Shaw 2005). A site verification survey was performed in the southwestern portion of MRS- 28 where the TCRA was not conducted (Appendix E of Volume 1, Remedial Investigation). A grid sampling investigation and 4-ft removal action were conducted in MRS-14D, adjacent to the southern portion of Barloy Canyon Road to the east (USA 2001a); one sampling grid was located in the roadway Parcel L20.8 within the boundaries of the MOUT Site MRA. Within Parcel L20.8, an approximately 600-ft section of the eastern side of the roadway was not previously investigated (Figure 6-2 of Volume 1); however, this area is not located within an MRS and, based on the removal action reporting, is not likely to have MEC. Therefore, a large portion of the MRA has not undergone a subsurface investigation. The majority of MEC and MD encountered are consistent with the documented historical use. Some items encountered in the MRA were likely the result of the area being within and along the edge of the historical Impact Area.

2.3.2 Summary of Risk Assessment Results

The general premise of the RA process is that MEC exists at a site at concentrations that can be compared to risk-based levels considered protective of human health and the environment. In order to quantify potentially remaining risks, protective risk-based levels are typically translated into site-wide cleanup levels. A range of remedial alternatives are then developed and compared in the FS based on their ability to achieve the site-wide cleanup levels and other RAOs. For MEC sites, quantitative site-wide cleanup levels are not used to assess potentially remaining MEC risks. In this case, a unique Fort Ord Ordnance and Explosives Risk Assessment Protocol ("the Protocol"; Malcolm Pirnie 2002) was developed to estimate potentially remaining MEC risks (overall MEC risk scores) for each receptor expected to be present during development and reuse of an area.

2.3.2.1 DRO / Monterey MRA

Tables 2-2 and 2-3 provide a summary of the reuse receptors and the overall MEC risk results for the after-action analysis of the DRO/Monterey MRA conducted in the RA, presented as Volume 2 of this Group 3 RI/FS Report. The overall risk for each receptor for each MEC hazard type in both reuse areas has been calculated as "A" (lowest risk).

Although the results of the RA calculated the overall MEC risk as "A" (lowest risk) for potential users within the DRO/Monterey MRA, it is recognized that although the detected anomalies may have been removed during the previous removal actions conducted on the DRO/Monterey MRA, the potential exists that some MEC may remain in the subsurface at the MRA. Therefore, the risks associated with intrusive receptors (maintenance workers, construction workers) are assumed to remain at the DRO/Monterey MRA at a level that requires mitigation.

2.3.2.2 Laguna Seca Parking MRA

Tables 2-4 and 2-8 provide a summary of the reuse receptors and the overall MEC risk results for the after-action analysis of the Laguna Seca Parking MRA conducted in the RA, presented as Volume 2 of this Group 3 RI/FS Report. Calculated overall MEC risk scores for surface receptors were "A" (lowest risk) and "B" (low risk) for MRS-47 and "A" (lowest risk) for the other MRSs in the MRA. The overall MEC risk scores for subsurface receptors were "B" (low risk) for MRS-29, "C" (medium risk) for MRS-30, and "D" and "E" (high and highest risk, respectively) for MRS-47 and for the 1-ft and 4-ft removal action areas of MRS-14A.

2.3.2.3 MOUT Site MRA

Tables 2-9 and 2-11 provide a summary of the reuse receptors and the overall MEC risk results for the after-action analysis of the MOUT training area and roadway portions of the MOUT Site MRA, conducted in the RA presented as Volume 2 of this Group 3 RI/FS Report. Calculated overall MEC risk scores for surface receptors were "B" and "C" (low risk and medium risk, respectively) for the MOUT training area and "B" (low risk) for the roadway portion of the MRA. Overall MEC risk scores for subsurface receptors ranged from "B" to "D" (low to high risk) for the MOUT training area and "D" for the roadway portion. .

2.3.3 Assessment and Definition of Areas for FS Analysis

The following sections provide descriptions of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs that are the subject of this FS.

2.3.3.1 DRO / Monterey MRA

The DRO/Monterey MRA is located in the southwestern portion of the former Fort Ord, along South Boundary Road (Figure 1). The DRO/Monterey MRA encompasses approximately 29 acres of undeveloped land and 5.245 acres of a portion of the existing South Boundary Road and associated right-of-way. The DRO/Monterey MRA contains the following four USACE property transfer parcels: E29.1, L6.2, L20.13.1.2, and L20.13.3.1 (Figure 4).

The terrain of the DRO/Monterey MRA is hilly and sloping downward from the southwest to the northeast, while relatively flat closer to and along the roadway. The elevation ranges from approximately 150 to 260 ft mean sea level (msl) with 0 to 30 percent slopes. The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil series present in the DRO/Monterey MRA are Baywood Sand and Arnold-Santa Ynez Complex. Soil conditions at the survey sites are predominantly weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

Vegetation consists primarily of maritime chaparral in the DRO/Monterey MRA (USACE/Jones & Stokes 1992). The area south of South Boundary Road consists of dense brush. The area along South Boundary Road transitions from sparse vegetation adjacent to the roadway to more dense vegetation to the south. A number of investigations and removal actions have been performed at MRS-43 that required vegetation removal. Vegetation removal was performed with both manual and mechanical methods. Past field activities have noted the presence of poison oak in the area.

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property near the DRO/Monterey MRA (HLA 1995). The MRA overlies the Seaside Groundwater Basin, which is structurally complex and divided into several sub-basins. Groundwater is generally encountered at a depth of more than 100 ft bgs; however, layers of perched groundwater may be present. The occurrence of groundwater beneath the MRA is not expected to influence geophysical surveys conducted for MEC remediation activities.

Storm-water drainage from the MRA flows overland to a drainage swale, which runs parallel to South Boundary Road and ultimately flows to the southwest through park district property. The surface water from the site is ultimately discharged to Laguna Del Rey. There are no delineated wetlands reported to be present on the DRO/Monterey MRA. There are two aquatic features (i.e., vernal pools, ponds) located within approximately 100 ft of the MRA.

The Habitat Management Plan (HMP) identifies the DRO/Monterey MRA as development and habitat reserve (USACE 1997b). Habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species.

The Monterey spineflower is a threatened plant species and has been identified as having possible occurrence in the DRO/Monterey MRA.

It is possible the California tiger salamander (CTS) may be found in the DRO/Monterey MRA as the MRA is within the 2-kilometer distance from an aquatic feature that may provide breeding habitat for the CTS.A portion of this MRA is planned for business park/light industrial and office/Research & Development (approximately 28 acres), and another portion of the MRA (approximately 6 acres) is planned for habitat management.

2.3.3.2 Laguna Seca Parking MRA

The Laguna Seca Parking MRA is located in the south-central portion of the former Fort Ord adjacent to the Laguna Seca Raceway (Figure 1). The MRA is bordered by Barloy Canyon Road and the historical Impact Area to the west, South Boundary Road and Laguna Seca Raceway to the south, and additional former Fort Ord property to the east and north. The MRA encompasses approximately 276 acres and contains the following six USACE property transfer parcels: L20.3.1, L20.3.2, L20.5.1, L20.5.2, L20.5.3, and L20.5.4 (Figure 6).

South Boundary Road and Barloy Canyon Road are not usually open to vehicle traffic; however, the roadways are opened to controlled vehicle traffic during events at the Laguna Seca Raceway. There are also several dirt roads and trails throughout the Laguna Seca Parking MRA.

The terrain of the Laguna Seca Parking MRA varies from flat to very steep terrain with slopes ranging from 15 to 50 percent. The elevation ranges from approximately 470 ft msl in the northern portion of the MRA to approximately 950 ft msl in the southern portion of the MRA. The geology includes deposits from the Paso Robles Formation and sand and gravel deposits of the Aromas Formation. Surface soil conditions in the Laguna Seca Parking MRA are predominantly weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

The vegetation of the Laguna Seca Parking MRA consists primarily of grassland and maritime chaparral. Smaller areas of coast live oak woodland, coast live oak savanna, and coastal scrub are also present (USACE/Jones & Stokes 1992). The MRA is characterized as open grassland and dense vegetation. A number of sampling and removal actions have been performed at the Laguna Seca Parking MRA, which required vegetation removal. Vegetation removal has been performed with prescribed burning, and both manual and mechanical methods. During past field activities, the presence of poison oak was noted in the MRA.

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of one monitoring well adjacent to the Laguna Seca Parking MRA (HLA 1995). The Seaside Groundwater Basin is the main hydrogeologic structure that underlies the Laguna Seca Parking MRA. The depth to groundwater is estimated to be greater than 100 ft bgs and is not expected to influence geophysical surveys conducted for MEC remediation activities.

A number of aquatic features (i.e., vernal pools, ponds) are located within 1,600 ft (approximately 500 meters) of the Laguna Seca Parking MRA. Two small ponds are located within parcel L20.5.1, adjacent to Barloy Canyon Road. An additional pond is located in the easternmost portion of L20.3.1 extending beyond the boundary of the MRA. The HMP identifies the Laguna Seca Parking MRA as development with reserve or development with restrictions. This is defined as lands slated for development that contain inholdings of reserve or require specific restrictions to protect biological resources values; management of reserve inholdings must match that for habitat reserves, while management in development areas must proceed with certain specific restrictions identified in the HMP. Nearby natural resource management areas (NRMAs) and habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species. Threatened or endangered plant species identified as having possible occurrence in the Laguna Seca Parking MRA include Monterey gilia (formerly sand gilia; endangered) and Monterey spineflower (threatened). A portion of the Laguna Seca Parking MRA has been designated as critical habitat for the Monterey spineflower by the USFWS. It is possible CTS may be found in the Laguna Seca Parking MRA as the MRA is within the 2-kilometer distance from an aquatic feature that may provide breeding habitat for the CTS.

In the Base Reuse Plan, the Laguna Seca Parking is proposed for open space/recreation. The HMP states that the Laguna Seca Parking MRA would be used for overflow parking during major events at the Laguna Seca raceway located to the south of the MRA and that the Monterey County Parks Department would be responsible for ensuring management requirements for the Laguna Seca Parking MRA are completed. Some existing maritime chaparral would be removed to create areas suitable for parking and that grass will be maintained over these areas to allow for parking. Management requirements for the Laguna Seca Parking MRA will include mowing the grass to minimize fire hazards, constructing a firebreak along the inside perimeter of the Laguna Seca Parking MRA to prevent fires from spreading to the adjacent natural resources management area, and inspecting the ponds within the MRA following events where the MRA is used for parking. No other improvements for the Laguna Seca Parking MRA are planned. The Reuse Plan emphasizes the principles of minimal development and ecological restoration of these lands.

2.3.3.3 MOUT Site MRA

The MOUT Site MRA is located in the central portion of the former Fort Ord within the northeastern portion of the historical Impact Area (Figure 1). The MRA includes two areas: the MOUT training area consisting of Impossible City, a mock city training area that is currently used for tactical training of military, federal, and local law enforcement agencies; and a portion of Barloy Canyon Road located along the eastern boundary of the historical impact area (Figure 8). The MOUT Site MRA encompasses approximately 61 acres and contains the following two USACE property transfer parcels: F1.7.2 and L20.8 (Figure 8).

The terrain of the MOUT Site MRA is characterized as rugged terrain with slopes ranging from 15 to 50 percent. The elevation ranges from approximately 260 ft msl to approximately 420 ft msl in the MOUT training area and from approximately 200 ft msl to approximately 480 ft msl in the Barloy Canyon Road portion of the MRA. The geology includes alluvial fan and flood deposits for the Paso Robles Formation, and sand and gravel deposits of the Aromas Formation. Surface soil conditions in the MOUT Site MRA are predominantly weathered dune sand, which provides a relatively good environment for conducting geophysical surveys, including electromagnetic and magnetic surveys.

The vegetation of the MOUT Site MRA consists primarily of inland coast live oak woodland and grassland with smaller areas of maritime chaparral (USACE/Jones & Stokes 1992). The MRA is characterized by dense vegetation except for the MOUT training area, which is developed with training facilities and buildings. A number of sampling and removal actions have been performed at the MOUT training area that required vegetation removal. Given the terrain, the vegetation removal was performed predominantly through manual practices, although a significant portion of the MRA was burned during an accidental fire that occurred in July 2003. During past field activities, the presence of poison oak was noted in the area.

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property (HLA 1995). The Seaside Groundwater Basin is the main hydrogeologic structure that underlies the MRA. The depth to groundwater is estimated to be greater than 100 ft bgs and is not

expected to influence geophysical surveys conducted for MEC remediation activities. No water supply wells or groundwater monitoring wells are identified in the area.

A number of aquatic features (i.e., vernal pools, ponds) are located within 800 ft (less than 300 meters) of the MOUT training area and the southern end of Barloy Canyon Road.

The HMP identifies the MOUT Site MRA as development. Nearby NRMA and habitat reserve areas support plant and animal species that require implementation of mitigation measures identified in the HMP to ensure compliance with the ESA and to minimize impacts to listed species.

Threatened or endangered plant species identified as having possible occurrence in the MOUT Site MRA include Monterey gilia (formerly sand gilia; endangered) and Monterey spineflower (threatened).

It is possible the CTS may be found in the MOUT Site MRA as the MRA is within the 2-kilometer distance from two aquatic features that may provide breeding habitat for the CTS. One feature was identified as suitable breeding habitat and the other feature was identified as a known CTS breeding site in 2004 (USFWS 2005).

The Base Reuse Plan designation for the MOUT Site MRA is school/university. The MOUT training area portion of the MOUT Site MRA is expected to continue being used as a tactical training area for law enforcement agencies. The Barloy Canyon portion of the MOUT Site MRA is likely to be improved and opened as a transportation corridor.

2.4 Definition of Remedial Action Objectives

The primary RAOs for the Group 3 MRAs are based upon the risk assessment results presented in Volume 2 of this Group 3 RI/FS Report and on EPA's RI/FS Guidance (EPA 1988) to achieve the EPA's threshold criteria of "Overall Protection of Human Health and the Environment" and "Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)."

For the purpose of this RI/FS, the contaminant of concern within the Group 3 MRAs is MEC. The potential for soil contamination from munitions constituents at the former Fort Ord is being addressed under the Army's BRA Program (IT 2001; Shaw/MACTEC 2009). As stated in FOSET 5, based on the BRA Program, no further action has been recommended for HAs within the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs (Army 2007).

The exposure pathway for potential receptors and MEC is direct contact. As described in Volume 2 of this Group 3 RI/FS Report, a risk assessment was performed to describe the qualitative and quantitative factors leading to an encounter between a potential reuse receptor and a MEC item. The RA results are based on the following three key factors that are assigned reuse-specific values and are weighted in importance: (1) MEC hazard type, (2) accessibility, and (3) exposure. These factors were used according to the RA protocol to

develop an overall MEC risk score for each potential receptor at a given reuse area within the Group 3 MRAs. The results were presented in Volume 2 of this Group 3 RI/FS Report.

Based upon the risk assessment and the EPA's RI/FS Guidance, the following RAO was developed for the protection of human health and the environment for the Group 3 MRAs:

- Prevent or reduce the potential for the Group 3 MRA reuse receptors to come in direct contact with MEC items potentially remaining in subsurface soil.

In order to achieve this RAO, the development of alternatives for the Group 3 MRA reuse areas will (1) mitigate potentially remaining MEC risks, and (2) comply with ARARs and other guidelines. A discussion of these components and their consideration in the development of remedial alternatives for the Group 3 MRA reuse areas is presented below.

2.4.1 Potential Applicable or Relevant and Appropriate Requirements

This section presents a general description and analysis of ARARs. Potential federal and state ARARs that may be pertinent to implementation of the remedial alternatives were developed for the Group3 MRAs. For each of the remedial alternatives developed in Section 4.0, their compliance with ARARs are evaluated and compared in Section 5.0.

Section 121 of CERCLA requires that site cleanups comply with federal and state laws that are ARARs. Under CERCLA Section 121(d)(2), the federal ARARs for a remedial action could include requirements under any of the federal environmental laws. State ARARs include promulgated requirements under state environmental or facility siting laws that are more stringent than federal ARARs, and that have been identified in a timely manner, pursuant to 40 Code of Federal Regulations Part 300.400(g)(4). A requirement may be either "applicable" or "relevant and appropriate."

The terms "applicable", "relevant and appropriate", and "to be considered" are defined in the next section.

2.4.1.1 Definition of ARARs

"Applicable" requirements are defined as those cleanup or control standards, or other substantive environmental protection requirements, criteria, or limitations, promulgated under federal or state laws. Applicable requirements are identified on a site-specific basis by determination of whether the jurisdictional prerequisite of a requirement fully addresses the circumstances at the site or the proposed remedial activity. All pertinent jurisdictional prerequisites must be met for the requirement to be applicable. These jurisdictional prerequisites are as follows:

- The party must be subject to the law;
- The substances or activities must fall under the authority of the law;
- The law must be in effect at the time the activities occur;

- The statute or regulation requires, limits, or protects the types of activities; and
- A requirement is applicable if the specific terms (or jurisdictional prerequisites) of the statute or regulation directly addresses the circumstances at the site.

"Relevant and appropriate" requirements refer to those cleanup standards, or other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law, that while not necessarily applicable, address problems or situations sufficiently similar to those encountered at the CERCLA site, and whose use is well suited to the particular site (EPA 1993). The relevance and appropriateness of a requirement can be judged by comparing a number of factors including the characteristics of the remedial action, the items in question, or the physical circumstances of the site, with those addressed in the requirement. If there is sufficient similarity between the requirements and the circumstances at the site, determination of the requirement as relevant and appropriate may be made.

Determining whether a requirement is both relevant and appropriate is a two-step process. First, to determine relevance, a comparison is made between the response action, location, or chemicals covered by the requirement and related conditions at the site, release, or potential remedy. A requirement is relevant if it generally pertains to these conditions. Second, to determine whether the requirement is appropriate, the comparison is further refined by focusing on the nature of the items, the characteristics of the site, the circumstances of the release, and the proposed response action. The requirement is appropriate if, based on such comparison, its use is well suited to the particular site. The facility must comply with the substantive elements of requirements that are determined to be both relevant and appropriate.

"To be considered" requirements, the final class of requirements considered by EPA during the development of ARARs, are non-promulgated advisories or guidance documents issued by federal or state governments. They do not have the status of ARARs, and are not legally binding, but may be considered in determining the necessary cleanup levels or actions to protect human health and the environment.

2.4.1.2 Types of ARARs

In general, ARARs that govern actions at CERCLA sites fall into three broad categories based upon the chemical contamination present, site characteristics, and alternatives proposed for cleanup (EPA 1993). These three categories (chemical-specific, location-specific, and action-specific) are described below.

Chemical-Specific ARARs

Chemical-specific ARARs include those environmental laws and regulations that regulate the release to the environment of materials with certain chemical or physical characteristics or that contain specified chemical compounds. These requirements generally set health or risk-based concentration limits or discharge limits for specific hazardous substances by media. Chemical-specific ARARs are triggered by the specific chemical contaminants found at a particular site. Examples of potential chemical-specific ARARs are effluent limitations, emission limitations, drinking water standards, and hazardous waste characteristics identified for specific chemicals and compounds. A more stringent standard, requirement, criterion, or limitation promulgated pursuant to a state environmental statute and identified in a timely manner is also a potential ARAR.

Location-Specific ARARs

Location-specific ARARs govern activities in certain environmentally sensitive areas. These requirements are triggered by the particular location and the proposed activity at the site. An example of a location-specific ARAR is compliance with the ESA of 1973, as amended, to avoid sensitive ecosystems or habitats. Location-specific ARARs also focus on wetland or floodplain protection areas, or archaeologically significant areas.

Action-Specific ARARs

Action-specific ARARs are restrictions that define acceptable treatment and disposal procedures for hazardous substances. These ARARs generally set performance, design, or other similar action-specific controls or restrictions on particular kinds of activities. An example might be a state Air Quality Management Authority that sets limitations on fugitive dust generated during grading and excavation activities during clearance actions.

2.4.1.3 Application of ARARs at Former Fort Ord

CERCLA Section 121(d) allows the selection of alternatives that will not attain ARAR status if any of six conditions for a waiver of ARARs exists. However, the identified alternative must be protective even if an ARAR is waived. Only five of the conditions for a waiver may apply to a DOD site. The conditions for a waiver are as follows:

- The action selected is only part of a total response action that will attain the required level or standard of control when completed;
- Compliance with the designated requirement at that site will result in greater risk to human health and the environment (e.g., worker safety) than alternative options;
- Compliance with the designated requirement is technically impracticable from an engineering perspective;
- The action selected will result in a standard of performance that is equivalent to an applicable requirement through the use of another method or approach;

- A state requirement has not been equitably applied in similar circumstances on other clearance actions within the state; and
- A fund-financed clearance action does not provide a balance between available monies and the need for protection of human health and the environment at sites where the need is more immediate (not applicable to DOD sites).

In determining whether a requirement is pertinent to MEC at the former Fort Ord, potential ARARs are initially screened for applicability. If determined not to be applicable, the requirement is then reviewed for both relevance and appropriateness. Requirements that are considered to be relevant and appropriate command the same importance as applicable requirements.

2.4.2 Land Use Control Guidelines

Although the Army determined that there were no potential Federal or State ARARs that relate to Land Use Controls (LUCs) at the Group 3 MRAs, LUCs will be implemented in a manner consistent with applicable Federal and State guidance. While the Army does not consider California laws and regulations concerning Land Use Covenants to be potential ARARs, the Army entered into a state Land Use Covenant at the time the property was transferred, and agreed to document the remedy-specific land use restrictions in a Covenant modification after the Group 3 MRA ROD is signed. Although the DTSC and EPA disagree with the Army's determination that California laws and regulations concerning Land Use Covenants are not potential ARARs, they will agree-to-disagree on this issue if the covenant is modified to be consistent with the ROD and modifications are acceptable to the DTSC (EPA 2009). Land Use Covenants signed by the Army and the State of California in the past restricting the reuse of the property were acceptable to the DTSC.

The following guidelines set forth by the EPA, DOD, and DTSC that are relevant to potential land use controls that may be identified for the Group 3 MRA reuse areas will be considered in the development and implementation of remedial alternatives.

As described in the Management Principles for Implementing Response Actions at Closed, Transferring, and Transferred Ranges (DOD/EPA 2000):

- LUCs must be clearly defined, established in conjunction with affected parties, and enforceable.
- LUCs will be considered as part of the development and evaluation of alternatives for a given closed, transferring, or transferred range.
- DOD (the Army) will conduct periodic reviews to ensure the long-term effectiveness of response actions, including LUCs.

In addition, DOD/EPA guidelines specifically address the requirement for institutional controls when MEC has been or may still be on the site as follows:

> "Property transfer records shall detail past munition and explosive contamination and decontamination efforts; provide requisite residual contamination information; and advise the user not to excavate or drill in a residual contamination area without a metal detection survey."

The EPA policy "Institutional Controls and Transfer of Real Property under CERCLA Section 120 (h)(3)(A), (B), or (C)" (EPA 2000a) requires the responsible agency to perform the following activities:

- Monitor the institutional controls' effectiveness and integrity
- Report the results of such monitoring, including notice of violation or failure of control to the appropriate EPA and/or state regulator, local or tribal government, and designated party or entity responsible for enforcement
- Enforce the institutional controls should a violation or failure of controls occur

In addition, the policy states that "in order to ensure long-term protection of human health and safety in the presence of potential explosive hazards, institutional controls must be enforceable against whomever may gain ownership or control of the property in the future."

In 1987, DTSC developed policy recommending the use of land use covenants based on statutory authority in the California Health and Safety Code (Chapters 6.5, 6.8, 6.85) and the California Civil Code, Section 1471, which allows an owner of property to enter into environmental restrictions due to the presence of hazardous materials, hazardous wastes or constituents, or hazardous substances that will remain at the property at levels that are not suitable for unrestricted use of the land. In April 2003, DTSC adopted regulations to add Section 67391.1—Requirements for Land Use Covenants—to Title 22, Division 4.5, Chapter 39, of the California Code of Regulations.

These regulations are imposed by the DTSC and specify that a land use covenant imposing appropriate limitations on land use will be executed and recorded at a county recorder's office so that they will be found during a title search of county records. The land use covenant regulations require DTSC to clearly set forth and define land use limitations or covenants in a remedy selection or response action decision document (for Group 3 MRA reuse areas under CERCLA, the Record of Decision) prior to approving or concurring with a response action. The decision document must also include an implementation and enforcement plan.

Land use covenants are proprietary controls, agreed to by property owners, to allow ongoing use of the property as long as the cleanup remedy is not compromised by current or future development. Land use covenants include written instruments and agreements restricting land uses, easements, servitudes, covenants, and land use restrictions, i.e., they are non-engineering mechanisms to restrict activities and site access to limit exposure pathways of human and environmental receptors to prevent exposure to contaminants. Land use covenants "run with the land", i.e., they are binding on current and subsequent property owners, and remain in effect until they are formally removed or modified,

pursuant to the California Health and Safety Code, sections 25233, 25234, and 25398.7. These regulations certify that DTSC may later modify or terminate land use covenants if it is determined such modification or termination is protective of public health and safety and the environment.

For sites requiring land use covenants, state and federal guidance requires that the property owner enter into a land use covenant agreement to ensure that the state will have authority to implement, monitor, and enforce protective restrictions. Restrictions agreed to in land use covenants are typically intended to do the following:

- Prevent inappropriate land use on or adjacent to property containing residual contamination;
- Guarantee that information about property containing residual contamination is available to local governments and the public;
- Disclose to real estate transaction participants (buyers, sellers, lending institutions, brokers, title companies) that the property in question contains residual contamination;
- Ensure that long-term mitigation measures or monitoring requirements are carried out and maintained;
- Ensure that the integrity and stability of the remedy is maintained;
- Ensure that subsequent property owners or lessees have a duty to assume responsibility for any requirements or restrictions pertaining to residual contamination when they take over the property;
- Ensure that DTSC will be contacted prior to change in land use or the cleanup remedy; and
- Ensure that only DTSC can terminate or modify the remedy (land use covenant per state and federal guidance).

3.0 IDENTIFICATION OF APPLICABLE RESPONSE ACTIONS

Potentially applicable response actions and process options for achieving the RAO are identified and screened in this section according to the EPA guidance (EPA 1988). Technologies that pass this screening are used to develop comprehensive remedial alternatives for the Group 3 MRA reuse areas. Due to the limited number of technologies available for MEC remediation, the general response actions and process options have been combined, rather than presented separately as recommended in the EPA guidance. A preliminary screening of the response actions and process options is conducted in this section based upon effectiveness, implementability, and general costs.

3.1 Description of General Response Actions and Associated Process Options

The following general response actions have been identified to potentially address remaining MEC risks at the Group 3 MRAs:

- No Further Action
- Land Use Controls
- Containment
- Additional MEC Remediation
- Residential Quality Assurance

In addition, process options have been identified for the general response actions. The general response actions and the process options have undergone a preliminary screening based upon effectiveness, implementability, and estimated costs. The results of this screening are presented in Section 3.2. The goal of the preliminary screening process is to eliminate general response actions and process options that clearly do not provide an additional reduction in risk for reuse receptors to contact MEC and/or are not technically implementable based on site conditions or intended future reuse of the MRAs. The general response actions and process options that are retained for further analysis in the preliminary screening are used to develop the remedial alternatives presented in Section 4.0.

3.1.1 No Further Action

This alternative assumes no further action would be taken related to MEC at the reuse areas. The No Further Action Alternative is provided, as required under CERCLA and the National Contingency Plan (NCP), as a baseline for comparison to the other identified remedial alternatives and has been retained for further analysis.

3.1.2 Land Use Controls

LUCs (also referred to as Institutional Controls) are legal and/or physical means of limiting or eliminating potential human exposures from a site. LUCs may be an appropriate alternative if placing controls on, or limits to, property use could prevent or limit exposure to potentially remaining MEC risks, such as in areas where MEC removal actions have already been conducted and the remaining MEC risks are expected to be low for the majority of receptors. Specific examples potentially applicable for the Group 3 MRAs include:

- Access Management Measures
- Deed and/or Zoning Restrictions
- MEC Safety, such as awareness training and construction support

3.1.2.1 Access Management Measures

Access management measures could include (1) maintenance of existing measures at the reuse area, or (2) implementation of additional measures. The Ordnance and Explosives Site Security Program Summary (Army 2005b) provides information about different types of site security measures that may be implemented at the former Fort Ord. For the Group 3 MRA reuse areas, the following access management measures may be applicable:

- **Informational Displays** such as signs, kiosks, or display boards would provide safety information regarding potentially remaining MEC risks in nearby areas. The informational displays would be multi-lingual and posted in areas such that they are within a legible distance.
- **Fencing** would be selected based on land use and potential for residual MEC risks.
- **Security Patrols** may be required and employed by either private or governmental entities to monitor and discourage trespassing into areas potentially containing MEC risks.

3.1.2.2 Deed and/or Zoning Restrictions

Deed and/or zoning restrictions regarding potential MEC risks at a Group 3 MRA reuse area would establish the appropriate restriction that indicates the following:

- Specified reuses evaluated in the RA, that were designated and approved at the time the Army transferred the property to FORA, must be maintained by all property owners.
- Potential MEC risks may significantly increase if changes in the designated and approved reuse are implemented without further evaluation and approval by the regulatory agencies.
- Any modifications to these restrictions must be approved by the Army and EPA, and be coordinated with DTSC prior to implementation.

Specific types of restrictions would vary depending on the reuse area conditions, potential MEC risks, and anticipated future land use. Examples could include restrictions that require the property owner to apply for and obtain a permit from the local jurisdiction prior to excavation of soil or restrictions that prevent residential use of the property. This control would identify who would be responsible for implementation, monitoring, reporting, and enforcement.

3.1.2.3 Residential Use Restriction

The Army agreed to enter into a Land Use Covenant to Restrict the Use of Property (CRUP) with the DTSC at the time of property transfer to FORA prohibiting the Group 3 MRAs from residential reuse. For the purposes of this document, residential reuse includes, but is not limited to, residences, schools, daycare facilities, hospitals, and hospices.

3.1.2.4 MEC Recognition and Safety Training

For the Group 3 MRA reuse areas, digging or underground "intrusive" activities are planned for the proposed reuses and development. Construction personnel involved in intrusive operations at these reuse areas would be required to attend the MEC recognition and safety training to increase their awareness of and ability to identify MEC items. Prior to planned intrusive activities, the landowner would be required to notify FORA or FORA's representatives and provide MEC recognition and safety training for all workers performing intrusive activities.

3.1.2.5 Construction Support

Construction support would be performed by UXO-qualified personnel during any intrusive or ground-disturbing construction activities at Group 3 MRA reuse areas to address potential MEC risks to construction personnel. Construction support would be arranged during the construction planning stages of the project prior to the start of any intrusive activities. The level of construction support will be determined on a case-by-case basis. Two levels of construction support have been identified: on-call construction support and active construction support. For on-call construction support, UXO-qualified personnel must be contacted prior to the start of intrusive activities to ensure their availability, advised about the project, and placed "on call" to assist if suspected MEC are encountered during construction. For active construction support, UXO-qualified personnel must be contacted prior to the start of intrusive activities, advised about the project, and must remain on-site during any such intrusive activities to monitor for MEC items. If evidence of MEC is found during construction support activities, the intrusive and ground-disturbing work will immediately cease, no attempt will be made to disturb, remove, or destroy the MEC, and the local police department will be immediately notified so that appropriate explosive ordnance disposal personnel can be dispatched to address the MEC, as required under applicable laws and regulations. Construction support may be applicable in the short term during development of the reuse area, and/or in the long term during established reuse.

3.1.3 Containment

Containment technologies involve placing a physical barrier over the areas of concern to limit or prevent the direct exposure to MEC items in soil without further removal or treatment, for example, by placing an asphalt cap over the area of concern or importing clean soil and placing a specified thickness of soil across the area of concern. Containment technologies do not offer a reduction in the quantity of MEC items, but instead reduce the remaining MEC risks by eliminating the exposure pathway (direct contact) to certain receptors. Containment technologies require regular inspection and maintenance to ensure that the integrity of the barrier is not compromised over time.

3.1.4 Additional MEC Remediation

Additional MEC Remediation involves locating remaining MEC items within an area, either visually or using MEC detection instruments, and physically removing or destroying the MEC item(s) thereby reducing the remaining MEC risk. Additional MEC Remediation includes the following components:

1) Vegetation clearance involves conducting site preparation procedures to clear vegetation to bare ground or approximately 6 inches above ground surface, if necessary, to allow for proper operation of MEC detection equipment, and to provide the required ground visibility for the safety of MEC workers.
2) MEC remedial action involves using the best available and appropriate detection technology (BAADT) and removal (remedial) technology procedures and Department of DDESB-approved MEC detonation procedures in areas where explosive MEC items are identified during remedial activities and require disposal. A MEC remedial action includes a range of potential components, including technology-aided surface clearance and subsurface clearance to depth. Additional remediation may be performed across an entire area or focused on specific areas of concern based upon previous investigation results and/or the results of the risk assessment. The type of removal action (e.g., surface removal versus subsurface removal) may determine the extent and type of vegetation removal that is necessary.

Descriptions and applicable methods for implementation of the components of additional MEC remediation are described below. If identified for implementation at all or any portion of the Group 3 MRAs, the RD/RA WP would describe the planned vegetation clearance methods and additional MEC removal methodologies. The RD/RA WP would be available for regulatory agency and public review prior to implementation of the fieldwork.

3.1.4.1 Vegetation Clearance

A range of vegetation clearance methods that are potentially applicable at the former Fort Ord were described and evaluated in the Evaluation of Vegetation Clearance Methods Technical Memorandum (Harding ESE 2002). Table 12 of the Vegetation Clearance

Methods Technical Memorandum presents a matrix of vegetation clearance methods that should be retained for further consideration for the range of different plant communities (types of vegetation) found at the former Fort Ord.

The selection of vegetation clearance methods depends on (1) the type of vegetation present, (2) the planned reuse of the site, and (3) the type and extent of the MEC remedial action. The predominant types of vegetation present at the Group 3 MRAs are as follows: DRO/Monterey MRA consists primarily of maritime chaparral; Laguna Seca Parking MRA consists primarily of grassland and maritime chaparral with smaller areas of coast live oak woodland, coast live oak savanna, and coastal scrub; and the MOUT Site MRA consists primarily of inland coast live oak woodland and grassland with smaller areas of maritime chaparral (ESCA RP Team 2008a). For the types of vegetation present at the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, the following subset of vegetation clearance methods may apply depending on the site-specific characteristics and the components of the removal action:

- No action – no vegetation clearance would be required prior to MEC remediation because vegetation that was cleared during the previous removal action has not re-grown to the extent that would prohibit the proper operation of MEC detection equipment, and vegetation at the site would provide the required ground surface visibility for the safety of MEC workers.
- Manual methods – the use of manual equipment by an operator to cut vegetation by hand. Typically, this work is conducted by an operator who is on foot and in the work area being cleared (e.g., using motorized chainsaws, power chippers, mowers, weed eaters, and non-motorized hand tools such as clippers, loppers, pruning shears, and trimmers). This type of vegetation removal is applicable to grassland, but is limited to understory in the coast live oak woodlands, and to 50 acres or less in habitat reserve areas containing maritime chaparral and coastal scrub communities.
- Mechanical methods – the use of mechanical equipment conducted by an operator to cut vegetation using self-propelled equipment in the work area being cleared (e.g., operation of tractor-pulled track carriers with booms or skid-steer equipment fitted with vegetation clearance tools). This type of vegetation removal is applicable to grassland, but is limited to understory in the coast live oak woodlands and to less than 50 acres in habitat reserve areas containing maritime chaparral and coastal scrub communities.
- Prescribed burning – the use of fire under a specific set of conditions to burn vegetation. This type of vegetation removal is applicable to the plant communities found within the Group 3 MRAs, and is the primary method used by the Army in designated maritime chaparral and coastal scrub communities within habitat reserve areas. The major elements of prescribed burning include: preparation of a burn prescription/burn plan outlining the objectives of the burn, burn area, and the range of environmental conditions under which the burn will be conducted; workforce and equipment resources required to ignite, manage, and contain the fire; communication procedures; site preparation, including establishment and maintenance of containment lines; conducting the burn within the range of environmental conditions established in the burn prescription; and follow-up operations to ensure that the fire is fully contained.

Special circumstances apply at the Group 3 MRAs for the following types of reuse areas: (1) habitat reserve areas, and (2) borderlands between habitat reserve areas and development areas. The HMP (USACE 1997b) and modifications to the HMP provided in the Assessment, East Garrison—Parker Flats Land Use Modifications, Fort Ord, California (Zander 2002) present the boundaries of habitat reserve and development areas and describe land use, conservation, management, and habitat monitoring requirements for target species within the Group 3 MRAs. The HMP for the former Fort Ord was prepared in accordance with the USFWS BO and establishes the guidelines for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival (USACE 1997b).

Depending on the type and height of vegetation present, the proposed reuse of the area (or portion thereof) requiring additional MEC remediation, and the extent of the identified MEC remediation, one or more of the vegetation clearance methods described above would be implemented in accordance with guidelines provided in the Vegetation Clearance Technical Memorandum (Harding ESE 2002), HMP (USACE 1997b), and subsequent modifications to the HMP (Zander 2002). It is assumed that some type of vegetation removal will be required if additional MEC remediation is identified as the preferred remedial alternative; the type and extent of the vegetation removal will be evaluated as part of the remedial alternatives development for each of the Group 3 MRAs.

3.1.4.2 Technology-Aided Surface MEC Removal

Technology-aided surface MEC removal utilizes MEC detection instruments to detect and remove MEC present in part or whole on the ground surface. If the MEC detection instruments indicate a response, but the item is not present at or near the ground surface, the investigation does not extend to depth. During a surface removal, qualified personnel mark, identify, and record the approximate locations of all MEC found on the surface for removal or subsequent destruction. Any explosive items identified would be detonated using DDESB-approved MEC detonation procedures. In addition, all MD and other materials interfering with the investigation present at the surface would be collected and stored for later disposal. After MEC removal is conducted, quality control and quality assurance activities are implemented.

3.1.4.3 Subsurface MEC Removal

Subsurface MEC Removal would consist of identifying MEC (conduct a visual search and operate MEC detection equipment to locate subsurface items), and investigating and removing detected MEC items. MD and cultural debris items that are found or detected during the process are also removed, to the extent feasible. The subsurface removal action can be conducted to a specified depth, which would be predetermined prior to beginning the removal activities. Alternatively, the excavations can be conducted to the depth of detection. Subsurface MEC removal depths would be determined based upon (1) the type of MEC, (2) the typical depth at which the type of MEC is found, and (3) the capabilities of the geophysical detection equipment selected as best suited for site conditions. The

RD/RA WP outlining planned MEC removal protocols would be available for regulatory agency and public review.

To the extent possible, digital geophysical surveys would be performed after conducting MEC removals on the surface. Digital mapping would be performed using the BAADT. The BAADT would digitally record and locate anomalies identified during the survey. A map of the anomalies would be generated and anomalies identified during the survey would be digitally reacquired and excavated to depth (the anomalies would be investigated, and MEC removals would be conducted if MEC was found). Any explosive items identified would be detonated using DDESB-approved MEC detonation procedures.

Digital mapping in some areas may not be feasible based on site conditions, such as difficult terrain that prevents equipment access or operation. In these areas other methods of subsurface detection and removal, such as "mag and flag" may be utilized.

Within areas that may be selected for subsurface MEC removal, there may be areas that contain significant amounts of MEC and/or metallic debris that preclude the use of typical methods of removal (e.g., 'mag and dig'). These areas may require large-scale excavations to remove the MEC present in the subsurface. The HMP and associated BOs currently limit the amount of temporary habitat destruction to 75 acres (USACE 1997b; USFWS 1999, 2002, and 2005; Zander 2002). FORA would be required to ensure that habitat and species within any large-scale excavations recover. The impacted areas must be monitored in accordance with the HMP and BOs to determine if the HMP success criteria have been achieved. It may be necessary to conduct active habitat restoration as a corrective action in order to meet the requirements of the HMP. Depending on the size of these large-scale excavations, it may also be necessary to re-initiate formal consultation with the USFWS in accordance with the requirements of the ESA. Based upon the results of previous investigations conducted within the Group 3 MRAs, high concentrations of MEC are not expected. Therefore, large-scale excavations would not be applicable to the Group 3 MRAs.

After the MEC removals are conducted, quality control and quality assurance procedures would be implemented.

3.1.5 Residential Quality Assurance

Any proposal for residential development in the DRO/Monterey, Laguna Seca Parking, or MOUT Site MRAs would be subject to regulatory review. The land use restriction currently in place on the MRAs would remain in effect until 1) the landowner notifies the Army, EPA, and DTSC in writing of its intent to change the designated site use and the location(s) where the residential site use change is proposed, and 2) the EPA and DTSC are satisfied that residential use is appropriate, on the basis of further site evaluation incorporating new information (such as the results of the RQA pilot study) or implementation of the full-scale RQA process.

3.2 Preliminary Screening of General Response Actions and Process Options

In this section, general response actions and process options for the Group 3 MRAs identified above are screened following the EPA guidance (EPA 1988). Options which pass the screening are combined into comprehensive alternatives for remediation of the Group 3 MRAs and are presented in Section 4.0. The Group 3 MRA remedial alternatives are the subject of the detailed analysis presented in Section 5.0.

3.2.1 Methodology for Preliminary Screening

Technologies which pass the initial screening in Section 3.1 are combined into remedial options and are further screened on the basis of effectiveness, implementability, and estimated cost for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. Task 5 of the AOC indicates that the FS evaluation should consider, at a minimum, the following:

- A no-action alternative
- An alternative that reduces or eliminates the hazard, toxicity, mobility, or volume of contaminants that includes treatment
- An alternative that considers land use controls
- An alternative that considers unrestricted use
- Innovative technologies

No innovative technologies that exist as process options were identified during the identification of applicable response actions. Some innovative detection technologies may be applicable as BAADT and would be discussed in the RD/RA WP, Land Use Control Implementation and Operation and Maintenance Plan, or similar document.

3.2.1.1 Effectiveness

Effectiveness is evaluated by the ability to achieve the remedial action objective as follows:

- Prevent or reduce the potential for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRA reuse receptors to come in direct contact with MEC items potentially remaining in surface and subsurface soil.

Short-term and long-term effectiveness are evaluated. The short-term time period is during construction and implementation of remedial activity, while the long-term time period is after the remedial action is complete.

3.2.1.2 Implementability

Implementability considers both technical and administrative feasibility. Technical feasibility considerations may include:

- the availability of necessary services, equipment, and skilled workers to implement a remedial option, and
- required permits.

Remedial options are first screened based on technical feasibility to eliminate those that are clearly ineffective or unworkable in the Group 3 MRAs.

Administrative feasibility considerations may include:

- the ability to obtain permits and approvals from regulatory agencies and other offices;
- the ability to obtain access from property owners or agreement from future landowners; and
- interference of a remedial option with planned future reuse of the MRA.

Administrative feasibility is an important element of implementability, because a technically feasible remedial option may be difficult to implement administratively.

3.2.1.3 Estimated Cost

The estimated cost of an option is evaluated with respect to both capital and operation and maintenance (O&M) requirements. At this stage of analysis, costs are estimated on the basis of engineering judgment. Each option is evaluated as to whether its costs are high, low, or moderate relative to other options. If two options are determined to provide equal benefits, the higher cost option is eliminated from further analysis.

3.2.2 Screening of General Response Actions and Process Options

Each of the remedial technology components identified in Section 3.1 are screened in the following sections based upon the factors identified in Section 3.2.1: effectiveness, implementability, and cost.

3.2.2.1 No Further Action

Effectiveness. No additional risk reduction measures would be implemented under this option and, therefore, the overall MEC risks calculated in the RA would remain the same for each reuse area and receptor. This measure would not be effective at reducing potentially remaining risks at any portion of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs.

Implementability. Since no further action would be conducted, this option would be technically implementable. However, this alternative would require approval from the regulatory agencies which may be difficult to obtain. Therefore, this alternative may not be administratively feasible to implement.

Cost. The cost of no action would be minimal and, therefore, considered low in comparison with other remedial options.

Overall Evaluation. The no further action option is retained for the Group 3 MRAs presented in this report for comparison with other remedial alternatives as required by the NCP.

3.2.2.2 Access Management Measures

Effectiveness. Access management measures, such as fencing and security patrols, may be effective in the short- and long-term at limiting access to the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs or portions of the MRAs. The effectiveness as it applies to each of these Group 3 MRAs is discussed below.

DRO/Monterey MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the DRO/Monterey MRA. The results of the RA, presented in Volume 2 of this RI/FS, calculated an overall MEC risk score of "A" (lowest risk) for both surface and subsurface receptors in both the non-residential development reuse area (including the roadway) and the habitat reserve reuse area of the MRA. The added protection gained by access management measures would be considered minimal for the amount of effort involved.

Laguna Seca Parking MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the Laguna Seca Parking MRA. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores for surface receptors of "A" (lowest risk) and "B" (low risk) for MRS-47 and "A" (lowest risk) for the other MRSs in the MRA. The overall MEC risk score for subsurface receptors was "B" (low risk) for MRS-29, "C" (medium risk) for MRS-30, and "D" and "E" (high and highest risk, respectively) for MRS-47 and for the 1-ft and 4-ft removal action areas of MRS-14A. Implementation of this measure would minimally reduce the potentially remaining risks posed by MEC to surface receptors, though would not reduce the potentially remaining risks to subsurface receptors in the MRA.

MOUT Site MRA: As presented in Volume 1 of this RI/FS, surface removal actions were completed over the majority of the MOUT Site MRA with some limited subsurface investigations. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores of "B" and "C" (low risk and medium risk, respectively) were calculated for surface receptors for the MOUT training area and "B" (low risk) for the roadway portion of the MRA. Overall MEC risk scores for subsurface receptors ranged from "B" to "D" (low to high risk) for the MOUT training area and "D" (high risk) for the roadway portion. Implementation of this measure may be effective at reducing the risks to surface receptors in the MRA, but would not reduce the potentially remaining risks posed by MEC to subsurface receptors in the MRA.

Implementability. The planned reuses for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs include non-residential development and habitat reserve. Restricting access to the Group 3 MRAs with use of a fence would be technically feasible, but not

administratively feasible in the non-residential development areas as this would prohibit access by the future users and interfere with the planned future reuse of portions of the MRAs that are designated for future non-residential development. A fence may be administratively feasible in specific portions of the habitat reserve areas; however, access will still need to be gained by specific personnel (such as biologists in order to perform habitat monitoring activities). If a fence, or other access restriction measure, is implemented on any portion of the Group 3 MRAs, additional measures may be required to allow safe access for the personnel. This could include requiring the persons needing to access the areas be accompanied by UXO-qualified personnel.

Cost. The cost of access management measures would be considered low in comparison with other remedial options.

Overall Evaluation. The overall evaluation for each of the Group 3 DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs is discussed below.

DRO/Monterey MRA: The planned reuse of the DRO/Monterey MRA is for non-residential development (approximately 28 acres) and for a habitat reserve area (approximately 6 acres). Access management measures may interfere with the planned reuse of the non-residential development (including the roadway) portion of the DRO/Monterey MRA and the added protection gained by access management measures would be considered minimal for the amount of effort involved for this MRA. Therefore, access management measures are not retained for further analysis for the DRO/Monterey MRA.

Laguna Seca Parking MRA: The planned reuse of the Laguna Seca Parking MRA is for non-residential development with restrictions (access to be allowed primarily during use of the area as an overflow parking lot during Laguna Seca raceway events). Because additional access management measures may interfere with the planned reuse of the Laguna Seca Parking MRA, additional access management measures have not been retained for further analysis for the Laguna Seca Parking MRA.

MOUT Site MRA: The planned reuse of the MOUT Site MRA is to continue use of the site as a tactical training area for law enforcement personnel, and the Barloy Canyon portion of the MOUT Site MRA is likely to be improved and opened as a transportation corridor. Access to the MOUT Site will be restricted to authorized personnel only and implementation of fencing would likely be redundant to any access restriction measures that will be necessary because of the intended future use of the site. For the Barloy Canyon portion of the MOUT Site MRA, access management measures would interfere with the planned reuse of the area. Therefore, access management measures are not retained for further analysis for the MOUT Site MRA.

3.2.2.3 Deed and/or Zoning Restrictions

Effectiveness. These measures are effective at helping to ensure that the current and future land use is compatible with the agreed-upon land use that was the basis for the risk assessment and selection of the remedial alternative.

Implementability. These measures are already in place for the Group 3 MRAs as described in Section 2.1.2 and, therefore, are considered technically and administratively feasible. The long-term management measures, which were identified in Section 2.2 ensure that these measures will continue by requiring that all property transferred from the former Fort Ord must include deed clauses informing property owners of the history and potential for presence of MEC at properties that were once part of the former Fort Ord. In addition, the local jurisdiction in which the Group 3 MRAs are located have adopted local ordinances, which require a special permit and construction support for any activities conducted at properties within the former Fort Ord that disturb 10 cubic yards or more of soil.

Cost. The cost of deed and/or zoning restrictions would be considered low in comparison with other remedial options.

Overall Evaluation. These types of restrictions are already in place at the Group 3 MRAs. The long-term management measures described in Section 2.2 will be a component of any remedial alternative identified for the Group3 MRAs and would ensure that these types of restrictions continue.

3.2.2.4 Residential Use Restriction

Effectiveness. This measure would effectively eliminate the risk posed to the resident/child user at the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs; however, a residential reuse restriction alone would not reduce the risks to other subsurface receptors, such as construction workers.

Implementability. The Army agreed to enter into a Land Use CRUP with the DTSC at the time of property transfer to FORA prohibiting the Group 3 MRAs from residential reuse. Since this restriction is already in place, it is both technically and administratively feasible. In addition, residential reuse is not planned for any portion of the Group 3 MRAs so this measure would not interfere with any of the planned reuses of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs.

Cost. The cost of a residential use restriction would be considered low in comparison with other remedial options.

Overall Evaluation. This alternative is retained for further analysis as a potentially applicable component of a remedial alternative.

3.2.2.5 MEC Recognition and Safety Training

Effectiveness. This measure is aimed at educating people who may conduct intrusive activities within the former Fort Ord about the potential presence of MEC and thereby increasing their awareness of these items and educating them on the proper procedures to follow should suspected MEC items be encountered during their work. This measure would only be effective for those people that took part in the training.

Implementability. The Army already offers the MEC recognition and safety training as part of their public education program. FORA is currently in the process of setting up a system to offer this type of training. Therefore, this measure is technically and administratively feasible.

Cost. The cost of MEC Recognition and Safety Training would be considered low in comparison with other remedial options.

Overall Evaluation. This measure is retained for further analysis for the Group 3 MRAs as a potentially applicable component of a remedial alternative.

3.2.2.6 Construction Support

Effectiveness. This measure is effective at reducing the risk posed by MEC to construction personnel by requiring UXO-qualified personnel to monitor for MEC during intrusive, soil-disturbing activities that occur within the Group 3 MRAs. Active construction support would be provided during any intrusive or ground-disturbing construction activities at the Group 3 MRA reuse areas. The effectiveness as it applies to the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs is discussed below.

DRO/Monterey MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the DRO/Monterey MRA. The results of the RA, presented in Volume 2 of this RI/FS, calculated an overall MEC risk score of "A" (lowest risk) for both surface and subsurface receptors in both the non-residential development reuse area and the habitat reserve reuse area of the MRA. Uncertainties were noted within the two portions of the DRO/Monterey MRA where removal actions were not conducted. To address these areas, active construction support would be applicable to the DRO/Monterey MRA. UXO-qualified personnel would provide active construction support during soil-disturbing activities to monitor for the presence of MEC.

Laguna Seca Parking MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the Laguna Seca Parking MRA. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores for surface receptors of "A" (lowest risk) and "B" (low risk) for MRS-47 and "A" (lowest risk) for all other areas of the MRA. The overall MEC risk score for subsurface receptors was "B" (low risk) for MRS-29 and "C" (medium risk) for MRS-30. The calculated overall MEC risk scores were "D" and "E" (high and highest risk, respectively) for subsurface

receptors for MRS-47 and for the 1-ft and 4-ft removal action areas of MRS-14A. Uncertainties were noted within the portions of the Laguna Seca Parking MRA where removal actions were not conducted. To address these areas, active construction support would be applicable to the Laguna Seca Parking MRA. UXO-qualified personnel would provide active construction support during soil-disturbing activities to monitor for the presence of MEC.

MOUT Site MRA: As presented in Volume 1 of this RI/FS, surface removal actions were completed over the majority of the MOUT Site MRA with some limited subsurface investigations. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores of "B" and "C" (low risk and medium risk, respectively) were calculated for surface receptors for the MOUT training area and roadway area of the MRA. Overall MEC risk scores for subsurface receptors ranged from "B" to "D" (low to high risk) for the roadway area and the MOUT training area. To address the remaining risks, UXO-qualified personnel would provide active construction support during intrusive activities.

Implementability. The local jurisdictions have adopted local ordinances that require construction support for soil-disturbing activities that occur within the boundaries of the former Fort Ord. This measure is both technically and administratively feasible.

Cost. The cost to implement construction support would be considered low in comparison with other remedial options.

Overall Evaluation. This measure is retained for further analysis for the Group 3 MRAs as a potentially applicable component of a remedial alternative.

3.2.2.7 Containment

Effectiveness. This measure would be effective at reducing risks to the potential reuses by providing a barrier between the receptor and MEC; however, no reduction in the quantity of MEC potentially remaining at the MRA would be achieved. Because this type of response action involves placing a physical barrier over the existing soil surface to eliminate the exposure pathway, the nature of the response would virtually eliminate, or at least greatly disturb, the existing vegetation within the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs.

Implementability. This option would be technically feasible to implement. However, it may be difficult to obtain public acceptance of this option because of the level of disturbance to the existing site conditions required by the implementation. In addition, this measure would virtually eliminate, or at least greatly disturb, the existing vegetation habitat within the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. Since one of the Group 3 MRAs contains a habitat reserve area and one MRA contains an open space/recreation and development with restrictions area, this measure may violate the ESA. Therefore, this alternative is not considered administratively feasible to implement.

Cost. The cost of containment would be high in comparison with other remedial options because of the costs associated with testing and importing the volume of clean fill material that may be required to implement this option.

Overall Evaluation. Because this type of response action involves placing a physical barrier over the existing soil surface to eliminate the exposure pathway, the nature of the response would virtually eliminate, or at least greatly disturb, the existing vegetation within the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. In addition, this measure may violate the ESA in habitat reserve area and/or open space/recreation and development with restrictions area. In addition, because the quantity of MEC would remain within the MRAs, the remaining MEC risks for intrusive receptors (such as construction or maintenance workers) would not be reduced. Therefore, containment technologies have not been retained for further analysis for these three Group 3 MRAs.

3.2.2.8 Technology-Aided Visual Surface MEC Removal

Effectiveness. This measure is effective at reducing the risks by reducing the amount of MEC that may remain on the surface. The effectiveness as it applies to the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs is discussed below.

DRO/Monterey MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the DRO/Monterey MRA. The results of the RA, presented in Volume 2 of this RI/FS, calculated an overall MEC risk score of "A" (lowest risk) for both surface and subsurface receptors in both the non-residential development reuse area and the habitat reserve reuse area of the MRA. The added protection gained by performing a technology-aided visual surface MEC removal in the areas not previously surveyed in the DRO/Monterey MRA would be considered minimal for the amount of effort involved.

Laguna Seca Parking MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the Laguna Seca Parking MRA. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores for surface receptors of "A" (lowest risk) and "B" (low risk) for MRS-47 and "A" (lowest risk) for all other areas of the MRA. The overall MEC risk score for subsurface receptors was "B" (low risk) for MRS-29 and "C" (medium risk) for MRS-30. The calculated overall MEC risk scores were "D" and "E" (high and highest risk, respectively) for subsurface receptors for MRS-47 and for the 1-ft and 4-ft removal action areas of MRS-14A. Implementation of this measure would not reduce the potentially remaining risks posed by MEC to subsurface receptors in MRS-47 and the portions of the MRS-14A where 1-ft and 4-ft removal actions were conducted..

MOUT Site MRA: As presented in Volume 1 of this RI/FS, surface removal actions were completed over the majority of the MOUT Site MRA with some limited subsurface investigations. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores of "B" and "C" (low risk and medium risk, respectively) were calculated for surface receptors for the MOUT training area and roadway area of the

MRA. Overall MEC risk scores for subsurface receptors ranged from "B" to "D" (low to high risk) for the roadway area and the MOUT training area. Implementation of this measure may be effective at reducing the risks to surface receptors in the MRA, but would not reduce the potentially remaining risks posed by MEC to subsurface receptors in the MRA.

Implementability. This type of removal action is technically feasible to implement. Vegetation cutting, removal, and/or burning in habitat reserve areas may be required to conduct the subsurface removal which, depending on the type of vegetation removal necessary, could greatly impact the technical and administrative implementability of this measure.

Cost. The cost of instrument-aided visual surface MEC remediation is expected to be moderate to high compared to other options evaluated.

Overall Evaluation. Although this measure is technically and administratively feasible and would reduce the potentially remaining risks posed by MEC to surface receptors, this measure would not reduce the potentially remaining risks posed by MEC to subsurface receptors within the Group 3 MRAs. Therefore, this measure is not retained for further analysis in any of the Group 3 MRAs.

3.2.2.9 Subsurface MEC Removal

Effectiveness. This measure is effective at reducing the surface and subsurface risks for reuse receptors encountering MEC on the surface and subsurface by reducing the amount of MEC that may remain at the MRAs. Additional measures such as LUCs would likely be required following the completion of the removal activities. The effectiveness as it applies to the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs is discussed below.

DRO/Monterey MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the DRO/Monterey MRA. The results of the RA, presented in Volume 2 of the RI/FS, calculated an overall MEC risk score of "A" (lowest risk) for both surface and subsurface receptors in both the non-residential development reuse area and the habitat reserve reuse area of the MRA. The added protection gained by performing a subsurface MEC removal in the DRO/Monterey MRA would be considered minimal for the amount of effort involved.

Laguna Seca Parking MRA: As presented in Volume 1 of this RI/FS, removal actions were completed over the majority of the Laguna Seca Parking MRA. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores for surface receptors of "A" (lowest risk) and "B" (low risk) for MRS-47 and "A" (lowest risk) for all other areas of the MRA. The overall MEC risk score for subsurface receptors was "B" (low risk) for MRS-29 and "C" (medium risk) for MRS-30. The calculated overall MEC risk scores were "D" and "E" (high and highest risk, respectively) for subsurface receptors for MRS-47 and for the 1-ft and 4-ft removal action areas of MRS-14A. Implementation of this measure may be effective at reducing the potentially remaining

risks to subsurface receptors posed by MEC in MRS-47 and the portion of the MRS-14A where 1-ft and 4-ft removal actions were conducted.

MOUT Site MRA: As presented in Volume 1 of this RI/FS, surface removal actions were completed over the majority of the MOUT Site MRA with some limited subsurface investigations. The results of the RA, presented in Volume 2 of this RI/FS, calculated overall MEC risk scores of "B" and "C" (low risk and medium risk, respectively) were calculated for surface receptors for the MOUT training area and roadway area of the MRA. Overall MEC risk scores for subsurface receptors ranged from "B" to "D" (low to high risk) for the roadway area and the MOUT training area. Implementation of this measure may be effective at reducing the risks to surface and subsurface receptors in the MRA.

Implementability. This type of removal action is technically feasible to implement using typical methods of removal (e.g., mag and dig). Based upon the results of previous investigations conducted within the Group 3 MRAs, high concentrations of MEC are not expected. Therefore, large-scale excavations would not be applicable to the Group 3 MRAs. Vegetation cutting, removal, and/or burning in habitat reserve areas may be required to conduct the subsurface removal, which, depending on the type of vegetation removal necessary, could greatly impact the technical and administrative implementability of this measure.

Cost. The cost of subsurface MEC Remediation is expected to be high to very high compared to other options evaluated.

Overall Evaluation. This measure is retained for further analysis as an alternative that reduces MEC risks through reduction of volume of potentially remaining MEC at the Group 3 MRAs in accordance with the AOC through the use of typical methods of removal (e.g., mag and dig). Based upon the results of previous investigations conducted within the Group 3 MRAs, high concentrations of MEC are not expected. Therefore, large-scale excavations would not be applicable to the Group 3 MRAs. This measure may be implemented in all or a portion of the Group 3 MRAs.

3.2.2.10 Residential Quality Assurance

Effectiveness. It is anticipated that the outcome of the RQA Pilot Study would yield a process to allow for unrestricted use of an MRA, once the process has been completed on the MRA.

Implementability. This measure is technically and administratively feasible.

Cost. The cost to implement this measure is expected to be moderate to high, depending on the levels (phases) of RQA demanded by site conditions.

Overall Evaluation. Although this option may allow for unrestricted use of a MRA, no portion of the Group 3 MRAs are currently planned for residential reuse. This measure is not retained for further analysis for any of the Group 3 MRAs.

[this page was intentionally left blank]

4.0 DEVELOPMENT OF REMEDIAL ALTERNATIVES

Based upon the options retained for further analysis for the Group 3 DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs from Section 3.0, the following remedial alternatives were developed for detailed analysis in these three Group 3 MRAs.

4.1 Alternative 1 – No Further Action

This alternative is carried forward for further analysis for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. This alternative assumes no further action would be taken to address potential MEC risks for those receptors identified in the RA. This alternative is provided as a baseline for comparison to the other remedial alternatives, as required under CERCLA and the NCP.

4.2 Alternative 2 – Land Use Controls

This alternative has been developed for further analysis in the DRO/Monterey, the Laguna Seca Parking, and the MOUT Site MRAs. This alternative assumes that LUCs without additional MEC remediation on any portion of the site would be implemented to address potential MEC risks for intrusive reuse. The LUCs alternative consists of MEC recognition and safety training, construction support, and continuation of the existing residential use restriction.

4.3 Alternative 3 – Additional Subsurface MEC Remediation

This alternative has been developed for further analysis in the three Group 3 MRAs. This alternative assumes that subsurface MEC remediation would be conducted throughout the entire footprints of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. This alternative includes implementing the appropriate type of vegetation clearance in the MRA, if necessary, and the implementation of additional MEC remediation. Within the three Group 3 MRAs, significant amounts of MEC and/or metallic debris that preclude the use of typical methods of removal (e.g., ‘mag and dig’) would not be expected because the majority of the MRAs have undergone previous removal actions. For the portions of the Group 3 MRAs designated for development, vegetation removal would be accomplished using mechanical methods. For the portions of the Group 3 MRAs designated for habitat reserve, vegetation removal would be accomplished using prescribed burning techniques, to the extent feasible. The general vegetation removal and subsurface MEC remediation techniques were described in Section 3.1.4. Additional subsurface MEC remediation would involve detection and removal of subsurface MEC to the depth of detection using BAADT and DDESB-approved MEC detonation procedures in areas where explosive MEC items are identified during remedial activities and require disposal. The specific details of the vegetation clearance methods and the MEC detection equipment used would be presented in the RD/RA WP, or similar document.

4.4 Alternative 4 – Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

This alternative has been developed for further analysis in the DRO/Monterey and MOUT Site MRAs. Within the MRAs, this alternative would consist of implementation of the LUCs described in Alternative 2 plus performing subsurface MEC remediation within selected areas of the MRAs to address specific risk and/or reuse needs. These areas would be candidates for subsurface MEC removals.

The DRO/Monterey MRA has two areas where no removal activities have taken place. These areas include a 50-ft strip of land on the northwestern edge of Parcel L6.2 and the southern side of South Boundary Road east of Parcel E29.1 (Figure 3). The results of removal actions performed around the 50-ft strip resulted in the recovery of few MEC and MD items. It is expected that finding MEC in this area would not be very likely. The area along South Boundary Road was identified for MEC remediation as part of this alternative. This area is comprised of bar ditches that run along both sides of South Boundary Road in Parcel L20.13.3.1, totaling approximately 5 acres. The area extends from the roadway pavement to the northern and southern boundary line of Parcel L20.13.3.1. Additional MEC remediation in this selected area would include brush cutting, surface MEC removal, fence removal, and subsurface MEC clearance using BAADT.

The MOUT Site MRA has undergone removal actions across both portions of the MRA except the southern portion of Barloy Canyon Road along the east side in Parcel L20.8. Given the accessibility of the area along Barloy Canyon Road to receptors, the area has been identified for MEC remediation as part of this alternative. The selected area in the MOUT Site MRA includes the bar ditch along the west side of Barloy Canyon Road, for the entire length of Parcel L20.8. The area is approximately 2.3 acres in size and extends from the west edge of the road to the western parcel boundary line. Additional MEC remediation in this selected area would include brush cutting, fence removal, subsurface MEC clearance using BAADT, and fence replacement.

Under this alternative, workers conducting surface-only activities would be provided MEC recognition and safety training. Intrusive activities would be conducted with construction support by UXO-qualified personnel, and MEC recognition and safety training would be provided for workers conducting intrusive activities.

5.0 EVALUATION AND COMPARISON OF REMEDIAL ALTERNATIVES

This section presents the evaluation and comparison of remedial alternatives that would provide mitigation of potentially remaining MEC risks for potential receptors assumed to reuse the areas of the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs. The evaluation is conducted based on the nine CERCLA evaluation criteria specified in the EPA's RI/FS Guidance (EPA 1988) and is summarized in Tables 5-1 through 5-3 for the DRO/Monterey, Laguna Seca Parking, and MOUT Site MRAs, respectively. Long-term management measures (deed clause, annual monitoring, and five-year review reporting) would be implemented to (1) warn property owners of potential MEC risks associated with intrusive activities, (2) monitor and report any MEC-related data during development or reuse, and (3) assess and manage information regarding the continued protectiveness of these alternatives over time.

The nine CERCLA evaluation criteria specified in the EPA's RI/FS Guidance are described in further detail as follows:

Threshold Criteria

1) *Overall Protection of Human Health and the Environment* – An alternative must eliminate, reduce, or control threats to public health and the environment through treatment or institutional controls.
2) *Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)* – The alternative must meet Federal and State environmental statutes, regulations, and other requirements that pertain to the site or area unless a waiver is justified.

Balancing Criteria

1) *Long-Term Effectiveness and Permanence* – Considers the ability of an alternative to maintain protection of human health and the environment over time.
2) *Reduction of Toxicity, Mobility, or Volume Through Treatment* – Evaluates the alternative's use of treatment (for which there is a statutory preference) to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
3) *Short-Term Effectiveness* – Considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
4) *Implementability* – Considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services. Technical feasibility considerations include the availability of services, necessary equipment, and skilled workers to implement a particular alternative. Administrative feasibility includes obtaining necessary permits and regulatory approvals for implementation of the alternative.
5) *Cost* – Capital and long-term management (LTM) costs are estimated for each alternative based on quotes for labor, materials, and equipment necessary to implement the alternative. For annual LTM costs, the net present value (NPV) is

calculated over the expected period of years it will take to implement the alternative based on real discount rates (similar to interest rates) that vary according to the period of performance for federal projects. For those alternatives whose life-cycle is indeterminate or exceeds 30 years, for the purposes of evaluating and comparing alternatives as specified in EPA's RI/FS Guidance (EPA 1988), a period of 30 years is used for estimating LTM costs. The USACE and EPA provide guidelines for estimating remedial alternative costs in Office of Solid Waste and Emergency Response (OSWER) Directive 9355.0-75 (EPA 2000b). The guidelines are applied to cost estimates based upon experience at the former Fort Ord and engineering judgment. These cost estimates are intended to have an accuracy of +50% or -30%.

Modifying Criteria

1) *State Acceptance* – Evaluates technical and administrative issues and concerns that the state may have regarding each alternative. State acceptance will be addressed in the Group 3 MRA ROD once comments on the RI/FS Report and Proposed Plan have been received (EPA 1988).

2) *Community Acceptance* – Evaluates issues and concerns that the public may have regarding each alternative. Community acceptance will be addressed in the Group 3 MRA ROD once comments on the RI/FS Report and Proposed Plan have been received (EPA 1988).

The following sections present the evaluation of remedial alternatives for each of the Group 3 MRAs based on each of the nine CERCLA evaluation criteria described above.

5.1 Evaluation of Remedial Alternatives for DRO / Monterey MRA

This section presents the evaluation of remedial alternatives developed for the DRO/Monterey MRA. The alternatives identified for the DRO/Monterey MRA include:

Alternative 1: No Further Action

Alternative 2: Land Use Controls

Alternative 3: Additional MEC Remediation

Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

5.1.1 Overall Protection of Human Health and the Environment

MEC removal actions were conducted to depth across the majority of the DRO/Monterey MRA. The Overall MEC risk score was calculated as "A" (lowest risk) for identified reuse receptors expected in the MRA. MEC is not expected to remain in the majority of the DRO/Monterey MRA.

Alternative 1 (No Further Action): This alternative would not be protective of human health for the receptors expected in the MRA. Although MEC removals have been conducted over the majority of the area, current MEC-detection technologies do not have a 100% detection efficiency and detection efficiencies decrease with depth. There is a possibility that MEC remains in the subsurface and would potentially pose unacceptable risks to those workers performing intrusive activities during development or reuse of the area.

Alternative 2 (Land Use Controls): This alternative would be protective of human health for the construction and maintenance workers who are to conduct intrusive activities. These receptors performing intrusive activities during or after development would be protected under this alternative because the landowner will be required to (1) provide notice of planned intrusive activities, and arrange for and provide MEC recognition and safety training to construction personnel prior to the start of intrusive work, and (2) coordinate and arrange for construction support by UXO-qualified personnel during any construction that involves intrusive activities. This alternative prohibits use of the DRO/Monterey MRA for residential reuse.

Alternative 3 (Additional MEC Remediation): This alternative may offer some additional protection of human health for the receptors during development or reuse of the area. The DRO/Monterey MRA has had a removal action conducted over the majority of the MRA. This alternative assumes there is MEC remaining in the subsurface that could pose a risk to receptors. Because current MEC-detection technologies do not have a 100% detection efficiency, this alternative is not expected to provide a significant increase in the protection of human health because these areas may require additional risk mitigation measures (e.g., LUCs) following the completion of the additional remediation to protect human health for those receptors that would perform intrusive activities during development and reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use controls): This alternative would be protective of human health for the construction and maintenance workers who are to conduct intrusive activities. These receptors performing intrusive activities during or after development would be protected under this alternative because the landowner will be required to (1) provide notice of planned intrusive activities, and arrange for and provide MEC recognition and safety training to construction personnel prior to the start of intrusive work, and (2) coordinate and arrange for construction support by UXO-qualified personnel during construction that involves intrusive activities. This alternative may reduce the explosive risks potentially remaining within the selected area if MEC is discovered and removed. This alternative would also result in manageable impacts to the natural resources found within the DRO/Monterey MRA. This alternative prohibits use of the DRO/Monterey MRA for residential reuse.

Alternatives 1 and 2 provide protection of the environment at the DRO/Monterey MRA; however, because approximately 6 acres of the DRO/Monterey MRA are designated for habitat reserve, Alternative 3 may impact sensitive species in the area due to the required vegetation removal in the habitat reserve portion of the MRA. Alternative 4 requires vegetation removal, though this would not be conducted within the habitat reserve area.

5.1.2 Compliance with ARARs

Alternative 1 (No Further Action): There are no ARARs that apply to implementation of this alternative.

Alternative 2 (Land Use Controls): The CRUP for residential use restriction would continue to be implemented in accordance with the state and federal guidance. No ARARs were identified that apply to implementation of this alternative.

Alternative 3 (Additional MEC Remediation): This alternative could be implemented in compliance with the ARARs listed in Table A-1 included in Appendix A of this report.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use controls): This alternative would be implemented in compliance with the ARARs listed in Table A-2 in Appendix A of this report. Because removal actions would be conducted within small areas of the DRO/Monterey MRA, the vegetation removal could be conducted using manual methods (with proper safety precautions implemented to protect the safety of the workers) and still maintain compliance with the HMP and ESA. This alternative would have some impacts to the natural resources on the MRA since excavation would be required of the soil within the selected area but could still be implemented in accordance with the ARARs identified in Table A-2.

Although the Army determined that there were no potential Federal or State ARARs that relate to LUCs at the DRO/Monterey MRA, LUCs will be implemented in a manner consistent with the applicable Federal and State guidance. While the Army does not consider California laws and regulations concerning Land Use Covenants to be potential ARARs, the Army entered into a State CRUP at the time the property was transferred, and after the Group 3 ROD is signed, the existing covenant will be modified, if appropriate, to document the land use restrictions included in the identified remedy. Although DTSC and EPA disagree with the Army's determination that California laws and regulations concerning Land Use Covenants are not potential ARARs, they will agree-to-disagree on this issue since the Army executed the State CRUP and agrees that it will be modified, if appropriate, to be consistent with the identified remedy, in a manner acceptable to DTSC (EPA 2009).

5.1.3 Short-Term Effectiveness (During Development)

This criterion considers the impact of an alternative in the short term. For the DRO/Monterey MRA, the short term is considered the period during implementation of additional MEC remediation and/or the period of initial site development during which construction activities and mass soil grading activities are expected to occur on the development portion of the MRA.

Alternative 1 (No Further Action): This alternative would not be effective in the short term because no further action would be taken to mitigate potentially remaining MEC risks to workers who are to conduct intrusive activities.

Alternative 2 (Land Use Controls): This alternative would be effective in the short term because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction workers who are to conduct intrusive activities during development within the development portion of the DRO/Monterey MRA. This alternative would prohibit the reuse of the DRO/Monterey MRA for residential reuse in the short and long term.

Alternative 3 (Additional MEC Remediation): This alternative may be effective in the short term because MEC removals would be conducted.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would be effective in the short term because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction workers who are to conduct intrusive activities during development within the MRA. This alternative would prohibit the reuse of the DRO/Monterey MRA for residential reuse in the short and long term.

5.1.4 Long-Term Effectiveness and Permanence

This criterion examines the impact of an alternative in the long term. For the DRO/Monterey MRA, the long term is considered the period following the implementation of additional MEC remediation and/or the period following initial site development during which construction activities and mass soil grading activities are expected to be completed. It is anticipated that construction and maintenance workers would be present to conduct occasional inspection and maintenance of roads, utilities, trails, and any other infrastructure located in the MRA.

Alternative 1 (No Further Action): This alternative would not provide long-term effectiveness or permanence because no further action would be taken to mitigate potentially remaining MEC risks to receptors who are to conduct intrusive activities during long-term reuse.

Alternative 2 (Land Use Controls): This alternative would provide long-term effectiveness and permanence for receptors because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during long-term reuse and would be maintained until further evaluation determined the LUCs were no longer necessary. This alternative would prohibit the reuse of the DRO/Monterey MRA for residential reuse in the long term.

Alternative 3 (Additional MEC Remediation): It is unknown whether this alternative would provide long-term effectiveness or permanence because after additional MEC remediation is completed, these areas may require additional risk mitigation measures (e.g., LUCs) to protect receptors conducting intrusive activities during long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative may provide long-term effectiveness and permanence for receptors if the removal action in the selected area reduces the potentially remaining MEC risks. LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate the potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during long-term reuse and would be maintained until further evaluation determined the LUCs were no longer necessary. This alternative would prohibit the reuse of the DRO/Monterey MRA for residential reuse in the long term.

5.1.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

This Group 3 RI/FS Report addresses only the physical hazards to humans from MEC. The chemical hazards have been addressed under the BRA program (Shaw/MACTEC 2009). MEC-related field sampling and removal activities were completed at the DRO/Monterey MRA by the Army's Munitions Response contractors according to contractual and/or work plan requirements in place at the time the work was conducted. Therefore, it is expected that the volume of MEC potentially remaining in the subsurface has been reduced by completion of these past sampling and removal actions.

Alternative 1 (No Further Action): This alternative would not reduce the volume of MEC potentially remaining in the subsurface because no further action would be taken to mitigate potentially remaining MEC risks.

Alternative 2 (Land Use Controls): This alternative would not reduce the volume of MEC potentially remaining in the subsurface because it does not include removal of MEC from the MRA.

Alternative 3 (Additional MEC Remediation): This alternative would result in varying levels of reduction of the volume of MEC potentially remaining in the subsurface depending on the amount of MEC, if any, discovered and removed during additional MEC remediation.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would result in varying levels of reduction of the volume of MEC potentially remaining in the subsurface within the selected area depending on the amount of MEC, if any, discovered and removed during the removal action.

5.1.6 Implementability

Alternative 1 (No Further Action): It is anticipated that this alternative would not be administratively feasible to implement because the necessary approvals from the regulatory agencies to take no further action are not expected to be obtainable. This alternative would be technically feasible to implement, since it requires taking no further action.

Alternative 2 (Land Use Controls): This alternative would be administratively feasible to implement. The necessary approvals to implement and manage the LUCs (MEC recognition and safety training, construction support, and residential use restrictions) are expected to be obtained. This alternative would require a moderate level of effort to implement from a technical perspective during development and reuse. LUCs require coordination prior to the start of intrusive work to (1) provide MEC recognition and safety training to all construction personnel performing intrusive activities and refresher training on an ongoing basis as appropriate, and (2) mobilize UXO-qualified personnel to provide monitoring during intrusive construction activities.

Alternative 3 (Additional MEC Remediation): This alternative would be administratively feasible to implement, because the necessary approvals to implement additional MEC remediation could be obtained. The necessary services, equipment, and skilled workers to implement this alternative are readily available. This alternative would require a high level of effort to implement from a technical perspective, because (1) it may require additional vegetation clearance, and (2) involves UXO-qualified personnel teams conducting MEC removals, managing, and reporting MEC-related data. After additional MEC remediation is completed, these areas are likely to require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would be administratively feasible to implement, because the necessary approvals to implement additional MEC remediation and the LUCs could be obtained. The necessary services, equipment, and skilled workers to implement this alternative are readily available. This alternative would require a high level of effort to implement from a technical perspective, because (1) it will require additional vegetation clearance within the non-completed areas, and (2) involves UXO-qualified personnel teams conducting MEC removals, managing, and reporting MEC-related data.

5.1.7 Cost

Capital and LTM costs are estimated for each alternative based on quotes for labor, materials, and equipment necessary to implement the alternative. For LTM costs, the NPV is calculated over the expected period of years it will take to implement the alternative based on real discount rates (similar to interest rates) that vary according to the period of performance for federal projects. The USACE and EPA provide guidelines for estimating remedial alternative costs in OSWER Directive 9355.0-75 (EPA 2000b). These cost estimates are intended to have an accuracy of +50% or -30%. A period of 30 years is used for estimating LTM costs for alternatives with indeterminate or 30+ year periods of performance, for the purposes of evaluating and comparing alternatives as specified in EPA's RI/FS Guidance (EPA 1988).

Cost estimating assumptions, unit costs, and real discount rates (that vary according to the period of performance) that are associated with implementation of the remedial alternatives are provided in Tables 5-4 through 5-7.

Long-term management measures (deed clause, annual monitoring, and five-year review reporting) will be implemented for the DRO/Monterey MRA as implementation and management aspects of the identified remedial alternatives. The costs associated with implementing these measures for the DRO/Monterey MRA over a period of 30 years is approximately $210,000 as summarized in Table 5-4.

Alternative 1 (No Further Action): There are minimal costs associated with implementation of this alternative. No cost tables have been prepared.

Alternative 2 (Land Use Controls): The costs associated with implementing this alternative are summarized in Table 5-5 for the DRO/Monterey MRA. The total cost is estimated to be $757,000.

Alternative 3 (Additional MEC Remediation): The costs associated with implementing this alternative for the DRO/Monterey MRA are summarized in Table 5-6. The cost is estimated to be approximately $1,045,000. Costs for this alternative may be higher than can be estimated at this time because these areas may require additional risk mitigation measures (e.g., LUCs) to protect human health during development and long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): The costs associated with implementing this alternative for the DRO/Monterey MRA are summarized in Table 5-7. The cost is estimated to be approximately $983,000.

5.1.8 State Acceptance

The anticipated acceptability by the state of each alternative is presented below; however, state acceptance of the preferred remedial alternative will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

Alternative 1 (No Further Action): This alternative is not likely to be acceptable to the regulatory agencies because it does not take action to mitigate potentially remaining MEC risks to workers who are to conduct intrusive activities during the planned development and reuse of these areas.

Alternative 2 (Land Use Controls): This alternative is likely to be acceptable to the regulatory agencies. It takes action both in the short and long term to mitigate potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during the planned development and reuse of these areas.

Alternative 3 (Additional MEC Remediation): This alternative would likely be acceptable to the regulatory agencies. This alternative takes action to attempt to mitigate potentially remaining MEC risks to receptors who are to conduct intrusive activities during the planned development and reuse of the MRA. After additional MEC remediation is completed, these areas are likely to continue to require additional risk mitigation measures (e.g., LUCs) to protect human health during development and long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would likely be acceptable to the regulatory agencies. This alternative takes action to attempt to mitigate potentially remaining MEC risks to receptors that are to conduct intrusive activities during the planned development and reuse of the MRA.

5.1.9 Community Acceptance

The anticipated acceptability by the community of each alternative is presented below; however, community acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

Alternative 1 (No Further Action): This alternative is not likely to be acceptable to the community because it does not take action to mitigate potentially remaining MEC risks during the planned development and reuse of these areas.

Alternative 2 (Land Use Controls): This alternative may be acceptable to the community. It takes action both in the short and long term to mitigate potentially remaining MEC risks to users who may conduct intrusive activities during the planned development and reuse of these areas.

Alternative 3 (Additional MEC Remediation): It is unknown at this time whether the vegetation disturbance and removal required to implement this alternative would be acceptable to the community.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative may be acceptable to the community. It takes action both in the short and long term to mitigate potentially remaining MEC risks to users who may conduct intrusive activities during the planned development and reuse of the MRA. It is unknown at this time whether the vegetation disturbance and removal required to implement this alternative would be acceptable to the community.

5.1.10 Overall Evaluation

Alternative 1 (No Further Action): Although this alternative is technically implementable and there are minimal costs associated with this alterative, this alternative does not take action to mitigate potentially remaining MEC risks during the planned development and reuse of the DRO/Monterey MRA. As a result, this alternative is not protective of human health and the environment in the short or long term, and does not meet the RAO identified for the Group 3 MRAs.

Alternative 2 (Land Use Controls): This alternative is technically and administratively feasible to implement and has an estimated implementation cost of $757,000. This alternative is protective of human health and the environment in the short and long term and does meet the RAO by reducing the potential for reuse receptors to come in contact with MEC.

Alternative 3 (Additional MEC Remediation): This alternative is technically and administratively feasible to implement. The costs associated with implementing this alternative are estimated to be $1,045,000. This alternative may be protective of human health and the environment in the short and long term; may reduce the volume of MEC potentially remaining in the subsurface if additional MEC is encountered; and does meet the RAO by potentially reducing the volume of MEC in the subsurface, thereby reducing the potential for a user to encounter MEC. However, this alternative may require additional risk reduction measures (e.g., LUCs) following completion of the additional MEC remediation.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative is technically and administratively feasible to implement and has an estimated implementation cost of $983,000. This alternative is protective of human health and the environment in the short and long term and does meet the RAO by reducing the potential for reuse receptors to come in contact with MEC.

5.2 Evaluation of Remedial Alternatives for Laguna Seca Parking MRA

This section presents the evaluation of remedial alternatives developed for the Laguna Seca Parking MRA. The alternatives identified for the Laguna Seca Parking MRA include:

Alternative 1: No Further Action

Alternative 2: Land Use Controls

Alternative 3: Additional MEC Remediation

5.2.1 Overall Protection of Human Health and the Environment

MEC removal actions were conducted to depth across the majority of the Laguna Seca Parking MRA. The Overall MEC risk scores for surface receptors were calculated as “A” (lowest risk) and “B” (low risk) for MRS-47 and “A” (lowest risk) for the other MRSs in the MRA. The overall MEC risk score for subsurface receptors was “B” (low risk) for MRS-29, “C” (medium risk) for MRS-30, and “D” and “E” (high and highest risk, respectively) for MRS-47 and for the 1-ft and 4-ft removal action areas of MRS-14A..

Alternative 1 (No Further Action): This alternative would not be protective of human health for the receptors expected in the MRA. Although MEC removals have been conducted over the majority of the area, current MEC-detection technologies do not have a 100% detection efficiency and detection efficiencies decrease with depth. There is a possibility that MEC remains in the subsurface, particularly in the areas where the removal action was conducted to a depth of 1 ft bgs, and would potentially pose unacceptable risks to those workers performing intrusive activities during reuse of the area.

Alternative 2 (Land Use Controls): This alternative would be protective of human health for the construction and maintenance workers who are to conduct intrusive activities. These receptors performing intrusive activities during or after development would be protected

under this alternative because the landowner will be required to (1) provide notice of planned intrusive activities, and arrange for and provide MEC recognition and safety training to construction personnel prior to the start of intrusive work, and (2) coordinate and arrange for construction support by UXO-qualified personnel during any construction that involves intrusive activities. This alternative prohibits use of the Laguna Seca Parking MRA for residential reuse.

Alternative 3 (Additional MEC Remediation): This alternative may offer some additional protection of human health for the receptors who are to conduct intrusive activities during development or reuse of the area. This alternative assumes there is MEC remaining in the subsurface that could pose a risk to receptors. Because even current MEC-detection technologies do not have a 100% detection efficiency, this alternative is not expected to provide a significant increase in the protection of human health because these areas may require additional risk mitigation measures (e.g., LUCs) following the completion of the additional remediation to protect human health for those receptors that would perform intrusive activities during development and reuse.

5.2.2 Compliance with ARARs

Alternative 1 (No Further Action): There are no ARARs that apply to implementation of this alternative.

Alternative 2 (Land Use Controls): The CRUP for residential use restriction would continue to be implemented in accordance with state and federal guidance. No ARARs were identified that apply to implementation of this alternative.

Alternative 3 (Additional MEC Remediation): This alternative could be implemented in compliance with the ARARs listed in Table A-1 included in Appendix A of this report.

Although the Army determined that there were no potential Federal or State ARARs that relate to LUCs at the Laguna Seca Parking MRA, LUCs will be implemented in a manner consistent with the applicable Federal and State guidance. While the Army does not consider California laws and regulations concerning Land Use Covenants to be potential ARARs, the Army entered into a State CRUP at the time the property was transferred, and after the Group 3 ROD is signed, the existing covenant will be modified, if appropriate, to document the land use restrictions included in the identified remedy. Although DTSC and EPA disagree with the Army's determination that California laws and regulations concerning Land Use Covenants are not potential ARARs, they will agree-to-disagree on this issue since the Army executed the State CRUP and agrees that it will be modified, if appropriate, to be consistent with the identified remedy, in a manner acceptable to DTSC (EPA 2009).

5.2.3 Short-Term Effectiveness (During Development)

This criterion considers the impact of an alternative in the short term. For the Laguna Seca Parking MRA, the short term is considered the period during implementation of additional MEC remediation and/or the period of initial site development during which construction

activities and mass soil grading activities could occur on the development portion of the MRA.

Alternative 1 (No Further Action): This alternative would not be effective in the short term because no further action would be taken to mitigate potentially remaining MEC risks to workers who are to conduct intrusive activities.

Alternative 2 (Land Use Controls): This alternative would be effective in the short term because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction workers who are to conduct intrusive activities during development within the development portion of the Laguna Seca Parking MRA. This alternative would prohibit the reuse of the Laguna Seca Parking MRA for residential reuse in the short and long term.

Alternative 3 (Additional MEC Remediation): This alternative may be effective in the short term because MEC removals would be conducted.

5.2.4 Long-Term Effectiveness and Permanence

This criterion examines the impact of an alternative in the long term. For the Laguna Seca Parking MRA, the long term is considered the period following the implementation of additional MEC remediation and/or the period following initial site development during which construction activities and mass soil grading activities are expected to be completed. It is anticipated that construction and maintenance workers would be present to conduct occasional inspection and maintenance of roads, utilities, trails, and any other infrastructure located in the MRA.

Alternative 1 (No Further Action): This alternative would not provide long-term effectiveness or permanence because no further action would be taken to mitigate potentially remaining MEC risks to receptors who are to conduct intrusive activities during long-term reuse.

Alternative 2 (Land Use Controls): This alternative would provide long-term effectiveness and permanence for receptors because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during long-term reuse and would be maintained until further evaluation determined the LUCs were no longer necessary. This alternative would prohibit the reuse of the Laguna Seca Parking MRA for residential reuse in the long term.

Alternative 3 (Additional MEC Remediation): It is unknown whether this alternative would provide long-term effectiveness or permanence because after additional MEC remediation is completed, these areas may require additional risk mitigation measures (e.g., LUCs) to protect receptors conducting intrusive activities during long-term reuse.

5.2.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

This Group 3 RI/FS Report addresses only the physical hazards to humans from MEC. The chemical hazards have been addressed under the BRA program (Shaw/MACTEC 2009). MEC-related field sampling and removal activities were completed at the Laguna Seca Parking MRA by the Army's Munitions Response contractors according to contractual and/or work plan requirements in place at the time the work was conducted. Therefore, it is expected that the volume of MEC potentially remaining in the subsurface has been reduced by completion of these past sampling and removal actions.

Alternative 1 (No Further Action): This alternative would not reduce the volume of MEC potentially remaining in the subsurface because no further action would be taken to mitigate potentially remaining MEC risks.

Alternative 2 (Land Use Controls): This alternative would not reduce the volume of MEC potentially remaining in the subsurface because it does not include removal of MEC from the MRA.

Alternative 3 (Additional MEC Remediation): This alternative may result in some reduction of the volume of MEC potentially remaining in the subsurface if MEC is discovered and removed during additional MEC remediation.

5.2.6 Implementability

Alternative 1 (No Further Action): It is anticipated that this alternative would not be administratively feasible to implement because the necessary approvals from the regulatory agencies to take no further action are not expected to be obtainable. This alternative would be technically feasible to implement, since it requires taking no further action.

Alternative 2 (Land Use Controls): This alternative would be administratively feasible to implement. The necessary approvals to implement and manage the LUCs (MEC recognition and safety training, construction support, and residential use restrictions) are expected to be obtained. This alternative would require a moderate level of effort to implement from a technical perspective during development and reuse. LUCs require coordination prior to the start of intrusive work to (1) provide MEC recognition and safety training to all construction personnel performing intrusive activities and refresher training on an ongoing basis as appropriate, and (2) mobilize UXO-qualified personnel to provide monitoring during intrusive construction activities.

Alternative 3 (Additional MEC Remediation): This alternative would be administratively feasible to implement, because the necessary approvals to implement additional MEC remediation could be obtained. The necessary services, equipment, and skilled workers to implement this alternative are readily available. This alternative would require a high level of effort to implement from a technical perspective, because (1) it may require additional vegetation clearance, and (2) involves UXO-qualified personnel teams conducting MEC

removals, managing, and reporting MEC-related data. After additional MEC remediation is completed, these areas are likely to require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

5.2.7 Cost

Capital and LTM costs are estimated for each alternative based on quotes for labor, materials, and equipment necessary to implement the alternative. For LTM costs, the NPV is calculated over the expected period of years it will take to implement the alternative based on real discount rates (similar to interest rates) that vary according to the period of performance for federal projects. The USACE and EPA provide guidelines for estimating remedial alternative costs in OSWER Directive 9355.0-75 (EPA 2000b). These cost estimates are intended to have an accuracy of +50% or -30%. A period of 30 years is used for estimating LTM costs for alternatives with indeterminate or 30+ year periods of performance, for the purposes of evaluating and comparing alternatives as specified in EPA's RI/FS Guidance (EPA 1988).

Cost estimating assumptions, unit costs, and real discount rates (that vary according to the period of performance) that are associated with implementation of the remedial alternatives are provided in Tables 5-8 through 5-10.

Long-term management measures (deed clause, annual monitoring, and five-year review reporting) will be implemented for the Laguna Seca Parking MRA as implementation and management aspects of the identified remedial alternatives. The costs associated with implementing these measures for the Laguna Seca Parking MRA over a period of 30 years is approximately $199,000 as summarized in Table 5-8.

Alternative 1 (No Further Action): There are minimal costs associated with implementation of this alternative. No cost tables have been prepared.

Alternative 2 (Land Use Controls): The costs associated with implementing this alternative are summarized in Table 5-9 for the Laguna Seca Parking MRA. The total cost is estimated to be $757,000.

Alternative 3 (Additional MEC Remediation): The costs associated with implementing this alternative for the Laguna Seca Parking MRA are summarized in Table 5-10. The cost is estimated to be approximately $5.8 million. Costs for this alternative may be higher than can be estimated at this time because these areas may require additional risk mitigation measures (e.g., LUCs) to protect human health during development and long-term reuse.

5.2.8 State Acceptance

The anticipated acceptability by the state of each alternative is presented below; however, state acceptance of the preferred remedial alternative will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

Alternative 1 (No Further Action): This alternative is not likely to be acceptable to the regulatory agencies because it does not take action to mitigate potentially remaining MEC risks to workers who are to conduct intrusive activities during the planned development and reuse of these areas.

Alternative 2 (Land Use Controls): This alternative is likely to be acceptable to the regulatory agencies. It takes action both in the short and long term to mitigate potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during the planned development and reuse of these areas.

Alternative 3 (Additional MEC Remediation): This alternative would likely be acceptable to the regulatory agencies. This alternative takes action to attempt to mitigate potentially remaining MEC risks to receptors who are to conduct intrusive activities during the planned development and reuse of the MRA. After additional MEC remediation is completed, these areas are likely to continue to require additional risk mitigation measures (e.g., LUCs) to protect human health during development and long-term reuse.

5.2.9 Community Acceptance

The anticipated acceptability by the community of each alternative is presented below; however, community acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

Alternative 1 (No Further Action): This alternative is not likely to be acceptable to the community because it does not take action to mitigate potentially remaining MEC risks during the planned development and reuse of these areas.

Alternative 2 (Land Use Controls): This alternative may be acceptable to the community. It takes action both in the short and long term to mitigate potentially remaining MEC risks to users who may conduct intrusive activities during the planned development and reuse of these areas.

Alternative 3 (Additional MEC Remediation): It is unknown at this time whether the vegetation disturbance and removal required to implement this alternative would be acceptable to the community.

5.2.10 Overall Evaluation

Alternative 1 (No Further Action): Although this alternative is technically implementable and there are minimal costs associated with this alterative, this alternative does not take action to mitigate potentially remaining MEC risks during the planned development and reuse of the Laguna Seca Parking MRA. As a result, this alternative is not protective of human health and the environment in the short or long term, and does not meet the RAO identified for the Group 3 MRAs.

Alternative 2 (Land Use Controls): This alternative is technically and administratively feasible to implement and has an estimated implementation cost of $757,000. This alternative is protective of human health and the environment in the short and long term and does meet the RAO by reducing the potential for reuse receptors to come in contact with MEC.

Alternative 3 (Additional MEC Remediation): This alternative is technically and administratively feasible to implement. The costs associated with implementing this alternative are estimated to be $5.8 million. This alternative may be protective of human health and the environment in the short and long term; may reduce the volume of MEC potentially remaining in the subsurface if additional MEC is encountered; and does meet the RAO by potentially reducing the volume of MEC in the subsurface, thereby reducing the potential for a user to encounter MEC. However, this alternative may require additional risk reduction measures (e.g., LUCs) following completion of the additional MEC remediation.

5.3 Evaluation of Remedial Alternatives for MOUT Site MRA

This section presents the evaluation of remedial alternatives developed for the MOUT Site MRA. The alternatives identified for the MOUT Site MRA include:

Alternative 1: No Further Action

Alternative 2: Land Use Controls

Alternative 3: Additional MEC Remediation

Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

5.3.1 Overall Protection of Human Health and the Environment

For the MOUT Site MRA, the overall MEC risk score was calculated as “B” and “C” (low risk and medium risk, respectively) were calculated for surface receptors for the MOUT training area portion of the MRA and “B” (low risk) for the roadway portion of the MRA. Overall MEC risk scores for subsurface receptors ranged from “B” to “D” (low to high risk) for the MOUT training area portion of the MRA and “D” (high risk) for the roadway portion.
.

Alternative 1 (No Further Action): This alternative would not be protective of human health for the receptors expected in the MRA as no action would be taken to address the remaining MEC risks in the MOUT Site MRA.

Alternative 2 (Land Use Controls): This alternative would be protective of human health for the construction and maintenance workers who are to conduct intrusive activities. These receptors performing intrusive activities during or after development would be protected under this alternative because the landowner will be required to (1) provide notice of planned intrusive activities, and arrange for and provide MEC recognition and safety training to

construction personnel prior to the start of intrusive work, and (2) coordinate and arrange for construction support by UXO-qualified personnel during any construction that involves intrusive activities. This alternative prohibits use of the MOUT Site MRA for residential reuse.

Alternative 3 (Additional MEC Remediation): This alternative may offer some additional protection of human health for the receptors who are to conduct intrusive activities during development or reuse of the area. This alternative assumes there is MEC remaining in the subsurface that could pose a risk to receptors. This alternative may require removal of existing structures within the MRA in order to completely address remaining MEC risks and may interfere with the continued reuse of the MRA for tactical training for law enforcement personnel. Because even current MEC-detection technologies do not have a 100% detection efficiency, this alternative is not expected to provide a significant increase in the protection of human health because these areas may require additional risk mitigation measures (e.g., LUCs) following the completion of the additional remediation to protect human health for those receptors that would perform intrusive activities during development and reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would be protective of human health for the construction and maintenance workers who are to conduct intrusive activities. These receptors performing intrusive activities during or after development would be protected under this alternative because the landowner will be required to (1) provide notice of planned intrusive activities, and arrange for and provide MEC recognition and safety training to construction personnel prior to the start of intrusive work, and (2) coordinate and arrange for construction support by UXO-qualified personnel during any construction that involves intrusive activities. This alternative may reduce the explosive risks potentially remaining within the selected area if MEC is discovered and removed. This alternative would also result in manageable impacts to the natural resources found within the MOUT Site MRA. This alternative would have some impacts to the natural resources on the site since excavation would be required of the soil within the selected area. This alternative prohibits use of the MOUT Site MRA for residential reuse.

5.3.2 Compliance with ARARs

Alternative 1 (No Further Action): There are no ARARs that apply to implementation of this alternative.

Alternative 2 (Land Use Controls): The CRUP for residential use restriction would continue to be implemented in accordance with the state and federal guidance. No ARARs were identified that apply to implementation of this alternative.

Alternative 3 (Additional MEC Remediation): This alternative could be implemented in compliance with the ARARs listed in Table A-1 included in Appendix A of this report.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use controls): This alternative would be implemented in a manner that complies with

the ARARs listed in Table A-2 in Appendix A of this report. Because removal actions would be conducted within small areas of the MOUT Site MRA, the vegetation removal could be conducted using manual methods (with proper safety precautions implemented to protect the safety of the workers) and still maintain compliance with the HMP and ESA. This alternative would have some impacts to the natural resources on the MRA since excavation would be required of the soil within the areas but could still be implemented in accordance with the ARARs identified on Table A-2.

Although the Army determined that there were no potential Federal or State ARARs that relate to LUCs at the MOUT Site MRA, LUCs will be implemented in a manner consistent with the applicable Federal and State guidance. While the Army does not consider California laws and regulations concerning Land Use Covenants to be potential ARARs, the Army entered into a State CRUP at the time the property was transferred, and after the Group 3 ROD is signed, the existing covenant will be modified, if appropriate, to document the land use restrictions included in the identified remedy. Although DTSC and EPA disagree with the Army's determination that California laws and regulations concerning Land Use Covenants are not potential ARARs, they will agree-to-disagree on this issue since the Army executed the State CRUP and agrees that it will be modified, if appropriate, to be consistent with the identified remedy, in a manner acceptable to DTSC (EPA 2009).

5.3.3 Short-Term Effectiveness (During Development)

This criterion considers the impact of an alternative in the short term. For the MOUT Site MRA, the short term is considered the period during implementation of additional MEC remediation and/or the period of initial site development during which construction activities and mass soil grading activities could occur on the development portion of the MRA.

Alternative 1 (No Further Action): This alternative would not be effective in the short term because no further action would be taken to mitigate potentially remaining MEC risks to workers who are to conduct intrusive activities.

Alternative 2 (Land Use Controls): This alternative would be effective in the short term because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction workers who are to conduct intrusive activities during development within MOUT Site MRA. This alternative would prohibit the reuse of the MOUT Site MRA for residential reuse in the short and long term.

Alternative 3 (Additional MEC Remediation): This alternative may be effective in the short term because MEC removals would be conducted.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would be effective in the short term because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction workers who are to conduct

intrusive activities during development within the MRA. This alternative would prohibit the reuse of the MOUT Site MRA for residential reuse in the short and long term.

5.3.4 Long-Term Effectiveness and Permanence

This criterion examines the impact of an alternative in the long term. For the MOUT Site MRA, the long term is considered the period following the implementation of additional MEC remediation and/or the period following initial site development during which construction activities and mass soil grading activities are expected to be completed. It is anticipated that construction and maintenance workers would be present to conduct occasional inspection and maintenance of roads, utilities, and any other infrastructure located in the MRA.

Alternative 1 (No Further Action): This alternative would not provide long-term effectiveness or permanence because no further action would be taken to mitigate potentially remaining MEC risks to receptors during long-term reuse.

Alternative 2 (Land Use Controls): This alternative would provide long-term effectiveness and permanence for receptors because LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during long-term reuse and would be maintained until further evaluation determined the LUCs were no longer necessary. This alternative would prohibit the reuse of the MOUT Site MRA for residential reuse in the long term.

Alternative 3 (Additional MEC Remediation): It is unknown whether this alternative would provide long-term effectiveness or permanence because after additional MEC remediation is completed, these areas may require additional risk mitigation measures (e.g., LUCs) to protect receptors conducting intrusive activities during long-term reuse. This alternative may require removal of existing structures within the MRA in order to completely address remaining MEC risks and may interfere with the continued reuse of the MRA for tactical training for law enforcement personnel.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative may provide long-term effectiveness and permanence for receptors if the removal action in the selected area reduces the potentially remaining MEC risks. LUCs (MEC recognition and safety training and construction support) would be implemented to mitigate the potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during long-term reuse and would be maintained until further evaluation determined the LUCs were no longer necessary. This alternative would prohibit the reuse of the MOUT Site MRA for residential reuse in the long term.

5.3.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

This Group 3 RI/FS Report addresses only the physical hazards to humans from MEC. The chemical hazards have been addressed under the BRA program (Shaw/MACTEC 2009). MEC-related field sampling and removal activities were completed at the MOUT Site MRA by the Army's Munitions Response contractors according to contractual and/or work plan requirements in place at the time the work was conducted. Therefore, it is expected that the volume of MEC potentially remaining in the subsurface has been reduced by completion of these past sampling and removal actions.

Alternative 1 (No Further Action): This alternative would not reduce the volume of MEC potentially remaining in the subsurface because no further action would be taken to mitigate potentially remaining MEC risks.

Alternative 2 (Land Use Controls): This alternative would not reduce the volume of MEC potentially remaining in the subsurface because it does not include removal of MEC from the MRA.

Alternative 3 (Additional MEC Remediation): This alternative may result in some reduction of the volume of MEC potentially remaining in the subsurface if MEC is discovered and removed during additional MEC remediation.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative may result in some reduction of the volume of MEC potentially remaining in the subsurface within the selected area if MEC is discovered and removed during the removal action.

5.3.6 Implementability

Alternative 1 (No Further Action): It is anticipated that this alternative would not be administratively feasible to implement because the necessary approvals from the regulatory agencies to take no further action are not expected to be obtainable. This alternative would be technically feasible to implement, since it requires taking no further action.

Alternative 2 (Land Use Controls): This alternative would be administratively feasible to implement. The necessary approvals to implement and manage the LUCs (MEC recognition and safety training, construction support, and residential use restrictions) are expected to be obtained. This alternative would require a moderate level of effort to implement from a technical perspective during development and reuse. LUCs require coordination prior to the start of intrusive work to (1) provide MEC recognition and safety training to all construction personnel performing intrusive activities and refresher training on an ongoing basis as appropriate, and (2) mobilize UXO-qualified personnel to provide monitoring during intrusive construction activities.

Alternative 3 (Additional MEC Remediation): This alternative would be administratively feasible to implement, because the necessary approvals to implement additional MEC remediation could be obtained. The necessary services, equipment, and skilled workers to implement this alternative are readily available. This alternative would require a high level of effort to implement from a technical perspective, because (1) it may require additional vegetation clearance, (2) may require demolition of existing structures on the MRA, and (3) involves UXO-qualified personnel teams conducting MEC removals, managing, and reporting MEC-related data. After additional MEC remediation is completed, these areas are likely to require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would be administratively feasible to implement, because the necessary approvals to implement additional MEC remediation and the LUCs could be obtained. The necessary services, equipment, and skilled workers to implement this alternative are readily available. This alternative would require a high level of effort to implement from a technical perspective, because (1) it will require additional vegetation clearance within the non-completed areas, and (2) involves UXO-qualified personnel teams conducting MEC removals, managing, and reporting MEC-related data.

5.3.7 Cost

Capital and LTM costs are estimated for each alternative based on quotes for labor, materials, and equipment necessary to implement the alternative. For LTM costs, the NPV is calculated over the expected period of years it will take to implement the alternative based on real discount rates (similar to interest rates) that vary according to the period of performance for federal projects. The USACE and EPA provide guidelines for estimating remedial alternative costs in OSWER Directive 9355.0-75 (EPA 2000b). These cost estimates are intended to have an accuracy of +50% or -30%. A period of 30 years is used for estimating LTM costs for alternatives with indeterminate or 30+ year periods of performance, for the purposes of evaluating and comparing alternatives as specified in EPA's RI/FS Guidance (EPA 1988).

Cost estimating assumptions, unit costs, and real discount rates (that vary according to the period of performance) that are associated with implementation of the remedial alternatives are provided in Tables 5-11 through 5-14.

Long-term management measures (deed clause, annual monitoring, and five-year review reporting) will be implemented for the MOUT Site MRA as implementation and management aspects of the identified remedial alternatives. The costs associated with implementing these measures for the MOUT Site MRA over a period of 30 years is approximately $199,000 as summarized in Table 5-11.

Alternative 1 (No Further Action): There are minimal costs associated with implementation of this alternative. No cost tables have been prepared.

Alternative 2 (Land Use Controls): The costs associated with implementing this alternative are summarized in Table 5-12 for the MOUT Site MRA. The total cost is estimated to be $757,000.

Alternative 3 (Additional MEC Remediation): The costs associated with implementing this alternative for the MOUT Site MRA are summarized in Table 5-13. The cost is estimated to be approximately $1.62 million. Costs for this alternative may be higher than can be estimated at this time because these areas may require additional risk mitigation measures (e.g., LUCs) to protect human health during development and long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): The costs associated with implementing this alternative for the MOUT Site MRA are summarized in Table 5-14. The cost is estimated to be approximately $1.09 million.

5.3.8 State Acceptance

The anticipated acceptability by the state of each alternative is presented below; however, state acceptance of the preferred remedial alternative will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

Alternative 1 (No Further Action): This alternative is not likely to be acceptable to the regulatory agencies because it does not take action to mitigate potentially remaining MEC risks to workers who are to conduct intrusive activities during the planned development and reuse of these areas.

Alternative 2 (Land Use Controls): This alternative is likely to be acceptable to the regulatory agencies. It takes action both in the short and long term to mitigate potentially remaining MEC risks to construction and maintenance workers who are to conduct intrusive activities during the planned development and reuse of these areas.

Alternative 3 (Additional MEC Remediation): This alternative would likely be acceptable to the regulatory agencies. This alternative takes action to attempt to mitigate potentially remaining MEC risks to receptors who are to conduct intrusive activities during the planned development and reuse of the MRA. After additional MEC remediation is completed, these areas are likely to continue to require additional risk mitigation measures (e.g., LUCs) to protect human health during development and long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative would likely be acceptable to the regulatory agencies. This alternative takes action to attempt to mitigate potentially remaining MEC risks to receptors that are to conduct intrusive activities during the planned development and reuse of the MRA.

5.3.9 Community Acceptance

The anticipated acceptability by the community of each alternative is presented below; however, community acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

Alternative 1 (No Further Action): This alternative is not likely to be acceptable to the community because it does not take action to mitigate potentially remaining MEC risks during the planned development and reuse of these areas.

Alternative 2 (Land Use Controls): This alternative may be acceptable to the community. It takes action both in the short and long term to mitigate potentially remaining MEC risks to reusers who may conduct intrusive activities during the planned development and reuse of these areas.

Alternative 3 (Additional MEC Remediation): It is unknown at this time whether the vegetation disturbance and removal required to implement this alternative would be acceptable to the community.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative may be acceptable to the community. It takes action both in the short and long term to mitigate potentially remaining MEC risks to users who may conduct intrusive activities during the planned development and reuse of the MRA.

5.3.10 Overall Evaluation

Alternative 1 (No Further Action): Although this alternative is technically implementable and there are minimal costs associated with this alterative, this alternative does not take action to mitigate potentially remaining MEC risks during the planned development and reuse of the MOUT Site MRA. As a result, this alternative is not protective of human health and the environment in the short or long term, and does not meet the RAO identified for the Group 3 MRAs.

Alternative 2 (Land Use Controls): This alternative is technically and administratively feasible to implement and has an estimated implementation cost of $757,000. This alternative is protective of human health and the environment in the short and long term and does meet the RAO by reducing the potential for reuse receptors to come in contact with MEC.

Alternative 3 (Additional MEC Remediation): This alternative is technically and administratively feasible to implement. The costs associated with implementing this alternative are estimated to be $1.62 million. This alternative may be protective of human health and the environment in the short and long term; may reduce the volume of MEC potentially remaining in the subsurface if additional MEC is encountered; and does meet the RAO by potentially reducing the volume of MEC in the subsurface, thereby reducing the potential for a reuser to encounter MEC. However, this alternative may interfere with

the continued reuse of the MRA for tactical training of law enforcement personnel and may require additional risk reduction measures (e.g., LUCs) following completion of the additional MEC remediation.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls): This alternative is technically and administratively feasible to implement and has an estimated implementation cost of $1.09 million. This alternative is protective of human health and the environment in the short and long term and does meet the RAO by reducing the potential for reuse receptors to come in contact with MEC.

5.4 Comparison of Remedial Alternatives

The following sections present the evaluation of remedial alternatives relative to each other in each MRA based upon their ability to achieve the nine evaluation criteria specified in the EPA's RI/FS Guidance (EPA 1988).

5.4.1 DRO/Monterey MRA

This section presents the comparison of remedial alternatives developed for the DRO/Monterey MRA. A summary of this comparison is provided in Table 5-15. The alternatives identified for the DRO/Monterey MRA include:

Alternative 1: No Further Action

Alternative 2: Land Use Controls

Alternative 3: Additional MEC Remediation

Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

5.4.1.1 Overall Protection of Human Health and the Environment

Alternative 2 (Land Use Controls) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would provide the most protection for receptors conducting intrusive activities and the LUCs included in both alternatives would address any potentially remaining risks due to subsurface MEC within the remaining portions of the MRA.

Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may have some impacts to the natural resources on the site since excavation would be required of the soil within the selected area; however, these impacts would be considered manageable by following the mitigation measures described in the HMP.

Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may provide

some additional protection of human health after MEC removal actions have been performed. However, if MEC is found and removed, this alternative is not expected to provide a significant decrease in potentially remaining MEC risks because a minimal amount of MEC is expected to remain in the DRO/Monterey MRA. After additional MEC remediation is completed as part of Alternative 3, the removal areas may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health for those receptors that would perform intrusive activities during development and reuse.

Alternative 1 (No Further Action) would be the least protective of reuse receptors at the DRO/Monterey MRA.

5.4.1.2 Compliance with ARARs

No potential federal and state ARARs were determined to apply to implementation of Alternative 1. Alternative 2 (Land Use Controls) would continue to be implemented in accordance with the state and federal guidance. Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would be implemented in a manner that complies with the potential ARARs shown in Table A-1 and Table A-2, respectively, provided in Appendix A to this report.

5.4.1.3 Short-Term Effectiveness

Alternative 2 (Land Use Controls) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) are the most effective alternatives in the short term during development of the reuse areas. These alternatives provide measures to protect workers conducting intrusive activities and also prohibit use of the DRO/Monterey MRA for residential purposes in the short term.

Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may provide some additional effectiveness in the short term to mitigate potentially remaining MEC risks.

Alternative 1 (No Further Action) would be the least effective in the short term regarding workers and the community because no further action would be taken to mitigate potentially remaining MEC, so there would be no potential reduction of risks regarding MEC.

5.4.1.4 Long-Term Effectiveness and Permanence

Alternative 2 (Land Use Controls) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) are the most effective alternatives in the long term during development of the reuse areas. These alternatives provide measures to protect workers conducting intrusive activities and also prohibit use of the DRO/Monterey MRA for residential purposes.

Alternatives 3 (Additional MEC Remediation) and 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may provide some additional effectiveness in the long term at mitigating potentially remaining MEC risks. Under Alternative 3, the DRO/Monterey MRA may continue to require additional risk mitigation measures (e.g., LUCs) to protect receptors that may conduct intrusive activities during long-term reuse.

Alternative 1 (No Further Action) provides the least long-term effectiveness.

5.4.1.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 3 (Additional MEC Remediation) would provide the most reduction of remaining MEC volume, if MEC is discovered and removed during the additional MEC remediation.

Alternatives 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would provide some reduction of remaining MEC at the DRO/Monterey MRA.

Alternatives 1 (No Further Action) and 2 (Land Use Controls) would provide the least reduction of remaining MEC risks through treatment.

5.4.1.6 Implementability

Alternatives 2 (Land Use Controls), 3 (Additional MEC Remediation), and 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) are equally administratively feasible to implement because the necessary approvals to implement these alternatives could be obtained. The necessary services, equipment, and skilled workers to implement these alternatives are readily available. However, Alternative 3 (Additional MEC Remediation) would require the highest level of effort to implement from a technical perspective, and after additional MEC remediation is completed, the area may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse. Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would require a higher level of technical effort to implement. The level of effort to implement Alternative 2 (Land Use Controls) is considered moderate from a technical perspective.

Alternative 1 (No Further Action) would be the least administratively feasible to implement because the necessary approvals to take no further action to mitigate potentially remaining MEC risks are not expected.

5.4.1.7 Cost

The costs to implement Alternative 1 (No Further Action) are expected to be the least of any of the alternatives evaluated.

Alternative 2 (Land Use Controls) has the next lowest costs associated with implementation. As summarized in Table 5-5, these costs are estimated to be $757,000.

Alternative 3 (Additional MEC Remediation) has a higher cost associated with implementation. As summarized in Table 5-6, these costs are estimated to be $1,045,000. Actual costs to implement this alternative may be higher than can be estimated at this time because, after additional MEC remediation is completed, these areas may require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) has the highest cost associated with implementation. As summarized in Table 5-7, these costs are estimated to be $983,000.

5.4.1.8 State Acceptance

State acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

5.4.1.9 Community Acceptance

Community acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

5.4.2 Laguna Seca Parking MRA

This section presents the comparison of remedial alternatives developed for the Laguna Seca Parking MRA. A summary of this comparison is provided in Table 5-16. The alternatives identified for the Laguna Seca Parking MRA include:

Alternative 1: No Further Action

Alternative 2: Land Use Controls

Alternative 3: Additional MEC Remediation

5.4.2.1 Overall Protection of Human Health and the Environment

Alternative 2 (Land Use Controls) would provide the most protection for future receptors conducting intrusive activities. Alternative 3 (Additional MEC Remediation) may provide some additional protection of human health. However, after additional MEC remediation is completed, these areas may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health for those receptors that would perform intrusive activities during development and reuse. Alternative 1 (No Further Action) would be the least protective of reuse receptors at the Laguna Seca Parking MRA.

5. 4.2.2 Compliance with ARARs

No potential federal and state ARARs were determined to apply to implementation of Alternative 1. Alternative 2 (Land Use Controls) would continue to be implemented in accordance with state and federal guidance. Alternative 3 (Additional MEC Remediation) would be implemented in a manner that complies with the potential ARARs shown in Appendix A to this report.

5. 4.2.3 Short-Term Effectiveness

Alternative 1 (No Further Action) would be the least effective in the short term regarding workers and the community because no further action would be taken to mitigate potentially remaining MEC, so there would be no potential reduction in risks regarding MEC.

Alternative 2 (Land Use Controls) is most effective in the short term during development of the reuse areas. This alternative provides measures to protect workers conducting intrusive activities and also prohibit use of the Laguna Seca Parking MRA for residential purposes in the short term.

Alternative 3 (Additional MEC Remediation) may provide some additional effectiveness in the short term to mitigate potentially remaining MEC risks.

5. 4.2.4 Long-Term Effectiveness and Permanence

Alternatives 2 (Land Use Controls) and 3 (Additional MEC Remediation) may provide some additional effectiveness in the long term at mitigating potentially remaining MEC risks. Under Alternative 3, the Laguna Seca Parking MRA may continue to require additional risk mitigation measures (e.g., LUCs) to protect receptors that may conduct intrusive activities during long-term reuse.

Alternative 1 (No Further Action) provides the least long-term effectiveness.

5. 4.2.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 3 (Additional MEC Remediation) would provide the most reduction of remaining MEC volume, if MEC is discovered and removed during the additional MEC remediation.

Alternatives 1 (No Further Action) would provide the least reduction of remaining MEC risks through treatment.

Alternative 2 (Land Use Controls) would not provide reduction of remaining MEC, though potential exposures to MEC in the subsurface would be reduced through controls that

would mitigate potentially remaining MEC risks to workers conducting intrusive activities during development and reuse of the MRA.

5. 4.2.6 Implementability

Alternatives 2 (Land Use Controls) and 3 (Additional MEC Remediation) would be the most administratively feasible to implement because the necessary approvals to implement these alternatives could be obtained. The necessary services, equipment, and skilled workers to implement these alternatives are readily available.

Alternative 2 (Land Use Controls) is considered to have a moderate level of effort to implement from a technical perspective.

Alternative 3 (Additional MEC Remediation) would require the highest level of effort to implement from a technical perspective, and after additional MEC remediation is completed, the area may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

Alternative 1 (No Further Action) would be the least administratively feasible to implement because the necessary approvals to take no further action to mitigate potentially remaining MEC risks are not expected.

5. 4.2.7 Cost

The costs to implement Alternative 1 (No Further Action) are expected to be the least of any of the alternatives evaluated.

Alternative 2 (Land Use Controls) has the next lowest costs associated with implementation. As summarized in Table 5-9, these costs are estimated to be $757,000.

Alternative 3 (Additional MEC Remediation) has the highest costs associated with implementation. As summarized in Table 5-10, these costs are estimated to be $5.8 million. Actual costs to implement this alternative may be higher than can be estimated at this time because, after additional MEC remediation is completed, these areas may require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

5. 4.2.8 State Acceptance

State acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

5. 4.2.9 Community Acceptance

Community acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

5.4.3 MOUT Site MRA

This section presents the comparison of remedial alternatives developed for the MOUT Site MRA. A summary of this comparison is provided in Table 5-17. The alternatives identified for the MOUT Site MRA include:

Alternative 1: No Further Action

Alternative 2: Land Use Controls

Alternative 3: Additional MEC Remediation

Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

5.4.3.1 Overall Protection of Human Health and the Environment

Alternative 2 (Land Use Controls) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would provide the most protection for receptors conducting intrusive activities and the LUCs included in both alternatives would address any potentially remaining risks due to subsurface MEC within the remaining portions of the MRA.

Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may have some impacts to the natural resources on the site since excavation would be required of the soil within the selected area; however, these impacts would be considered manageable by following the mitigation measures described in the HMP.

Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may provide some additional protection of human health after MEC removal actions have been performed. If MEC is found and removed, this alternative may provide a decrease in potentially remaining MEC risks. After additional MEC remediation is completed as part of Alternative 3, the removal areas may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health for those receptors that would perform intrusive activities during development and reuse.

Alternative 1 (No Further Action) would be the least protective of reuse receptors at the DRO/Monterey MRA.

5.4.3.2 Compliance with ARARs

No potential federal and state ARARs were determined to apply to implementation of Alternative 1. Alternative 2 (Land Use Controls) would continue to be implemented in accordance with state and federal guidance. Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would be implemented in a manner that complies with the potential ARARs shown in Table A-1 and Table A-2, respectively, provided in Appendix A to this report.

5.4.3.3 Short-Term Effectiveness

Alternative 2 (Land Use Controls) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) are most effective in the short term during development of the reuse areas. These alternatives provide measures to protect workers conducting intrusive activities and also prohibit use of the MOUT Site MRA for residential purposes in the short term.

Alternative 3 (Additional MEC Remediation) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may provide some additional effectiveness in the short term to mitigate potentially remaining MEC risks.

Alternative 1 (No Further Action) would be the least effective in the short term regarding workers and the community because no further action would be taken to mitigate potentially remaining MEC, so there would be no potential reduction of risks regarding MEC.

5.4.3.4 Long-Term Effectiveness and Permanence

Alternative 2 (Land Use Controls) and Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) are the most effective alternatives in the long term during development of the reuse areas. These alternatives provide measures to protect workers conducting intrusive activities and also prohibit use of the MOUT Site MRA for residential purposes.

Alternatives 3 (Additional MEC Remediation) and 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) may provide some additional effectiveness in the long term at mitigating potentially remaining MEC risks. Under Alternative 3, the MOUT Site MRA may continue to require additional risk mitigation measures (e.g., LUCs) to protect receptors that may conduct intrusive activities during long--term reuse. Alternative 1 (No Further Action) provides the least long-term effectiveness.

5.4.3.5 Reduction of Toxicity, Mobility, or Volume Through Treatment

Alternative 3 (Additional MEC Remediation) would provide the most reduction of remaining MEC volume, if MEC is discovered and removed during the additional MEC remediation.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would provide reduction of remaining MEC at the MOUT Site MRA.

Alternatives 1 (No Further Action) and 2 (Land Use Controls) would provide the least reduction of remaining MEC risks through treatment because no action would be taken to remove additional MEC under these alternatives. However, under Alternative 2 (Land Use Controls), potential exposures to remaining MEC would be reduced through controls that would mitigate potentially remaining MEC risks to workers conducting intrusive activities.

5.4.3.6 Implementability

Alternatives 2 (Land Use Controls), 3 (Additional MEC Remediation), and 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) are equally administratively feasible to implement because the necessary approvals to implement these alternatives could be obtained. The necessary services, equipment, and skilled workers to implement these alternatives are readily available.

Alternative 1 (No Further Action) would be the least administratively feasible to implement because the necessary approvals to take no further action to mitigate potentially remaining MEC risks are not expected.

Alternative 2 (Land Use Controls) is considered to have a moderate level of effort to implement from a technical perspective.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) would require a higher level of technical effort to implement.

Alternative 3 (Additional MEC Remediation) would require the highest level of effort to implement from a technical perspective, and after additional MEC remediation is completed, the area may continue to require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

5.4.3.7 Cost

The costs to implement Alternative 1 (No Further Action) are expected to be the least of any of the alternatives evaluated.

Alternative 2 (Land Use Controls) has the next lowest costs associated with implementation. As summarized in Table 5-12, these costs are estimated to be $757,000.

Alternative 4 (Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls) has a higher cost associated with implementation. As summarized in Table 5-14, these costs are estimated to be $1.09 million.

Alternative 3 (Additional MEC Remediation) has the highest cost associated with implementation. As summarized in Table 5-13, these costs are estimated to be $1.62 million. Actual costs to implement this alternative may be higher than can be estimated at this time because, after additional MEC remediation is completed, these areas may require additional risk mitigation measures (e.g., LUCs) to protect human health and comply with ARARs during development and long-term reuse.

5.4.3.8 State Acceptance

State acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

5.4.3.9 Community Acceptance

Community acceptance will be addressed in the Group 3 ROD once comments on the Group 3 RI/FS Report and Proposed Plan have been received.

[this page was intentionally left blank]

6.0 IDENTIFICATION OF PREFERRED REMEDIAL ALTERNATIVE

This section identifies a preliminary identification of a preferred remedial alternative in accordance with the Group 3 RI/FS Work Plan (ESCA RP Team 2009). The preferred remedial alternatives are as listed below.

- DRO/Monterey MRA: Alternative 2 (Land Use Controls)
- Laguna Seca Parking MRA: Alternative 2 (Land Use Controls)
- MOUT Site MRA: Alternative 2 (Land Use Controls)

These alternatives would:

- be protective of human health and the environment for intrusive receptors;
- be effective in the short and long term at mitigating potentially remaining MEC risks to reusers conducting intrusive activities during development and reuse of the area;
- be administratively and technically feasible to implement; and
- have a moderate cost associated with its implementation relative to the other alternatives evaluated.

If selected as the remedy, implementation of this alternative would be described in further detail in the RD/RA, Land Use Covenant Implementation, Operations and Management (LUCI O&M) Plan, or similar document.

Although this section of the report identifies a preliminary preferred remedial alternative, the preferred remedial alternative may be modified based upon comments received from the agencies and the public during the review period of the Draft and Draft Final RI/FS Report. Based upon the input received from the agencies and the public, any modifications to the alternative would be prepared and submitted as part of the Proposed Plan. Section 7.0 discusses the approval process that will be followed for identification of the preferred remedial alternative.

[this page was intentionally left blank]

7.0 APPROVAL PROCESS

The approval process for the Group 3 RI/FS includes the following components:

- Prepare the Final RI/FS report with regulatory agency and public review of the Draft and Draft Final reports.
- Prepare a Group 3 Proposed Plan that presents the identified remedial alternative for the reuse areas and summarizes the results of the RI, RA, and FS.
- Solicit public comments on the Proposed Plan during a 30-day comment period.
- Provide an opportunity for a public meeting on the Proposed Plan where written and verbal comments can be submitted by the public.
- Prepare the ROD that (1) summarizes the results of the RI, RA, and FS, (2) includes a responsiveness summary that summarizes public comments received on the Proposed Plan, and responses to comments, and (3) specifies the details of the identified remedy(s), including plans for development and submittal of a RD/RA WP and a LUCI O&M Plan. The RD/RA WP and LUCI O&M Plan may be combined.
- Receive EPA approval of the ROD, and review by DTSC.
- Announce the decision regarding the remedy selection in a major local newspaper and place copies of the RI/FS, Proposed Plan, and ROD in the Administrative Record and local information repositories.

[this page was intentionally left blank]

8.0 REFERENCES

United States Department of Defense (DOD)/United States Environmental Protection Agency (EPA). 2000. Management Principles for Implementing Response Actions at Closed, Transferring, and Transferred Ranges. March.

Environmental Services Cooperative Agreement Remediation Program Team (ESCA RP Team). 2008a. Final Summary of Existing Data Report, Former Fort Ord, Monterey County, California. November 26. (Fort Ord Administrative Record No. ESCA-0130)

¾¾¾. 2008b. Final Group 1 Remedial Investigation/Feasibility Study Work Plan, Seaside Munitions Response Area and Parker Flats Munitions Response Area Phase II, Former Fort Ord, Monterey County, California. December 17. (Fort Ord Administrative Record No. ESCA-0124)

¾¾¾. 2008c. Final Community Involvement and Outreach Program Plan, Former Fort Ord, Monterey County, California. December 30. (Fort Ord Administrative Record No. ESCA-0135)

¾¾¾. 2009. Final Group 3 Remedial Investigation/Feasibility Study Work Plan, Interim Action Ranges, Military Operations in Urban Terrain Site, Laguna Seca Parking, and Del Rey Oaks/Monterey Munitions Response Areas, Former Fort Ord, Monterey, California. November 13. (Fort Ord Administrative Record No. ESCA-0241)

Harding ESE (now MACTEC Engineering and Consulting, Inc.). 2002. Draft Final Evaluation of Vegetation Clearance Methods Technical Memorandum, Ordnance and Explosives Remedial Investigation/Feasibility Study, Former Fort Ord, California. October. (Fort Ord Administrative Record No. OE-0399F)

Harding Lawson Associates (HLA). 1995. Basewide Remedial Investigation/Feasibility Study, Fort Ord, California, Volumes I and II. October 18. (Fort Ord Administrative Record Nos. BW-1283A, BW-1283B, and BW-1283E)

IT Corporation (IT). 2001. Draft Final Basewide Range Assessment Work Plan and Contractor Quality Control Plan, Small Arms and Multi-Use Ranges, Fort Ord, California. July. (Fort Ord Administrative Record No. BW-2085A)

Malcolm Pirnie. 2002. Final Fort Ord Ordnance and Explosives Risk Assessment Protocol. October. (Fort Ord Administrative Record No. OE-0402G)

Shaw Environmental, Inc. (Shaw). 2005. Final After Action Report, Time Critical Removal Action and Military Munitions Reconnaissance, Eucalyptus Fire Area, Former Fort

Ord, California. Revision 0. January 20. (Fort Ord Administrative Record No. OE-0499G)

Shaw Environmental, Inc./MACTEC Engineering and Consulting, Inc. (Shaw/MACTEC). 2009. Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 1. June 9. (Fort Ord Administrative Record No. BW-2300J)

United States Army Corps of Engineers (USACE). 1997a. Revised Archive Search Report, Former Fort Ord, California, Monterey County, California. (Fort Ord Administrative Record No. OE-0022)

¾¾¾. 1997b. Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California (HMP). With Technical Assistance From Jones and Stokes, Sacramento, California. April. (Fort Ord Administrative Record No. BW-1787)

¾¾¾. 2000. Draft Final Ordnance and Explosives Remedial Investigation/Feasibility Study (OE RI/FS) Work Plan, Former Fort Ord, California. January 4. (Fort Ord Administrative Record No. OE-0233M)

United States Army Corps of Engineers/Jones & Stokes Associates, Inc. (USACE/Jones & Stokes). 1992. Flora and Fauna Baseline Study of Fort Ord, California. December. (Fort Ord Administrative Record No. BW-1938)

United States Department of the Army (Army). 2002. Final Record of Decision, No Action Regarding Ordnance-Related Investigation, Former Fort Ord, California. June 19. (Fort Ord Administrative Record No. OE-0406)

¾¾¾. 2005a. Record of Decision, No Action Related to munitions and Explosive of Concern - Track 1 Sites, No Further Remedial Action with Monitoring for Ecological Risks from Chemical Contamination at Site 3 (MRS-22), Former Fort Ord, California. March 10. (Administrative Record OE-0526)

¾¾¾. 2005b. Ordnance and Explosives Site Security Program Summary, Former Fort Ord, California. April (updated yearly).

¾¾¾. 2006. Community Relations Plan Update Number 3, Fort Ord, California. June. (Fort Ord Administrative Record No. BW-2364L)

¾¾¾. 2007. Finding of Suitability for Early Transfer (FOSET), Former Fort Ord, California, Environmental Services Cooperative Agreement (ESCA) Parcels and Non-ESCA Parcels (Operable Unit Carbon Tetrachloride Plume) (FOSET 5). September 25. (Fort Ord Administrative Record No. FOSET-004J)

United States Fish and Wildlife Service (USFWS). 1999. Biological Opinion on the Closure and Reuse of Fort Ord, Monterey County, California (1-8-99-F/C-39R). March 30. (Fort Ord Administrative Record No. BW-2232A)

¾¾¾. 2002. Biological Opinion on the Closure and Reuse of Fort Ord, Monterey County, California, as it affects Monterey Spineflower Critical Habitat (1-8-01-F-70R). October 22. (Fort Ord Administrative Record No. BW-2233)

¾¾¾. 2005. Cleanup and Reuse of Former Fort Ord, Monterey County, California, as it affects California Tiger Salamander and Critical Habitat for Contra Costa Goldfields (1-8-04-F-25R). March 14. (Fort Ord Administrative Record No. BW-2334)

United States Environmental Protection Agency (EPA). 1988. Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA. Interim Final. EPA/540/G-89/001. October.

¾¾¾. 1993. Guidance for Development of Applicable or Relevant and Appropriate Requirements Under CERCLA. EPA 580-I-94-007. March.

¾¾¾. 2000a. Institutional Controls and Transfer of Real Property under CERCLA Section 120 (h)(3)(A), (B), or (C). Interim Final. January.

¾¾¾. 2000b. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study. EPA 540-R-00-002, OSWER 9355.0-75. July.

¾¾¾. 2009. EPA Comments on the Draft Group 2 Remedial Investigation / Feasibility Study, California State University at Monterey Bay Off-Campus and County North Response Areas, Former Fort Ord, Monterey County, California. November 19. (Fort Ord Administrative Record No. ESCA-0177B)

USA Environmental, Inc. (USA). 2001a. Final After Action Report, Site OE-14D (14 West), Former Fort Ord, California. April 19. (Fort Ord Administrative Record No. OE-0301A)

¾¾¾. 2001b. Final SS/GS and 100% Grid Sampling, After Action Report, Inland Range Contract, Former Fort Ord, California, Site OE-28. August 17. (Fort Ord Administrative Record No. OE-0314)

Zander Associates (Zander). 2002. Assessment East Garrison – Parker Flats Land Use Modifications, Fort Ord, California. May. (Fort Ord Administrative Record No. BW-2180)

[this page was intentionally left blank]

Table 2-1
DRO / Monterey, Laguna Seca Parking, and MOUT Site MRAs – Administrative Controls

Type	Description
Land Use Covenants	· To further ensure protection of human health and the environment, the Army has agreed to enter into Covenants to Restrict the Use of Property (CRUPs) with the State of California. The CRUPs place additional use restrictions on the transferring property, as appropriate. · Due to Fort Ord's former use as a military installation, the property may contain MEC and there remains a risk of encountering subsurface MEC. Any person conducting ground disturbing or intrusive activities (e.g., digging or drilling) must comply with the applicable municipal code. Any alterations, additions, or improvements to the property in any way that may violate excavation restrictions are prohibited. No actual or potential hazard exists on the surface of the property from MEC that may be in the subsurface of the property provided the CRUPs are adhered to (Army 2007). · The CRUPs are defined in the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxics Substances Control Concerning the Monitoring and Reporting of Environmental Restrictions on the Former Fort Ord, Monterey County, California" (MOA). · These restrictions involve the enforcement of site review and reporting requirements and agency cost recovery/reimbursement requirements as imposed by the DTSC.
Restrictions to Digging / Excavation	· City of Del Rey Oaks adopted Ordinance No. 259 amending the municipal code to add Chapter 15.48, which prohibits excavation, digging, development, or ground disturbance of any type on the former Fort Ord that involves the displacement of 10 or more cubic yards of soil without a permit. · Monterey County adopted Ordinance No. 5012 amending the County Code to include Chapter 16.10, which prohibits excavation, digging, development, or ground disturbance of any type on the former Fort Ord that involves the displacement of 10 or more cubic yards of soil without a permit. · City of Monterey adopted Ordinance No. 3384 amending the municipal code to add Chapter 9 Article 8, which prohibits excavation, digging, development, or ground disturbance of any type on the former Fort Ord that involves the displacement of 10 or more cubic feet of soil without a permit.
FORA Resolution 98-1	· An approved FORA resolution that contains proposed and suggested measures to avoid or minimize hazardous material impact.
ESCA MOA	· MOA between FORA and the jurisdictions for the purpose of defining terms of an agreement for holding and managing (ownership and responsibilities) property while remedial work is accomplished under an ESCA. · MOA establishes FORA's ownership during the MEC remediation period; identifies that jurisdictions need to provide public safety response from police, fire, and other emergency personnel as needed; establishes control of access to ESCA properties during the MEC remediation period; and agreement that access to properties will be governed by the restrictions included in the Land Use Covenant accompanying the transfer of the property.
Habitat Management Plan	· The Habitat Management Plan (HMP) incorporated conservation measures pursuant to USFWS BOs dated prior to issuance of the HMP in April 1997. Specific MEC activities were addressed in Chapter 3 of the HMP (USACE 1997b).
Biological Opinions/ Critical Habitat	· Since the release of the HMP, three additional BOs have been issued that are relevant to the MEC remediation period (USFWS 1999, 2002, and 2005). Accordingly, some information has been updated and additions have been made to the sections that address MEC activities. · A portion of the Laguna Seca MRA has been designated as critical habitat for the Monterey

Table 2-1
DRO / Monterey, Laguna Seca Parking, and MOUT Site MRAs – Administrative Controls

Type	Description
	spineflower. · Future MEC work is required to be consistent with the applicable conservation measures.

Table 2-2
MEC Risk Assessment Summary for Habitat Reuse Area of the DRO/Monterey MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (down to 12 inches bgs)	1	A
	2	A
	3	n/a
Habitat Monitor (Surface)	1	A
	2	A
	3	n/a
Recreational User (down to 6 inches bgs)	1	A
	2	A
	3	n/a
Maintenance Worker (down to 24 inches bgs)	1	A
	2	A
	3	n/a

Notes:

MEC = munitions and explosives of concern
bgs = below ground surface

[1] **MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2 =Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.

[2] **Overall MEC Risk**: qualitative score related to MEC Hazard Type, Accessibility Factor, and Exposure Factor:
A=Lowest Risk
n/a = not applicable because MEC Hazard Type and 3 was not found in this area.

Table 2-3
MEC Risk Assessment Summary for Development Reuse Area of the DRO/Monterey MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (Surface)	1	A
	2	n/a
	3	n/a
Office Worker (Surface)	1	A
	2	n/a
	3	n/a
Maintenance Worker (down to 24 inches bgs)	1	A
	2	n/a
	3	n/a
Construction Worker (down to 60 inches bgs)	1	A
	2	n/a
	3	n/a

Notes:

MEC = munitions and explosives of concern
bgs = below ground surface

[1] **MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.

[2] **Overall MEC Risk**: qualitative score related to MEC Hazard Type, Accessibility Factor, and Exposure Factor:
A=Lowest Risk
n/a = not applicable because MEC Hazard Types 2 and 3 were not found in this area.

Table 2-4
MEC Risk Assessment Summary for MRS-29 of the Laguna Seca Parking MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (Surface)	1	A
	2	n/a
	3	n/a
Recreational User (Surface)	1	A
	2	n/a
	3	n/a
Maintenance Worker (down to 24 inches bgs)	1	B
	2	n/a
	3	n/a
Construction Worker (down to 60 inches bgs)	1	B
	2	n/a
	3	n/a

Notes:
MEC = munitions and explosives of concern
bgs = below ground surface
[1]**MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.
[2]**Overall MEC Hazard**:
A=Lowest Risk
B=Low Risk
n/a =not applicable because MEC Hazard Types 2 and 3 were not found in this sector

Table 2-5
MEC Risk Assessment Summary for MRS-30 of the Laguna Seca Parking MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (Surface)	1	n/a
	2	n/a
	3	A
Recreational User (Surface)	1	n/a
	2	n/a
	3	A
Maintenance Worker (down to 24 inches bgs)	1	n/a
	2	n/a
	3	C
Construction Worker (down to 60 inches bgs)	1	n/a
	2	n/a
	3	C

Notes:
MEC = munitions and explosives of concern
bgs = below ground surface
[1]**MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.
[2]**Overall MEC Hazard**:
A=Lowest Risk
C=Medium Risk
n/a = not applicable because MEC Hazard Types 1 and 2 were not found in this sector

Table 2-6
MEC Risk Assessment Summary for MRS-47 of the Laguna Seca Parking MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (Surface)	1	A
	2	A
	3	B
Recreational User (Surface)	1	A
	2	A
	3	B
Maintenance Worker (down to 24 inches bgs)	1	D
	2	E
	3	E
Construction Worker (down to 60 inches bgs)	1	D
	2	E
	3	E

Notes:
MEC = munitions and explosives of concern
bgs = below ground surface
[1]**MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.
[2]**Overall MEC Hazard**:
A=Lowest Risk
B=Low Risk
D=High Risk
E=Highest Risk

Table 2-7
MEC Risk Assessment Summary for MRS-14A 4-ft Removal Action Areas of the Laguna Seca Parking MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (Surface)	1	A
	2	A
	3	n/a
Recreational User (Surface)	1	A
	2	A
	3	n/a
Construction Worker (down to 60 inches bgs)	1	D
	2	E
	3	n/a

Notes:
MEC = munitions and explosives of concern
bgs = below ground surface
[1] **MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.
[2] **Overall MEC Risk**: qualitative score related to MEC Hazard Type, Accessibility Factor, and Exposure Factor:
A=Lowest Risk
D=High Risk
E=Highest Risk
n/a = not applicable because MEC Hazard Type 3 was not found in this sector

Table 2-8
MEC Risk Assessment Summary for MRS-14A 1-ft Removal Action Areas of the Laguna Seca Parking MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (Surface)	1	A
	2	A
	3	n/a
Maintenance Worker (down to 24 inches bgs)	1	D
	2	E
	3	n/a

Notes:
MEC = munitions and explosives of concern
bgs = below ground surface
[1] **MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.
[2] **Overall MEC Risk**: qualitative score related to MEC Hazard Type, Accessibility Factor, and Exposure Factor:
B=Low Risk
D=High Risk
E=Highest Risk
n/a = not applicable because MEC Hazard Type 3 was not found in this area.

Table 2-9
MEC Risk Assessment Summary for MOUT Training Area of MOUT Site MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Trespasser (Surface)	1	B
	2	B
	3	C
MOUT Trainee (Surface)	1	B
	2	B
	3	C
MOUT Maintenance Worker (down to 24 inches bgs)	1	D
	2	B
	3	C
MOUT Construction Worker (down to 60 inches bgs)	1	D
	2	B
	3	C

Notes:
MEC = munitions and explosives of concern
bgs = below ground surface
[1] **MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.
[2] **Overall MEC Risk**: qualitative score related to MEC Hazard Type, Accessibility Factor, and Exposure Factor:
B=Low Risk
C=Medium Risk
D=High Risk

Table 2-10
MEC Risk Assessment Summary for Roadway Area of MOUT Site MRA

Receptor	MEC Hazard Type[1]	Overall MEC Risk[2]
Roadway Recreational User (Surface)	1	B
	2	n/a
	3	n/a
Roadway Maintenance Worker (down to 24 inches bgs)	1	D
	2	n/a
	3	n/a
Roadway Construction Worker (down to 60 inches bgs)	1	D
	2	n/a
	3	n/a

Notes:

MEC = munitions and explosives of concern
bgs = below ground surface

[1] **MEC Hazard Type**:
1=Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2=Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3=Will kill an individual if detonated by an individual's activities.

[2] **Overall MEC Risk**: qualitative score related to MEC Hazard Type, Accessibility Factor, and Exposure Factor:
B=Low Risk
D=High Risk
n/a = not applicable because MEC Hazard Types 2 and 3 were not found in this area.

Table 5-1
Summary of Evaluation of Remedial Alternatives for DRO/Monterey MRA

Remedial Alternative	EPA's 9 CERCLA EVALUATION CRITERIA								
	Threshold Criteria		Balancing Criteria					Modifying Criteria	
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Short-Term Effectiveness	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, and Volume Through Treatment [1]	Implementability	Cost	State Acceptance	Community Acceptance
Alternative 1 - No Further Action	Not protective; does not mitigate potentially remaining MEC risks to surface receptors or intrusive workers	No ARARs identified for this alternative	Not effective in the short-term; no MEC risk mitigation	Not effective in the long-term; no MEC risk mitigation	No reduction in volume because no further MEC removals would be conducted	Not administratively feasible	Minimal	Unlikely	Unlikely
Alternative 2 - Land Use Controls	Protective to construction and maintenance workers (intrusive workers); prohibits use for residential reuse	Continued implementation of CRUP with no ARARs identified for this alternative	Effective in the short-term; implementation of LUCs to mitigate MEC risk to construction and maintenance workers (intrusive workers)	Required training and construction support would mitigate risks to construction and maintenance workers (intrusive workers) until evaluation determines LUCs no longer necessary	No reduction in volume because no further MEC removals would be conducted	Administratively feasible; moderate technical effort required to implement	$757,000	Likely to be acceptable because of short and long term mitigation actions	May be acceptable; takes short and long term mitigation actions
Alternative 3 - Additional MEC Remediation	Protective of human health and the environment	Implementation would require compliance with ARARs identified in Appendix A	May be effective in the short-term; MEC removals would be conducted	May or may not be effective in the long-term; additional risk mitigation may be needed after additional MEC remediation	May result in MEC reduction if additional MEC is discovered and removed during remediation	Administratively feasible; high level of technical effort required to implement	$1,045,000	Likely to be acceptable because of additional remediation and short and long term mitigation actions	Acceptability unknown due to vegetation disturbance and removal involved
Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls	Protective to construction and maintenance workers (intrusive workers); protective of human health and the environment	Implementation would require compliance with ARARs identified in Appendix A	Effective in the short-term; required training and construction support would mitigate risks to construction and maintenance workers (intrusive workers)	Effective in the long-term; required training and construction support would mitigate risks to construction and maintenance workers (intrusive workers); may reduce MEC risks	May result in MEC reduction if additional MEC is discovered and removed during remediation	Technically and administratively feasible to implement	$983,000	Likely to be acceptable because of additional remediation and short and long term mitigation actions	May be acceptable; takes short and long term mitigation actions

Notes:
ARARs = applicable or relevant and appropriate requirements
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
MEC = munitions and explosives of concern
CRUP = Covenant to Restrict the Use of Property
LUC = Land Use Controls
[1] = Completed MEC removal actions already provide for reduction of volume.

Table 5-2
Summary of Evaluation of Remedial Alternatives for Laguna Seca Parking MRA

Remedial Alternative	EPA's 9 CERCLA EVALUATION CRITERIA								
	Threshold Criteria		Balancing Criteria					Modifying Criteria	
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Short-Term Effectiveness	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, and Volume Through Treatment [1]	Implementability	Cost	State Acceptance	Community Acceptance
Alternative 1 - No Further Action	Not protective; does not mitigate potentially remaining MEC risks to surface receptors or intrusive workers	No ARARs identified for this alternative	Not effective in the short-term; no MEC risk mitigation	Not effective in the long-term; no MEC risk mitigation	No reduction in volume because no further MEC removals would be conducted	Not administratively feasible	Minimal	Unlikely	Unlikely
Alternative 2 - Land Use Controls	Protective to construction and maintenance workers (intrusive workers); prohibits use for residential use	Continued implementation of CRUP with no ARARs identified for this alternative	Effective in the short-term; implementation of LUCs to mitigate MEC risk to construction and maintenance workers (intrusive workers)	Required training and construction support would mitigate risks to construction and maintenance workers (intrusive workers) until evaluation determines LUCs no longer necessary	No reduction in volume because no further MEC removals would be conducted	Administratively feasible; moderate technical effort required to implement	$757,000	Likely to be acceptable because of short and long term mitigation actions	May be acceptable; takes short and long term mitigation actions
Alternative 3 - Additional MEC Remediation	Protective of human health and the environment	Implementation would require compliance with ARARs identified in Appendix A	May be effective in the short-term; MEC removals would be conducted	May or may not be effective in the long-term; additional risk mitigation may be needed after additional MEC remediation	May result in MEC reduction if additional MEC is discovered and removed during remediation	Administratively feasible; high level of technical effort required to implement	$5,767,000	Likely to be acceptable because of additional remediation and short and long term mitigation actions	Acceptability unknown due to vegetation disturbance and removal involved

Notes:
ARARs = applicable or relevant and appropriate requirements
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
MEC = munitions and explosives of concern
CRUP = Covenant to Restrict the Use of Property
LUC = Land Use Controls
[1] = Completed MEC removal actions already provide for reduction of volume.

Table 5-3
Summary of Evaluation of Remedial Alternatives for MOUT Site MRA

Remedial Alternative	EPA's 9 CERCLA EVALUATION CRITERIA								
	Threshold Criteria		Balancing Criteria					Modifying Criteria	
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Short-Term Effectiveness	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, and Volume Through Treatment [1]	Implementability	Cost	State Acceptance	Community Acceptance
Alternative 1 - No Further Action	Not protective; does not mitigate potentially remaining MEC risks to surface receptors or intrusive workers	No ARARs identified for this alternative	Not effective in the short-term; no MEC risk mitigation	Not effective in the long-term; no MEC risk mitigation	No reduction in volume because no further MEC removals would be conducted	Not administratively feasible	Minimal	Unlikely	Unlikely
Alternative 2 - Land Use Controls	Protective to construction and maintenance workers (intrusive workers); prohibits use for residential reuse	Continued implementation of CRUP with no ARARs identified for this alternative	Effective in the short-term; implementation of LUCs to mitigate MEC risk to construction and maintenance workers (intrusive workers)	Required training and construction support would mitigate risks to construction and maintenance workers (intrusive workers) until evaluation determines LUCs no longer necessary	No reduction in volume because no further MEC removals would be conducted	Administratively feasible; moderate technical effort required to implement	$757,000	Likely to be acceptable because of short and long term mitigation actions	May be acceptable; takes short and long term mitigation actions
Alternative 3 - Additional MEC Remediation	Protective of human health and the environment	Implementation would require compliance with ARARs identified in Appendix A	May be effective in the short-term; MEC removals would be conducted	May or may not be effective in the long-term; additional risk mitigation may be needed after additional MEC remediation; may interfere with continued use of area for training	May result in MEC reduction if additional MEC is discovered and removed during remediation	Administratively feasible; high level of technical effort required to implement	$1,621,000	Likely to be acceptable because of additional remediation and short and long term mitigation actions	Acceptability unknown due to vegetation disturbance and removal involved
Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls	Protective to construction and maintenance workers (intrusive workers); protective of human health and the environment	Implementation would require compliance with ARARs identified in Appendix A	Effective in the short-term; required training and construction support would mitigate risks to construction and maintenance workers (intrusive workers)	Effective in the long-term; required training and construction support would mitigate risks to construction and maintenance workers (intrusive workers); may reduce MEC risks	May result in MEC reduction if additional MEC is discovered and removed during remediation	Technically and administratively feasible to implement	$1,148,000	Likely to be acceptable because of additional remediation and short and long term mitigation actions	May be acceptable; takes short and long term mitigation actions

Notes:
ARARs = applicable or relevant and appropriate requirements
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act
MEC = munitions and explosives of control
CRUP = Covenant to Restrict the Use of Property
LUC = Land Use Controls
[1] = Completed MEC removal actions already provide for reduction of volume.

Table 5-4
DRO/Monterey MRA
Long-Term Management Costs

	Quantity	Unit	Unit Price	Total
LONG-TERM MANAGEMENT MEASURES UNIT COSTS				
File Initial Deed Notice [1]	2	reuse area	$5,000	$10,000
Modify or Remove Deed Notice [1]	2	reuse area	$5,000	$10,000
Subtotal Capital Costs				$20,000
Capital Cost Contingency	10%	of Capital Costs		$2,000
TOTAL CAPITAL COSTS				**$22,000**
Annual LTM Costs				
Annual Monitoring [2]	1	Entire MRA	$5,000	$5,000
5-Year Review Reporting [3]	1	Entire MRA	$3,000	$3,000
Subtotal Annual Costs				$8,000
Annual Cost Contingency	10%	of Annual Costs		$800
TOTAL ANNUAL COSTS				**$8,800**
30-Year Annual LTM Costs				
NPV LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$179,369
TOTAL LONG-TERM MANAGEMENT COSTS (rounded to nearest thousand)				$210,000

Definitions:
LTM = Long-Term Management
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary pre-field activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] Costs for initial deed notice and modification of deed notice assumed by FORA.
[2] Costs of annual monitoring assumed by FORA until FORA ceases to exist. The County of Monterey has agreed to prepare the annual report when FORA ceases to exist in accordance with the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxic Substances Control Concerning Monitoring and Reporting on Environmental Restrictions on the Former Fort Ord, Monterey County, California"
[3] Costs of first two five-year review reports (for 2012 and 2017) assumed by FORA, then covered by Army.

Table 5-5
DRO/Monterey MRA
Alternative 2 - Land Use Controls Costs

	Quantity	Unit	Unit Price	Total
LAND USE CONTROLS UNIT COSTS				
ANNUAL LTM COSTS (Years 1-7 During Development)				
Construction Support [1]				
UXO-Qualified Personnel & Equipment	10	day	$1,867	$18,670
MEC Recognition Training [2]				
On-Site Training	10	each	$300	$3,000
Subtotal				$21,670
Annual Cost Contingency	10% of Annual Costs			$2,167
TOTAL ANNUAL COSTS (Years 1-7)				$23,837
ANNUAL LTM COSTS (Years 8-30 During Reuse)				
Construction Support [3]				
UXO-Qualified Personnel & Equipment	5	day	$1,867	$9,335
MEC Recognition Training [4]				
On-Site Training	4	each	$300	$1,200
Subtotal				$10,535
Annual Cost Contingency	10% of Annual Costs			$1,054
TOTAL ANNUAL COSTS (Years 8-30)				$11,589
NPV YEARS 1-7 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$485,866
NPV YEARS 8-30 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$236,207
LAND USE CONTROLS TOTAL COST (rounded to nearest thousand)				**$757,000**

Definitions:
LTM = Long Term Management
MEC = munitions and explosives of concern
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary prefield activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes two-person UXO-qualified personnel team visually observing mass soil grading and utility installation activities during development (estimate of 2 weeks for comparison purposes, actual length may vary)
[2] = Assumes monthly training and/or refresher training of construction crews during development (estimate of 10 months for comparison purposes, actual length may vary)
[3] = Assumes two-person UXO-qualified personnel team visually observing occasional utility installation and/or repairs during reuse (estimate of 1 week for comparison purposes, actual length may vary)
[4] = Assumes quarterly training and/or refresher training of construction crews during reuse

Table 5-6
DRO/Monterey MRA
Alternative 3 - Additional MEC Remediation Costs

	Quantity	Unit	Unit Price	Total
ADDITIONAL MEC REMEDIATION UNIT COSTS [1]				
Survey (Boundary & Grid)	35	acre	$380	$13,300
Vegetation Clearance	35	acre	$4,500	$157,500
Burning	6	acre	$7,000	$42,000
Fence Removal	7300	linear foot	$4	$25,550
Digital Survey of Anomalies	35	acre	$2,592	$90,720
Excavation & Removal of MEC	35	acre	$6,389	$223,615
Detonation & Engineering Controls	35	acre	$450	$15,750
GIS/Database	35	acre	$1,000	$35,000
Quality Control DGM	35	acre	$2,592	$90,720
QC Excavation & Removal of MEC	35	acre	$1,405	$49,175
Site Restoration	35	acre	$862	$30,170
Total Field Costs				$773,500
Reporting [2]	1	lump sum	$200,000	$200,000
ADDITIONAL MEC REMEDIATION TOTAL COST (rounded to nearest thousand)				$974,000
ANNUAL COSTS				
HABITAT MANAGEMENT [3]				
Post-Remediation Habitat Monitoring	6	acre	$500	$3,000
Subtotal				$3,000
Annual Cost Contingency	10%	of Annual Costs		$300
TOTAL ANNUAL COSTS				$3,300
NPV YEARS 30 years (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$67,263
Habitat Management 30-YEAR NPV COST (rounded to nearest thousand)				$71,000
ALTERNATIVE 3 TOTAL COST (rounded to nearest thousand)				$1,045,000

Definitions:
MEC = munitions and explosives of concern
GIS = Geographical Information System
DGM = digital geophysical mapping
QC = quality control
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary pre-field activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes digital geophysical survey using best available and appropriate technology followed by anomaly reacquisition, excavation of identified anomalies, and detonations where required
[2] = Reporting includes Remedial Design/Remedial Action Work Plan and Remedial Action Completion Report
[3] = Annualized unit cost for maintaining roads, fuelbreaks, performing invasive weed control, and species monitoring. For costing purposes, HMP annual monitoring plants assumed to be monitored during 3 events in the first five years and HMP habitat reserve species (e.g., chaparral) assumed to be monitored during 5 events in the first 13 years. Includes mapping, data management/evaluation, prepartion of reports.

Table 5-7
DRO/Monterey MRA
Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

	Quantity	Unit	Unit Price	Total
ADDITIONAL MEC REMEDIATION UNIT COSTS [5]				
Survey (Boundary & Grid)	5	acre	$380	$1,900
Vegetation Clearance	5	acre	$4,500	$22,500
Fence Removal	7300	linear foot	$4	$25,550
Digital Survey of Anomalies	5	acre	$2,592	$12,960
Excavation & Removal of MEC	5	acre	$6,389	$31,945
Detonation & Engineering Controls	5	acre	$450	$2,250
GIS/Database	5	acre	$1,000	$5,000
Quality Control DGM	5	acre	$2,592	$12,960
QC Excavation & Removal of MEC	5	acre	$1,405	$7,025
Site Restoration	5	acre	$862	$4,310
TOTAL FIELD COSTS				$126,400
Reporting [6]	1	lump sum	$100,000	$100,000
ADDITIONAL MEC REMEDIATION TOTAL COST (rounded to nearest thousand)				**$226,000**
LAND USE CONTROLS UNIT COSTS				
ANNUAL LTM COSTS (Years 1-7 During Development)				
Construction Support [1]				
UXO-Qualified Personnel & Equipment	10	day	$1,867	$18,670
MEC Recognition Training [2]				
On-Site Training	10	each	$300	$3,000
Subtotal				$21,670
Annual Cost Contingency	10% of Annual Costs			$2,167
TOTAL ANNUAL COSTS (Years 1-7)				$23,837
ANNUAL LTM COSTS (Years 8-30 During Reuse)				
Construction Support [3]				
UXO-Qualified Personnel & Equipment	5	day	$1,867	$9,335
MEC Recognition Training [4]				
On-Site Training	4	each	$300	$1,200
Subtotal				$10,535
Annual Cost Contingency	10% of Annual Costs			$1,054
TOTAL ANNUAL COSTS (Years 8-30)				$11,589
NPV YEARS 1-7 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$485,866
NPV YEARS 8-30 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$236,207
LAND USE CONTROLS TOTAL 30-YEAR NPV COST (rounded to nearest thousand)				**$757,000**
ALTERNATIVE 4 TOTAL COST (rounded to nearest thousand)				**$983,000**

Definitions:
LTM = Long-Term Management
MEC = munitions and explosives of concern
GIS = Geographical Information System
DGM = digital geophysical mapping
QC = quality control
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary

prefield activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes two-person UXO-qualified personnel team visually observing mass soil grading and utility installation activities during development (estimate of 2 weeks for comparison purposes, actual length may vary)
[2] = Assumes monthly training and/or refresher training of construction crews during development (estimate of 10 months for comparison purposes, actual length may vary)
[3] = Assumes two-person UXO-qualified personnel team visually observing occasional utility installation and/or repairs during reuse (estimate of 1 week for comparison purposes, actual length may vary)
[4] = Assumes quarterly training and/or refresher training of construction crews during reuse
[5] = Assumes digital geophysical survey using best available and appropriate technology followed by anomaly reacquisition and excavation of identified anomalies and detonations where required
[6] = Reporting includes Remedial Design/Remedial Action Work Plan and Remedial Action Completion Report

Table 5-8
Laguna Seca Parking MRA
Long-Term Management Costs

	Quantity	Unit	Unit Price	Total
LONG-TERM MANAGEMENT MEASURES UNIT COSTS				
File Initial Deed Notice [1]	1	reuse area	$5,000	$5,000
Modify or Remove Deed Notice [1]	1	reuse area	$5,000	$5,000
Subtotal Capital Costs				$10,000
Capital Cost Contingency	10%	of Capital Costs		$1,000
TOTAL CAPITAL COSTS				**$11,000**
Annual LTM Costs				
Annual Monitoring [2]	1	Entire MRA	$5,000	$5,000
5-Year Review Reporting [3]	1	Entire MRA	$3,000	$3,000
Subtotal Annual Costs				$8,000
Annual Cost Contingency	10%	of Annual Costs		$800
TOTAL ANNUAL COSTS				**$8,800**
30-Year Annual LTM Costs				
NPV LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$179,369
TOTAL LONG-TERM MANAGEMENT COSTS (rounded to nearest thousand)				$199,000

Definitions:
LTM = Long-Term Management
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary pre-field activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] Costs for initial deed notice and modification of deed notice assumed by FORA.
[2] Costs of annual monitoring assumed by FORA until FORA ceases to exist. The County of Monterey has agreed to prepare the annual report when FORA ceases to exist in accordance with the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxic Substances Control Concerning Monitoring and Reporting on Environmental Restrictions on the Former Fort Ord, Monterey County, California"
[3] Costs of first two five-year review reports (for 2012 and 2017) assumed by FORA, then covered by Army.

Table 5-9
Laguna Seca Parking MRA
Alternative 2 - Land Use Controls Costs

	Quantity	Unit	Unit Price	Total
LAND USE CONTROLS UNIT COSTS				
ANNUAL LTM COSTS (Years 1-7 During Development)				
Construction Support [1]				
UXO-Qualified Personnel & Equipment	10	day	$1,867	$18,670
MEC Recognition Training [2]				
On-Site Training	10	each	$300	$3,000
Subtotal				$21,670
Annual Cost Contingency	10% of Annual Costs			$2,167
TOTAL ANNUAL COSTS (Years 1-7)				$23,837
ANNUAL LTM COSTS (Years 8-30 During Reuse)				
Construction Support [3]				
UXO-Qualified Personnel & Equipment	5	day	$1,867	$9,335
MEC Recognition Training [4]				
On-Site Training	4	each	$300	$1,200
Subtotal				$10,535
Annual Cost Contingency	10% of Annual Costs			$1,054
TOTAL ANNUAL COSTS (Years 8-30)				$11,589
NPV YEARS 1-7 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$485,866
NPV YEARS 8-30 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$236,207
ALTERNATIVE 2 TOTAL COST (rounded to nearest thousand)				**$757,000**

Definitions:
LTM = Long Term Management
MEC = munitions and explosives of concern
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary prefield activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes two-person UXO-qualified personnel team visually observing mass soil grading and utility installation activities during development (estimate of 2 weeks for comparison purposes, actual length may vary)
[2] = Assumes monthly training and/or refresher training of construction crews during development (estimate of 10 months for comparison purposes, actual length may vary)
[3] = Assumes two-person UXO-qualified personnel team visually observing occasional utility installation and/or repairs during reuse (estimate of 1 week for comparison purposes, actual length may vary)
[4] = Assumes quarterly training and/or refresher training of construction crews during reuse

Table 5-10
Laguna Seca Parking MRA
Alternative 3 - Additional MEC Remediation Costs

	Quantity	Unit	Unit Price	Total
ADDITIONAL MEC REMEDIATION UNIT COSTS [1]				
Survey (Boundary & Grid)	276	acre	$380	$104,880
Vegetation Clearance	276	acre	$4,500	$1,242,000
Digital Survey of Anomalies	276	acre	$2,592	$715,392
Excavation & Removal of MEC [2]	276	acre	$6,389	$1,763,364
Detonation & Engineering Controls	276	acre	$450	$124,200
GIS/Database	276	acre	$1,000	$276,000
Quality Control DGM	276	acre	$2,592	$715,392
QC Excavation & Removal of MEC	276	acre	$1,405	$387,780
Site Restoration	276	acre	$862	$237,912
Total Field Costs				$5,566,920
Reporting [3]	1	lump sum	$200,000	$200,000
ADDITIONAL MEC REMEDIATION TOTAL COST (rounded to nearest thousand)				$5,767,000
ALTERNATIVE 3 TOTAL COST (rounded to nearest thousand)				$5,767,000

Definitions:
MEC = munitions and explosives of concern
GIS = Geographical Information System
DGM = digital geophysical mapping
QC = quality control
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary pre-field activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes digital geophysical survey using best available and appropriate technology followed by anomaly reacquisition, excavation of identified anomalies, and detonations where required.
[2] = Includes monitoring for California Tiger Salamander (CTS) during excavation within the 2km boundary of an aquatic feature that could serve as breeding habitat for CTS.
[3] = Reporting includes Remedial Design/Remedial Action Work Plan and Remedial Action Completion Report

Table 5-11
MOUT Site MRA
Long-Term Management Costs

	Quantity	Unit	Unit Price	Total
LONG-TERM MANAGEMENT MEASURES UNIT COSTS				
File Initial Deed Notice [1]	1	reuse area	$5,000	$5,000
Modify or Remove Deed Notice [1]	1	reuse area	$5,000	$5,000
Subtotal Capital Costs				$10,000
Capital Cost Contingency	10%	of Capital Costs		$1,000
TOTAL CAPITAL COSTS				**$11,000**
Annual LTM Costs				
Annual Monitoring [2]	1	Entire MRA	$5,000	$5,000
5-Year Review Reporting [3]	1	Entire MRA	$3,000	$3,000
Subtotal Annual Costs				$8,000
Annual Cost Contingency	10%	of Annual Costs		$800
TOTAL ANNUAL COSTS				**$8,800**
30-Year Annual LTM Costs				
NPV LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$179,369
TOTAL LONG-TERM MANAGEMENT COSTS (rounded to nearest thousand)				$199,000

Definitions:
LTM = Long-Term Management
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary pre-field activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] Costs for initial deed notice and modification of deed notice assumed by FORA.
[2] Costs of annual monitoring assumed by FORA until FORA ceases to exist. The County of Monterey has agreed to prepare the annual report when FORA ceases to exist in accordance with the "Memorandum of Agreement Among the Fort Ord Reuse Authority, Monterey County and Cities of Seaside, Monterey, Del Rey Oaks and Marina, California State University Monterey Bay, University of California Santa Cruz, Monterey Peninsula College, and the Department of Toxic Substances Control Concerning Monitoring and Reporting on Environmental Restrictions on the Former Fort Ord, Monterey County, California"
[3] Costs of first two five-year review reports (for 2012 and 2017) assumed by FORA, then covered by Army.

Table 5-12
MOUT Site MRA
Alternative 2 - Land Use Controls Costs

	Quantity	Unit	Unit Price	Total
LAND USE CONTROLS UNIT COSTS				
ANNUAL LTM COSTS (Years 1-7 During Development)				
Construction Support [1]				
UXO-Qualified Personnel & Equipment	10	day	$1,867	$18,670
MEC Recognition Training [2]				
On-Site Training	10	each	$300	$3,000
Subtotal				$21,670
Annual Cost Contingency	10% of Annual Costs			$2,167
TOTAL ANNUAL COSTS (Years 1-7)				$23,837
ANNUAL LTM COSTS (Years 8-30 During Reuse)				
Construction Support [3]				
UXO-Qualified Personnel & Equipment	5	day	$1,867	$9,335
MEC Recognition Training [4]				
On-Site Training	4	each	$300	$1,200
Subtotal				$10,535
Annual Cost Contingency	10% of Annual Costs			$1,054
TOTAL ANNUAL COSTS (Years 8-30)				$11,589
NPV YEARS 1-7 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$485,866
NPV YEARS 8-30 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$236,207
LAND USE CONTROLS TOTAL COST (rounded to nearest thousand)				**$757,000**

Definitions:
LTM = Long Term Management
MEC = munitions and explosives of concern
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary prefield activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes two-person UXO-qualified personnel team visually observing mass soil grading and utility installation activities during development (estimate of 2 weeks for comparison purposes, actual length may vary)
[2] = Assumes monthly training and/or refresher training of construction crews during development (estimate of 10 months for comparison purposes, actual length may vary)
[3] = Assumes two-person UXO-qualified personnel team visually observing occasional utility installation and/or repairs during reuse (estimate of 1 week for comparison purposes, actual length may vary)

Table 5-13
MOUT Site MRA
Alternative 3 - Additional MEC Remediation Costs

	Quantity	Unit	Unit Price	Total
ADDITIONAL MEC REMEDIATION UNIT COSTS [1]				
Survey (Boundary & Grid)	61	acre	$380	$23,180
Vegetation Clearance	61	acre	$4,500	$274,500
Fence Removal	8000	linear foot	$4	$28,000
Fence Installation	8000	linear foot	$20	$162,320
Digital Survey of Anomalies	61	acre	$2,592	$158,112
Excavation & Removal of MEC	61	acre	$6,389	$389,729
Detonation & Engineering Controls	61	acre	$450	$27,450
GIS/Database	61	acre	$1,000	$61,000
Quality Control DGM	61	acre	$2,592	$158,112
QC Excavation & Removal of MEC	61	acre	$1,405	$85,705
Site Restoration	61	acre	$862	$52,582
Total Field Costs				$1,420,690
Reporting [2]	1	lump sum	$200,000	$200,000
ADDITIONAL MEC REMEDIATION TOTAL COST (rounded to nearest thousand)				$1,621,000
ALTERNATIVE 3 TOTAL COST (rounded to nearest thousand)				$1,621,000

Definitions:
MEC = munitions and explosives of concern
GIS = Geographical Information System
DGM = digital geophysical mapping
QC = quality control
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:
These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary pre-field activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes digital geophysical survey using best available and appropriate technology followed by anomaly reacquisition, excavation of identified anomalies, and detonations where required
[2] = Reporting includes Remedial Design/Remedial Action Work Plan and Remedial Action Completion Report

Table 5-14
MOUT Site MRA
Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

	Quantity	Unit	Unit Price	Total
ADDITIONAL MEC REMEDIATION UNIT COSTS [5]				
Survey (Boundary & Grid)	2.3	acre	$380	$874
Vegetation Clearance	2.3	acre	$4,500	$10,350
Fence Removal	8000	linear foot	$4	$28,000
Fence Installation	8000	linear foot	$20	$162,320
Digital Survey of Anomalies	2.3	acre	$2,592	$5,962
Excavation & Removal of MEC	2.3	acre	$6,389	$14,695
Detonation & Engineering Controls	2.3	acre	$450	$1,035
GIS/Database	2.3	acre	$1,000	$2,300
Quality Control DGM	2.3	acre	$2,592	$5,962
QC Excavation & Removal of MEC	2.3	acre	$1,405	$3,232
Site Restoration	2.3	acre	$862	$1,983
TOTAL FIELD COSTS				$236,711
Reporting [6]	1	lump sum	$100,000	$100,000
ADDITIONAL MEC REMEDIATION TOTAL COST (rounded to nearest thousand)				**$337,000**
LAND USE CONTROLS UNIT COSTS				
ANNUAL LTM COSTS (Years 1-7 During Development)				
Construction Support [1]				
UXO-Qualified Personnel & Equipment	10	day	$1,867	$18,670
MEC Recognition Training [2]				
On-Site Training	10	each	$300	$3,000
Subtotal				$21,670
Annual Cost Contingency	10% of Annual Costs			$2,167
TOTAL ANNUAL COSTS (Years 1-7)				$23,837
ANNUAL LTM COSTS (Years 8-30 During Reuse)				
Construction Support [3]				
UXO-Qualified Personnel & Equipment	5	day	$1,867	$9,335
MEC Recognition Training [4]				
On-Site Training	4	each	$300	$1,200
Subtotal				$10,535
Annual Cost Contingency	10% of Annual Costs			$1,054
TOTAL ANNUAL COSTS (Years 8-30)				$11,589
NPV YEARS 1-7 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$485,866
NPV YEARS 8-30 LTM (2.7% Real Interest Rate, OMB Circular A-94, Appendix C, December 2008)				$236,207
LAND USE CONTROLS TOTAL 30-YEAR NPV COST (rounded to nearest thousand)				**$757,000**
ALTERNATIVE 4 TOTAL COST (rounded to nearest thousand)				**$1,094,000**

Definitions:
LTM = Long-Term Management
MEC = munitions and explosives of concern
GIS = Geographical Information System
DGM = digital geophysical mapping
QC = quality control
NPV = Net Present Value
OMB = President's Office of Management and Budget

Assumptions:

Table 5-14
MOUT Site MRA
Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

These costs are for comparison purposes only and have an accuracy of +50 or -30%. Many design variables and necessary prefield activities have not been established. Cost estimates would be refined after the field preparation/design is completed.

[1] = Assumes two-person UXO-qualified personnel team visually observing mass soil grading and utility installation activities during development (estimate of 2 weeks for comparison purposes, actual length may vary)
[2] = Assumes monthly training and/or refresher training of construction crews during development (estimate of 10 months for comparison purposes, actual length may vary)
[3] = Assumes two-person UXO-qualified personnel team visually observing occasional utility installation and/or repairs during reuse (estimate of 1 week for comparison purposes, actual length may vary)
[4] = Assumes quarterly training and/or refresher training of construction crews during reuse
[5] = Assumes digital geophysical survey using best available and appropriate technology followed by anomaly reacquisition and excavation of identified anomalies and detonations where required
[6] = Reporting includes Remedial Design/Remedial Action Work Plan and Remedial Action Completion Report

Table 5-15
DRO/Monterey MRA
Summary of Comparison of Remedial Alternatives

	EPA's 9 CERCLA EVALUATION CRITERIA	Remedial Alternative			
		Alternative 1 - No Further Action	Alternative 2 - Land Use Controls	Alternative 3 - Additional MEC Remediation	Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls
Threshold Criteria	Overall Protectiveness of Human Health and the Environment	○	●	◐	●
	Compliance with ARARs	N/A	N/A	●	●
Balancing Criteria	Short-Term Effectiveness	○	●	◐	●
	Long-Term Effectiveness & Permanence	○	●	◐	●
	Reduction of Toxicity, Mobility, and Volume Through Treatment	○	○	◐	◐
	Implementability	○	●	●	●
	Cost	$	$$	$$$	$$$
Modifying Criteria[1]	State Acceptance	TBD	TBD	TBD	TBD
	Community Acceptance	TBD	TBD	TBD	TBD

Notes:

ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
MEC	munitions and explosives of control
N/A	not applicable
●	Has high ability to meet the CERCLA criteria
○	Does not meet the CERCLA criteria
◐	Has moderate ability to meet the CERCLA criteria
$	Low or minimal costs to implement relative to other alternatives evaluated
$$	Moderate costs to implement relative to other alternatives evaluated
$$$	High costs to implement relative to other alternatives evaluated
[1]	Modifying criteria (state and community acceptance) will be further evaluated following the comment period for the Group 3 Remedial Investigation/Feasibility Study Report
TBD	to be determined

Table 5-16
Laguna Seca Parking MRA
Summary of Comparison of Remedial Alternatives

	EPA's 9 CERCLA EVALUATION CRITERIA	Remedial Alternative		
		Alternative 1 - No Further Action	Alternative 2 - Land Use Controls	Alternative 3 - Additional MEC Remediation
Threshold Criteria	Overall Protectiveness of Human Health and the Environment	○	●	◐
	Compliance with ARARs	N/A	N/A	●
Balancing Criteria	Short-Term Effectiveness	○	●	◐
	Long-Term Effectiveness & Permanence	○	●	◐
	Reduction of Toxicity, Mobility, and Volume Through Treatment	○	○	◐
	Implementability	○	●	●
	Cost	$	$$	$$$
Modifying Criteria [1]	State Acceptance	TBD	TBD	TBD
	Community Acceptance	TBD	TBD	TBD

Notes:

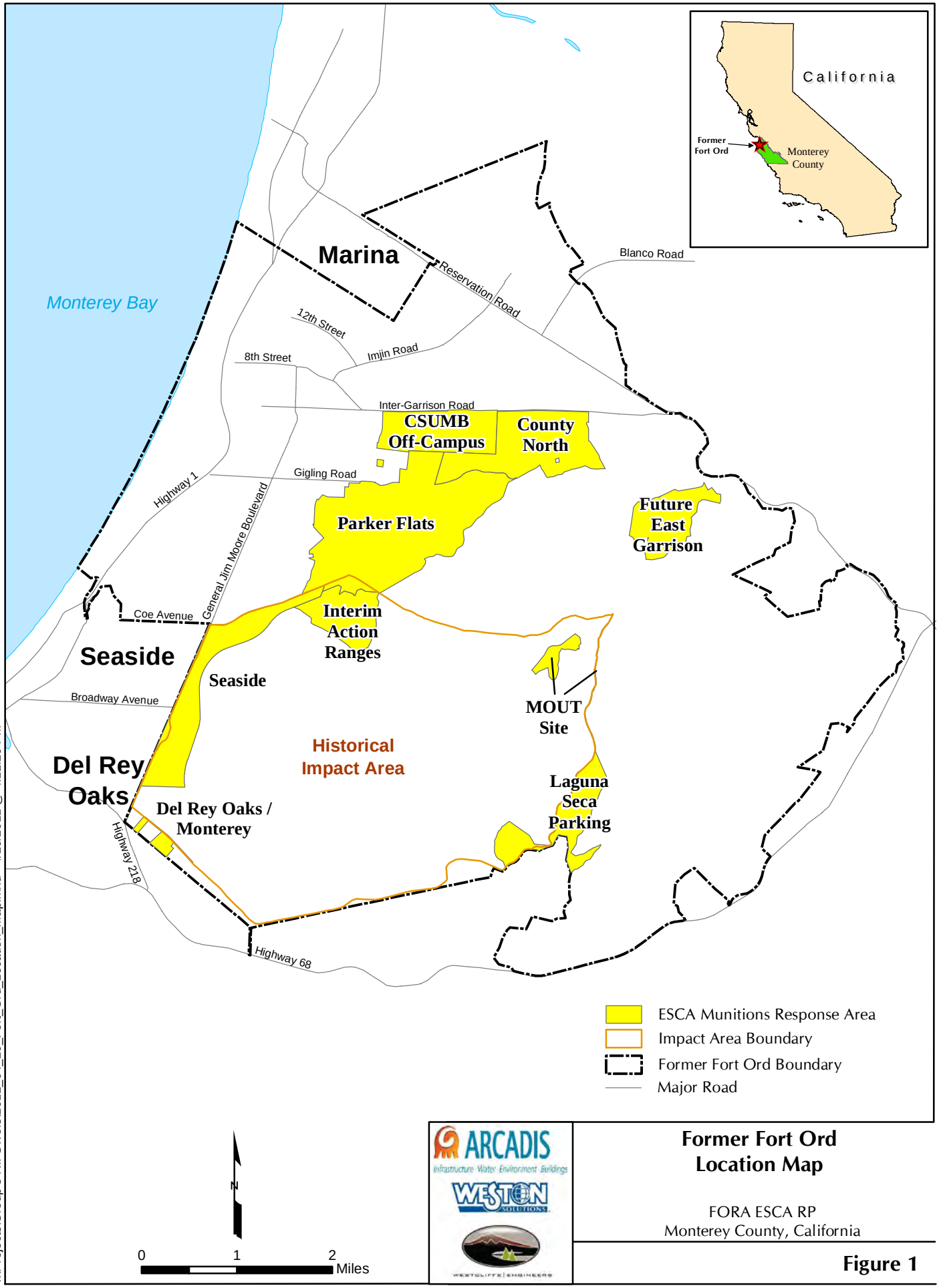
ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
MEC	munitions and explosives of control
N/A	not applicable
●	Has high ability to meet the CERCLA criteria
○	Does not meet the CERCLA criteria
◐	Has moderate ability to meet the CERCLA criteria
$	Low or minimal costs to implement relative to other alternatives evaluated
$$	Moderate costs to implement relative to other alternatives evaluated
$$$	High costs to implement relative to other alternatives evaluated
[1]	Modifying criteria (state and community acceptance) will be further evaluated following the comment period for the Group 3 Remedial Investigation/Feasibility Study Report
TBD	to be determined

Table 5-17
MOUT Site MRA
Summary of Comparison of Remedial Alternatives

	EPA's 9 CERCLA EVALUATION CRITERIA	Remedial Alternative			
		Alternative 1 - No Further Action	Alternative 2 - Land Use Controls	Alternative 3 - Additional MEC Remediation	Alternative 4 - Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls
Threshold Criteria	Overall Protectiveness of Human Health and the Environment	○	●	◐	●
	Compliance with ARARs	N/A	N/A	●	●
Balancing Criteria	Short-Term Effectiveness	○	●	◐	●
	Long-Term Effectiveness & Permanence	○	●	◐	●
	Reduction of Toxicity, Mobility, and Volume Through Treatment	○	○	◐	◐
	Implementability	○	●	●	●
	Cost	$	$$	$$$	$$$
Modifying Criteria[1]	State Acceptance	TBD	TBD	TBD	TBD
	Community Acceptance	TBD	TBD	TBD	TBD

Notes:

ARARs	applicable or relevant and appropriate requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
MEC	munitions and explosives of control
N/A	not applicable
●	Has high ability to meet the CERCLA criteria
○	Does not meet the CERCLA criteria
◐	Has moderate ability to meet the CERCLA criteria
$	Low or minimal costs to implement relative to other alternatives evaluated
$$	Moderate costs to implement relative to other alternatives evaluated
$$$	High costs to implement relative to other alternatives evaluated
[1]	Modifying criteria (state and community acceptance) will be further evaluated following the comment period for the Group 3 Remedial Investigation/Feasibility Study Report
TBD	to be determined



T:\Projects\Group 3 RIFS\Vol3\2012_04_20_Fort_Ord_Location_Map.mxd - 4/20/2012 @ 4:12:26 PM

ARCADIS Infrastructure Water Environment Buildings
WESTON SOLUTIONS
WESTCLIFFE ENGINEERS

Former Fort Ord Location Map

FORA ESCA RP
Monterey County, California

Figure 1

CSUMB Off-Campus MRA

County North MRA

Parker Flats MRA

Future East Garrison MRA

Interim Action Ranges MRA

Seaside MRA

MOUT Site MRA

Laguna Seca Parking MRA

Del Rey Oaks/ Monterey MRA

Legend

Former Fort Ord Boundary

Group 1 MRAs

Seaside MRA
Parker Flats MRA

Group 2 MRAs

CSUMB Off-Campus MRA
County North MRA

Group 3 MRAs

MOUT Site MRA
Del Rey Oaks/Monterey MRA
Laguna Seca Parking MRA

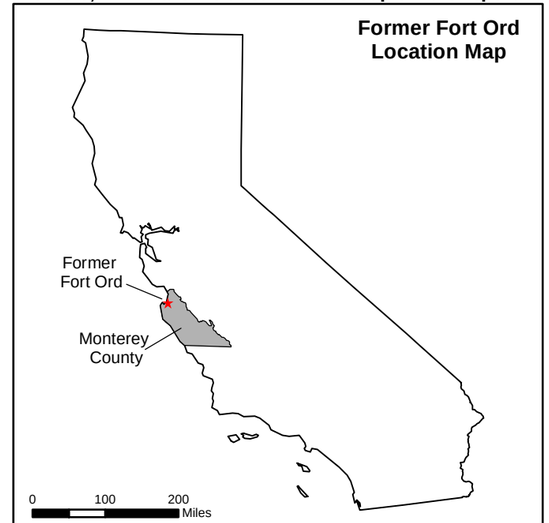
Interim Action Ranges MRA

Group 4 MRA

Future East Garrison MRA

NOTE:
Only the MOUT Site, Laguna Seca Parking, and Del Rey Oaks/ Monterey MRAs are included in this Group 3 RI/FS report.

Former Fort Ord Location Map



N

0 3,000 6,000 Feet

ARCADIS Infrastructure · Water · Environment · Buildings

WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

ESCA Munitions Response Area Groups

FORA ESCA RP
Monterey County, California

Figure 2

T:\Projects\Group 3 RIFS\Vol3\2012_05_18_MRA_Groups.mxd 5/18/2012 @ 3:20:41 PM

South Boundary Road

MRS-15 DRO 01

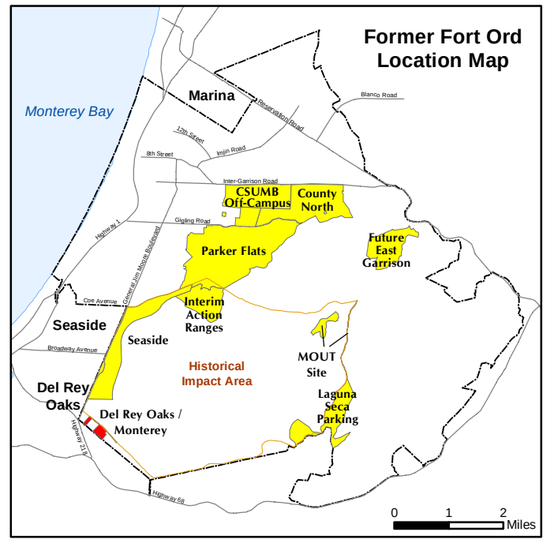
MRS-43

Hillside Used for Target Practice

Highway 218

Legend

- MRS-43 — Munitions Response Site
- Track 1 Site
- Munitions Response Area
- Major Road
- Fence
- Former Fort Ord Boundary



N

0 300 600
Feet

ARCADIS
Infrastructure · Water · Environment · Buildings

WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

Del Rey Oaks / Monterey MRA Munitions Response Site Boundaries

FORA ESCA RP
Monterey County, California

Figure 3

T:\Projects\Group 3 RIFS\Vol3\2012_04_23_DRO_MRS_Boundaries.mxd - 4/23/2012 @ 2:15:35 PM

L20.13.1.2

South Boundary Road

L6.2

L20.13.3.1

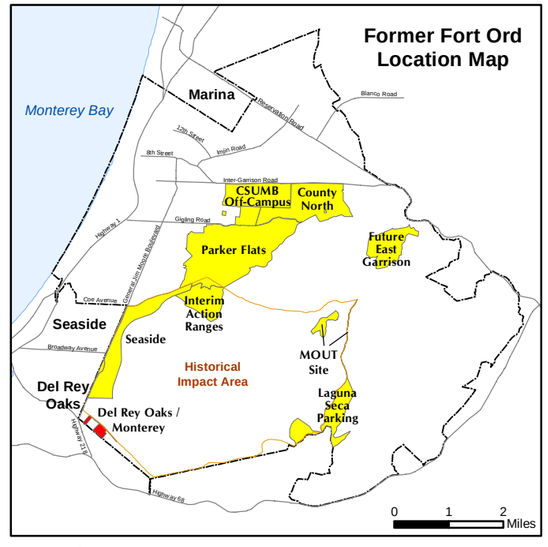
E29.1

Highway 218

T:\Projects\Group 3 RIFS\Vol3\2012_04_23_DRO_USACE_Land_Transfer_Parcels_Structures_and_Utilities.mxd - 5/11/2012 @ 11:41:25 AM

Legend

- E29.1 — USACE Parcel
- Gate
- Entry Forbidden Sign
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary



N

0 300 600 Feet

ARCADIS
Infrastructure · Water · Environment · Buildings

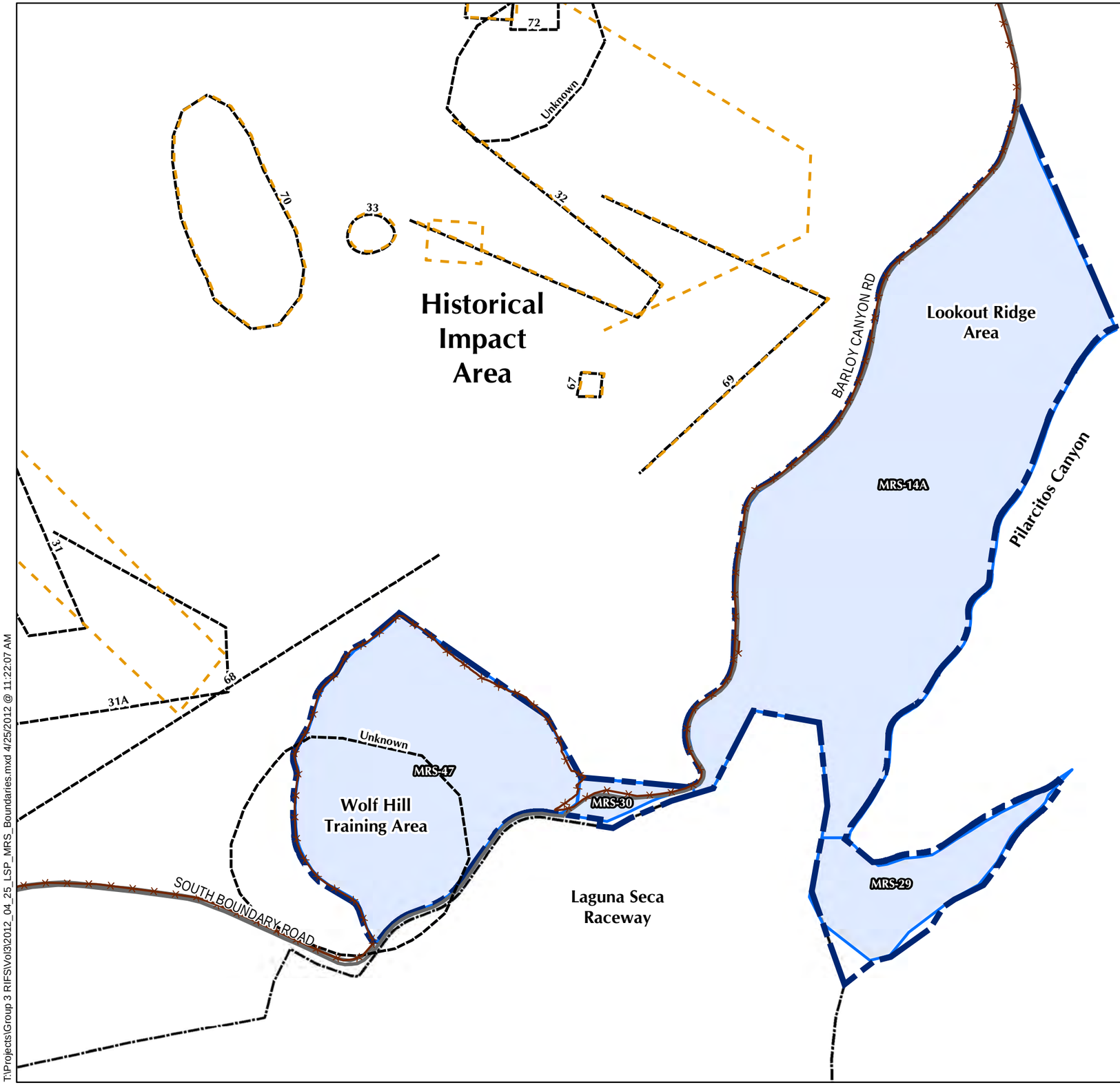
WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

Del Rey Oaks / Monterey MRA
USACE Land Transfer Parcels, Structures, and Utilities

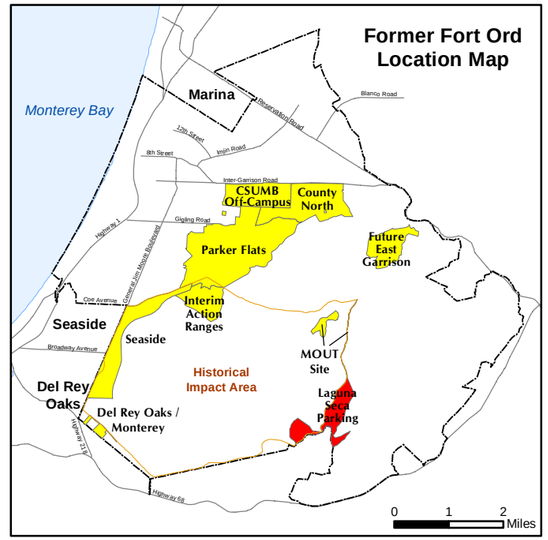
FORA ESCA RP
Monterey County, California

Figure 4



Legend

- MRS-14A — Munitions Response Site
- 67 — Firing Range
- Historical Range
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary



N

0 800 1,600 Feet

ARCADIS
Infrastructure Water Environment Buildings

WESTON SOLUTIONS

WESTCLIFFE ENGINEERS

Laguna Seca Parking MRA
Munitions Response Site Boundaries

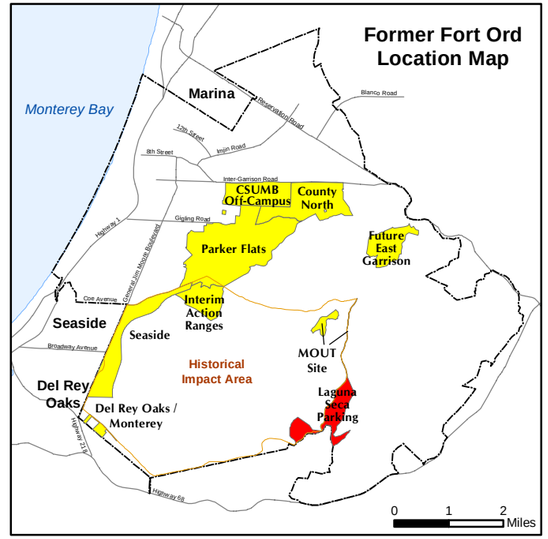
FORA ESCA RP
Monterey County, California

Figure 5

T:\Projects\Group 3 RIFS\Vol3\2012_04_25_LSP_MRS_Boundaries.mxd 4/25/2012 @ 11:22:07 AM

Legend

- E23.1 — USACE Parcel
- Gate
- Sign
- R9211 — Structure
- Electrical Line
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary



N

0 800 1,600 Feet

ARCADIS
Infrastructure · Water · Environment · Buildings

WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

Laguna Seca Parking MRA
USACE Land Transfer Parcels, Structures, and Utilities

FORA ESCA RP
Monterey County, California

Figure 6

T:\Projects\Group 3 RIFS\Vol3\2012_04_25_LSP_USACE_Land_Transfer_Parcels_Structures_and_Utilities.mxd 4/25/2012 @ 10:55:29 AM

EUCALYPTUS RD

40

39

40A

38

36

Unknown

MRS-28

74

Unknown

35

Unknown

MRS-BLM:MRS-27O

MRS-27O

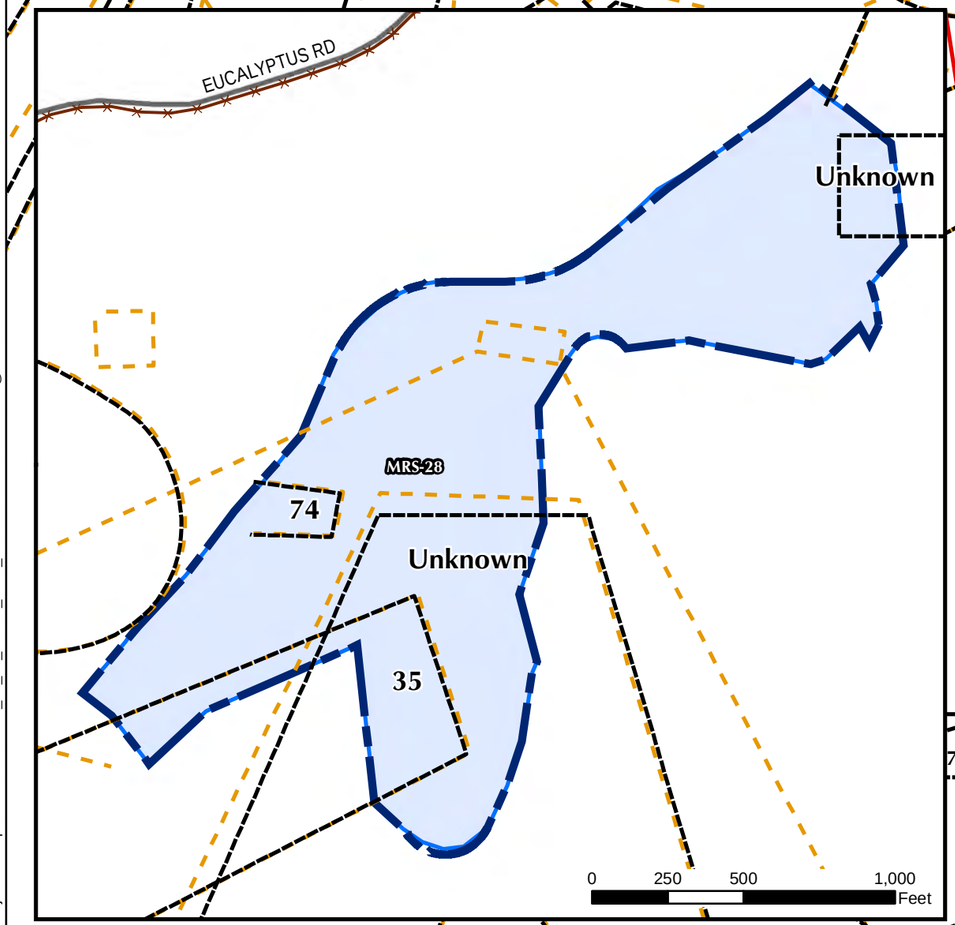
Unknown

34

BARLOY CANYON RD

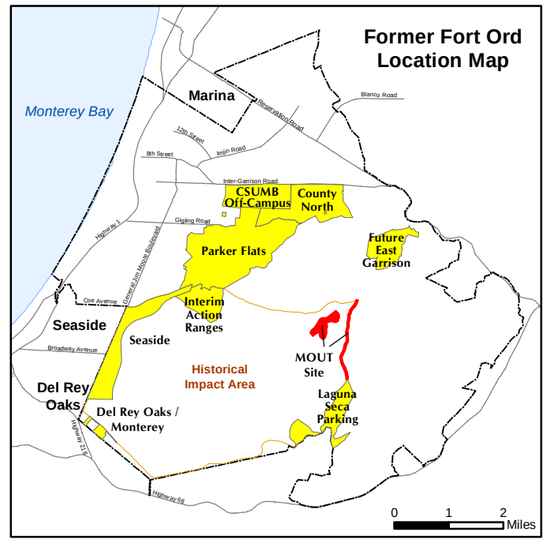
72

Unknown



Legend

- MRS-28 — Munitions Response Site
- 36 — Firing Range
- Historical Range
- Fence
- Munitions Response Area
- Major Road
- Training Sites



N

0
800
1,600
Feet

ARCADIS
Infrastructure · Water · Environment · Buildings

WESTON SOLUTIONS

WESTCLIFFE | ENGINEERS

MOUT Site MRA
Munitions Response Site Boundaries

FORA ESCA RP
Monterey County, California

Figure 7

T:\Projects\Group 3 RIFS\Vol3\2012_04_25_MOUT_MRS_Boundaries.mxd 5/2/2012 @ 1:48:25 PM

T:\Projects\Group 3 RIFS\Vol3\2012_04_25_MOUT_USACE_Land_Transfer_Parcels_Structures_and_Utilities.mxd 5/11/2012 @ 11:42:21 AM

EUCALYPTUS RD

F1.7.2

L20.8

BARLOY CANYON RD

R9350

R9411

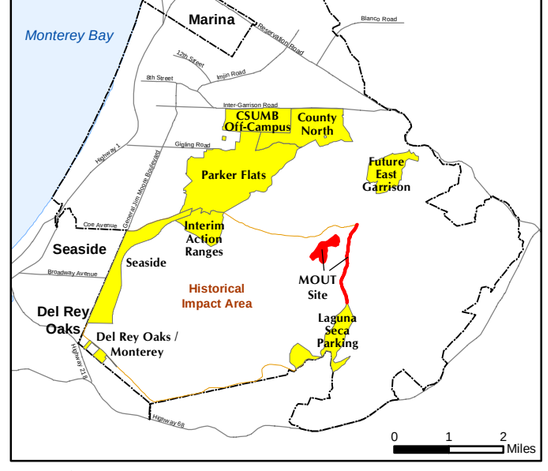
R9521

0 250 500 1,000 Feet

Legend

- L20.8 — USACE Parcel
- Gate
- Sign
- R9211 — Structure
- Electrical Line
- Telephone Line
- Water Line
- Fence
- Munitions Response Area
- Major Road
- Former Fort Ord Boundary

Former Fort Ord Location Map



N

0 800 1,600 Feet

ARCADIS
Infrastructure · Water · Environment · Buildings
WESTON SOLUTIONS
WESTCLIFFE | ENGINEERS

MOUT Site MRA
USACE Land Transfer Parcels, Structures, and Utilities

FORA ESCA RP
Monterey County, California

Figure 8

APPENDIX A

Potential Applicable or Relevant and Appropriate Requirements (ARARs)

Table A-1
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternate 3: Additional MEC Remediation

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
Federal ARARs				
Endangered Species Act (ESA) (16 United States Code [U.S.C.] §§ 1531-1543)	16 U.S.C. § 1536 (a) and (c); 16 U.S.C. § 1538 (a)(1)	Applicable [1, 2, 3] / Location	Federal agencies are required under Section 7 of the ESA to ensure that their actions do not jeopardize the continued existence of a listed species or result in destruction of or adverse modification of its critical habitat (16 U.S.C. § 1536). If the proposed action may affect the listed species or its critical habitat, consultation with the United States Fish and Wildlife Service (USFWS) and/or California Department of Fish and Game may be required (50 Code of Federal Regulations [CFR] § 402.14). Additionally, Section 9 of the ESA prohibits the illegal taking of a listed species (16 U.S.C. § 1538(a)(1)).	Endangered plant and animal species and critical habitats occur at the former Fort Ord. Each reuse area will be screened for potential impacts to any endangered species identified in the Installation-Wide Multispecies Habitat Management Plan (HMP; USACE 1997) and additional requirements identified in subsequent documents (USFWS 1999, 2002, and 2005; and Zander 2002). The provisions of the HMP and referenced additional requirements satisfy the requirements of the ESA.
Migratory Bird Treaty Act (MBTA)	16 U.S.C. §§ 703-712	Applicable [1, 2, 3] / Location	The statute sections prohibit the taking, possession of, buying, selling, purchasing, or bartering of any migratory bird, including feathers or other parts, nest eggs, or products, except as allowed by regulations.	The requirement includes specific standards of control.
Hazardous Materials & Transportation Act	49 CFR Part 172.101	Applicable [3] / Chemical and Action	These regulations impose procedures and controls on the transportation of hazardous materials.	The regulations include specific standards of control and substantive requirements, criteria, and limitations that may apply to the transport of detonation materials and off-site transportation of certain recyclable ordnance materials.
National Pollutant Discharge Elimination System (NPDES)	40 CFR Parts 122, 123, 124	Relevant and Appropriate [1, 2, 3] / Action	Regulates the discharge of pollutants to waters of the United States.	The regulations include specific standards of control and substantive requirements, criteria, and limitations that may apply to discharges of pollutants to waters of the United States. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), procedural requirements such as obtaining a permit while conducting MEC investigation/remediation do not apply.
Federal Resource Conservation and Recovery Act (RCRA), Subpart M (Military Munitions Rule [“the Military Munitions Rule”])	40 CFR Parts 266 and 270	Relevant and Appropriate [2, 3] / Chemical and Action	The regulations identify when military munitions on active ranges become subject to the regulatory definition of “solid waste,” for purposes of RCRA Subtitle C and, if these wastes are hazardous, the management standards that apply.	Portions of the Military Munitions Rule may be relevant and appropriate, but those provisions of the Rule that exclude military munitions from RCRA Subtitle C regulations are not appropriate to the remediation of a closed range. The relevant portions relate to the management of munitions and explosives of concern (MEC), which is recovered, including characterization as hazardous waste and requirements for treatment, storage, and transportation. The Rule provides for the storage and transportation of recovered military munitions in accordance with Department of Defense Explosives Safety Board (DDESB) standards.
State of California ARARs				
California Endangered Species Act	Fish and Game Code §§ 2051 et seq. and §2080	Relevant and Appropriate [1, 2, 3] / Location	The statute sections provide a declaration of policy and definitions. Section 2080 provides that no person shall take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the commission determines to be an endangered species or a threatened species, or attempt any of those acts.	Section 2080 includes specific standards of control with respect to the taking of endangered or threatened species.

Table A-1
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternate 3: Additional MEC Remediation

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
California Fish and Game Code	§ 3511	Relevant and Appropriate [1, 2, 3] / Location	This statute section prohibits taking or possessing fully protected birds or parts thereof, listed as: (a) American peregrine falcon *(Falco peregrinus analum)*; (b) Brown pelican; (c) California black rail *(Lateralhus jamaicensis coturniculus)*; (d) California clapper rail *(Rallus longirostris obsoletus)*; (e) California condor *(Gymnogyps californianus)*; (f) California least tern *(Sterna albifrons browni)*; (g) Golden eagle; (h) Greater sandhill crane *(Grus canadensis tabida)*; (i) Light-footed clapper rail *(Rallus longirostris levipes)*; (j) Southern bald eagle *(Haliaeetus leucocephalus leucocephalus)*; (k) Trumpeter swan *(Cygnus buccinator)*; (l) White-tailed kite *(Elanus leucurus)*; and (m) Yuma clapper rail *(Rallus longirostris yumanensis)*.	The requirement includes specific standards of control that may apply to the American peregrine falcon (some possibility), golden eagle (slight possibility), brown pelican (not likely but possible), and California least tern (not likely but possible).
California Fish and Game Code	§ 3513	Relevant and Appropriate [1, 2, 3] / Location	This statute section declares that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA or any part of such migratory non-game bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.	The requirement includes specific standards of control.
California Fish and Game Code	§ 3503.5	Relevant and Appropriate [1, 2, 3] / Location	This statute section prohibits the take, possession, or destruction of any birds in the orders of Falconiformes or Strigiformes, or to take, possess, or destroy the nest or eggs of any such bird, except as provided in the code.	The requirement includes specific standards of control that may apply to vultures, hawks, ospreys, falcons, and owls.
California Fish and Game Code	Title 14, California Code of Regulations (CCR) § 472	Relevant and Appropriate [1, 2, 3] / Location	This regulation limits the taking of non-game birds and mammals except for specified species.	The requirement includes specific standards of control that may affect American crows.
California Fish and Game Code	§ 4800 et seq.	Relevant and Appropriate [1, 2, 3] / Location	This statute section declares that it is unlawful to take, injure, possess, transport, or sell any mountain lion.	The requirement includes specific standards of control.
California Fish and Game Code	Title 14, CCR §§ 40-42	Relevant and Appropriate [1, 2, 3] / Location	These regulations make it unlawful to take, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, unless under special permit.	The requirement includes specific standards of control that may apply to California black legless lizard and coast horned lizard.
California Clean Air Act (Health and Safety Code)	Monterey Bay Unified Air Pollution Control District Rule 438	Relevant and Appropriate [1] / Location and Action	The rule describes permit requirements, allowable days for burning, and restrictions. The rules include both substantive and procedural requirements regarding open burning.	The rule includes specific standards of control. It also includes non-substantive procedural and administrative provisions which would not apply under CERCLA. This potential ARAR would apply to any alternative evaluated that would involve significant vegetation removal in certain areas of the DRO/Monterey MRA. Substantive requirements include: §3.3, prohibiting burn on no-burn days. §3.4.10, burns shall be ignited only be devices and methods approved by the California Department of Forestry and Fire Protection. §3.4, materials to be burned shall be dry and reasonably free of dirt, soil, and visible surface moisture prior to burning, and shall be free from combustible impurities such as tires, tar, paper, household rubbish, demolition or construction debris, and other materials not grown on site.

Table A-1
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternate 3: Additional MEC Remediation

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
California Health and Safety Code, Division 20	Title 22, CCR Division 4.5	Applicable [3] / Chemical and Action	The statute and regulations provide for identification of hazardous waste in §§ 66261. If a material is a hazardous waste, Division 4.5 provisions further regulate hazardous waste generators, transporters, and treatment, storage, and disposal facilities.	The Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team will evaluate discovered items in accordance with the approved work plan to determine the presence of energetic materials or other constituents that would cause it to be characterized as a hazardous waste. Substantive requirements: • Storage: on-site storage of MEC items occur in a designated bunker that meets the standard of DDESB 6055.9 STD, including security measures such as fences, signs, and an alarm system. • Transportation: off-site transportation of small arms ammunition will incorporate applicable manifesting and placarding requirements. Conforms to Defense Reutilization and Marketing Office instruction. • Disposal/recycling: off-site disposal or recycling facility or facilities for small arms ammunition will be state and/or RCRA-authorized.
California Health and Safety Code	Title 22, CCR § 66264.601-603	Relevant and Appropriate [2] / Action	These regulations apply to hazardous waste treatment, which is conducted in a device that does not meet the definition of a "container" in 22 CCR § 66260.10 or is characterized as a "Miscellaneous Unit" subject to the provisions of 22 CCR § 66264.601-603. For activities where detonations are in a device that meets the 22 CCR § 66260.10 definition of a container, the requirements for "temporary units," as set forth in 22 CCR § 66264.553, apply.	The regulations include generally described narrative standards. Compliance with substantive requirements is achieved through regulatory coordination of site-specific work plans in accordance with the CERCLA and the Administrative Order on Consent (AOC).
California Health and Safety Code	Title 22, CCR § 66265.382	Relevant and Appropriate [3] / Chemical and Action	Open burning of hazardous waste is prohibited except for the open burning and open detonation (OB/OD) of waste explosives. Waste explosives include waste that has the potential to detonate and bulk military propellants that cannot safely be disposed of through other modes of treatment. Detonation is an explosion in which chemical transformation passes through the material faster than the speed of sound (0.33 kilometer/second at sea level). Owners or operators choosing to open burn or detonate waste explosives shall do so in accordance with the following table and in a manner that does not threaten human health or the environment. Pounds Waste Explosives — Minimum Distance from OB/OD to property 0 to 100 — 204 meters (670 feet) 101 to 1,000 — 380 meters (1,250 feet) 1,001 to 10,000 — 530 meters (1,730 feet) 10,001 to 30,000 — 690 meters (2,260 feet)	The requirement includes specific standards of control and addresses situations similar to those that may be encountered during MEC remediation; detonation of MEC will comply with these requirements.
California Fish and Game Code	§ 1900 et seq.	Relevant and Appropriate [1, 2, 3] / Action	These statute sections sets forth programmatic and administrative provisions and, in § 1908, provides that no person shall import into the state, or take, possess, or sell within this state, except as incident to the possession or sale of the real property on which the plant is growing, any native plant, or any part or product thereof, that the commission determines to be an endangered native plant or rare native plant.	The standards of control are relevant and appropriate, and the citation is therefore considered as an ARAR.

Table A-1
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternate 3: Additional MEC Remediation

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
California Fish and Game Code	Title 14, CCR § 783 et seq.	Relevant and Appropriate [1, 2, 3] / Action	These regulations provide that no person shall import into the State, export out of the State or take, possess, purchase, or sell within the State, any endangered species, threatened species, or part or product thereof, or attempt any of those acts, except as otherwise provided in the California Endangered Species Act, Fish and Game Code Section 2050, et seq., the Native Plant Protection Act, the Natural Community Conservation Planning Act, the California Desert Native Plants Act, or as authorized under this article in an incidental take permit. The regulations also provide programmatic and administrative procedures for incidental take permits.	The section includes specific standards of control with respect to taking rare or endangered plants. The standards of control are relevant and appropriate, and the citation is therefore considered as an ARAR.
California Clean Air Act (Health and Safety Code)	Title 17, CCR § 80100 et seq,	Relevant and Appropriate [1] / Action	The regulations provide guidelines, programs, and agency procedures for smoke management plans.	The rule includes specific standards of control. It also includes non-substantive procedural and administrative provisions which would not apply under CERCLA. This potential ARAR would apply to any alternative evaluated that would involve significant vegetation removal in certain areas of the DRO/Monterey MRA. Substantive requirements include: §80110(d), prohibiting burn on no-burn days. §80145(o)(l), [local air district smoke management plan or other enforceable mechanisms shall] require the material to be burned shall be free of material that is not produced on the property or in an agricultural or prescribed burning operation. Material not to be burned includes, but is not limited to, tires, rubbish, plastic, treated wood, construction/demolition debris, or material containing asbestos.
Porter Cologne Water Quality Control Act	California Water Code, Division 7, Section 13200	Relevant and Appropriate [1, 2] / Action	Requires submission of Report of Waste Discharge and obtaining waste discharge requirements for specified waste discharges.	Investigation and MEC remediation activities may require submitting Report of Waste Discharge and obtaining waste discharge requirements; this may be addressed as part of NPDES permit requirements. Under CERCLA, procedural requirements such as obtaining a permit while conducting MEC investigation/remediation do not apply.
State of California To-Be-Considered Criteria (TBCs)				
California Fish and Game Commission	Wetlands Resources (pursuant to § 703 of California Fish and Game Code; not a statute)	Policy [1, 2, 3] / Location	This policy: (1) seeks to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California; (2) strongly discourages development in or conversion of wetlands; and (3) opposes, consistent with its legal authority, any development or conversion that would result in a reduction of wetland acreage or wetland habitat values. To that end, the Commission: (1) opposes wetland development proposals unless, at a minimum, project mitigation assures there will be “no net loss” of either wetland habitat values or acreage; and (2) strongly prefers mitigation that would achieve expansion of wetland acreage and enhancement of wetland habitat values.	The policy provides for the protection of wetland resources.

Table A-1
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternate 3: Additional MEC Remediation

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
Regulations that were considered as Potential ARARs but were not considered applicable				
California Fish and Game Code	§ 3005		The statute section prohibits the taking of birds or mammals, except non-game mammals, with any net, pound, cage, trap, set line, or wire, or poisonous substance. Included in the term "taking" is the killing of birds or mammals by poison.	
California Fish and Game Code	§ 4000 et seq.		This statute section provides that a fur-bearing mammal may be taken only with a trap, firearm, bow and arrow, poison under a proper permit, or with the use of dogs.	
California Fish and Game Code	Title 14, CCR § 460		This regulation makes it unlawful to take Fisher, marten, river otter, desert kit fox and red fox.	The species of red fox protected by the State is located in the Sierra Nevada mountain range. The species of red fox located at the former Fort Ord is an introduced species and is not protected by this section.
California Clean Air Act	Health and Safety Code § 41701		This statute section prohibits the discharge into the atmosphere from any source whatsoever any air contaminant for a period or periods aggregated more than three minutes in any one hour that is dark or darker than No. 2 on the Ringelmann Chart or obscures the view to a degree equal to or greater than smoke.	Agricultural burning for which a permit has been granted pursuant to Article 3 (commencing with § 41850, emission limitations for agricultural burning) are exempt from this requirement per § 41704(b). Any prescribed bums that would be conducted for vegetation removal prior to MEC remediation will be conducted under Monterey Bay Unified Air Pollution Control District Rule 407, which implements the requirements of Article 3 (California Health and Safety Code § 41850 et seq.).

Notes:
1. Vegetation Clearance
2. MEC Remediation
3. Detonation of MEC

Table A-2
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
Federal ARARs				
Endangered Species Act (ESA) (16 United States Code [U.S.C.] §§ 1531-1543)	16 U.S.C. § 1536 (a) and (c); 16 U.S.C. § 1538 (a)(1)	Applicable [1, 2, 3] / Location	Federal agencies are required under Section 7 of the ESA to ensure that their actions do not jeopardize the continued existence of a listed species or result in destruction of or adverse modification of its critical habitat (16 U.S.C. § 1536). If the proposed action may affect the listed species or its critical habitat, consultation with the United States Fish and Wildlife Service (USFWS) and/or California Department of Fish and Game may be required (50 Code of Federal Regulations [CFR] § 402.14). Additionally, Section 9 of the ESA prohibits the illegal taking of a listed species (16 U.S.C. § 1538(a)(1)).	Endangered plant and animal species and critical habitats occur at the former Fort Ord. Each reuse area will be screened for potential impacts to any endangered species identified in the Installation-Wide Multispecies Habitat Management Plan (HMP; USACE 1997) and additional requirements identified in subsequent documents (USFWS 1999, 2002, and 2005; and Zander 2002). The provisions of the HMP and referenced additional requirements satisfy the requirements of the ESA.
Migratory Bird Treaty Act (MBTA)	16 U.S.C. §§ 703-712	Applicable [1, 2, 3] / Location	The statute sections prohibit the taking, possession of, buying, selling, purchasing, or bartering of any migratory bird, including feathers or other parts, nest eggs, or products, except as allowed by regulations.	The requirement includes specific standards of control.
Hazardous Materials & Transportation Act	49 CFR Part 172.101	Applicable [3] / Chemical and Action	These regulations impose procedures and controls on the transportation of hazardous materials.	The regulations include specific standards of control and substantive requirements, criteria, and limitations that may apply to the transport of detonation materials and selected recyclable ordnance materials.
National Pollutant Discharge Elimination System (NPDES)	40 CFR Parts 122, 123, 124	Relevant and Appropriate [1, 2,] / Action	Regulates the discharge of pollutants to waters of the United States.	The regulations include specific standards of control and substantive requirements, criteria, and limitations that may apply to discharges of pollutants to waters of the United States. Under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), procedural requirements such as obtaining a permit while conducting MEC investigation/remediation do not apply.
Federal Resource Conservation and Recovery Act (RCRA), Subpart M (Military Munitions Rule [“the Military Munitions Rule”])	40 CFR Parts 266 and 270	Relevant and Appropriate [2, 3] / Chemical and Action	The regulations identify when military munitions on active ranges become subject to the regulatory definition of “solid waste,” for purposes of RCRA Subtitle C and, if these wastes are hazardous, the management standards that apply.	Portions of the Military Munitions Rule may be relevant and appropriate, but those provisions of the Rule that exclude military munitions from RCRA Subtitle C regulations are not appropriate to the remediation of a closed range. The relevant portions relate to the management of munitions and explosives of concern (MEC), which is recovered, including characterization as hazardous waste and requirements for treatment, storage, and transportation. The Rule provides for the storage and transportation of recovered military munitions in accordance with Department of Defense Explosives Safety Board (DDESB) standards.
State of California ARARs				
California Endangered Species Act	Fish and Game Code §§ 2051 et seq. and §2080	Relevant and Appropriate [1, 2, 3] / Location	The statute sections provide a declaration of policy and definitions. Section 2080 provides that no person shall take, possess, purchase, or sell within this state, any species, or any part or product thereof, that the commission determines to be an endangered species or a threatened species, or attempt any of those acts.	Section 2080 includes specific standards of control with respect to the taking of endangered or threatened species.

Table A-2
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
California Fish and Game Code	§ 3511	Relevant and Appropriate [1, 2, 3] / Location	This statute section prohibits taking or possessing fully protected birds or parts thereof, listed as: (a) American peregrine falcon *(Falco peregrinus analum)*; (b) Brown pelican; (c) California black rail *(Lateralhus jamaicensis coturniculus)*; (d) California clapper rail *(Rallus longirostris obsoletus)*; (e) California condor *(Gymnogyps californianus)*; (f) California least tern *(Sterna albifrons browni)*; (g) Golden eagle; (h) Greater sandhill crane *(Grus canadensis tabida)*; (i) Light-footed clapper rail *(Rallus longirostris levipes)*; (j) Southern bald eagle *(Haliaeetus leucocephalus leucocephalus)*; (k) Trumpeter swan *(Cygnus buccinator)*; (l) White-tailed kite *(Elanus leucurus)*; and (m) Yuma clapper rail *(Rallus longirostris yumanensis)*.	The requirement includes specific standards of control that may apply to the American peregrine falcon (some possibility), golden eagle (slight possibility), brown pelican (not likely but possible), and California least tern (not likely but possible).
California Fish and Game Code	§ 3513	Relevant and Appropriate [1, 2, 3] / Location	This statute section declares that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA or any part of such migratory non-game bird except as provided by rules and regulations adopted by the Secretary of the Interior under provisions of the MBTA.	The requirement includes specific standards of control.
California Fish and Game Code	§ 3503.5	Relevant and Appropriate [1, 2, 3] / Location	This statute section prohibits the take, possession, or destruction of any birds in the orders of Falconiformes or Strigiformes, or to take, possess, or destroy the nest or eggs of any such bird, except as provided in the code.	The requirement includes specific standards of control that may apply to vultures, hawks, ospreys, falcons, and owls.
California Fish and Game Code	Title 14, California Code of Regulations (CCR) § 472	Relevant and Appropriate [1, 2, 3] / Location	This regulation limits the taking of non-game birds and mammals except for specified species.	The requirement includes specific standards of control that may affect American crows.
California Fish and Game Code	§ 4800 et seq.	Relevant and Appropriate [1, 2, 3] / Location	This statute section declares that it is unlawful to take, injure, possess, transport, or sell any mountain lion.	The requirement includes specific standards of control.
California Fish and Game Code	Title 14, CCR §§ 40-42	Relevant and Appropriate [1, 2, 3] / Location	These regulations make it unlawful to take, possess, purchase, propagate, sell, transport, import, or export any native reptile or amphibian, unless under special permit.	The requirement includes specific standards of control that may apply to California black legless lizard and coast horned lizard.
California Health and Safety Code, Division 20	Title 22, CCR Division 4.5	Applicable [3] / Chemical and Action	The statute and regulations provide for identification of hazardous waste in §§ 66261. If a material is a hazardous waste, Division 4.5 provisions further regulate hazardous waste generators, transporters, and treatment, storage, and disposal facilities.	The Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team will evaluate discovered items in accordance with the approved work plan to determine the presence of energetic materials or other constituents that would cause it to be characterized as a hazardous waste. Substantive requirements: • Storage: on-site storage of MEC items occur in a designated bunker that meets the standard of DDESB 6055.9 STD, including security measures such as fences, signs, and an alarm system. • Transportation: off-site transportation of small arms ammunition will incorporate applicable manifesting and placarding requirements. Conforms to Defense Reutilization and Marketing Office instruction. • Disposal/recycling: off-site disposal or recycling facility or facilities for small arms ammunition will be state and/or RCRA-authorized.

Table A-2
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
California Health and Safety Code	Title 22, CCR § 66264.601-603	Relevant and Appropriate [2] / Action	These regulations apply to hazardous waste treatment, which is conducted in a device that does not meet the definition of a "container" in 22 CCR § 66260.10 or is characterized as a "Miscellaneous Unit" subject to the provisions of 22 CCR § 66264.601-603. For activities where detonations are in a device that meets the 22 CCR § 66260.10 definition of a container, the requirements for "temporary units," as set forth in 22 CCR § 66264.553, apply.	The regulations include generally described narrative standards. Compliance with substantive requirements is achieved through regulatory coordination of site-specific work plans in accordance with the CERCLA and Federal Facility Agreement.
California Health and Safety Code	Title 22, CCR § 66265.382	Relevant and Appropriate [3] / Chemical and Action	Open burning of hazardous waste is prohibited except for the open burning and open detonation (OB/OD) of waste explosives. Waste explosives include waste that has the potential to detonate and bulk military propellants that cannot safely be disposed of through other modes of treatment. Detonation is an explosion in which chemical transformation passes through the material faster than the speed of sound (0.33 kilometer/second at sea level). Owners or operators choosing to open burn or detonate waste explosives shall do so in accordance with the following table and in a manner that does not threaten human health or the environment. Pounds Waste Explosives — Minimum Distance from OB/OD to property 0 to 100 — 204 meters (670 feet) 101 to 1,000 — 380 meters (1,250 feet) 1,001 to 10,000 — 530 meters (1,730 feet) 10,001 to 30,000 — 690 meters (2,260 feet)	The requirement includes specific standards of control and addresses situations similar to those that may be addressed during MEC remediation; detonation of MEC will comply with these requirements.
California Fish and Game Code	§ 1900 et seq.	Relevant and Appropriate [1, 2, 3] / Action	These statute sections sets forth programmatic and administrative provisions and, in § 1908, provides that no person shall import into the state, or take, possess, or sell within this state, except as incident to the possession or sale of the real property on which the plant is growing, any native plant, or any part or product thereof, that the commission determines to be an endangered native plant or rare native plant.	The standards of control are relevant and appropriate, and the citation is therefore considered as an ARAR.
California Fish and Game Code	Title 14, CCR § 783 et seq.	Relevant and Appropriate [1, 2, 3] / Action	These regulations provide that no person shall import into the State, export out of the State or take, possess, purchase, or sell within the State, any endangered species, threatened species, or part or product thereof, or attempt any of those acts, except as otherwise provided in the California Endangered Species Act, Fish and Game Code Section 2050, et seq., the Native Plant Protection Act, the Natural Community Conservation Planning Act, the California Desert Native Plants Act, or as authorized under this article in an incidental take permit. The regulations also provide programmatic and administrative procedures for incidental take permits.	The section includes specific standards of control with respect to taking rare or endangered plants. The standards of control are relevant and appropriate, and the citation is therefore considered as an ARAR.
Porter Cologne Water Quality Control Act	California Water Code, Division 7, Section 13200	Relevant and Appropriate [1, 2] / Action	Requires submission of Report of Waste Discharge and obtaining waste discharge requirements for specified waste discharges.	Investigation and MEC remediation activities may require submitting Report of Waste Discharge and obtaining waste discharge requirements; this may be addressed as part of NPDES permit requirements. Under CERCLA, procedural requirements such as obtaining a permit while conducting MEC investigation/remediation do not apply.

Table A-2
Potential Applicable or Relevant and Appropriate Requirements (ARARs) for Alternative 4: Additional Subsurface MEC Remediation in Selected Areas of the MRA and Land Use Controls

Source or Authority	Requirement, Standard, or Criterion	Type	Description	Remarks
State of California To-Be-Considered Criteria (TBCs)				
California Fish and Game Commission	Wetlands Resources (pursuant to § 703 of California Fish and Game Code; not a statute)	Policy [1, 2, 3] / Location	This policy: (1) seeks to provide for the protection, preservation, restoration, enhancement, and expansion of wetland habitat in California; (2) strongly discourages development in or conversion of wetlands; and (3) opposes, consistent with its legal authority, any development or conversion that would result in a reduction of wetland acreage or wetland habitat values. To that end, the Commission: (1) opposes wetland development proposals unless, at a minimum, project mitigation assures there will be "no net loss" of either wetland habitat values or acreage; and (2) strongly prefers mitigation that would achieve expansion of wetland acreage and enhancement of wetland habitat values.	The policy provides for the protection of wetland resources.
Regulations that were considered as Potential ARARs but were not considered applicable				
California Fish and Game Code	§ 3005		The statute section prohibits the taking of birds or mammals, except non-game mammals, with any net, pound, cage, trap, set line, or wire, or poisonous substance. Included in the term "taking" is the killing of birds or mammals by poison.	
California Fish and Game Code	§ 4000 et seq.		This statute section provides that a fur-bearing mammal may be taken only with a trap, firearm, bow and arrow, poison under a proper permit, or with the use of dogs.	
California Fish and Game Code	Title 14, CCR § 460		This regulation makes it unlawful to take Fisher, marten, river otter, desert kit fox and red fox.	The species of red fox protected by the State is located in the Sierra Nevada mountain range. The species of red fox located at the former Fort Ord is an introduced species and is not protected by this section.
California Clean Air Act	Health and Safety Code § 41701		This statute section prohibits the discharge into the atmosphere from any source whatsoever any air contaminant for a period or periods aggregated more than three minutes in any one hour that is dark or darker than No. 2 on the Ringelmann Chart or obscures the view to a degree equal to or greater than smoke.	Agricultural burning for which a permit has been granted pursuant to Article 3 (commencing with § 41850, emission limitations for agricultural burning) are exempt from this requirement per § 41704(b). Any prescribed bums that would be conducted for vegetation removal prior to MEC remediation will be conducted under Monterey Bay Unified Air Pollution Control District Rule 407, which implements the requirements of Article 3 (California Health and Safety Code § 41850 et seq.).

Notes:
1. Vegetation Clearance
2. MEC Remediation
3. Detonation of MEC

APPENDIX B

Distribution List

Document Distribution List

Copies	Name	Organization	Address	City and State	Zip
1	Stan Cook	Fort Ord Reuse Authority	920 2nd Avenue, Suite A	Marina, CA	93933
1	Michael Houlemard	Fort Ord Reuse Authority	920 2nd Avenue, Suite A	Marina, CA	93933
1	Judy Huang	U.S. Environmental Protection Agency	75 Hawthorne Street, Mail SFD-8-3	San Francisco, CA	94105
1	Tom Hall	TechLaw, Inc.	7 Shore Point Road	North Little Rock, AR	72116
1	Roman Racca	California Department of Toxic Substances Control	8800 California Center Drive	Sacramento, CA	95826
1	Ed Walker	California Department of Toxic Substances Control	8800 California Center Drive	Sacramento, CA	95826
2	Gail Youngblood	Department of the Army	BRAC, Bldg. #4463 Gigling Road	Seaside, CA	93955
1	Lindsay Alexander	Fort Ord Administrative Record	BRAC, Bldg. #4463 Gigling Road	Seaside, CA	93955
1	Mike Weaver	Fort Ord Community Advisory Group	52 Corral de Tierra Road	Salinas, CA	93908
1	Richard Bailey	Fort Ord Community Advisory Group	440 Ramona Avenue, Apt 16	Monterey, CA	93940
1	LeVonne Stone	Fort Ord Environmental Justice Network	P.O. Box 361	Marina, CA	93933
1	Linda Millerick	Save Our Air Resources (SOAR)	751 Montery - Salinas Highway	Salinas, CA	93908
1	Nick Nichols	Monterey County, Resources Management Agency Office of Housing & Redevelopment	168 West Alisal Street, Third Floor	Salinas, CA	93901
1	Project File	ARCADIS, Attention: Jennifer Johnson	2000 Powell Street, 7th Floor	Emeryville, CA	94608
1	Project Library	ARCADIS / Weston Project Office	100 12th Street, Bldg. 2903	Marina, CA	93933

Approved:

Christopher G. Spill, P.G.
ESCA Technical Project Manager
ARCADIS U.S., Inc.