FORA ESCA REMEDIATION PROGRAM

FINAL

Technical Information Paper

Phase II Seaside
Munitions Response Area
Roadway Alignment and Utility Corridor

(Pollution Report and Removal Action Activity Report)

Former Fort Ord
Monterey County, California

September 26, 2008

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ACRONYMS AND ABBREVIATIONS

µsec	microsecond
AR	Army Regulation
Army	United States Department of the Army
ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
BADT	best available (and appropriate) detection technology
BMP	best management practice
BRAC	Base Realignment and Closure
BO	Biological Opinion
CCR	California Code of Regulations
CDR	Covenant Deferral Request
CEHNC	Corps of Engineers - Huntsville Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeters
CTS	California tiger salamander
cy	cubic yards
DA PAM	Department of the Army Pamphlet
DGM	Digital Geophysical Mapping
DMM	discarded military munitions
DOD	U.S. Department of Defense
DQO	Data Quality Objective
EM	electromagnetic
EPA	U.S. Environmental Protection Agency
ESCA	Environmental Services Cooperative Agreement
FORA	Fort Ord Reuse Authority
FVF	field variance form
GJMB	General Jim Moore Boulevard
GPS	Global Positioning System
HMP	Habitat Management Plan
IDW	investigation-derived waste
km	kilometers

LBP	lead-based paint
LDSP	Land Disposal Site Plan
LFR	LFR Inc.
mag	magnetic
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
MPPEH	material potentially presenting an explosive hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
MSD	minimum separation distance
mV	millivolt
NC	no contact
NPL	National Priorities List
NRMA	natural resources management area
NTCRA	Non-Time-Critical Removal Action
OE	Ordnance and Explosives
QA	quality assurance
QC	quality control
RI/FS	Remedial Investigation/Feasibility Study
RTK	Real-Time Kinematic
SAA	small arms ammunition
SCA	Special Case Area
SEDR	Summary of Existing Data Report
SSWP	Site-Specific Work Plan
SUXOS	Senior UXO Supervisor
SWPPP	Stormwater Pollution Prevention Plan
TCRA	Time-Critical Removal Action
TIP	Technical Information Paper
USACE	U.S. Army Corps of Engineers
USACE EM	U.S. Army Corps of Engineers Engineering Manual
USFWS	U.S. Fish and Wildlife Service
UXO	unexploded ordnance
WESTON	Weston Solutions, Inc.

GLOSSARY

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 all remediation has been accomplished prior to transfer. U.S. 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.

Early Transfers

The transfer by deed of federal property by U.S. 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.

Construction Support

Assistance provided by DOD Explosive Ordnance Disposal or unexploded ordnance (UXO) qualified personnel and/or by personnel trained and qualified for operations involving chemical agent, 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 chemical agent, regardless of configuration, to ensure the safety of personnel or resources from any potential explosive or chemical agent hazards.

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))

Exclusion Zone

A safety zone established around an MEC work area. Only 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.

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.

ESCA RP Team

LFR Inc., Weston Solutions, Inc., and Westcliffe Engineers, Inc.

mag and dig

Utilizing handheld geophysical instruments to detect anomalies and investigating the anomalies by manual digging or with the assistance of heavy equipment.

Material Potentially Presenting an Explosive Hazard (MPPEH)

Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing 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 DOD's 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.

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 Department of Defense, 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 thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than nonnuclear 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
Department of Defense-established program that manages the environmental, health, and safety issues presented by munitions and explosives of concern.

Minimum Separation Distance (MSD)
MSD is the distance at which personnel in the open must be from an intentional or unintentional detonation.

Munition with the Greatest Fragmentation Distance (MGFD)
The munition with the greatest fragment distance that is reasonably expected (based on research or characterization) to be encountered in any particular area.

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, DMM, 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)(e)(3)

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)
Ordnance and explosives (OE) is an obsolete term replaced by munitions and explosives of concern (MEC). See MEC in the glossary for further definition.

shape charges
Small conical explosive charges used to vent or detonate munitions of concern.

Special Case Areas (SCAs)
SCAs were identified by the Army for a variety of reasons, such as dense metallic clutter that prevented digital detection instruments or interference due to nearby metal structure or features. SCAs include historical and current fencing; asphalt/concrete range pads, roads, and

walkways; areas under existing structures (i.e., field latrines and range-related structures); berms and culverts; and areas requiring excavation by heavy equipment (i.e., scrape areas).

Small Arms Ammunition (SAA)
Ammunition, without projectiles that contain explosives (other than tracers), that is .50 caliber or smaller, or for shotguns.

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 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.

EXECUTIVE SUMMARY

This Technical Information Paper (TIP) describes the field activities, operations, and results of activities conducted to complete a portion of the munitions and explosives of concern (MEC) removal activities associated with the United States Department of the Army's (Army's) munitions response actions within the Seaside Munitions Response Area (MRA) at the former Fort Ord in Monterey County, California. A site vicinity map is provided on Figure 1-1. This report has been prepared in accordance with the Administrative Order on Consent (AOC) Task 10. The field activities, operations, and results described in this report are limited to work conducted within the following areas at the Seaside MRA:

- The proposed roadway limits for the realignment of General Jim Moore Boulevard (GJMB) and Eucalyptus Road, plus a 50-foot-wide work area on both sides of the roadway for a total approximate width of 200 to 300 feet, hereafter referred to as "the roadway alignment"; and
- The limits of the 50-foot-wide utility corridor located along the boundary between the Seaside MRA and the adjacent Natural Resources Management Area (also known as the inland ranges or the former impact area) to the east and southeast, hereafter referred to as "the utility corridor."

These areas are shown on Figure 1-2. The activities discussed in this report that occurred within the roadway alignment and utility corridor began in December 2007 and were completed in July 2008. This TIP will be used to support a determination that these areas are acceptable for their intended future uses, such that land within the roadway alignment and utility corridor can be released to Fort Ord Reuse Authority (FORA) for roadway and utility construction prior to release of the balance of the land within the Seaside MRA.

As contractors to FORA under the Environmental Services Cooperative Agreement Remediation Program (ESCA RP), the work described in this report was performed by LFR Inc., Weston Solutions, Inc., Westcliffe Engineers, Inc. (collectively, "the ESCA RP Team"), and their subcontractors. The scope of work covered under this TIP included:

- Clearing and grubbing of vegetated surface soils within areas that have had previous MEC removal actions completed by the Army;
- Scraping and sifting of surface soils and/or excavating soils within the areas previously identified as special case areas (SCAs) by the Army where MEC removal actions could not be completed. A minimum of the top 6 inches of surface soils were scraped within the SCAs located in the roadway alignment and utility corridor. The SCAs were scraped to greater depths (generally 12 inches but in some cases down to 10 feet) where additional removal of soil was necessary to minimize the number of discrete anomalies from the subsequent DGM survey;
- Conducting a geophysical survey and investigating and removing target anomalies that potentially represented MEC from SCAs within the roadway alignment and utility corridor; and

- Conducting a geophysical survey and investigating and removing target anomalies that potentially represented MEC from the portion of the hillside west of GJMB within the roadway alignment.

In total, 111 SCA points and 78 SCA polygons or portions of polygons were investigated as part of this work. A total of 22 MEC items, 208 pounds of MD, and more than 6,000 pounds of cultural debris were removed as part of the investigation and removal action activities conducted within the roadway alignment and utility corridor. Of the 22 MEC items, six items were recovered during the roadway clearing and grubbing activities, 12 items were recovered during soil sifting operations, and four items were recovered during intrusive investigations of target anomalies identified during digital geophysical mapping surveys.

The FORA ESCA RP Team has successfully completed the Seaside MRA Phase II Removal Action for the SCAs (points and polygons) or portions of SCAs (polygons) within the roadway alignment and utility corridor and for the portion of the hillside west of GJMB that lies within the roadway alignment. All subsurface target anomalies that potentially represented MEC were intrusively investigated and removed, except in a few areas where anomalies were left in place. These anomaly locations were defined as “left in place” because the areas could not be adequately investigated using the best available (and appropriate) detection technology (BADT) due to the metallic content of these features. As discussed below, active UXO construction support will be utilized for construction or any other intrusive activities within the left in place anomaly locations.

During the investigation and removal actions, all required quality control (QC) and quality assurance (QA) inspections were successfully completed. The QC and QA approach resulted in a quality level that is greater than or equivalent to that performed by the Army during previous removal actions. No MEC was encountered during the QC and QA checks of the investigated anomaly locations.

Based upon the results of the removal action, the potential for residual MEC risks to remain within the roadway alignment and utility corridor has been significantly reduced; however, due to the inherent uncertainty in the BADT used for MEC removal actions, some level of residual risk will always remain. To manage any remaining risks related to the potential presence of MEC, unexploded ordnance (UXO) construction support will be utilized during intrusive construction activities, such as grading of the roadway alignment and trenching for the underground utility corridor. Active UXO construction support will be utilized for construction or any other intrusive activities within the left in place anomaly locations. In addition, construction personnel will be required to complete UXO recognition and avoidance training.

With these protective measures in place and based on the successful removal action efforts conducted to date in the Seaside MRA, the roadway alignment and utility corridor are considered safe and protective of human health for the intended reuse and have been deemed acceptable for FORA to proceed with planned construction activities within these areas.

This TIP presents the results for only those portions of the removal action activities conducted within the roadway alignment, including the hillside west of GJMB, and the utility corridor. Additional activities are currently being conducted to complete the removal action in the remainder of the SCAs within the Seaside MRA. In addition to being presented in this TIP, the results of the removal action activities conducted within the roadway alignment and the utility corridor will be incorporated into the Group 1 Remedial Investigation/Feasibility Study report along with the removal action activities currently being conducted in the remainder of the Seaside MRA to support a final remedial decision.

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1.0 INTRODUCTION

This Technical Information Paper (TIP) describes the field activities, operations, and results of activities conducted to complete a portion of the munitions and explosives of concern (MEC) removal activities associated with the United States Department of the Army's (Army's) munitions response actions within portions of the Seaside Munitions Response Area (MRA) at the former Fort Ord in Monterey County, California. A site vicinity map is provided on Figure 1-1. This report has been prepared in accordance with the Administrative Order on Consent (AOC) Task 10. The field activities, operations, and results described in this report are limited to work conducted within the following areas at the Seaside MRA:

- The proposed roadway limits for the realignment of General Jim Moore Boulevard (GJMB) and Eucalyptus Road, plus a 50-foot-wide work area on both sides of the roadway for a total approximate width of 200 to 300 feet, hereafter referred to as "the roadway alignment"; and
- The limits of the 50-foot-wide utility corridor located along the boundary between the Seaside MRA and the adjacent Natural Resources Management Area (NRMA; also known as the inland ranges and former impact area) to the east and southeast, hereafter referred to as "the utility corridor."

The limits of these areas are shown on Figure 1-2. The activities discussed in this report that occurred within the roadway alignment and utility corridor began in December 2007 and were completed in July 2008. This TIP will be used to support a determination that these areas are acceptable for their intended future uses, such that land within the roadway alignment and utility corridor can be released to Fort Ord Reuse Authority (FORA) for roadway and utility construction prior to release of the balance of the land within the Seaside parcels.

As contractors to FORA under the Environmental Services Cooperative Agreement Remediation Program (ESCA RP), the work described in this report was performed by LFR Inc. (LFR), Weston Solutions, Inc. (WESTON), Westcliffe Engineers, Inc. (collectively, "the ESCA RP Team"), and their subcontractors. Activities described in this TIP were conducted in accordance with the following project documents:

- Final Addendum to Final OE-15SEA.1-4 Site-Specific Work Plan, Phase II Seaside Munitions Response Area (MRA) Removal Action ("the Seaside Site-Specific Work Plan [SSWP] Addendum"; ESCA RP Team 2008b)
- 2nd Addendum to the 3rd Amendment to the 17 Feb 94 Land Disposal Site Plan (LDSP) for Base Realignment and Closure (BRAC) of Fort Ord, California (ESCA RP Team 2008a)
- Approved field variance forms associated with the SSWP Addendum as described in greater detail in 3.13 of this report
- Soil Management Plan, Seaside Munitions Response Area (ESCA RP Team 2008f)
- Final City of Seaside - Community Safety Plan (ESCA RP Team 2008c)

- Final Standard Operating Procedure for Mechanical Soil Sifting (ESCA RP Team 2008e)
- Final Stormwater Pollution Prevention Plan (LFR 2008)

1.1 Purpose and Scope

The purpose of this TIP is to document the activities conducted within the Seaside MRA roadway alignment and utility corridor to investigate and/or remove MEC, thereby reducing the threat to human health and providing an additional measure of safety for future construction work. The scope of work covered under this TIP included:

- Clearing and grubbing of vegetated surface soils within areas that have had previous MEC removal actions completed by the Army;
- Conducting a geophysical survey and investigating and removing MEC from Special Case Areas (SCAs) within the roadway alignment and utility corridor; and
- Conducting a geophysical survey and investigating and removing MEC from the hillside west of GJMB within the roadway alignment.

The work has been conducted such that land within the roadway alignment and utility corridor can be released to FORA for roadway and utility construction prior to release of the balance of the land within the Seaside MRA. This report provides the necessary documentation and data collection to demonstrate that the project scope was accomplished and the roadway alignment and utility corridor are protective for their intended future uses.

This TIP presents only the portion of the investigation and removal activities conducted within the roadway alignment and utility corridor. Additional activities are being conducted to complete the removal action in the remainder of the Seaside MRA SCAs. In addition to being presented in this TIP, the results of the removal action activities conducted within the roadway alignment and utility corridor, as well as the results from historical actions conducted by the Army and the actions currently being conducted in the remainder of the Seaside MRA SCAs, will be incorporated into the remedial investigation/feasibility study (RI/FS) for the Group 1 MRAs (Seaside MRA and Parker Flats MRA Phase II) to support a final remedial decision for the Seaside MRA.

1.2 Report Organization

This TIP is presented in numbered sections, tables, and figures and lettered appendices. Tables and figures as referenced in the sections are numbered to correspond with the section in which they appear. Introductory information for the project is presented in Section 1.0. Background information for the Seaside MRA is presented in Section 2.0. Section 3.0 presents the technical approach employed to complete activities associated with the MEC investigation and removal action within the roadway alignment and utility corridor. Quality control (QC) and quality assurance (QA) activities were conducted throughout the course of the project and are described in Section 4.0. The results of the MEC investigation and removal action are discussed in Section 5.0. The conclusions and recommendations are presented in Section 6.0. References are provided in Section 7.0.

2.0 SITE BACKGROUND AND DESCRIPTION

The scope of this TIP is limited to the roadway alignment and the utility corridor, which make up a portion of the Seaside MRA. The following sections discuss the background, history, and previous investigations conducted for the entire Seaside MRA.

2.1 Seaside MRA Location

The Seaside MRA is located in the southwestern portion of the former Fort Ord, bordered by the City of Seaside, the NRMA area to the east (the former impact area), Eucalyptus Road to the north, and additional former Fort Ord property to the south (Figures 1-1 and 1-2). GJMB crosses the western portion of the Seaside MRA in a north-south direction. The Seaside MRA is wholly contained within the jurisdictional boundaries of the City of Seaside.

The Seaside MRA encompasses approximately 419 acres, and includes the U.S. Army Corps of Engineers (USACE) reuse parcels E24, E34, E23.1, and E23.2, which are roughly coincident with (and include all of) MRS-15SEA.1 (183 acres), MRS-15SEA.2 (86 acres), MRS-15SEA.3 (50 acres), and MRS-15SEA.4 (79 acres), respectively. Not included within the boundaries of the Munitions Response Sites (MRSs), but located within the Seaside MRA is GJMB and the narrow area west of GJMB (21 acres). The MRS-15SEA.1–4 nomenclature will be used in this document to refer to the four MRSs within the Seaside MRA. The boundaries of the four MRSs and the MRA are shown on Figure 1-2.

The majority of the roadway alignment is located within the western edge of MRS-15SEA.1 and MRS-15SEA.2 and the northern edge of MRS-15SEA.3 and MRS-15SEA.4. Sections of the roadway alignment are located outside of the MRS boundaries, including the section in MRS-15SEA.1 that cuts through the hillside west of the existing GJMB (referred to as “the hillside west of GJMB”) and the portion of the roadway alignment that is north of Eucalyptus Road (Figure 1-2). Although outside of the MRS boundary, the hillside west of GJMB is within the boundary of the Seaside MRA and was identified as a data gap in the Summary of Existing Data Report (SEDR) prepared by the ESCA RP Team (ESCA RP Team 2008h). The area north of Eucalyptus Road is outside the boundaries of the Seaside MRSs, but located in portions of other MRSs previously established by the Army. The area north of Eucalyptus Road was not identified as a data gap for the Seaside MRA in the SEDR and a removal action was not required in this area under the ESCA RP. However, the portion of the roadway alignment north of Eucalyptus Road was cleared and grubbed of vegetation to facilitate an instrument-aided surface inspection by the ESCA RP Team in preparation for future roadway construction work. The locations and boundaries of the roadway alignment, utility corridor, and the hillside west of GJMB are described in greater detail in the following sections.

2.1.1 Roadway Alignment Location and Description

The roadway alignment is approximately 84 acres and extends a length of approximately 9,400 linear feet along GJMB on the western edge of the Seaside MRA, and a length of approximately 6,400 linear feet along Eucalyptus Road on the northern edge of the Seaside

MRA. The roadway alignment work area is defined as the width of the actual roadway and center median (varies from 100 to 200 feet wide) plus a 50-foot-wide work area on both sides of the roadway for a total approximate width of 200 to 300 feet. MEC investigations and/or removal actions have been previously completed by the Army within the roadway alignment with the exception of the SCAs and the hillside west of GJMB.

2.1.2 Utility Corridor Location and Description

The utility corridor is defined as a 50-foot-wide strip of land within the Seaside MRA that runs along the boundary with the adjacent NRMA located to the east and southeast. The utility corridor extends a length of approximately 8,650 linear feet along the eastern boundary of the Seaside MRA and then trends eastward for approximately 5,900 linear feet along the southeastern boundary of the Seaside MRA. MEC removal actions have been previously completed by the Army within the utility corridor with the exception of the SCAs.

2.1.3 Hillside West of GJMB Location and Description

The hillside west of GJMB is an approximately 2.8-acre area located within the roadway alignment immediately west of the existing GJMB in the vicinity of MRS-15SEA.1 (Figure 1-2). The hillside west of GJMB is outside of the MRS boundary, but within the boundary of the Seaside MRA. Although there was no historical evidence that this specific area was used for troop training or maneuvers, the area was identified as a data gap in the SEDR and it was determined that the area of the hillside that lies within the boundary of the roadway alignment should be intrusively investigated.

2.2 Site History

Initial use of the Seaside MRA began in approximately 1917 when the U.S. government purchased more than 15,000 acres of land and designated it as an artillery range. Although no training maps from this time period have been found, pre-World War II-era military munitions have been removed during previous Army response actions within the Seaside MRA. These munitions included Livens projector shells, Stokes mortars, and 37 millimeter (mm) and 75mm projectiles. The Livens projector shells and Stokes mortars previously found at the former Fort Ord have been high explosive, practice, or screening smoke. Cavalry and artillery troops stationed at the Presidio of Monterey, along with infantry troops stationed at the Presidio of San Francisco, reportedly conducted training activities in the vicinity of the Seaside MRA, although the precise location and extent of use are not known.

By 1945, the Army established 18 firing ranges and training sites within the boundaries of the 8,000-acre former impact area. The Seaside MRA lies on the westernmost part of the former impact area. The Seaside MRA contained the former firing points and some of the former targets associated with the following military activities:

- Small arms ammunition (SAA) training - Ranges 18, 19, 20, 21, 22, 23, and 46 and Historical Area 59

- Non-firing target range training - Old Range 22 and Range 23M
- Mortar and antitank training - Range 48
- Booby trap training - Historical Area 50

According to the known configuration of the ranges, weapons were fired to the east and southeast from these firing points toward the center of the impact area. It is expected that munitions activity associated with these ranges would have occurred at, or in the general vicinity of, the firing points. To facilitate previous MEC investigations and removal activities, these locations were divided into four MRSs, MRS-15SEA.1 through MRS-15SEA.4. The boundaries of each of these MRSs are shown on Figure 1-2.

2.3 Seaside MRA Physical Description

The physical description provides information on topography, vegetation, surface water, and groundwater associated with the MRA.

2.3.1 Topography

The terrain of the Seaside MRA varies from flat to moderately rolling hills. The elevation ranges from approximately 210 to approximately 520 feet mean sea level (msl) with 2 to 15% slopes. Old dune deposits up to 250 feet thick cover most of the area. Surface soil conditions at the MRA are predominantly weathered dune sand.

2.3.2 Vegetation

In general, the vegetation at the Seaside MRA consists primarily of maritime chaparral with patches of nonnative grassland and scattered stands of coastal and inland coast live oak woodlands. Poison oak is known to be found in many of the areas of the MRA. In the past, vegetation on the MRA has been cut in support of previous removal actions conducted within the Seaside MRA. In 2003, as part of the Army’s Time-Critical Removal Action (TCRA) for MEC, 398 acres of the Seaside MRA vegetation were cut. The maritime chaparral was cut to a 6-inch height, and the oak trees were pruned up to shoulder height to allow access below the tree canopies. Additional vegetation removal occurred in support of the Army’s Non-Time-Critical Removal Action (NTCRA). Much of the native vegetation had been reestablished by the time the work described in this report occurred.

2.3.3 Surface Water and Groundwater

The Seaside MRA overlies the Seaside Groundwater Basin, which is structurally complex and divided into several sub-basins. The uppermost aquifer ranges in thickness from 60 to 180 feet. Groundwater is generally encountered at a depth of approximately 100 feet below ground surface.

No significant surface-water features or delineated wetlands are reported to be present in the MRA; however, two aquatic features are known to exist to the south and southeast of the MRA.

2.3.4 Seaside MRA Ecological Profile

The Habitat Management Plan (HMP) identifies the Seaside MRA as a development parcel with a borderland development buffer area along the interface with the NRMA, which is designated as habitat reserve (USACE 1997). The NRMA interface separates the development category land within the Seaside MRA from the adjacent habitat reserve area of the former impact area. The NRMA and habitat reserve areas support plant and animal species that require implementing mitigation measures identified in the HMP to ensure compliance with the Endangered Species Act and to minimize impacts to listed species.

The U.S. Fish and Wildlife Service's 1993 Biological Opinion for the Cleanup and Reuse of the former Fort Ord (USFWS BO) required that an HMP be developed and implemented to reduce the incidental take of listed species and loss of habitat that supports these species. The HMP for the former Fort Ord complies with the USFWS BO and establishes the mitigation measures for the conservation and management of wildlife and plant species and habitats that largely depend on former Fort Ord land for survival. The HMP incorporated conservation measures pursuant to the USFWS BO dated prior to issuance of the HMP in April 1997. Since April 1997, three additional BOs have been issued that are relevant to MEC removal activities (USFWS 1999, 2002, and 2005). Future MEC remediation is required to be consistent with the applicable conservation measures.

Plant species identified at the former Fort Ord that are either threatened or endangered include Contra Costa goldfields (*Lasthenia conjugens;* endangered), sand gilia (*Gilia tenuiflora ssp. Arenaria;* endangered), and Monterey spineflower (*Chorizanthe pungens var. pungens;* threatened).

In 2004, the California tiger salamander (CTS; *Ambystoma californiense*) was identified as a threatened species. CTS may be found as far as 2 kilometers (km) from aquatic breeding habitats. The CTS may be found in MRS-15SEA.1 and MRS-15SEA.2 as these two MRSs are within 2 km of aquatic features that may provide breeding habitat for the CTS.

2.4 Previous Investigations

From 1997 to 2004, the Army performed sampling and removal investigations on the Seaside MRSs (MRS-15SEA.1–4). During these investigations, MEC items were removed from the MRSs including Stokes trench mortars, 60mm mortars, 75mm projectiles, and hand grenade fuzes.

The Army conducted the following munitions response actions on the Seaside MRA:

- Field Latrine Investigation from March to November 1997 (USA 2001a)

- MEC Sampling in Small Arms Ranges (OE-15A Grid Sampling) from October to November 1997 (USA 2000a)
- MEC Sampling (OE-15B Grid Sampling) from October 1997 to February 1998 (USA 2000b)
- Impact Area Grid Sampling from March to August 1999 (USA 2001d)
- MEC Removal-Impact Area Roads and Trails from March 1997 to March 1998 (USA 2001b)
- MEC Removal-Blue Line Fuel Break from May to June 1998 (USA 2001e)
- MEC Removal to Support Lead-Contaminated Soil Remediation at Ranges 19, 21, 22, and 23 from April 1997 to June 1999 (USA 2001c)
- MEC Removal to Support Lead-Contaminated Soil Remediation at Range 46 from April to August 1999 (USA 2001c)
- Impact Area Fuel Break Maintenance in 2001 (Parsons 2001)
- TCRA – Vegetation and Surface MEC Removal from December 2001 to March 2002 (Parsons 2006)
- NTCRA and Phase I Geophysical Operations – 4-Foot Removal Action from March 2002 to March 2004 (Parsons 2006)

These actions are summarized in the Final Technical Information Paper MRS-15SEA.1-4 Time-Critical Removal Action and Phase I Geophysical Operations (Parsons 2006). These actions were completed on the Seaside MRA in 2004, with the exception of several areas that were scattered throughout the Seaside MRA. The areas in which the actions were not completed are referred to by the Army as SCAs. Together, the total area covered by the SCAs was approximately 35 acres. SCAs were identified by the Army for a variety of reasons, such as dense metallic clutter that prevented digital detection instruments or interference due to nearby metal structures or features. SCAs included historical and current fencing; asphalt/concrete range pads, roads, and walkways; areas under existing structures (i.e., field latrines and range-related structures); berms and culverts; and areas requiring excavation by heavy equipment (i.e., scrape areas).

The NTCRA was performed pursuant to site-specific and programmatic work plans. The Programmatic Work Plan was prepared by Parsons in May 2001 with updates in May 2004 and describes the procedures, methods, and resources used while performing munitions response work at the former Fort Ord (Parsons 2004). In March 2002, Parsons prepared an SSWP for munitions response actions in MRS-15SEA.1-4. An addendum to the March 2002 SSWP was issued in December 2002, to include the previously excluded 25-acre eastern portion of MRS-15SEA.4. These documents are available on the Army's Administrative Record, which can be found at www.fortordcleanup.com, or at the Fort Ord BRAC office.

These actions resulted in the removal of anomalies selected as potentially representing MEC to the depth of detection, with the exception of the SCAs and the hillside west of GJMB. Because the Army's investigation activities did not include the hillside west of GJMB, the status of MEC in this area represented a data gap and further investigation was recommended in the SEDR (ESCA RP Team 2008h).

2.5 Historical MEC Sources and Types

Historical information summarized in this TIP is based on historical documents and previous MEC sampling and removal activities in the Seaside MRA. The Seaside MRA contains portions of ranges that were used for military training activities. The Final Technical Information Paper MRS-15SEA.1-4 prepared by Parsons summarized the previous MEC removal and sampling activities that were performed in the Seaside MRA (Parsons 2006). Table 2-1 lists the MEC that were encountered during the previous MEC removal and sampling activities. Figure 2-1 shows the locations where the MEC was encountered and removed during the previous MEC removal and sampling activities.

3.0 TECHNICAL OPERATIONS

Section 3.0 describes the technical approach employed to complete activities associated with the MEC investigation and removal action within the roadway alignment and utility corridor. QC and QA activities were conducted throughout the course of the project and are described in Section 4.0. The results of the MEC investigation and removal action are discussed in Section 5.0.

3.1 Extent of MEC Investigation and Removal Action Activities

The scope of this TIP is limited to the activities that occurred within the roadway alignment and the utility corridor. As described in the SSWP Addendum, intrusive investigation and removal activities were planned for the SCAs and the hillside west of GJMB. As described below, the SCAs were recategorized prior to conducting field operations.

3.1.1 Recategorization of the Special Case Areas

As described in Section 2.4, the Army previously completed removal actions at the Seaside MRA except for areas that were identified as SCAs. Prior to beginning field operations, the ESCA RP Team prepared the SSWP Addendum, which separated the SCAs into types as originally defined by the Army. The SSWP Addendum described each type of SCA in detail and proposed investigation approaches for each SCA type. The SCAs, as described in the SSWP Addendum, of which all or a portion fell within the roadway alignment and utility corridor included:

- Existing Site Fence Area – a metallic barbed wire site fence is located along GJMB and Eucalyptus Road and removal actions could not be completed due to electromagnetic interference during geophysical surveys (portions of this SCA pass in and out of the roadway alignment area).
- Original Fence Line – the original fence line footprint is located 10 to 15 feet east of GJMB within MRS-15SEA.1-3 and removal actions could not be completed due to saturation of metallic debris in the soil along the former fence line location (portions of this SCA pass in and out of the roadway alignment area).
- Asphalt and Concrete – asphalt paved roads extend from GJMB and Eucalyptus Road onto the Seaside MRA (many asphalt-paved roads cross the roadway alignment). Concrete pads were located beneath structures that had been demolished previously.
- Backhoe Excavations – approximately 350 locations/areas were identified by the Army that required backhoe excavations. A total of 53 of these locations were within the roadway alignment or utility corridor. These 53 locations included areas where backhoe excavations were started by the Army but not completed due to budgetary constraints and areas containing buried cable/wire, grounding rods, range markers, reinforced concrete, and wood.

- Heavy Equipment Excavations – Approximately 40 locations were identified by the Army as requiring excavation with heavy equipment. Of these 40 locations, 19 occurred within the roadway alignment or utility corridor. These 19 locations included concrete bunkers, fighting positions, flag poles, target boxes, tie downs, utility poles, and wooden stairs.
- Berms – The metal connections on the wooden retaining walls of the berms located on the Seaside MRA prevented geophysical surveys from being successfully completed in the vicinity of the berms. One berm was identified within the roadway alignment or utility corridor.
- Structures – Several structures and latrines were located at the Seaside MRA that required demolition in order to perform geophysical surveys. Five of these types of structures on the Seaside MRA were identified within the roadway alignment or utility corridor.
- Debris Piles – Numerous piles of debris were previously located throughout the Seaside MRA. Four debris piles were identified by the Army as occurring within the roadway alignment and/or utility corridor. During a site reconnaissance, additional debris pile locations were found, although these areas were not identified as SCAs.

The SCA types described above were based upon information provided by the Army and were reviewed by the ESCA RP Team prior to a site reconnaissance. Upon mobilization in the field, it was determined that many of the SCA types identified above were co-located, improperly categorized, or were located so closely to each other that consolidating them into one larger area was appropriate. As a result, the ESCA RP Team recategorized the SCA types listed above (existing site fence, original fence line, etc.) into two types: SCA point locations and SCA polygons. The SCA point locations were renumbered 1 through 534 (85 of these locations were located in the roadway alignment and 26 were located in the utility corridor). The SCA polygons were renumbered using the following format, SCA_W### (e.g., SCA_W111), and were further broken down into large or small polygons. Large polygons were those with a surface area greater than 1,000 square feet. Small polygons were those with a surface area less than or equal to 1,000 square feet. A total of 78 polygons were located either completely or partially in the roadway alignment and/or utility corridor (in some cases large polygons extended across the site such that portions of the polygons were located in the roadway alignment and portions in the utility corridor). In total, approximately 14.3 acres of SCA polygons were located either completely or partially in the roadway. Approximately 0.25 acre of SCA polygons was located completely or partially within the utility corridor.

An overview of the SCAs located within the roadway alignment and utility corridor for each MRS is shown on Figures 3-1 through 3-4. More detailed maps showing the renumbered, recategorized SCA point locations and SCA polygons are provided in Appendix A and Appendix B, respectively. Table 3-1 summarizes the SCA points located within the roadway alignment and utility corridor and includes the SCA type previously identified by the Army for each SCA point. Table 3-2 summarizes the SCA polygons either completely or partially located within the roadway alignment and utility corridor and includes the SCA type(s) previously identified by the Army that were located in each SCA polygon. In accordance with the SSWP Addendum, SCA locations were investigated using the best available (and appropriate) detection technology (BADT).

3.1.2 Hillside West of General Jim Moore Boulevard

The hillside west of GJMB (Figure 1-2) is not a SCA. It was identified as a data gap in the SEDR and was investigated in support of the RI/FS for the Group 1 MRAs (Seaside MRA and Parker Flats MRA Phase II), as defined in the SEDR, and to confirm that the area is safe for the planned roadway alignment construction.

3.2 General Approach

In general, the following approach was taken to complete the activities associated with the MEC investigation and removal action within the roadway alignment and utility corridor. Copies of contractor and subcontractor daily field reports are provided in Appendix C.

- Site Preparatory Activities – the following activities were conducted to prepare the site for MEC investigation and removal activities:
    - Surveying activities – this task included staking the roadway alignment extents, the border between the MRA and the NRMA, the SCA polygons, and SCA point locations in the field based on the coordinates as reported in the Army's Geographic Information System and associated databases
    - Vegetation cutting and removal – this task consisted of cutting vegetation and trees to allow for roadway clearing and grubbing activities, as well as root-mass removal in non-SCAs, and reestablishment of the fire-line fuel break along the boundary between the Seaside MRA and the NRMA in accordance with HMP requirements
    - Structure demolition and debris removal activities – this task consisted of demolition of existing structures such as latrines and removal of debris piles
    - Asphalt removal activities – this task consisted of removal of asphalt roads that would impact upcoming geophysical investigations (asphalt does not influence the performance of the geophysical instruments but constrains follow-up digging activities)
- Clearing and grubbing activities within the roadway alignment outside of the SCAs - this task consisted of removing the top 6-inch vegetated soil layer to prepare the area for upcoming roadway improvements and performing instrument-aided visual inspection for MEC within the cleared and grubbed limits of the roadway alignment (outside of the SCAs)
- Investigation of SCA point locations using BADT within the roadway alignment and utility corridor
- Scraping 6 to 12 inches of surface soils and/or excavating soils within the SCA polygon boundaries located within the roadway alignment and along the utility corridor, as appropriate, and transporting scraped and/or excavated soil to the sifting plant location
- Setup of sifting plant and sifting of soil scraped and/or excavated from SCA polygons

- Completion of a geophysical investigation using BADT of SCA polygons and the hillside west of GJMB within the roadway alignment and utility corridor, including the following activities:
    - Processing geophysical investigation data and selecting target anomalies that may represent MEC items
    - Investigating the target anomalies for potential MEC and recording the results
    - Removal and disposal of MEC or MD items encountered at the target anomalies and recording the results
- Conducting QC and QA procedures for all aspects of the tasks, as defined by the SSWP Addendum and appropriate field variance forms (FVFs)

Table 3-1 lists the 111 SCA point location located either entirely or partially within the roadway alignment or utility corridor. Table 3-2 lists the 78 SCA polygon locations located either entirely or partially within the roadway alignment or utility corridor. The table is separated by roadway alignment and utility corridor. In some cases a portion of the same polygon was located in both the roadway alignment and utility corridor and therefore appears on the table twice. In a few cases the approach was modified to suit the requirement for the specific area and these areas are identified in the notes column of Table 3-2. The following are the areas that were exceptions to the above approach:

- SCA_W111: This SCA polygon was located in MRS-15SEA.4 within an area requiring a minimum separation distance of 1,073 feet from nonessential personnel if heavy equipment were used to scrape the surface soil and transport it to the sifting plant. The location of this SCA is shown on Map B-8 in Appendix B. This minimum separation distance would have extended off the MRA and required evacuation of several homes in the Army Ord Community Fitch Park neighborhood. The Army requested that FORA identify an alternative solution so that residents could remain in their homes while this work was conducted. It was determined that a smaller separation distance could be used if discrete anomaly excavations were conducted prior to soil scraping activities. The discrete anomaly excavation locations were determined using the Digital Geophysical Mapping (DGM) data collected by Parsons and presented in their Final Technical Information Paper MRS-15SEA.1-4 (Parsons 2006). A field variance form (FVF SEAMRA-003) was issued to provide information about the alternative approach as presented in Section 3.13.3. Following the discrete anomaly investigations, the SCA was scraped and the soil sifted. Following scraping, the DGM and anomaly investigation procedures were repeated to confirm the completion of the removal action.
- SCAs W003, W035, W046, W123, W124, W125, W126, W127, W128, and W129 (Transmission Towers): There are 10 high-voltage electrical transmission towers identified within SCA polygons that completely or partially lie within the roadway alignment. The locations of these SCA polygons are shown on Maps B-1 through B-4 in Appendix B. DGM surveys are ineffective within 10 feet of the base of the towers. DGM surveys were performed as close as possible to the base of each tower; however, the area directly under the tower could not undergo a DGM survey.

- SCA_W140 (previously referred to as the existing fence line): MRS-15SEA.1-4 were fenced on the northern and western boundaries by a four-strand barbed wire fence, backed with concertina wire. The location of this SCA is shown on Maps B-1 through B-8 in Appendix B. The fence was installed in 1996 with unexploded ordnance (UXO) construction support. As part of the ESCA RP Team's activities, the fence adjacent to Eucalyptus Road was relocated outside the SCA and a DGM survey of the entire 25-foot-wide portion of SCA_W140 adjacent to Eucalyptus Road was conducted. Analog surveys were also conducted in this area as terrain-related data gaps were found in the DGM survey data. Due to site security issues and the presence of fence posts embedded in the asphalt and road base next to the edge of the existing GJMB roadway, the fence adjacent to GJMB was not removed. Instead, the concertina wire was removed and an analog survey was conducted over a majority of the SCA_W140 that was within the roadway alignment and adjacent to the existing GJMB. A small portion of SCA_W140 adjacent to GJMB, near the corner of Eucalyptus Road, underwent a DGM survey. Analog surveys were also conducted in this area as terrain-related data gaps were found in the DGM survey data. Figures 3-1 and 3-2 show the portions of SCA_W140 where the analog survey was conducted.
- SCA_W006, SCA_W012, and SCA_W153 (Wooden communication poles): Three wooden communication poles lie within the roadway alignment and were identified as SCAs by the Army. The locations of SCA_W006 and SCA_W012 are shown on Map B-4 and the location of SCA_W153 is shown on Map B-1 (Appendix B). The wooden communication poles support active overhead communication lines and are held in place by guy wires anchored into the ground. In order to perform a removal action around the base of the poles the guy wires would need to be removed. With the guy wires removed a vehicle would be needed to support the poles. Since the vehicle would cause more interference than the guy wire, this option was not feasible. On April 10, 2008, WESTON personnel showed these SCA polygons to DTSC personnel to discuss this approach. DTSC personnel concurred with the approach of leaving the guy wires in place with active UXO construction support during removal for the roadway work.
- SCA_W014, SCA_W035, SCA_W037, SCA_W039, SCA_W048, SCA_W055, SCA_W057, SCA_W066, SCA_W074, SCA_W112, SCA_W118, SCA_W119, SCA_W123, SCA_W124, SCA_W125, SCA_W129, SCA_W130, SCA_W143, SCA_W151, SCA_W158, SCA_W159, SCA_W161, and SCA_W162: These SCA polygons presented a variety of terrain, steep slopes, proximity to existing fences, gates, and other challenges that prevented the collection of DGM data in portions of the SCAs using geophysical equipment.
- SCA_W137 and SCA_W165: These SCAs contained asphalt that was left in place because the asphalt was part of an existing road or part of an apron left at gated site entrances, which were kept in place to provide stabilized construction site entrances to minimize erosion and dirt track-out onto the streets. As a result, DGM surveys were not performed in the portions of these SCAs located within the roadway alignment. These SCAs are discussed in Section 5.7.

3.3 Geophysical Detection Equipment

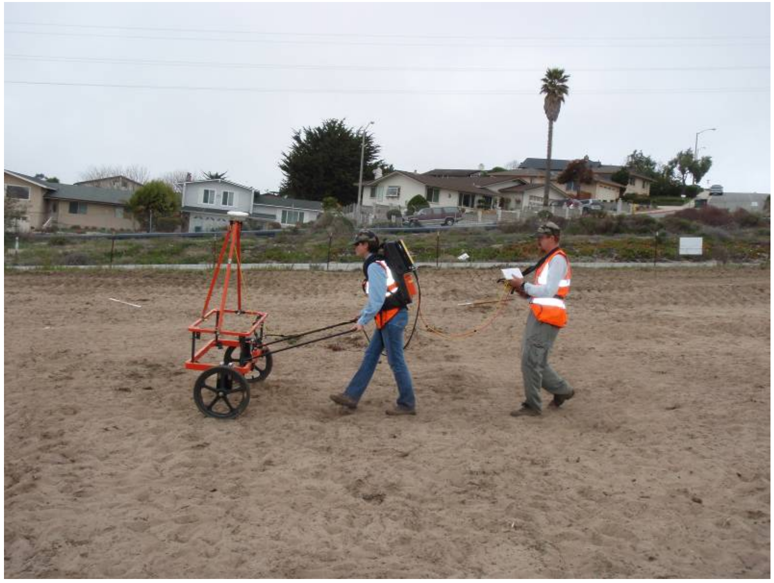
The MEC investigation and removal action activities were conducted using four geophysical instruments (two digital and two analog), which employ two different geophysical methods (time-domain electromagnetic and magnetometry). The digital geophysical instruments were used during the DGM survey (described in greater detail in Section 3.9). The analog instruments were used for the following activities: performing instrument-aided visual inspections of the cleared and grubbed portion of the roadway alignment (described in Section 3.5); supporting intrusive investigations of target anomaly excavations (described in Section 3.9.5); performing analog surveys in areas where digital instruments could not be effective due to electromagnetic interference from metallic site features (described in Section 3.9.6); and performing UXO construction support. The instruments are described in greater detail below.

3.3.1 Digital Detection Equipment

The two digital geophysical instruments that were used include the data recording Geonics Limited, EM61-MK2 (0.5-meter by 1-meter coils) time-domain electromagnetic metal detector and the Geometrics® G-858 Cesium Vapor Magnetometer. Both of these digital geophysical instruments record digital data. The metric for mean speed of operation of the digital instruments is less than 3 miles per hour. The metric for along-track spacing is less than 0.5 foot. The metric for cross-track spacing is 2.5 feet, excluding gaps due to surface obstructions. The metric for the smallest detection of MEC is a 37mm projectile buried 16 inches below ground surface.

3.3.1.1 EM61-MK2

The Geonics Limited, EM61-MK2 is a high-sensitivity ferrous and nonferrous metal detector. Electromagnetic surveys were performed using a man-towed single-array system (shown in Photograph 3-1), or a vehicle-towed multi-array system based on site conditions and survey area (shown in Photographs 3-2 and 3-3). The EM61-MK2 is battery-powered and operates at a maximum output of 10,000 millivolts. This man-towed system consists of two 1 x 0.5 meter air-cored coils with the top coil 28 centimeters (cm) above the bottom coil. The transmitter generates a pulsed magnetic field that induces eddy currents in conductive objects within the subsurface. These currents are proportional to the conductive nature of the material below the instrument. When conductive objects are present below the instrument, the amplitude and decay time of the induced eddy currents vary in response to the size, mass, and orientation of the objects. The bottom receiver coil measures the amplitude of these eddy currents at 216-, 366-, 660-, and 1,266-microsecond (μsec) intervals (time gates) during the decay period. The top coil measures the response at the same 660-μsec time gate as the bottom coil. Data were collected from the bottom coil in the standard four-time-gate mode. The operating height of the standard single-unit EM61-MK2 was 16 inches above ground surface and the towed array was 10 inches above the ground surface. The effective detection depth for the EM61-MK2 is a function of target characteristic (i.e., composition, size, mass, and orientation) and geological noise.

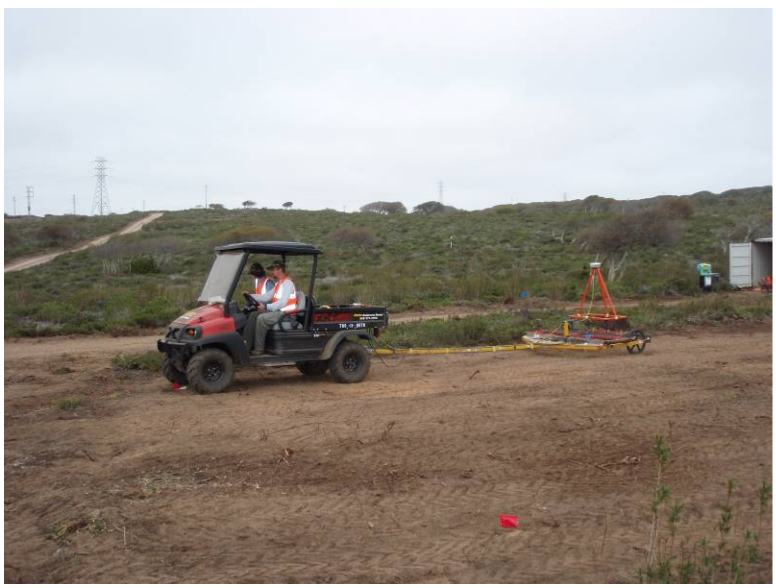


Photograph 3-1 - EM61-MK2 man-towed single-array system

The vehicle-towed system is comprised of an array of three EM61-MK2 coils mounted on a fiberglass frame, interfaced with a survey-grade global positioning system (GPS) to provide precise navigation and geographical positioning of detected anomalies. The complete array is towed by a (diesel) all-terrain vehicle (shown in Photographs 3-2 and 3-3). The array is a fabrication of nonmetallic composite fiberglass frame and axles and Kevlar wheel bearing to virtually eliminate metal-induced noise. A multi-port hub, which provides a direct interface between the GPS and the geophysical sensors, streams both positional and sensor information directly into a field laptop computer. The data are logged into ruggedized field laptop computers using specialized software. This configuration provides real-time monitoring of navigational tracking, sensor status, and anomaly responses to the field crew.

Prior to the start of each survey QC function checks were performed following the instrument-operating manual and standard industry practices (discussed in Section 4.3). The single-unit survey instrument readings were adjusted (nulled) to a common zero background at a low background area to level datasets according to site-specific conditions. The instrument was set to digitally record and store data at 10 readings per second (10 Hz) in an Allegro data logger. The towed array was also set to record and store data at 10 readings per second (10 Hz), in a field laptop computer. Since this system is not nulled in the field, data corrections were made during the post-processing stage.

Photograph 3-2 - EM61-MK2 vehicle-towed multi-array system

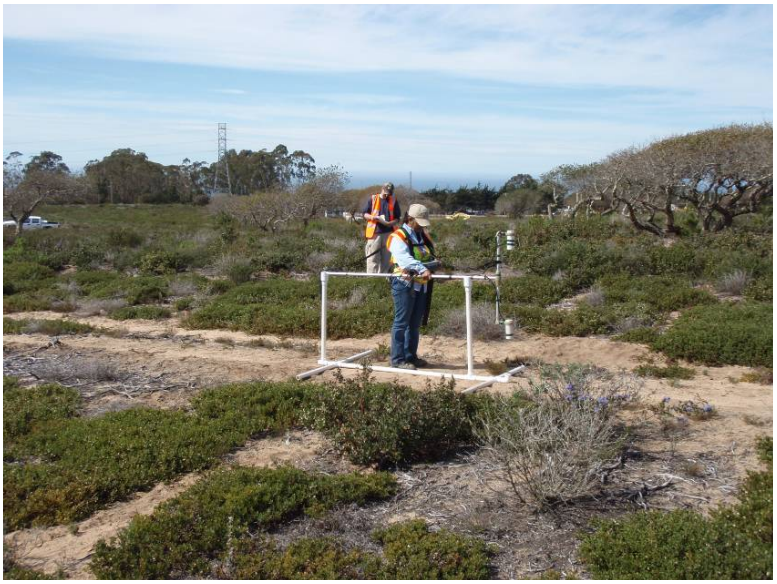


Photograph 3-3 - EM61-MK2 vehicle-towed multi-array system

3.3.1.2 G-858

Magnetometer surveys were performed using a Geometrics Model G-858 Cesium Vapor Magnetometer. Measurements of the magnetic field were collected using two sensors in gradiometer configuration. A Geometrics G-856 base station magnetometer was used to monitor diurnal variation in the ambient local magnetic field (daily fluctuations of 20 to 60 nanoTeslas [nT]) that occurred during the course of the survey. Photograph 3-4 shows the G-858 configuration. Prior to surveying, both instruments were time-synchronized and programmed following the manufacturer's instruction manual. The G-858 consoles were programmed to acquire data at a rapid 0.1-second cycle time (10 readings per second). The

G-856 base station was set at a fixed location to collect total field readings at 20-second intervals. The Geometrics Model G-858 Cesium Vapor Magnetometer was interfaced with a Trimble RTK, GPS to provide navigation. The standard height of the magnetometer surveys was 12 inches above ground surface, with a sensor separation of 2 feet (0.6 meter).



Photograph 3-4 – G-858 Magnetometer

3.3.1.3 Navigation Interface

A Trimble Real-Time Kinematic (RTK) GPS was utilized to position data collected during the EM61-MK2 and G-858 magnetometer surveys to cm accuracy. The GPS antenna was mounted over the center of the top EM61-MK2 coil and connected to the logging device. This receiver captures real-time differential corrections from a fixed local base station and outputs a National Marine Electronics Association GPS Fixed Data message directly into the data logger at 1-second intervals. For the G-858 surveys, the GPS antenna was mounted over the center boom, offset 4.0 feet from the vertical staff holding the two sensors. Direct interfacing between the GPS and instruments utilizes a single clock and streams position information directly into the raw data files. The G-858 data were collected in line and fiducial mode on a Cartesian grid. The relative coordinates were later warped (re-projected) to the appropriate coordinate system.

3.3.2 Analog Detection Equipment

The analog instruments that were used included the Schonstedt® GA-52/Cx handheld magnetometer and the Whites XLT® E Series handheld all-metals detector. Prior to operating an analog instrument (i.e., Schonstedt®, Whites XLT® E Series), the analog operator conducted and documented the analog checkout procedure.

3.3.2.1 Schonstedt® GA-52/Cx

The Schonstedt® GA-52/Cx handheld magnetometer has been approved for use at the former Fort Ord as documented in the Ordnance Detection and Discrimination Study. Schonstedt magnetometers are typically used to locate ferrous anomalies, and are typically used in conjunction with the Whites XLT® E Series all-metals detector.

Schonstedt magnetometer sweeps (i.e., "mag and dig") are particularly effective in areas where vegetation and terrain limit the use of larger digital systems. "Mag and dig" approaches were used for analog surveys.

3.3.2.2 Whites XLT® E Series

The Whites XLT® E Series handheld all-metals detector is also commonly used for geophysical investigations. Whites all-metals detectors are typically used to locate anomalies associated with buried objects composed of various types of metal, and are typically used in conjunction with the Schonstedt® GA-52/Cx handheld magnetometer.

Whites XLT® E Series handheld all-metals detector sweeps (i.e., "mag and dig") are particularly effective in areas where vegetation and terrain limit the use of larger digital systems. "Mag and dig" approaches were used for analog surveys.

3.4 Site Preparation Activities

Site preparation activities continued concurrently with other activities, the majority of which were complete in March 2008. In June 2008, brush cutting crews remobilized to the site to cut brush along the existing fence line. All site preparation activities were conducted with the escort of a UXO Technician II to assist with MEC avoidance.

3.4.1 Surveying Activities

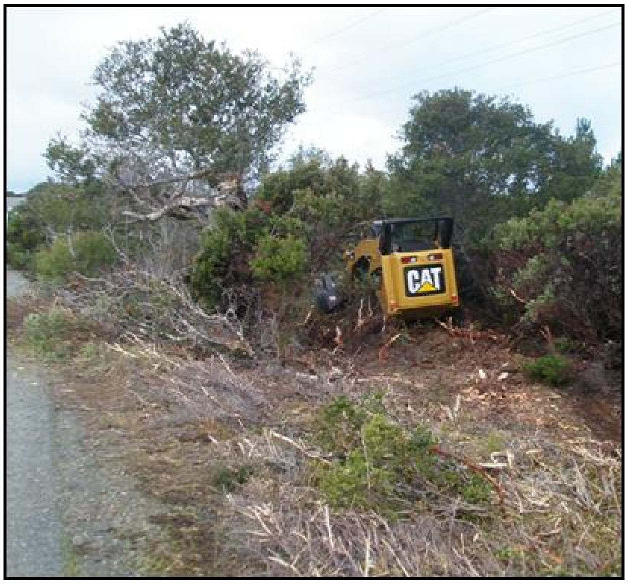
In December 2007, the ESCA RP Team mobilized subcontractor, Polaris Consulting of Carmel, California, a licensed land surveyor in the state of California, to begin surveying the MRA boundary, the SCA boundaries, and the limits of the roadway alignment in preparation of MEC removal activities. The survey work on the MRA was based on established monuments and used the North American Datum 83 California State Plane Zone IV coordinate system for control points and other survey activities. All control points used for base lines met the standards established by the Federal Geodetic Control Committee for Third Order, Class 1 survey as published in the "Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys" (September 1984) and "Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys" (1980). All control points recovered and/or established at the site were plotted on planimetric drawings at the appropriate coordinate location and were identified by name or number. Surveying activities continued concurrently with other activities and were completed in March 2008. All surveying activities were conducted with the escort of a UXO Technician II to assist with MEC avoidance.

3.4.2 Vegetation Cutting and Removal Activities

To make the surface safe and accessible for geophysical investigation and UXO personnel, vegetation within the work areas at the Seaside MRA and north of Eucalyptus Road was cut to a height of approximately 6 inches above ground surface. Vegetation cutting and removal activities were performed by the ESCA RP Team's subcontractor, Ahtna Government Services Corporation of Oakland, California ("Ahtna") in coordination with FORA's environmental consultant. Vegetation removal activities began in December 2007. During brush cutting and removal activities within the roadway, a UXO Technician II was present to assist with MEC avoidance.

Brush cutting activities occurred within the SCA boundaries, the roadway alignment and along a 30-foot-wide section of the entire length of the utility corridor. Photograph 3-5 shows brush cutting activities that occurred north of Eucalyptus Road. The 30-foot-wide section of vegetation was cut within the Seaside MRA along the boundary with the NRMA as a fire-line fuel break, in accordance with the HMP requirements. The fire-line fuel break extends along the southern border of MRS-15SEA.3 and MRS-15SEA.4 and bends south along the eastern boundaries of MRS-15SEA.1 and MRS-15SEA.2 (along the boundary with the NRMA), which corresponds with the location of the planned utility corridor.

Prior to brush cutting, a UXO Technician II used a magnetometer to aid in searching the vegetation for surface MEC. Vegetation cutting was followed by root mass removal outside of the SCA boundaries within the limits of grading for the roadway alignment. The majority of brush cutting activities were complete in January 2008. In June 2008, Ahtna remobilized to the site to cut remaining brush along the existing fence line to prepare for DGM activities in this area.

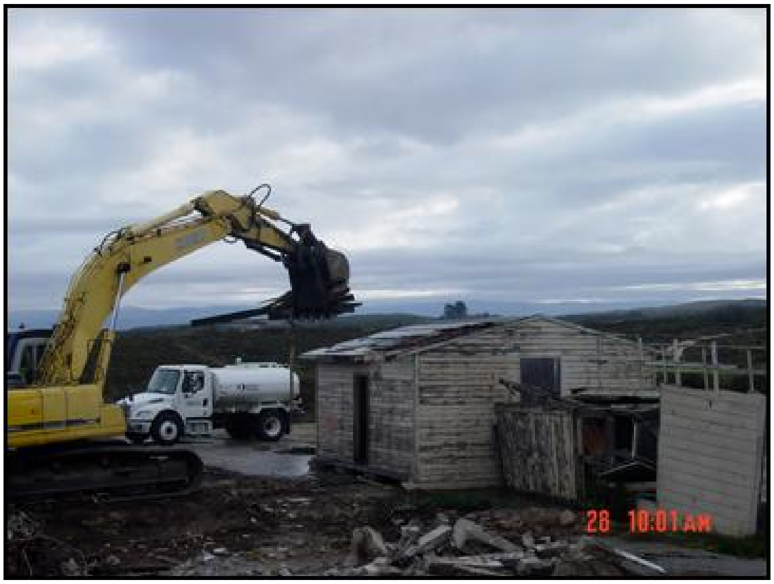


Photograph 3-5 – Brush cutting activities north of Eucalyptus Road

3.4.3 Structure Demolition and Debris Removal Activities

Five structures were present within the roadway alignment and/or utility corridor. These structures had previously been identified as buildings 8304, 8312, 3908, 3941, and R9180. To accommodate the roadway alignment, these structures were demolished and removed and a DGM survey completed for the areas beneath the structures. In addition, numerous debris piles were located throughout the Seaside MRA; 10 of these piles were located within the roadway alignment and/or utility corridor, which needed to be moved in order to complete the DGM survey (identified as Pile No. 4, Pile No. 6, Pile No. 9A, Pile No. 9B, Pile No. 9C, Pile No. 13, Pile No. 15, Pile No. 18, Pile No. 22, and Pile No. 26). Four of these debris piles had previously been identified as SCAs by the Army. The locations of structure 3908, Pile No. 4, Pile No. 13, and Pile No. 15 are shown on Figure 3-5. The location of structure 8312 is shown on Figure 3-6. The location of structure 8304, Pile No. 9A, Pile No. 9B, Pile No. 9C, and Pile No. 18 are shown on Figure 3-7. The locations of structures R9180 and 3941, Pile No. 6, Pile No. 22, and Pile No. 26 are shown on Figure 3-8.

Prior to demolishing the structures, asbestos abatement and lead-based paint (LBP) stabilization was conducted. Asbestos abatement and LBP stabilization activities for the structures began in December 2007 and were performed by the subcontractor Performance Abatement Services of Richmond, California under the oversight of a California-Certified Asbestos Consultant and California Department of Public Health-Certified Lead Inspector/Assessor and Project Monitor. Following the asbestos abatement and LBP stabilization, the structures were demolished. Demolition activities were completed by the subcontractor Soil Enterprises Inc. of Brentwood, California. Photograph 3-6 shows a structure being demolished. Asbestos abatement, LBP stabilization, and demolition activities were complete in January 2008.



Photograph 3-6 – Structure demolition activities

The debris piles from the entire MRA were inspected by UXO Technicians to ensure no MEC hazards were present. The piles were then consolidated into one central area and were segregated according to waste stream and transported off site to appropriate receiving facilities. A complete summary of demolition and debris pile removal activities for the entire Seaside MRA, including waste manifests and detailed disposal information, will be included in the RI/FS report.

3.4.4 Asphalt Removal Activities

Asphalt range roads extended from GJMB and Eucalyptus Road into the Seaside MRA. Additional asphalt-covered areas, including parking and staging areas, were present on the MRA. The asphalt roads, including road base material, and pads were removed by subcontractor Ahtna with the construction support of UXO personnel. The location of the asphalt that was removed is shown on Figures 3-5 through 3-8. The removed asphalt was transported to the sifting plant and sifted to remove material greater than ¾ inch, which could represent potential MEC items.

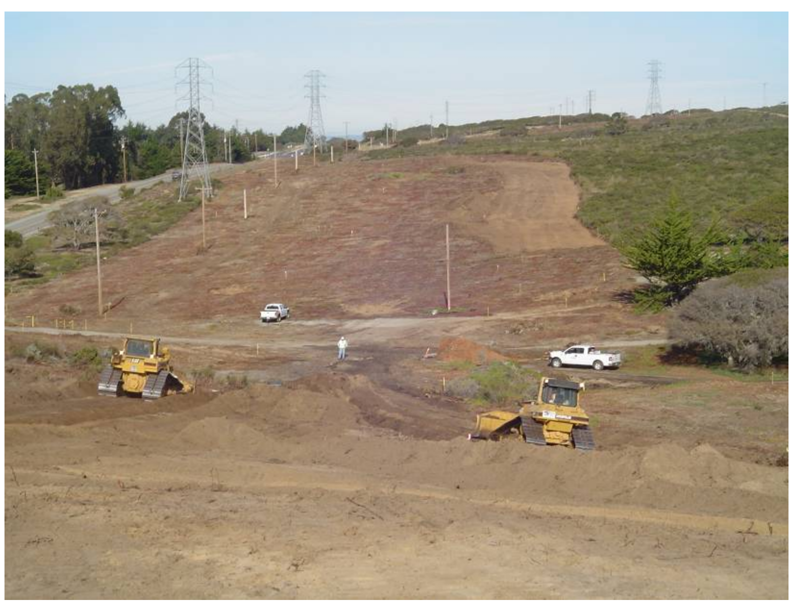
3.5 Roadway Alignment Clearing and Grubbing Operations

Figure 1-2 shows the roadway alignment. In January 2008, the ESCA RP Team mobilized crews to begin clearing and grubbing the roadway alignment, excluding SCAs. The crews cleared and grubbed approximately 67 acres within the roadway alignment (84 acres minus the areas consisting of SCA polygons and the hillside west of GJMB). The crews removed the top 6-inch vegetative layer within the staked limits of the roadway alignment using heavy equipment, including CAT D6N and D6M dozers, one CAT 966 loader, and three CAT 740 haul trucks. Clearing activities proceeded from Seaside MRS-15SEA.2 to MRS-15SEA.1, then to MRS-15SEA.4, and lastly to MRS-15-SEA.3. Roadway clearing and grubbing activities were conducted with the UXO construction support consisting of UXO Technicians and the overall oversight of the Senior UXO Supervisor. The majority of roadway clearing and grubbing activities were completed on January 31, 2008. Additional clearing and grubbing occurred later to avoid erosion during the rainy season. Photographs 3-7 and 3-8 show the clearing and grubbing operations.

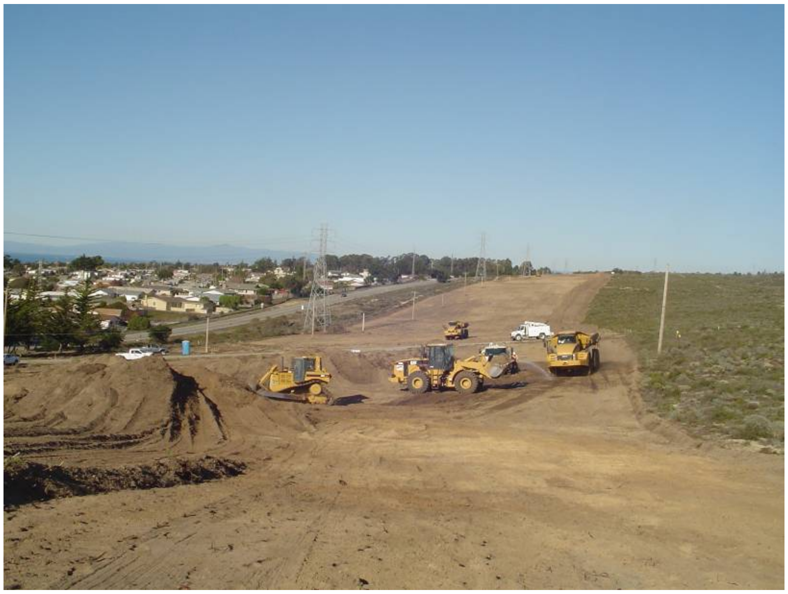
The material generated from clearing and grubbing activities was consolidated and stockpiled in the 50-foot work zone along the eastern and southern edges of the roadway alignment. A total of approximately 40,250 cubic yards (cy) of soil and vegetation was removed and stockpiled as part of the clearing and grubbing operations.

UXO Technicians were present during clearing and grubbing operations as well as loading and staging of the grubbed material to observe and inspect the material for the presence of MEC or munitions debris (MD) items. Following clearing and grubbing activities, UXO Technicians conducted instrument-aided visual inspections of the cleared and grubbed roadway alignment (Photographs 3-9 and 3-10) as well as the stockpiled material for the presence of MEC or MD using the Schonstedt® GA-52/Cx handheld magnetometer and Whites all-metals detectors (Photograph 3-11). The inspections consisted of UXO Technicians walking lanes across 100% of the cleared and grubbed roadway alignment area and visually inspecting the surface for MEC or MD. The roadway alignment inspection was conducted from January 10 to February 8, 2008 (roadway inspections were also conducted for additional clearing and grubbing that occurred later to avoid erosion during the rainy season).

During the instrument-aided visual inspection of the cleared and grubbed roadway alignment, six anomalies were detected by the UXO Technicians that were not within the SCAs identified by the Army. These analog anomalies were intrusively investigated using the excavation techniques described in 3.9.5. The results of the analog anomaly investigations following the clearing and grubbing activities are discussed in Section 5.2.

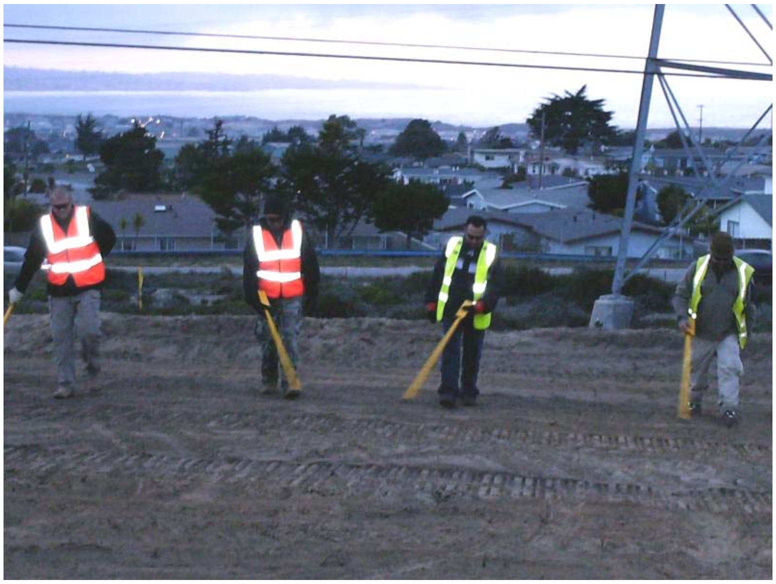


Photograph 3-7 – Clearing and grubbing operations within roadway alignment outside of SCAs.

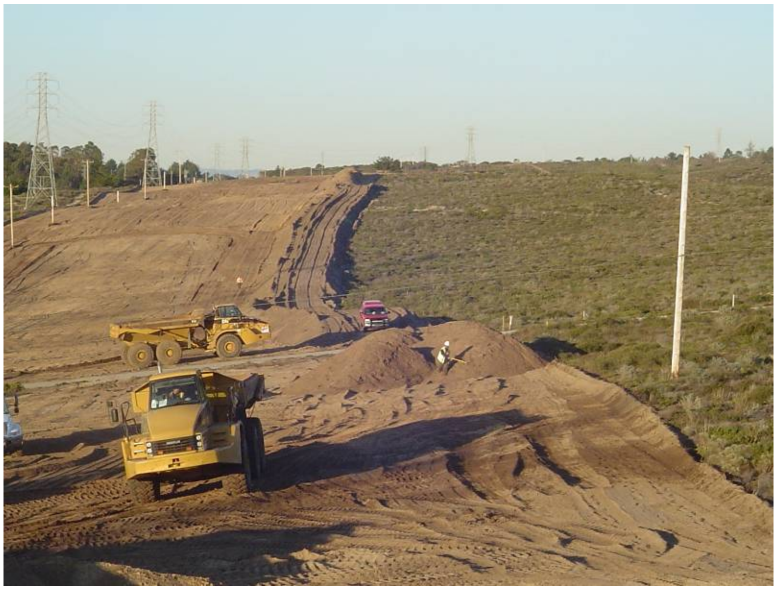


Photograph 3-8 – Clearing and grubbing operations within roadway alignment outside of SCAs

Photograph 3-9 – Instrument-aided visual inspection of the stockpiled soil during clearing and grubbing activities



Photograph 3-10 – Instrument-aided visual inspection of roadway alignment during clearing and grubbing activities



Photograph 3-11 – Instrument-aided visual inspection of cleared and grubbed roadway stockpile material

3.6 MEC Removal Action for SCA Point Locations within the Roadway Alignment and Utility Corridor

A total of 534 SCAs were previously identified as discrete point locations by the Army and for a variety of reasons were not previously investigated. Of these 534 SCAs, 85 were located within the roadway alignment and 26 within the utility corridor (Table 3-1). The locations of the SCA points within the roadway alignment and utility corridor are shown on Figures 3-1 through 3-4. More detailed maps showing the SCA points and corresponding identification numbers are provided in Appendix A. These discrete SCAs were identified by the ESCA RP Team as SCA point locations, as discussed in Section 3.1.1. SCA point locations were staked by a licensed surveyor as previously discussed in Section 3.4.1 and UXO Technicians investigated the points using handheld magnetometers and all-metals detectors to locate the anomaly response.

Once the anomaly response was located, the UXO Technician began excavation of the location using either shovels and/or an excavator depending on the depth of the anomaly. Once the anomaly source was found and recovered, the UXO Technician rechecked the 3-foot-radius area around the location to determine if other items remained buried. Item(s) recovered were logged into a Personnel Digital Assistant (PDA) or Juniper Systems Archer Ultra-Rugged Field Personal Computer. At the end of each day, the data were uploaded to an Access database. If no anomaly source was detected, the negative result was noted as no contact (NC).

The SCA points were investigated and anomalies were removed to the extent possible. If the anomaly source could not be physically removed due to the presence of remaining power poles or other features, the locations were not excavated. Each SCA point excavation was inspected using the QC-1 procedure described in Sections 4.2 and 4.3.6.1 by the UXO Quality Control Specialist (UXOQCS). Section 5.0 summarizes the findings of the SCA point investigations.

3.6.1 SCA Points within SCA Polygons in the Roadway Alignment and Utility Corridor

There were a total of 15 SCA points that were located within the footprint of SCA polygons and within the roadway alignment. These points were identified as point numbers 207, 208, 248, 272, 278, 280, 281, 304, 308, 336, 337, 441, 483, 484, and 486 (Table 3-1). The locations of these SCA points and identification numbers are shown on detailed maps provided in Appendix A. The polygons in which these points were located are identified in Table 3-1. These SCA points were investigated using the procedures described in Section 3.6 after the polygons were scraped. In addition, these SCA points underwent a DGM survey or an analog survey as part of the associated SCA polygon (the type of survey depended upon the polygon). As described in Section 3.7, the SCA polygons, including any SCA point locations, were scraped to remove metallic clutter and other debris, and the scraped soil was sifted as described in Section 3.8. The majority of the polygons were surveyed using DGM instruments followed by investigation of detected anomalies (Section 3.9). In some circumstances, the polygons were investigated using analog instruments. The SCA polygons went through the appropriate QC and QA processes depending on the type of survey that was conducted (DGM or analog), as discussed in Section 4.0.

3.7 Scraping Operations of SCA Polygons within the Roadway Alignment and Utility Corridor

As opposed to the SCA point locations, SCA polygons were identified as defined areas that could not be cleared due either to physical obstructions or to dense metallic clutter, which caused interference and prevented a DGM survey from being completed in the area. Prior to

DGM surveys, the soil within the SCA polygons was scraped and sifted to remove metallic clutter and other debris. A total of 78 SCA polygons within the roadway alignment and utility corridor were proposed for scraping and sifting prior to performing the DGM survey (Table 3-2). The locations of the SCA polygons within the roadway alignment and utility corridor are shown on Figures 3-1 through 3-4. More detailed maps showing the SCA polygons and corresponding identification numbers are provided in Appendix B. In 12 of these polygons, scraping did not occur in portions of the polygon or occurred only after the DGM survey was complete. These SCA polygons were described in Section 3.2 and are identified as:

- SCA_W111 (investigated as discrete anomaly excavations under approved field variance form FVF SEAMRA-003)
- SCA_W140 (existing fence line SCA)
- SCA_W003, SCA_W035, SCA_W046, SCA_W123, SCA_W124, SCA_W125, SCA_W126, SCA_W127, SCA_W128, and SCA_W129.

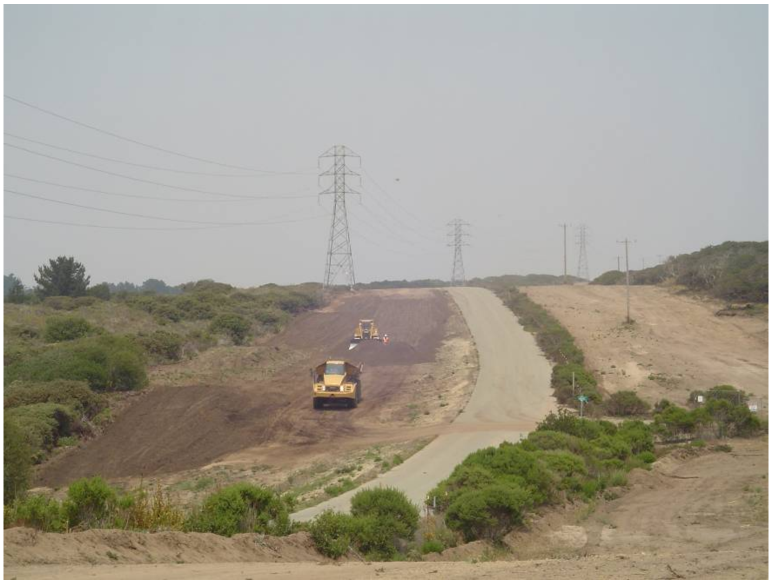
Figures 3-9 through 3-12 show the locations of the SCA polygons that were scraped within the roadway alignment and utility corridor.

Portions of SCA_W137, SCA_W162, and SCA_W165 include access gate entrances, which were not scraped due to the fact that these entrances are currently used by the construction crews and public agencies and are in close proximity to General Jim Moore Boulevard. Scraping of these entrances would cause an erosion problem and over time could cause undermining of General Jim Moore Boulevard. These entrances will require active UXO construction support during the proposed roadway alignment construction work.

On February 4, 2008, ESCA RP Team personnel began scraping the soil within the SCA polygons. Soil scraping continued until April 2008. Additional scraping was conducted in June and July 2008 to complete the scraping of SCA_W101, SCA_W111, and SCA_W160. The SCA boundaries were previously staked by a licensed surveyor as indicated in Section 3.4.1. SCA scraping activities were conducted with UXO construction support. Prior to initiating scraping activities, the surface of the area to be scraped was visually inspected by UXO Technicians for the presence of MEC or MD items. Once the areas were visually inspected, scraping activities were conducted. UXO Technicians were present to observe and inspect scraping, loading, and transport activities in the event that potential MEC items were uncovered.

The depths to which the SCA polygons were scraped were based on the response from the handheld magnetometer and/or the all-metals detectors used by the UXO Technicians during their oversight. Scraping was conducted to the required depth until minimal anomaly responses were detected by the handheld instruments. The scraping of SCA polygons is shown in Photographs 3-12 and 3-13. Typically, the depth of scraping was approximately 6 inches; however, in some areas scraping extended deeper. In the case of SCA_W160, scraping extended to an approximate depth of 10 feet due to the presence of significant asphalt debris.

Scraped soil was loaded onto haul trucks and transported to a soil stockpile staging area in Seaside MRS-15SEA.1. The locations of the sifting plant and soil stockpile staging area are shown on Figure 3-13. As shown on the figure, the locations of the sifting plant and soil stockpile staging area were located outside the limits of the roadway alignment and utility corridor. The soil was staged in discrete stockpiles by MRS (MRS-15SEA1 through MRS-15SEA.4).



Photograph 3-12 – SCA polygon scraping activities

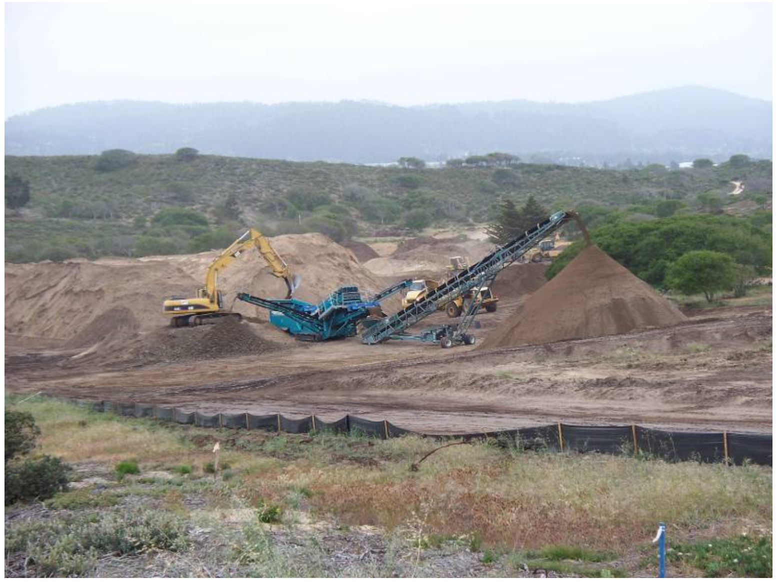
Photograph 3-13 – SCA polygon scraping and dust control activities

3.8 Sifting Operations of SCA Scraped Soil

The soil scraped from the SCA polygons located within the roadway alignment and utility corridor was not segregated from the soil scraped from the SCA polygons located outside the roadway alignment or utility corridor. However, the soil was segregated by MRS when stockpiled adjacent to the sifting plant location. A total of approximately 89,000 cy of material were scraped from the SCA polygons within MRS-15SEA.1-4 and transported to the sifting plant location to be sifted. The sifting plant is shown in Photograph 3-14. The soil was sifted using a 6-inch grizzly, a 2-inch and 3/4-inch screen, two magnets, and conveyors. The 3/4-inch screen was later replaced with a 3/8-inch (8mm) Speedharp-type screen, which was better suited to screen soil that was wetted for dust control with minimal clogging. FVF SEAMRA-002 was prepared and approved by the regulatory agencies to document this change in operation. Section 3.13 provides additional information on the FVFs.

The sifting plant and stockpile staging area were located on the eastern side of Seaside MRS-15.SEA.1 outside the limits of the roadway alignment and utility corridor, as shown on Figure 3-13. The sifting operation location in Seaside MRS-15SEA.1 was approved by the Department of Defense Explosive Safety Board in the "2nd Addendum to the 3rd Amendment, Revision 2 to the 17 Feb 94 LDSP for BRAC of Fort Ord, California" (ESCA RP Team 2008a). Operations were conducted using the selected MEC item (60mm mortar M4982) with a horizontal range of maximum weight fragment of 1,127 feet for nonessential personnel. These exclusion zone calculations and rationale are described in the "2nd Addendum to the 3rd Amendment, Revision 2 to the 17 Feb 94 LDSP for BRAC of Fort Ord, California."

Sifting operations of scraped soil from SCAs within and outside the roadway alignment and utility corridor began on April 9, 2008; sifting operations of scraped soil from SCAs within the roadway alignment and utility corridor were completed on July 23, 2008. After July 23, 2008 sifting continued for soil removed from SCAs outside of the roadway alignment and utility corridor. There were a minimum of two UXO Technicians (UXO Technician II or equivalent) on site during active sifting operations. The UXO Technicians conducted an overall visual survey of the area prior to starting operations and inspected the sifted materials.



Photograph 3-14 – Sifting plant operations

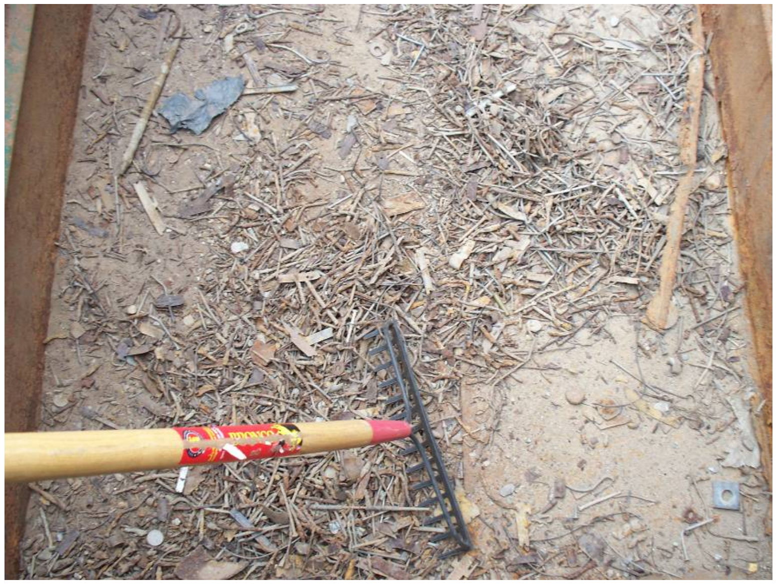
Figure 3-14 shows a schematic of the sifting equipment used to remove metal items (potential MEC) and oversize items greater than 3/4 inch or greater than 3/8 inch following the installation of the Speedharp-type screen as approved by FVF SEAMRA-002. The excavated soil sifting process was as follows:

1. The excavated material was introduced into the feed hopper/grizzly using an armored loader. Material greater than 6 inches in size was rejected and discharged to one side of the grizzly. This was the first of the five material types generated. This oversized material was transported to a separate staging area and was 100% inspected in the morning and afternoon by trained UXO Technicians. Materials removed by the sifting plant were segregated and managed accordingly. The Senior UXO Supervisor (SUXOS) was immediately notified if MEC items were recovered.
2. The material passing the 6-inch grizzly was less than 6 inches and fell into the feed hopper and onto a heavy duty conveyor belt, which led to the first magnet. The magnet collected ferrous metal items and discharged the metal into a scrap bin container using a small conveyor rotating around the magnet into a scrap bin container (See Photograph 3-15). This was the second of the five material types generated. Depending on the quantity of metal collected, the bin was inspected and transported at least daily to the staging area for sorting and was 100% inspected in the morning and afternoon by UXO Technicians. Materials (MEC, MD, and non-MEC-related scrap) were segregated and managed accordingly. The SUXOS was immediately notified if MEC items were recovered.

Photograph 3-15 – Metal recovered from the first magnet of the sifting plant

3. The remaining material that was not collected by the magnet continued on a heavy duty conveyor belt, which conveyed the material through dual-layered 2-inch (top) and 3/4-inch (3/8-inch after the approval of FVF SEAMRA-002; bottom) vibrating screens. The top screen was sized to reject larger potential MEC items while minimizing the potential for clogging by vegetative matter removed during the clearing and grubbing activities. Material greater than the bottom screen size and the top screen size were rejected and discharged together to one side of the sifting plant into a stockpile at the end of the conveyor. This material was introduced back into the screening plant system at least one more time to minimize the volume of the oversize material. This was the third of the five materials that were generated. This material was then transported to a separate staging area and was 100% inspected in the morning and afternoon by UXO Technicians. Materials (UXO, MEC, MD, and non-MEC-related scrap) were segregated and managed accordingly. The SUXOS was immediately notified if MEC items were recovered.

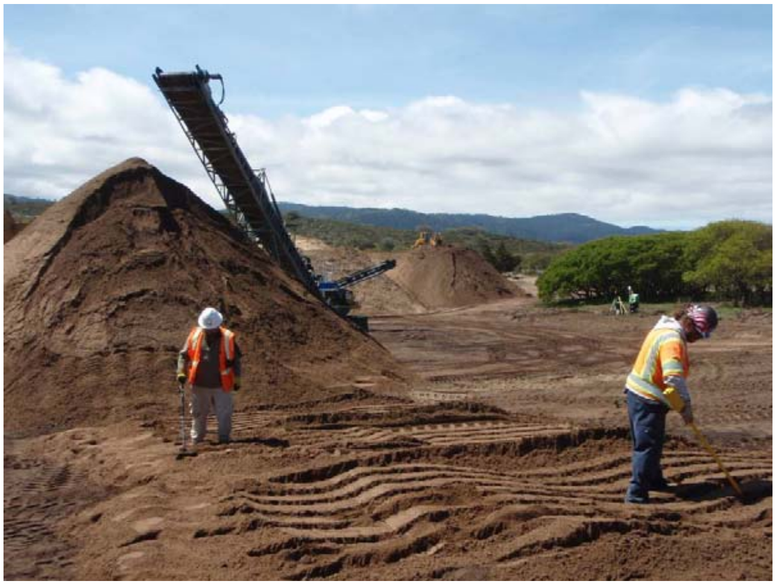
4. The material that passed through the bottom screen (< 3/4-inch material or <3/8-inch material after approval of FVF SEAMRA-002) was then passed along a heavy duty conveyor belt and passed under a second magnet. The second magnet removed any ferrous metal and a small conveyor discharged the metal into a separate scrap bin container (see Photograph 3-16). This was the fourth of the five material types generated. This < 3/4-inch or <3/8-inch material was then transported to the sorting area and was 100% inspected in the morning and afternoon by trained UXO Technicians. Materials (UXO, MEC, MD, and non-MEC-related scrap) were segregated and managed accordingly. The SUXOS was immediately notified if MEC items were recovered.



Photograph 3-16 – Metal recovered from the second magnet of the sifting plant

5. Any material that passed through the bottom vibrating screen and past the second magnet was considered the final screened material. This material consisted only of material that was less than 3/4 inch in size or less than 3/8 inch in size following the approval of FVF SEAMRA-002 (Photograph 3-17). Morning and afternoon inspections of the final sifted soil were conducted by taking approximately 15 cy of sifted soil, spreading it into a thin lift, and inspecting the soil visually and with the assistance of handheld instruments (Schonstedt magnetometers and Whites all-metals detectors) for the presence of items/metal larger than 3/4 inch. Photograph 3-18 shows two UXO Technicians conducting this inspection using a Schonstedt magnetometer and Whites all-metals detectors. The SUXOS was immediately notified if MEC items were recovered.

Photograph 3-17 – Final screened material from the sifting plant



Photograph 3-18 – Inspection of sifted soil; Inspection was conducted twice daily for a portion of each stockpile of sifted soil generated

The final screened material was conveyed onto conical-shaped stockpiles by a stacking conveyor as shown in Photograph 3-17. Soil sifted each morning was segregated from soil sifted each afternoon. After the inspection step for the sifted soil was performed, along with a satisfactory recovery of seed items introduced to the sifting plant during the time when the stockpile was generated (described in Section 4.1), the sifted soil stockpile was loaded into off-road haul trucks. Sifted soil was transported and placed within the cleared and grubbed roadway alignment along GJMB or Eucalyptus Road in areas where additional fill soil is needed for the planned roadway construction project as requested by FORA. Sifted soil was not placed outside of the roadway alignment. The Army requested use of oversize reject materials (materials rejected by the 6-inch, 2-inch, or 3/8-inch sifting screen), which had been generated by sifting operations for use in fuel break repair projects on the inland ranges of the former Fort Ord.

3.9 MEC Removal Actions - SCA Polygons and Hillside West of GJMB

Following the site preparatory activities and the soil scraping of SCA polygons to remove the debris that would prevent effective geophysical surveys, a DGM survey was performed within the SCA polygons and the hillside west of GJMB to establish and record the locations of geophysical anomalies that potentially represented subsurface MEC. The BADT was utilized as appropriate for each area and physical investigation. The performance goal for the geophysical survey was to locate all items in the subsurface that could be detected given the particular instrument and the site-specific conditions (i.e., terrain, vegetation, cultural, etc.). Items identified as potential MEC were intrusively investigated. Terrain and physical constraints prevented DGM surveys from being completed in certain areas of several SCAs as described in Section 3.9.6. Instead, an analog survey and removal action was completed in these areas.

3.9.1 Geophysical Test Plot and Report

Prior to initiating the full-scale geophysical mapping within the SCAs and the hillside west of GJMB, instrumentation was tested at the established geophysical test plots. The geophysical test plot survey was conducted in accordance with the SSWP Addendum and the "Final Geophysical Test Plot Plan, Seaside Munitions Response Area (MRA)," dated March 7, 2008 ("the Final GTP Plan"; ESCA RP Team 2008d). As part of the geophysical test plot survey, two geophysical test plot grids (referred to as Test Plot 1 and Test Plot 2) were established and geophysically mapped at the Seaside MRA. The second test plot was established to evaluate the potential effects of a power line that crosses part of the survey area. The primary objectives of the test plot surveys were to 1) provide information that was used to validate proposed geophysical sensor and navigation instrumentation and personnel protocols, and 2) confirm that the project scope and other proposed metrics for Data Quality Objectives (DQOs) were attainable and sufficient to meet the intended project goals. The intended project goals were to accurately map and locate MEC within the Seaside MRA. A summary of the results of the geophysical test plot are provided below. Additional details of the geophysical test plot survey are included in the Geophysical Test Plot Report (ESCA RP Team 2008g).

The electromagnetic (EM) surveys were conducted using a Geonics Limited, EM61-MK2™ high sensitivity ferrous and nonferrous metal detector described in Section 3.3.1.1. Independent surveys were performed using the single man-towed cart and towed multiple-array units. Magnetic (mag) surveys were performed using a Geometrics Model G-858 Cesium Vapor Magnetometer described in Section 3.3.1.2. An RTK GPS was utilized to position data collected during the EM61-MK2 single- and towed-array surveys to cm accuracy. Static background, static spike, and vibration/cable tests were performed daily before and after surveying and during power-on and power-off cycles to confirm the equipment was functioning properly throughout the survey period. The EM61-MK2 and G-858 were tested at a designated QC area during the pre- and post-survey instrument function tests.

Based on the results of the geophysical test plot surveys presented in detail in the Final GTP Report, the following recommendations were proposed and approved for the full-scale activities at the Seaside MRA:

- EM61-MK2 was selected as the primary instrument for DGM. Data were to be collected and processed using conventional processing techniques. The towed array would be used in areas that were wide open and easily accessible. The single unit would be used to collect data at small, discrete locations or where the data from the towed array could be compromised (excessive topography and rough terrain).
- G-858 line and fiducial data would be utilized where RTK signal lock was completely compromised and could not be achieved. This situation was expected to be minimal at the Seaside MRA.
- Target selection thresholds would initially be based on analysis of a portion of background data in each dataset. This background data would be examined to calculate a threshold of three times the standard deviation of the background signal. It was also

recommended that low threshold values be ground-truthed against a representative sample of these low threshold geophysical targets in the initial stages of the full-scale surveys. After several datasets had been investigated (reacquired and logged), an analysis was to be performed of these targets and their resulting dig information to determine if an increase in the target selection threshold was warranted. During the DGM survey activities conducted at the Seaside MRA, no increase in the target selection threshold was warranted.

3.9.2 Digital Geophysical Data Mapping Surveys

DGM surveys were completed in wide open areas where terrain permitted. As was determined by the geophysical test plot survey, EM61-MK2 was the primary instrument used for DGM. On the hillside west of GJMB, the G-858 magnetometer was selected as the primary instrument for DGM due to the influence of cultural effects resulting from overhead high-voltage power lines. In contrast to the EM61-MK2, the G-858 was not affected by the overhead power lines.

Some areas were not accessible for DGM surveying. These areas included the high electrical transmission towers, communication poles with guy wires and anchors, steep slopes, and the area of existing fence immediately adjacent to the existing GJMB. The planned construction work for the roadway alignment and utility corridor will include removing the utilities supported by communication poles from the roadway alignment and installing them underground within the roadway alignment and/or along the utility corridor. However, until these utilities can be relocated, they are required to remain in service. To maintain service of these utilities, the DGM survey was conducted as close to these locations as possible. Active UXO construction support will be on site during the subsequent removal of these towers and communication poles.

3.9.2.1 SCA Polygons

The full-scale and QC-2 DGM of the SCA polygons within MRS-15SEA.1-4 were performed using the EM61-MK2 as the primary instrument. Data were collected and processed using methodologies consistent with the USACE Data Item Description (DID) MR005.05A and industry standards. The towed array was used to acquire data in portions of larger areas (i.e., SCA_W048 and along the fence line [SCA_W140]) that were wide open and easily accessible. The single EM61-MK2 sensor on a wheel-mounted cart was used to acquire data at smaller SCAs, discrete locations, and data gaps in the towed-array data resulting from excessive topography or rough terrain. Both instruments were interfaced with the Trimble RTK GPS to provide navigation to cm accuracy. Prior to conducting each survey, QC function tests were performed following the instrument-operating manual and USACE guidelines. The instrument QC readings were digitally recorded and stored in memory in an Allegro data logger. The locations where the EM61-MK2 surveys were conducted are shown on Figures 3-15 through 3-18.

3.9.2.2 Hillside West of GJMB

Within the hillside area west of GJMB, the full-scale DGM was initially performed using the single EM61-MK2 sensor on a wheel-mounted cart (see Photograph 3-1). Upon review of the data, it was determined that cultural effects resulting from overhead high-power lines affected the EM61-MK2 instrument, introducing noise and adversely affecting data quality. To overcome the effect of the overhead power line, the area was resurveyed using a Geometrics Model G-858 Cesium Vapor Magnetometer interfaced with the Trimble RTK, GPS to provide navigation. The G-858 data is not affected by the high-voltage power lines. The location where the G-858 survey was conducted is shown on Figure 3-19.

Measurements of the total magnetic field were collected using two sensors spaced 2.0 feet (0.6 meter) apart in the vertical orientation. The total field data from the two sensors were used to calculate the vertical magnetic gradient. The vertical gradient minimizes terrain noise and maximizes the sensitivity toward buried ferrous materials. The bottom sensor was set at a height of 12 inches above the ground surface as the operator traversed each line. This optimum height was determined from previous investigations. The GPS antenna was offset 4.0 feet from the vertical sensor staff. The offset compensation was removed in the post-processing step, adjusting vertical gradient measurements to their true geographical position. A Geometrics Model G-856 base station magnetometer was used to monitor diurnal variation in the ambient local magnetic field that might occur during the course of the survey. Prior to surveying, both instruments were time-synchronized and programmed following the manufacturer's instruction manual.

The G-858 instrument was programmed to acquire data at a 0.1-second cycle time (10 readings per second). Geophysical data were collected using a line spacing of 2 feet between pathways while collecting data at 10 readings per second (approximately 0.25 foot between measurement stations).

The same approach was used at the hillside west of GJMB for the QC-2 surveys discussed in Section 4.3.6.2.

3.9.3 Digital Geophysical Data Processing and Target Anomaly Selection

The data collected from the digital detection instruments were processed using the techniques described in the following subsections.

3.9.3.1 Preprocessing of Raw Data

The raw EM61-MK2 single unit and G-858 field data were processed using DAT61 MK2 and MagMap 2000 software, respectively. The base station (G-856) data were reviewed and diurnal corrections were applied to the mobile G-858 data. Prior to the vertical gradient calculation, data dropouts were linearly interpolated and the total field data were corrected for diurnal drift on each sensor. The G-858 data were pre-processed and offsets between the two mag sensors, and the vertical sensor staff and GPS antennae were applied in MagMap 2000. The EM61-MK2 towed-array data were collected using MagLog software and preprocessed using MagMap 2000 software. Data were then exported in Geosoft XYZ file format for post-processing.

3.9.3.2 Geophysical Processing

Raw XYZ files were imported into Geosoft Oasis Montaj™ processing software. Data were checked for navigational accuracy, line distribution, and coverage. Latency values obtained during the pre- and post-survey QC tests were applied to the data, correcting for any temporal lags seen in the data. A Geosoft script was run to automatically progress through the processing steps for each of the four individual data channels. The script was used to drift-correct the data using a common filtering technique. A nonlinear drift correction filter was used to remove any drift associated with each data channel occurring throughout the survey period. Velocity and sample separation were calculated for each dataset (recorded in Processing Notes, presented in Appendix D). After each of the four time-gate data channels was processed and evaluated, the channels were summed into a single "stack" channel.

Background noise was evaluated for each dataset by windowing a section of the data and generating statistics using the UX-Process QC module. Background noise was variable across the site. The lowest noise values averaged between 4 to 5 millivolt (mV) and an average standard deviation of 2.4 (DQO of <3.0). The highest levels were observed in SCA_W048 (original fence line SCA) in MRS-15SEA.2

Separate contour plots for the EM61-MK2 (stacked channels 1 through 4), and the magnetic vertical gradient (hillside area west of GJMB) were then generated using Oasis Montaj contour plotting software. Contour plots were generated by gridding the stack data channel using a grid cell size of 0.25 foot, a search radius of 2 feet, and blanking distance of 1.8 feet (for the 4-coil configuration). The contour plots for the EM61-MK2 surveys are shown in Figures 3-15 through 3-18 and the contour plot for the G-858 survey in the hillside west of GJMB is shown in Figure 3-19. More detailed maps of the contour color plots are provided in Appendix E.

The EM61-MK2 and G-858 plots were used to identify and locate target anomalies requiring further investigation. The targets were selected for the gridded data by running the Blakely Peak algorithm in Geosoft. A grid cutoff value of three times the standard deviation of the background was used on each dataset to select targets. In areas exhibiting low noise levels a grid threshold value of 5 to 7 mV was used to select the initial target list. In areas exhibiting slightly higher ambient noise, a nonlinear filter was applied to remove a portion of the background noise and a grid threshold of 8 to 10 mV was used for the target selection. These values were based upon a review of the background signal. Background was calculated by windowing a polygon of data typical of a quiet area. Target review consisted of manually evaluating selected targets, and removing or merging multiple targets associated with large anomalies. Targets were also moved (where necessary) to the location of the peak response associated with a given anomaly. A target decay analysis was also run to remove targets that had an atypical decay between their four time-gate channels. An atypical decay occurs when an anomaly undergoes a decay that does not decrease through time, but instead shows an increase in any of the subsequent time-gate channels.

The data processing procedures were used to generate a target anomaly database. Coordinate positions for each of the target anomalies identified in the DGM were compiled by SCA into a dig list, which was then provided to the UXO Teams for reacquisition and excavation. The composite dig list (also known as “dig sheets”), including the unique ID, position, and anomaly characteristics and dig information for each investigated target selected using the DGM, is presented in Appendix F. A total of 7,808 target anomaly locations were identified as requiring further investigation. Navigation and target picking accuracy were checked by selecting a target over a known QC seed survey control and calculating the offset distance between the two; these values were recorded and are documented in the Processing Notes (Appendix D). Table 3-3 summarizes the details of the EM61-MK2 and G-858 data processing parameters utilizing Geosoft.

3.9.4 Anomaly Reacquisition Procedures

Field reacquisition teams reacquired the target anomalies based upon information provided on the dig sheets. Target anomaly reacquisition was performed utilizing the Trimble RTK GPS for navigation to the precise coordinate location for each target anomaly and the location was flagged with a nonmetallic pin flag bearing the unique target identifier. The DGM target anomaly locations found were investigated within a 3-foot radius around the location previously flagged with RTK GPS. The UXO Dig Team used handheld analog instruments, appropriate to the type of instrument used for the DGM survey (the Whites all-metals detector for EM61-MK2 data and/or Schonstedt magnetometer for the G-858 data). The UXO Dig Team noted any offset from the flag to the excavated anomaly source(s) and logged the information accordingly. If no anomaly source was detected, the reacquisition team noted the negative result as NC on the anomaly list and left the flag in the location. Target anomalies were intrusively investigated using the procedures described in Section 3.9.5.

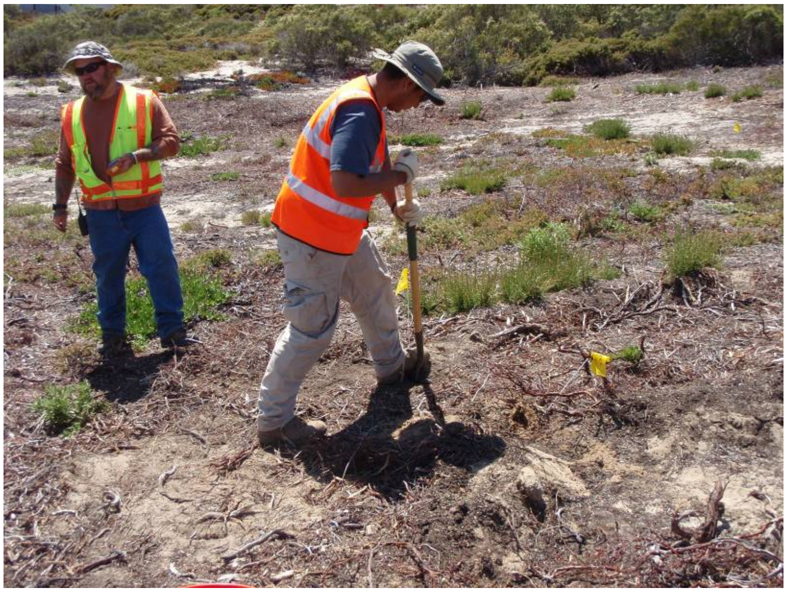
During the course of the project, it was concluded that the use of an EM61-MK2 was not necessary to peak the anomaly location due to the level of accuracy of the navigation equipment used (Trimble RTK GPS). Therefore, FVF SEAMRA-004 was prepared to document the removal of this step from anomaly reacquisition procedures. FVF SEAMRA-004 was reviewed and approved by the regulatory agencies prior to implementation in the field. Section 3.13 provides additional information on the FVFs.

3.9.5 Excavation of DGM Target Anomalies

During the DGM target anomaly removal actions, near-surface anomaly excavations were performed with hand tools such as shovels (near-surface anomalies are those subsurface anomalies that are within 6 inches of the surface). Photographs 3-19 and 3-20 show the hand excavation of near-surface anomalies. Those items considered too large or deep to be excavated by hand tools were investigated using heavy machinery such as a mini-excavator. UXO dig teams consisting of UXO Technicians performed excavations at the target anomaly locations identified in the DGM survey, identified the source of the anomaly, and utilized the PDA-based UXOFast^{SM} data logging system to electronically log the target anomaly characteristics real-time in the field. Target anomaly characteristics logged included, but were not limited to: item type (e.g., MEC, cultural debris, QC item); item description (e.g., concrete, practice grenade); weight of item; depth, confirmation of hole cleared, etc. MEC items encountered were photographed for documentation purposes. The following nomenclature was used to categorize the items discovered by the dig teams:

- UXO (Unexploded Ordnance)—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.
- DMM (Discarded Military Munitions)—Ammunition and ammunition components that have been abandoned, lost, or discarded.
- MC (Munitions Constituents)—Any material originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions present in high enough concentrations to pose an explosive hazard.
- MD (Munitions Debris)—Primarily shrapnel or fragments of items that once contained explosive fillers, detonators, or primers. These items are put through an inspection process to ensure they do not contain any explosive residue. Small arms ammunition is categorized as MD in this report and not reported separately.
- Cultural Debris (Non-MEC-related items)—A variety of materials not related to MEC. These include, but are not limited to, metal scrap, cultural materials, and construction debris.
- NC (No Contact)—Items that were not identified (no response) at the reacquired target location by using either a handheld magnetometer and/or an all-metals detector.

At the end of each day, the data were uploaded to an Access database. The results of the target anomaly excavations are provided in Section 5.5. The handheld Schonstedt magnetometer was utilized to “clear the hole” of ferrous material. The Whites all-metals detectors were used to further investigate locations for nonferrous objects. An EM61-MK2 was used to resolve any NC that the detectors could not resolve.



Photograph 3-19 - View of Anomaly Investigation Activities

Photograph 3-20 – View of Anomaly Investigation Activities

3.9.6 Analog Surveys

Analog surveys were conducted in portions of several SCAs within the roadway alignment and utility corridor and the hillside west of GJMB for a variety of reasons as described in the following subsections. The boundaries of the analog survey areas were drawn to overlap adjacent DGM survey areas in order to establish complete surveys of the accessible areas of the SCAs. The handheld Schonstedt magnetometer and the Whites all-metals detectors were used to locate anomaly responses in these areas. Once an anomaly response was located, the UXO Technician excavated the location using either shovels and/or an excavator depending on the depth of the anomaly. Once the anomaly source was found and removed, the UXO

Technicians rechecked the 3-foot-radius area around the location to determine if other items remained buried. Analog investigations were logged in analog survey sheets. Copies of the analog survey sheets are included in Appendix G. The totals for cultural debris, MEC, or MD items were recorded for each area by SCA. Section 5.5.3 summarizes the findings of the analog investigations.

3.9.6.1 SCA_W140

As described in Section 3.2, DGM surveys could not be completed in certain portions of the SCA polygon SCA_W140 (existing fence line), where steep slopes prevented the use of the DGM survey equipment. DGM surveys could not be completed in another portion of SCA_W140 because removing the fence posts in this area could have undermined the existing GJMB, which is still in use. As such, analog surveys and removal actions were completed in these areas of SCA_W140 using the procedures described above. The locations where the analog surveys were completed are shown on Figures 3-20 and 3-21 and on more detailed maps provided in Appendix E.

3.9.6.2 SCA_W048

DGM surveys could not be completed in certain portions of the SCA polygon SCA_W048 (original fence line), where steep slopes and terrain prevented the use of the DGM survey equipment. Analog surveys and removal actions were completed in these areas of SCA_W048. The locations where the analog surveys were completed are shown on Figures 3-20 and 3-21 and on more detailed maps provided in Appendix E.

3.9.6.3 Various SCAs

DGM surveys could not be completed in small portions of 23 SCA polygons, including SCA_W014, SCA_W035, SCA_W037, SCA_W039, SCA_W048, SCA_W055, SCA_W057, SCA_W066, SCA_W074, SCA_W112, SCA_W118, SCA_W119, SCA_W123, SCA_W124, SCA_W125, SCA_W129, SCA_W130, SCA_W143, SCA_W151, SCA_W158, SCA_W159, SCA_W161, and SCA_W162. These SCA polygons presented a variety of terrain, steep slopes, proximity to existing fences, gates, and other challenges that prevented the collection of DGM data using geophysical equipment. UXO Technicians conducted analog surveys and removal actions as described above. The locations where the analog surveys were completed are shown on Figures 3-20 and 3-21 and on more detailed maps provided in Appendix E.

3.9.6.4 Hillside West of GJMB

DGM surveys could not be completed in portions of the hillside west of GJMB. These areas contained very steep slopes, the shoulder of an active road, and a high-voltage electrical transmission tower, which prevented the use of DGM equipment within 10 feet of the base of the tower. UXO Technicians conducted analog surveys and removal actions as described above. The locations where the analog surveys were completed are shown on Figures 3-20 and 3-21 and on more detailed maps provided in Appendix E.

3.10 Demolition Operations

On-site demolition operations have been conducted and will continue to be conducted for all remaining MEC items encountered during sifting, SCA polygon removal actions, and the data gap investigation on the hillside west of GJMB. Demolition operations for all items will be completed prior to demobilization. MEC items recovered during roadway clearing and grubbing activities were transferred to the Army as these items were not associated with SCA removal actions. Documentation of this transfer is included in the MEC Incident Report Forms included in Appendix H.

Engineering controls were used during demolition operations that have been performed to date to reduce the minimum separation distance (MSD) in accordance with the work plan and the LDSP. The MEC items that have been demolished to date have been destroyed using shaped charges (perforators). The MEC items that have been demolished to date are discussed in Section 5.6.

3.10.1 MD Recycling

Following completion of MEC investigation and removal action operations in MRS-15SEA.1-4, MD will be disposed of at a foundry or recycler where it will be processed through a smelter, shredder, or furnace prior to resale or release. MD will be disposed of permanently. Disposal in a landfill or to a scrap dealer where it may sit in a scrap pile is not approved. All MD is secured in a lockable container after discovery. All containers remained locked until such time as they were delivered to, and signed for by, a foundry/recycler.

3.10.2 Explosive Storage

The ESCA RP Team is using government-supplied explosives storage facilities at the former Fort Ord in accordance with the approved LDSP and a Right of Entry agreement from the Army. The government-supplied explosives storage facilities are known as the Explosive Storage Location, which includes standard earth-covered and aboveground magazines for storage of explosives. The ESCA RP Team also uses portable apparatus approved by the Bureau of Alcohol, Tobacco, Firearms, and Explosives for Type 2, outdoor, and box magazines for temporary holding of MEC items that are safe to move while awaiting demolition.

3.11 Other Related Activities

Additional activities that were conducted during the MEC investigation and removal activities included environmental monitoring, implementation of stormwater and erosion control measures, and dust monitoring to minimize fugitive dust from leaving the MRA.

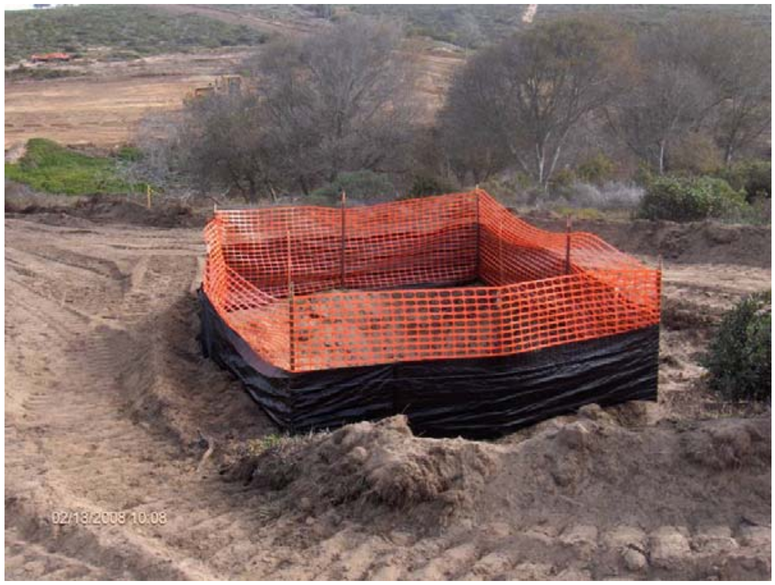
3.11.1 Environmental Protection

Each MRS-15SEA.1-4 site is designated in the HMP for development. However, the sites fall within borderland development areas along the NRMA interface designated in the HMP. Therefore, measures to reduce impacts to natural resources were implemented. In addition, guidelines that minimize activities that could degrade lands through soil erosion or invasive weed problems were followed.

Biological monitoring within the roadway alignment, outside of the SCAs, was the responsibility of FORA's qualified biologist. FORA's biologist conducted site visits to confirm that environmental directives were followed. Within the SCAs, the biological monitoring activities were the responsibility of the ESCA RP Team qualified field biologist.

Though the fieldwork required vegetation removal and grubbing activities, efforts were made to the extent possible to preserve and protect environmental features within the Seaside MRA, including, but not limited to:

- Minimized vegetation removal and cutting where possible while ensuring that the required work could be completed to the extent feasible.
- Clearing and grubbing and scraping activities were conducted such that soil erosion was minimized.
- ESCA RP Team qualified field biologists were on site during the rainy season to monitor SCA excavations within the limits of the areas identified as potential California tiger salamander breeding habitat (located on MRS-15SEA.1 and a small portion of MRS-15SEA.2) – refer to Photograph 3-21 for an example of an excavation protected with silt fencing to prevent entrance by the CTS.
- Awareness training for the CTS and other sensitive animal and plant species was provided for all field personnel by the ESCA RP qualified field biologists.



Photograph 3-21 – SCA excavation with silt fencing for protection of CTS

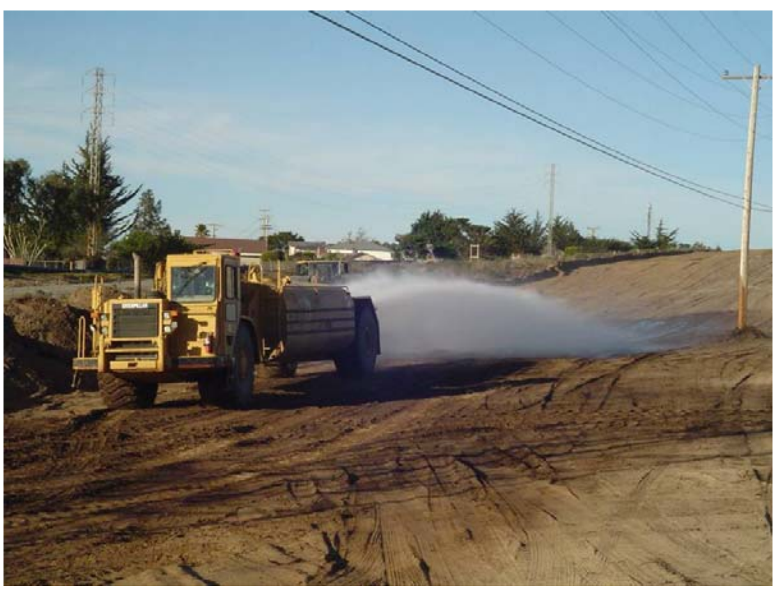
3.11.2 Stormwater Pollution Prevention

The ESCA RP Team prepared a Stormwater Pollution Prevention Plan (SWPPP) for the clearing and grubbing operations performed within the roadway alignment (LFR 2008). The plan included descriptions of how Best Management Practices (BMPs) would be implemented at the site to manage soil erosion and surface runoff within the limits of clearing and grubbing activities discussed in Section 3.5. The SWPPP also identified an inspection and maintenance schedule and sampling protocols in the event stormwater pollution impacts were suspected. BMPs implemented at the site consisted of installation of straw wattles (see Photograph 3-22) along the southern end of the roadway alignment at the border of the Seaside MRA, grading of steeply-sloped areas to minimize off-site surface runoff, and construction of berms and swales downgradient from disturbed soil areas along the existing GJMB and Eucalyptus Road. The Water Pollution Control Manager identified in the SWPPP was responsible for conducting weekly inspections during the rainy season (October 15–April 15) and biweekly inspections during the non-rainy season (April 15–October 15). BMPs were maintained to ensure that they were functioning as intended and designed.

Photograph 3-22 – BMPs (straw wattles) installed adjacent to GJMB

3.11.3 Dust Control Measures and Monitoring

This section presents the dust minimization, controls, and monitoring activities that were implemented during the project activities. The ESCA RP Team implemented dust controls during site operations consisting of spraying water along the haul routes, work areas, and stockpiled soil introduced to the sifting plant, as needed to minimize fugitive dust. In addition, heavy equipment speeds were monitored to minimize dust emissions. Photograph 3-23 shows the water spraying activities employed to minimize fugitive dust.



Photograph 3-23 – Water spraying activities to minimize fugitive dust

Two stationary dust monitoring stations were active during working hours. During sifting operations, three stationary dust monitoring stations were active. One dust monitor was set up in the work area to monitor dust levels for worker safety. A second monitor was set up near the downwind perimeter of the work area along GJMB to monitor dust levels leaving the site. A third dust monitor was set up along the haul route to monitor dust levels from running haul trucks. Wind direction was observed in the field and noted on the contractor daily field reports (included in Appendix C). The dust monitor locations are shown on Figure 3-13.

The dust monitors continuously monitored the dust concentrations and recorded the dust concentrations every minute. The data were downloaded each day and maintained in the project files for documentation purposes. Site management personnel periodically inspected the dust monitors to evaluate if dust control measures needed to be increased and/or site operations needed to be modified. Site management also visually monitored the site for "visible" dust and made necessary corrective actions, if warranted. The Monterey Bay Unified Air Pollution Control District 24-hour ambient air-quality standard is 50 micrograms per cubic meter (http://www.mbuapcd.org/index.cfm?Doc=383). Every effort was made to ensure the site activities and dust controls were implemented such that the dust emissions were minimized and the ambient air-quality standard was achieved.

3.12 Site Restoration

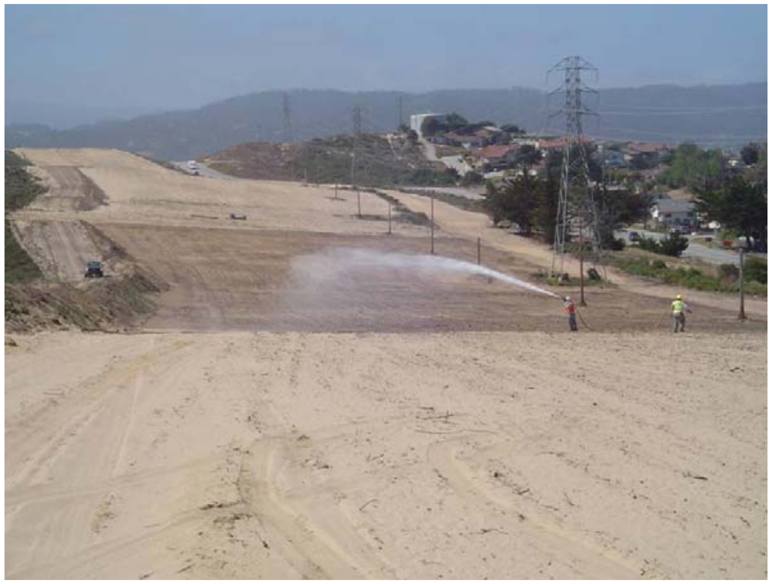
Site restoration activities consisted of spraying a soil stabilization product on exposed areas of soil with a high potential for wind erosion and installing barbed wire fencing along the Seaside MRA boundary with the NRMA.

3.12.1 Soil Stabilization

During this activity, approximately 67 acres of roadway alignment were cleared and grubbed as part of this scope of work. To address wind erosion concerns, a soil stabilization product was applied across the exposed areas of the roadway alignment with potential for wind erosion and fugitive dust transport to nearby communities. These areas (totaling approximately 20 acres) were along the roadway alignment adjacent to GJMB. An ESCA RP Team subcontractor, Superior Hydroseeding, Inc., from Watsonville, California, applied a soil stabilization product called Gorilla Snot® across the areas shown in Figures 3-22 and 3-23. Photograph 3-24 below shows the application of the soil stabilization product along a portion of the roadway alignment.

Gorilla-Snot® is an eco-safe, biodegradable, liquid copolymer used to stabilize and solidify soil for the purposes of erosion control and dust suppression. Once applied to the soil, the copolymer molecules coalesce forming bonds between the soil or aggregate particles. The key advantage of Gorilla-Snot® originates with its long, nanoparticle molecular structure that links and cross-links together. As the water dissipates from the soil or aggregate, a durable and water-resistant matrix of flexible solid-mass is created. Once cured, Gorilla-Snot® becomes completely transparent.

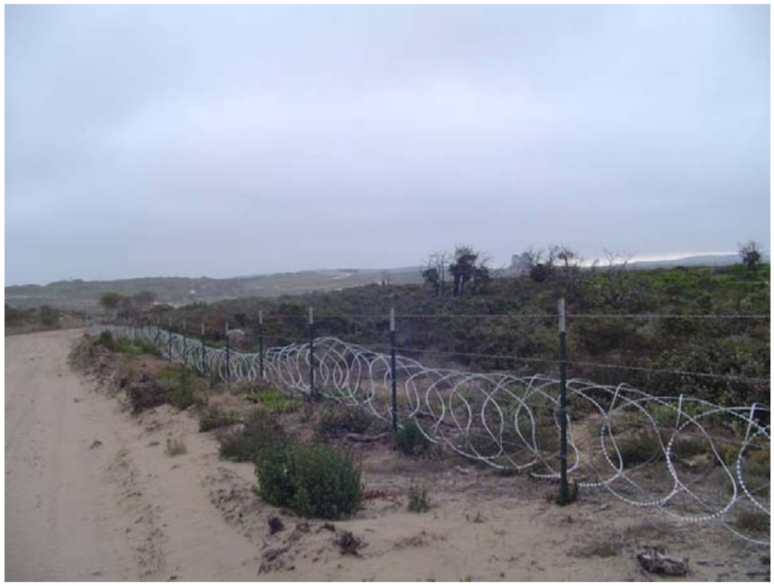
The product was applied in May 2008 and is expected to provide wind erosion protection for a minimum of six months or until the next rainy reason.



Photograph 3-24 – Soil Stabilization Activities to Minimize Wind Erosion

3.12.2 Fence Installation at NRMA Line

In June 2008, Ahtna remobilized to the site to install fencing between the Seaside MRA and the NRMA boundary. The fencing was installed approximately 3 feet off of the boundary line, on the interior of the Seaside MRA in accordance with the SSWP Addendum. The fencing includes four-strand galvanized barbed wire with posts every 10 feet and pole posts every 500 feet. As an additional measure to restrict public access, concertina wire coils were attached to the barbed wire fencing on the NRMA side of the fence. Photograph 3-25 below shows the installed fence. To allow for access to the inland range, five 25-foot-wide swing gates with posts and concertina wire on top were also installed. Gates and perimeter fencing requirements were coordinated with Presidio of Monterey Fire Department.



Photograph 3-25 – Fence installation along the NRMA Boundary

3.13 Project Field Variances

During the course of the field activities a number of FVFs were issued. FVFs are required when field activities deviate from those described in the original work plan. Most of the FVFs applicable to the field operations were discussed briefly in the previous sections of this report. The following sections provide additional details regarding the FVFs submitted during the SSWP Addendum field operations.

3.13.1 Field Variance No. 1

Field Variance Form No. 1 (Appendix I, FVF SEAMRA-001) was prepared to provide additional details regarding the procedures, quality control activities, and safety and health requirements applicable to the conduct of mechanical soil sifting operations in the Seaside MRA. The SSWP Addendum did not provide sufficient details to describe the work that would be conducted. The FVF was reviewed and approved by the regulatory agencies.

3.13.2 Field Variance No. 2

Field Variance Form No. 2 (Appendix I, FVF SEAMRA-002) was prepared to document the replacement of the 3/4-inch screen installed in the sifting plant to a different design 3/8-inch (8mm) spaced Speedharp-type screen. The reason for the screen type variance was due to the restricting throughput of the 3/4-inch mesh screen design with the high moisture content of the sandy material that was being sifted. The stockpiled SCA soil (sand) from the SCA polygons had been wetted during scraping and transport activities to minimize dust emissions. Based on input by the sifting plant vendor (Powerscreen), the replacement of a 3/4-inch square mesh screen deck with a 3/8-inch (8mm) spaced screen deck would provide a better design to handle wet sand with less clogging. Once the FVF was implemented, the throughput of the soil sifting increased significantly while still passing all of the daily QC inspections. The FVF was reviewed and approved by the regulatory agencies.

3.13.3 Field Variance No. 3

Field Variance No. 3 (Appendix I, FVF No. SEAMRA-003) was prepared to document the rationale for using an alternate approach to removing anomalies within a SCA polygon (SCA_W111) located in the roadway alignment in MRS-15SEA.4. The original approach to removing anomalies in this SCA was to scrape the top 6 inches of soil in order to remove debris from the area followed by DGM surveying and removal of any remaining target anomalies that could be MEC. The MSD for this activity would be 1,073 feet. This approach would require evacuation of approximately eight homes during scraping operations. The Army requested that FORA identify alternate solutions as the evacuation of homes was not a desired approach.

The ESCA RP Team reviewed the digital geophysical data previously collected and processed by Parsons, an Army contractor conducting removal actions. A linear feature appeared to be present within this SCA. The feature was broken at regular intervals and was interpreted to be the remnants of a fence line. The ESCA RP Team proposed to investigate approximately 100 points along this linear feature to verify the hypothesis that the anomalies were related to a former fence line. This was accomplished by identifying the approximately 100 anomalies as SCA point locations within the SCA polygon. The anomalies were investigated using the SCA point anomaly procedures specified in the SSWP Addendum and discussed in this report. It was anticipated that investigation of the approximate 100 SCA point locations within the polygon prior to conducting DGM would remove the anomalies that created the SCA, thus allowing the SCA polygon to undergo effective DGM surveying and completion of the removal action. Clearing and grubbing of this area in preparation for the roadway alignment occurred following DGM and anomaly removal operations.

Since the excavations were conducted as point anomalies, the MSD for this activity was the hazardous fragment distance for the 57mm projectile M306. The MSD for this operation was therefore reduced to 167 feet and did not require the evacuation of homes.

3.13.4 Field Variance No. 4

Field Variance No. 4 (Appendix I, FVF No. SEAMRA-004) was prepared to document the rationale for using a simplified approach for reacquisition and excavation of anomalies. The original approach indicated that after the DGM surveys, the locations of anomalies selected for investigation were to be flagged using RTK GPS. After flagging the anomaly location, the anomaly location was to be refined using the same instrument used to conduct the digital geophysical survey (e.g., EM61-MK2 or G-858). This refinement required the movement of the flag or the placement of a secondary flag to indicate the offset of the real-time peak response from the original DGM survey flag. The original approach of refining the anomaly location with an EM61-MK2 or G-858 was related to controlling navigation errors more typically associated with less accurate forms of navigation, such as line and fiducial navigation or "dead reckoning." Due to the high accuracy of target positioning using RTK GPS on this project, refinement of anomaly locations was not necessary.

Therefore, for the secondary step of refining the anomaly selected for excavation, all anomalies found were investigated within the area 3 feet around the DGM anomaly location flagged with RTK GPS. The UXO Dig Team used handheld instruments, appropriate to the type of instrument used for the DGM survey (Whites all-metals detectors for EM61-MK2 data and/or Schonstedt magnetometers for G-858 data). The UXO Dig Team noted any offset from the flag to the excavated anomaly or anomalies and logged the information accordingly.

The QC-1 process remained intact and required checking 100% of the anomaly excavations with the same digital instrument (i.e., EM61-MK2 and/or G-858) used in the original DGM survey. The FVF was reviewed and approved by the regulatory agencies.

3.13.5 Field Variance No. 5

Field Variance No. 5 (Appendix I, FVF No. SEAMRA-005) was prepared to provide clarification regarding access for regulatory representatives to inspect the site unescorted. The original statement regarding regulatory representative site access stated that representatives from regulatory agencies were "permitted to enter the site at any time during business hours or any other reasonable time with an escort." Confusion existed regarding whether this statement meant that an escort was required at all times for regulatory agency representatives or whether the regulatory agency representatives could be on site without an escort during normal business hours, but required an escort outside of normal business hours. The FVF clarified that regulatory agency representatives could be on site during normal business hours without an escort, but an escort was required outside of normal business hours. In addition, regulatory agency representatives were required to sign in and out at the job site trailer. The FVF also clarified that any violations or concerns identified by the regulatory agency representatives while on site would be brought to the immediate attention of the Senior UXO Supervisor on site and communicated in writing to FORA.

3.13.6 Field Variance No. 6

Field Variance No. 6 (Appendix I, FVF SEAMRA-006) was prepared to document a revised approach for the quality control process referred to as QC-2. The revised QC-2 approach considers the fact that only SCAs are addressed as part of the Seaside removal action and not entire grids. The revised approach for QC-2 also considered that the majority of QC-2 had been completed during previous removal actions conducted by the Army. The field variance in Appendix I provides the flow of logic used to revise the QC-2 process.

The QC-2 processes approved through the field variance were as follows:

- 10% DGM resurvey for all SCAs with areas greater than 1,000 square feet as shown on the FVF SEA-006 Maps 7-8 (Appendix I).
- 100% DGM resurvey for 30% of the 103 SCAs (a minimum of 31 SCAs) with areas less than or equal to 1,000 square feet as shown on the FVF SEA-006 Maps 7-8 (Appendix I).

The modified approach would result in a level of QC-2 that was greater than or equivalent to the approximately 16% QC-2 performed by Parsons during previous removal actions at Fort Ord.

A failure was constituted by the discovery of a UXO or UXO-like item, or five re-acquirable anomalies as a result of the QC survey, sufficient in size to represent a 37mm projectile or larger, or the discovery during the QC process of five nonselected anomalies that should have been selected during the initial survey. The following were the prescribed corrective actions for a QC-2 failure:

- Small SCAs: If failure occurred during QC-2, 100% of the area was resurveyed and an additional small SCA, similar in size, underwent QC-2 10% resurvey
- Large SCAs: If a failure occurred during QC-2, the area or grid (equivalent to ¼ acre or 100 x 100 feet) surrounding the failure within the boundaries of the SCA was 100% resurveyed

A root cause analysis was to be performed to determine an appropriate corrective action to be implemented if a QC failure occurred. For small SCAs, root cause analyses were to be performed for any single item meeting the failure criteria. Corrective actions would include: retraining, procedural change, evaluation of equipment, etc.

3.13.7 Field Variance No. 7

Field Variance No. 7 (Appendix I, FVF SEAMRA-007) was prepared to document a revised approach to inspecting the oversize reject materials (materials rejected by the 6-inch, 2-inch, or 3/8-inch sifting screen) generated by sifting operations. The Army requested use of the oversize reject materials for use in fuel break repair projects on the inland ranges of the former Fort Ord.

On Monday, August 11, 2008, the Army notified the ESCA RP Team that work operations were stopped when a 40mm projectile was found in the oversize reject material being used for fuel break repairs during spreading operations. The WESTON SUXOS immediately notified the WESTON Remediation Project Manager of this occurrence. The WESTON SUXOS then proceeded to inspect the item. The item was determined to be a 40mm M407 A1 practice projectile. Based on the encounter of the 40mm M407 A1 practice projectile in the oversize material taken by the Army, it was apparent that the instrument-aided visual inspection technique was not sufficient for inspecting the relatively large volume of reject oversized material, comprised primarily of aggregate rock with lesser amounts of asphalt, concrete, nonferrous metal (soda cans), and wood debris.

FVF-07 was prepared and described how the oversize reject material would be processed through a rock crusher to reduce the size of this stream to approximately 1.0 inch or smaller and a quality control check of a portion of the reprocessed reject material would be performed in a similar manner as prescribed for the sifted soil in the April 22, 2008 Standard Operating Procedure (SOP) for Mechanical Soil Sifting, Seaside MRA (Soil Sifting SOP, Material

Type 5). The amended SOP for Mechanical Soil Sifting, Seaside MRA (included with Appendix I) was revised to incorporate this change.

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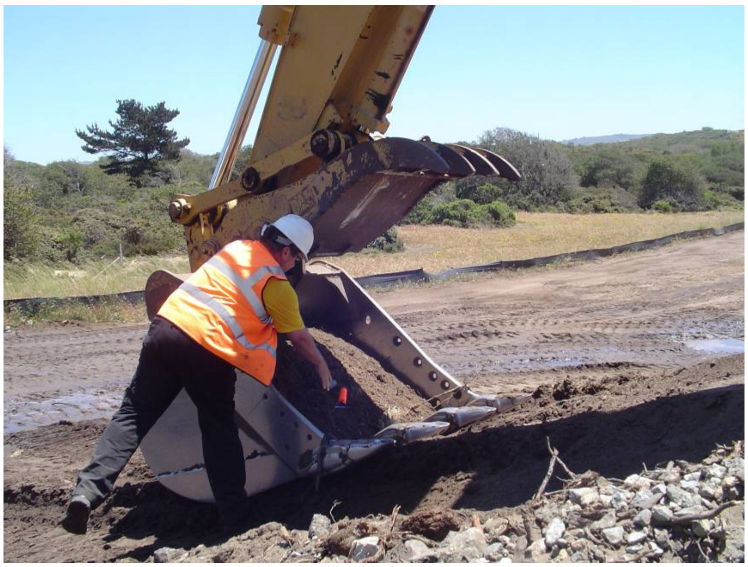
4.0 QUALITY CONTROL AND QUALITY ASSURANCE

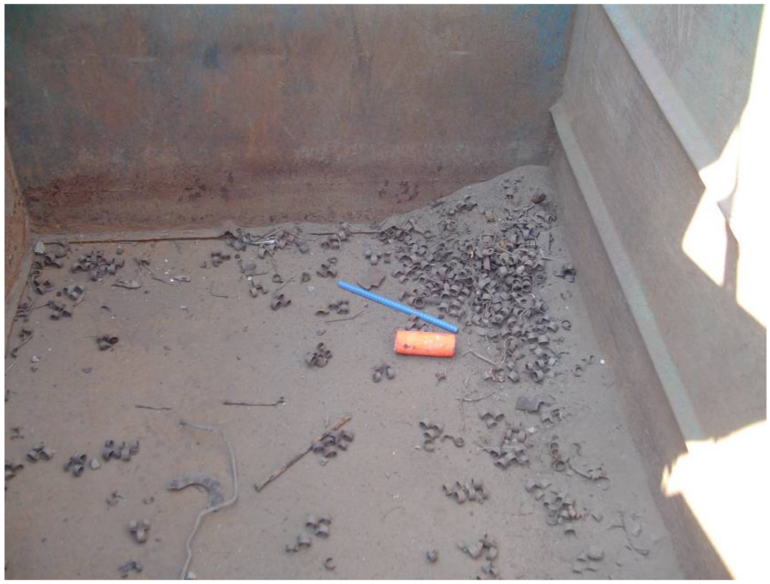
Quality activities, including QC and FORA independent QA were conducted throughout the project. QC activities were conducted by the UXOQCS. FORA independent QA was conducted by FORA's subcontractors, ERRG and InDepth Corporation. The QC activities and their results are discussed in detail in the following sections. FORA contractor's independent QA report is included in Appendix K.

4.1 Sifting Quality Control Activities

A total of three seeded QC items were introduced to the sifting plant twice daily, typically in the morning and afternoon to check for proper operation of the sifting plant. The three simulant seeds consisted of the following: 1) a piece of rebar that was ½ inch in diameter and 12 inches long; 2) an inert 57mm projectile; and 3) a pipe that was 2 inches in diameter and 5 inches long. The seeds were introduced by the excavator into the sifting plant grizzly. The sifting plant was turned on for operation, and then inspected for recovery of the seeds. Photographs 4-1 and 4-2 show a UXO Technician placing the seeds into the excavator bucket and the recovery of the seeds in the magnet recovery bin. All three QC seeds were successfully recovered twice daily by the sifting plant throughout the course of sifting operations. QC seed tests were recorded for documentation purposes. QC inspections were documented in a Daily Quality Control Inspection Report – Soil Sifting Operations. Copies of these daily inspection reports are included in Appendix J.



Photograph 4-1 – Placement of QC seeds into excavator bucket for feeding into sifting plant



Photograph 4-2 – View of two QC seeds recovered from the first magnet.

4.2 Quality Control of SCA Point Anomaly Excavations

Following the excavation of the SCA point anomalies by the intrusive team, the QC team checked each of the SCA point anomaly excavations to ensure that the sources of the anomalies were satisfactorily removed. The area within at least a 3-foot radius of each excavated anomaly was inspected with the same analog instrument type used for the initial survey. If it was determined that the source of the anomaly had not been removed, the intrusive operation at that location was considered as “failed,” and the location was reinvestigated by the intrusive team. The discovery of any UXO or UXO-like item sufficient in size to represent a 37mm projectile or larger constituted a failure of the SCA being investigated.

Following the initial excavation, the QC check of each of the 111 SCA point anomalies within the roadway alignment and utility corridor resulted in no point anomaly locations requiring re-excavation.

4.3 Quality Control Digital Geophysical Mapping

QC activities conducted during the DGM surveys included equipment function tests, QC seeding, and QC of anomaly excavations.

4.3.1 DGM Instrument Function Testing

QC function checks were performed following the instrument operating manual and standard industry practices. Static background, static spike, and vibration/cable connection tests were performed daily before and after surveying in accordance with the USACE DID FPRI 005-05A, Geophysical Prove-Out Plan and Report to determine whether the equipment was functioning properly throughout the day. The EM61-MK2 was tested at a designated quality control area. The results for all function tests performed during the DGM surveys are provided in Appendix D.

4.3.1.1 Static Background

The static background test consisted of collecting EM data at a "quiet" area for a period of 3 minutes. The static test enabled the operator(s) to see if any fluctuations in the data were occurring in real-time.

4.3.1.2 Static Spike

Static spike tests for the EM were performed with 6-inch rebar spikes set immediately beneath the center point of the coil. Data were collected for a period of 3 minutes, enabling the operator to monitor the instruments response to the spike object and any potential real-time fluctuations in the data.

4.3.1.3 Vibration/Cable Test

The vibration/cable test was performed to measure any effect of moving the cables during data collection. The cable test does not have a time limit associated with it, but allowed the operator to verify that all the connections were in good condition and were operating as designed.

4.3.1.4 Repeatability Lines

Repeatability lines were performed for the EM instrument to verify the repeatability of results. The repeat lines are displayed as graphical outputs of the sensor amplitude and navigational tracks. The acceptable limits for these tests were a repeatability of response amplitude +/-20% and a positional accuracy of 0.65 foot. Results for repeatability of response amplitude and positional accuracy were within these metrics. The results for these tests are presented in Appendix D.

4.3.1.5 Instrument Function Testing Results

Statistical evaluation of the static background, static spike, and cable connection tests indicated acceptable noise levels. Acceptable noise levels are defined as variability from the mean noise reading of less than 2 standard deviations in magnitude. EM61-MK2 instrument function tests all showed acceptable values with respect to established metrics. The EM61-MK2 instrumentation also showed good agreement throughout the life of the project.

4.3.2 Instrument Latency

To determine temporal lags inherent to the EM61-MK2 towed array, a bidirectional navigation test was performed during the instrument function testing. The test was set up at a consistent latency QC station and consisted of traversing a known cloverleaf test lane with a fixed piece of rebar at the cross point. These tests allowed the processing geophysicist to determine the appropriate time corrections needed to accurately position the collected data. In addition to identifying instrument latency effects, the cross-point test quantified navigational accuracy based on operator ability and geophysical data results. Latency results can be found on the processing notes, and maps are provided in Appendix D.

4.3.3 Navigational Accuracy

The RTK GPS base station was set up over a previously established control point with the supplied X and Y coordinates to third-order accuracy. The base station then provided corrected data to the rover unit mounted above each geophysical sensor or array with centimeter accuracy. Geophysical data were collected over known locations (rebar/grid corners) at the latency QC station during the surveys (pre- and post-daily) to validate navigational precision and target selection. The navigational DQO for the project (1 foot) was achieved within acceptable limits, and documented examples are shown in the processing notes in Appendix D (this navigational DQO is different from the Reacquisition DQO offset of 2 feet). The 1-foot DQO relates strictly to the navigational system itself. It is independent of additional/cumulative “offsets” that may propagate when the geophysical sensors and the processing/target picking are considered.

4.3.4 QC Seeding for Geophysical Operations

QC seed items were used in the field during geophysical operations. Known QC seed items were used to quantify the positional accuracy of each dataset. The geophysicists were aware of the location of the known QC seed items throughout the DGM survey and data processing activities. In addition, blind QC items were placed in various locations throughout the MRA where geophysical operations occurred. The locations of the blind seed items were not known to the geophysicists during the DGM survey or data processing activities.

4.3.4.1 Known Seed Items

Known QC seed items were used in the field during the geophysical data collection to quantify positional accuracy of each dataset. The QC seed items consisted of 6-inch rebar spikes or equivalent inserted vertically at a surveyed location within each SCA polygon where DGM surveys were conducted.

The digital anomaly response from the QC item was identified during data processing and analysis. Each seed item was reviewed to quantify positional accuracy by measuring the anomaly target location to the actual geo-referenced location of the rebar spike recorded during the survey. The measured offset was logged for each dataset in the geophysical processing form spreadsheet.

A total of 53 QC seed items were placed within the roadway alignment or utility corridor SCAs. Of these 53 items, 49 were successfully recovered during the DGM. Three known QC seed items (identified as SEA1-A12 located in SCA_W140, SEA2-A8a located in

SCA_W160, and SEA2-A11 located in SCA_W048) were recovered during analog surveys within the SCAs. One item (SEA1-A5 located in SCA_W034) was removed during soil scraping operations and, therefore, was not recovered as part of the DGM survey.

Of the 49 QC seed items recovered during the DGM survey, 47 were excavated within the DQO metrics (2 feet from their original surveyed location). The two exceptions were SEA2-A12 located in SCA_W049 and SEA2-A35 located in SCA_W161. The location of seed SCA2-A12 was incorrectly entered into the database and was recovered in a different location and an offset could not be determined. Seed SEA2-A35 was reported at 2.67 feet from its original location. The area of SCA_W161 is steeply sloped, resulting in a terrain offset. This offset was within the 3-foot-radius criteria established for the anomaly excavation.

A total of nine QC seed items were placed within the hillside west of GJMB area. All nine of these seed items were successfully recovered during the DGM within the DQO metrics (2 feet from their original surveyed location). Three were detected during the initial EM61-MK2 survey while the remaining six were mapped using the G-858 magnetometer.

Detection results of each QC seed item are detailed in Table 4-1. The minimum offset was 0.05 foot and the maximum was 1.40 feet (excluding SCA_W161). The average offset for the group was 0.65 foot. These values reflect the high level of accuracy achieved for the navigation, detection, and anomaly selection processes over the duration of the field effort.

4.3.4.2 Blind Seed Items

Blind seed items were placed in SCAs throughout MRS-15SEA.1-4. Four blind seeds were placed in SCAs within the roadway alignment. Additional blind seed items were placed throughout the MRS-15SEA.1-4 SCAs outside of the roadway alignment; however, work in those SCAs is not complete. The UXOQCS in consultation with the Remediation Project Manager and Project QA Representative determined the locations of the blind seed items.

The seeds were placed using a survey-grade GPS. The blind seeds consisted of a 1 1/2-inch by 5-inch pipe, to simulate a 37mm projectile. Each seed was painted Orange and a laminated UXOQCS business card including a control number (ESCA-SEA-019) was zip tied to the pipe for identification. UXO Technicians were shown the blind seed items so they could positively identify a seed, if excavated. Photograph 4-3 shows a recovered blind QC seed item.

The seeds were buried at a depth interval between 6 and 12 inches, which is within the geophysical limits of 100% probability of detection of 16.06 inches for a 37mm projectile. The location of the seed items was not known to the on-site project personnel. QC and QA personnel reviewed the DGM data against the seed locations. The blind seeds placed in SCAs within the roadway alignment were detected within the reacquisition metric identified in the geophysical test plot report. Detection results of each QC seed item are detailed in Table 4-1. The minimum offset was 0.05 foot and the maximum was 1.87 feet. The average offset for the group was 1.19 feet. Consistent with the known seed results these values reflect the high level of accuracy achieved for the navigation, detection, and anomaly selection processes over the duration of the field effort.

Photograph 4-3 – View of recovered blind QC seed item in a DGM anomaly location.

4.3.5 QC of DGM Data and Deliverables

QC of geophysical data and data deliverables was performed by WESTON and included checks and reviews of the field forms and digital data.

4.3.6 Geophysical QC Surveys

After completion of the initial geophysical survey, reacquisition, and excavation of anomalies, geophysical QC surveys were conducted in the SCAs where digital geophysical data were collected. These surveys consisted of:

QC-1: Verification of anomaly removal at each anomaly selected for excavation.

QC-2: Resurvey a percentage of each SCA and excavate selected anomalies.

QC-3: Conduct analog survey of at least 10% of the SCAs.

4.3.6.1 QC-1

Following the excavation of the anomalies by the intrusive team, the geophysical QC team checked each of the excavations to ensure that the source(s) of the anomalies were satisfactorily removed. The area within at least a 3-foot radius of each excavated anomaly was inspected with the same instrument type used for the initial survey, and the maximum amplitude response in the area was recorded and checked against the original anomaly amplitude. If it was determined that the source of the digital anomaly had not been removed, the intrusive operation at that location would have been considered as "failed" and the location would be reinvestigated by the intrusive team.

Following the initial excavation, the QC-1 check of each of the 7,808 anomalies resulted in zero anomaly locations requiring re-excavation. This is attributed to the following actions:

- UXO Dig Teams had access to geophysical instruments to verify completion of excavations prior to the QC-1 check.
- UXO Dig Teams were diligent to verify “no contacts” prior to the QC-1 check.
- Scraping the surface of the SCA polygons prior to DGM surveys reduced the clutter that could have masked anomalies.
- Maintaining a very low target selection threshold resulted in a greater number of anomalies excavated than if the threshold had been higher.

4.3.6.2 QC-2

The QC-2 process provided in the SSWP Addendum was revised through a field variance dated July 28, 2008 and approved on July 30, 2008 (Appendix I, FVFSEA-006). As part of the revised process, the FORA ESCA RP Team conducted (at a minimum) a 100% DGM resurvey of 29% of the small SCAs (47% of the total area of small SCA polygons) located within the roadway alignment and utility corridor. A total of 28 small SCA polygons (< 1,000 square feet) were identified within the roadway alignment and utility corridor or a total of 0.243 acre. Eight of these small SCA polygons received a 100% DGM resurvey (a total of 0.114 acre).

A total of 50 large SCA polygons (> 1,000 square feet) and the hillside west of GJMB were identified as being either partially or completely within the roadway alignment and utility corridor for a total of approximately 17.396 acres. At least 10% of the surface area of all 50 large SCA polygons received a QC-2 DGM resurvey. In many cases, the large SCA polygons received a DGM resurvey over greater than 10% of the surface area. The total QC-2 acreage is equivalent to 25% of the total hillside west of GJMB and SCA acreage within the roadway and utility corridor.

Of the 58 total SCAs surveyed for QC-2, 14 had no anomalies identified, 37 had five or less anomalies identified. Twenty-one yielded more than five anomalies with the highest number observed in SCA_W048 (97) and SCA_W140 (224). The anomalies were reinvestigated and identified as small cultural debris items or cultural noise associated with a surface feature. Of the 224 QC-2 anomalies investigated in SCA_W140, 186 were small cultural debris, much of it associated with pieces of barbed wire, and 38 were no contact or magnetic soils. None of the items excavated from anomalies that were reinvestigated for QC-2 constituted a failure based on size. QC-2 failure criteria for small and large SCAs are defined in Section 3.13.6 of this TIP.

Of the 97 QC-2 anomalies investigated in SCA_W048, 5 were small MD, 29 were small cultural debris, much of it associated with pieces of scrap metal, and 64 were no contact or magnetic soils. Of the five MD items 4 were inert empty casings and 1 inert small projectile, all significantly smaller in size than the 37mm projectile.

There were no MEC detected in any of the QC-2 anomalies investigated from the SCA polygons or portions of polygons located within the roadway alignment and utility corridor. Table 4-2 shows the SCA polygons, overall acreage, % QC-2 survey, and the number of anomalies re investigated. However, during re-investigation of QC-2 anomalies in SCA polygon SCA_W085, which is located outside of the roadway alignment, two 81 mm training mortars were recovered, constituting a failure based on the QC failure criteria of any item found that is greater than or equal to a 37 mm projectile. A root cause analysis of the failure was conducted and the appropriate corrective actions were implemented at SCA polygons located both inside and outside of the roadway alignment and utility corridor as summarized in the Corrective Action Report No. SEAMRA-001 provided in Appendix J of this report.

4.3.6.3 QC-3

To complete the Army's previous investigations, a 10% QC-3 inspection was performed using a Schonstedt magnetometer for all grids (previously defined by the Army) that contained SCA points and all or portions of SCA polygons. In addition, a 10% QC-3 inspection was performed for grids within the entire roadway alignment even if the grid did not contain SCA polygons or points. The discovery of any UXO or UXO-like item sufficient in size to represent a 37mm projectile or larger would have constituted a failure of the SCA being investigated. No MEC, MD, or cultural debris sufficient in size to represent a 37mm was found during the QC-3 survey. The total cultural debris recovered during all QC-3 surveys performed within the roadway alignment and utility corridor was less than 2.5 lbs.

4.3.6.4 Back Check of Anomaly Database

To verify the target anomaly response and the database entries, a QC back check of the database was conducted by reinvestigating certain target anomalies. Target anomalies were selected for reinvestigation if their geophysical signatures identified during the DGM data analysis was deemed moderate or large and the target anomaly excavation result was listed in the database as either NC or very small metal items that did not appear to match the signal. A total of 48 target anomalies were selected for reinvestigation and confirmation sampling. No metal debris was found in any of the 48 target anomalies reinvestigated. It was determined that the anomalies were due to magnetic soil and rocks or the proximity of cultural features.

4.4 Quality Control Analog Survey and Excavations

Once the source of the analog anomaly was found and removed, the UXO Technicians rechecked a 3-foot-radius area around the location to determine if other items remained buried. No MEC, MD, or cultural debris sufficient in size to represent a 37mm projectile was found during the analog QC survey.

4.5 FORA Independent Quality Assurance

Independent quality assurance was conducted by FORA. FORA contractors provided an independent QA report, which is included in Appendix K.

5.0 REMOVAL ACTION RESULTS

In total, 78 SCA polygons and 111 SCA points were investigated as part of this work. A total of 7,808 DGM target anomalies were identified as requiring further investigation and approximately 89,300 cubic yards of material were sifted. A total of 22 MEC items, 208 lbs of MD, and more than 6,000 lbs of cultural debris were removed as part of the investigation and removal action activities conducted within the roadway alignment and utility corridor. Table 5-1 summarizes the 22 MEC items removed from the roadway alignment and utility corridor. Appendix L contains photographs of the MEC items removed during these activities. Figures 5-1 through 5-9 show the locations where the MEC items were removed. Of the 22 MEC items, six items were encountered during the roadway clearing and grubbing activities and the locations where these items were removed are shown on Figure 5-1. Twelve of the MEC items were recovered during sifting operations. Locations for the MEC items recovered during sifting plant operations are not shown on any figures because the MEC items were recovered from scraped soil consolidated by MRS and, therefore, the precise original location of the MEC items could not be determined. Four of the MEC items were removed from DGM anomaly investigations: one item in SCA_W048 shown on Figure 5-6; one item in SCA polygon W140 shown on Figure 5-9; and two in the hillside west of GJMB shown on Figure 5-6. The MD results are summarized by activity in Table 5-2.

Of the 22 items identified as MEC, three items were determined to be too sensitive to move and were blown in place. These items are identified in Table 5-1. The other suspected MEC were determined to be an acceptable risk to hand-carry a short distance and were moved to the field magazine to await demolition or were transferred to the Army. The following subsections discuss the results in greater detail.

5.1 Site Preparation Results

On December 28, 2007, 296 0.50-caliber bullets were found in the roof of structure 3941 during building demolition. Structure 3941 is located in MRS-15SEA.4. The 0.50-caliber bullets are classified as SAA. Although SAA is not considered MD, these items are summarized on Table 5-2. The location where these items were found is shown on Figure 5-1.

5.2 Roadway Alignment Clearing and Grubbing Results

MEC or MD items were encountered and investigated during the visual inspection of the cleared and grubbed areas of the roadway alignment (outside of the SCAs). Table 5-1 summarizes the MEC items removed during the visual inspection within the roadway alignment cleared and grubbed areas. Figure 5-1 shows the locations where the MEC and MD items were found. The majority of the MEC items recovered outside of the SCAs within the roadway alignment cleared and grubbed areas were located north of Eucalyptus Road, outside the limits of the Seaside MRA.

5.3 Soil Sifting Results

Approximately 89,300 cubic yards of material were sifted during sifting plant operations. From this material, 12 MEC items and 71 lbs of MD were recovered. Table 5-3 summarizes the sifting volume and total MD weight by MRS. The MEC generated from the sifting operations are summarized in Table 5-1. As described in Section 3.8, soil from scrape areas was consolidated into stockpiles based upon MRS. These MEC items are not shown on a figure because the exact original location of each MEC item within the specific MRS could not be determined due to the nature of sifting operations.

A total of 12 MEC items were recovered during sifting operations (Table 5-1). These items were typically found during the 100% inspections of the oversized and/or ferrous items removed by the sifting plant and/or screen inspections as described in Section 3.8. Two items (the 57mm cartridge, TP M306A1 and the M407A1 40mm practice) were found during inspection of the 2-inch oversize material. One item (a 40mm projectile) was found during spreading operations of the oversize reject material being used by the Army in their fuel break repairs. The electrical blasting cap, which was trapped in the screen, was found during a shutdown for inspection and cleaning of the screen plant. The remaining items were found during inspection of the recovered metal from the first magnet.

5.4 MEC Removal Action SCA Point Location Results

A total of 85 SCA point anomaly locations were investigated in the roadway alignment and 26 in the utility corridor. No MEC was recovered during the SCA point anomaly location removal actions within the roadway alignment or utility corridor. MD items totaling approximately 0.5 lb were encountered in one SCA point location excavation. The MD was recovered from MRS-15SEA.1 within the roadway alignment and consisted of ammo links. The remainder of the SCA point locations contained cultural debris (22 point locations within the roadway alignment and 22 point locations in the utility corridor) or the anomalies were listed as NC (62 point locations within the roadway alignment and 4 point locations within the utility corridor). Approximately 160 lbs total of cultural debris were collected from the 22 SCA point locations within the roadway alignment and approximately 25 lbs of cultural debris were collected from the 22 SCA point locations within the utility corridor. The depth of the MD and cultural debris items found ranged from 0 to 60 inches below the ground surface (in some cases point anomalies fell within scrape areas for DGM survey). Table 5-4 summarizes the results of the point anomaly excavation results. The results of the point anomaly excavations are shown by MRS on Figures 5-2 through 5-5.

5.5 MEC Removal Action SCA Polygons and Hillside West of GJMB Results

To identify anomalies within the SCA polygons and the hillside west of GJMB, a DGM survey was conducted over a majority of these areas. Terrain and physical constraints prevented DGM surveys from being completed in certain areas of some SCA polygons and the hillside west of GJMB. In these areas, an analog survey and removal action was completed. As described in Section 3.2, SCA_W111 required a slightly modified approach in order to reduce the MSD and avoid the evacuation of several homes in the vicinity. The following subsections present the results of these activities.

5.5.1 SCA Polygon W111

Prior to scraping and performing the DGM survey, a total of 96 discrete point anomalies (FL-01 through FL-96) were reacquired within SCA polygon W111 using Parsons previous DGM data. No MEC or MD was recovered during the discrete point anomaly removal actions conducted in SCA_W111. Approximately 328 lbs of cultural debris were removed from 74 of the discrete point anomaly locations. The remaining 22 discrete point anomalies were identified as NC. The depth of the items removed ranged from 0 to 24 inches below ground surface. These depths were recorded prior to the area being scraped.

5.5.2 DGM Anomaly Investigation Results

The anomaly selection process conducted as part of the DGM resulted in a total of 7,808 anomalies requiring investigation. Of the 7,808 anomalies, 6,598 of the anomalies were located in the SCA polygons and 1,210 were located in the hillside west of GJMB. The geophysicist selected anomaly coordinates and imported the coordinates into the project database. Color contour maps showing the processed digital geophysical data and the 7,808 anomaly locations are included in Appendix E. A total of four items of MEC were removed during the anomaly investigations within the SCA polygons and hillside west of GJMB. A total of approximately 36 lbs of MD were removed. Table 5-1 summarizes the different types of MEC encountered during DGM anomaly excavations and Table 5-2 summarizes the MD. Table 5-5 summarizes the DGM investigation results by polygon. A summary of the DGM reacquisition results are summarized by anomaly type in Table 5-6. Table 5-7 details the response amplitude ranges from the DGM survey for each MEC item encountered during the DGM anomaly excavations. Figures 5-6 through 5-9 show the results of the anomaly excavations that occurred within the SCA polygons by MRS.

5.5.2.1 SCA Polygons

Of the 6,598 anomaly locations identified in the DGM survey and data analysis of the SCA polygons, 4,925 were successfully reacquired. A total of 1,673 were recorded as NC. The UXO Dig Teams excavated the 6,598 anomalies within the SCA polygons. The excavations resulted in 2 items identified as MEC and approximately 31 lbs of MD (78 items). An estimated 143,000 lbs of cultural debris were encountered during the investigations, although an estimated 140,000 lbs of the cultural debris items were left in place, as discussed in Section 5.7 below (the majority of the cultural debris items were left in place because they were very large). The depths of detection for all the items encountered in the SCA polygons ranged from 0 to 54 inches below ground surface. The depths of these items were recorded after the polygons had been scraped and/or excavated. As discussed in Section 3.7, scraping was conducted to the required depth until minimal anomaly responses were detected by the handheld instruments. Typically, the depth of scraping was approximately 6 inches; however, in some areas scraping extended deeper. In the case of SCA_W160, scraping extended to an approximate depth of 10 feet due to the presence of significant asphalt debris.

5.5.2.2 Hillside West of GJMB

Of the 1,210 anomalies identified in the DGM survey and data analysis of the hillside west of GJMB, 506 were successfully reacquired. A total of 704 were recorded as NC. The excavations resulted in two items of MEC (2.5 pounds of bulk explosive and one practice grenade fuze) and approximately 5 lbs of MD identified as pieces of a Livens projector shell. Both the bulk explosive and the pieces of the Livens projector shell were recovered from the same target anomaly excavation, and were likely related to a demolition shot historically conducted by the Army. The discovery of the bulk explosive in the soil prompted the Army to collect a soil sample on July 9, 2008 and analyze the sample for explosive compounds using EPA Method 8330 since the potential for MC in soil is an Army-retained condition. The preliminary results of the Army's soil sampling activities were presented in a letter report submitted to the EPA and the DTSC on August 19, 2008 (Army 2008). The preliminary soil sampling results indicated that the residual concentrations of explosive compounds in soil in this area were below designated screening levels for the former Fort Ord. Based upon these results, no further investigation of the area has been recommended by the Army.

An estimated 250 lbs of cultural debris were recovered from 493 anomaly excavations. The depths of the detected items ranged from 0 to 60 inches below ground surface. Since the hillside west of GJMB was not scraped prior to conducting the DGM survey, these depths are recorded from the existing grade.

5.5.3 Analog Survey Results

As indicated in Section 3.9.6, a number of SCA polygons and the hillside west of GJMB required analog surveys due to terrain or other constraints preventing the collection of DGM data. No MEC or MD items were found during the analog surveys conducted. Cultural debris, however, was recovered during these investigations. The following is a summary of the analog survey results and recovered cultural debris:

- A total of 78 detected anomalies were investigated in the hillside west of GJMB and 15.5 lbs of cultural debris (scrap metal) were recovered.
- A total of 287 detected anomalies were investigated from SCA_W140 (existing fence line SCA) and 23 lbs of cultural debris (fence debris, cable, trash, scrap metal, etc.) were recovered.
- A total of 14 detected anomalies were investigated from SCA_W048 (original fence line SCA) and 3 lbs of cultural debris (fence debris, cable, trash, scrap metal, etc.) were recovered.
- A total of 52 detected anomalies were investigated from four data gap SCAs (SCA_W014, SCA_W057, SCA_W074, and SCA_W118) throughout the Seaside MRA and 1.5 lbs of cultural debris (cable, trash, scrap metal, etc.) were recovered from these SCAs. The remaining 19 SCAs did not have any detectable anomalies.

5.6 Demolition Results

On three separate occasions, in-place demolitions were conducted for UXO items that were determined to be unsafe for transport or storage. These three items were as follows:

- One 40mm practice projectile (M407A1) was found in MRS-15SEA.4 sifting operations on June 18, 2008
- One 57mm projectile (high explosive, M306) was found in MRS-15SEA.4, SCA polygon SCA_W140, anomaly investigations on July 22, 2008
- One 40mm projectile was found during spreading operations of the oversize reject material from the sifting plant being used by the Army in their fuel break repairs

The first 40mm practice projectile was destroyed on June 18, 2008 at 16:07 along with one electrical blasting cap, two practice antitank mine fuzes, and one 57mm projectile as indicated in Table 5-1. These items were destroyed using shaped charges (perforators).

The 57mm projectile was destroyed on July 22, 2008 at 14:51 using shaped charges (perforators) as indicated in Table 5-1.

The second 40mm projectile was destroyed on August 14, 2008 at 14:58 using shaped charges (perforators) as indicated in Table 5-1.

As indicated in Table 5-1, MEC items recovered during clearing and grubbing of the roadway alignment were transferred to the Army as these items were not associated with SCA removal actions. Documentation of these transfers is included in the MEC Incident Report Forms provided in Appendix H.

5.7 Left In Place Anomaly Locations

There were a number of anomaly locations where the item(s) encountered were left in place. These locations were investigated for the presence of MEC or MD, without removing the obstructions. The UXO Technicians did not encounter MEC or MD items. These items are recorded in the anomaly target database as being left in place. A number of these anomalies were identified as metallic dirt or rocks and were entered into the database as “hot dirt.” These items were not removed and will not be investigated further.

In a number of other anomaly locations, the item(s) encountered were not removed because the anomaly sources were very large and/or likely the result of existing infrastructure. The removal of the anomaly sources would have required a disruption in utility services or existing infrastructure. Grading activities associated with the construction of the planned roadway alignment and utility corridor will require active UXO construction support for these obstructions. These anomaly locations were logged as cultural debris in the target anomaly database and consist of the following:

- Existing Culverts. Culverts were not removed because they ran underneath the existing GJMB and Eucalyptus Road.
- Wooden Communication Poles with Guy Wires. The wooden communications poles are active and are supported by guy wires, which caused interference and these locations could not be surveyed. The communication poles, guy wires, and the cable tie-downs for the guy wires were not removed because their removal would interrupt services to the surrounding area.
- High-Voltage Electrical Transmission Towers. Ten high-voltage electrical transmission towers were identified within SCA polygons that completely or partially lie within the roadway alignment. DGM surveys were performed as close as possible to the base of each tower; however, the area directly under the tower did not undergo a DGM survey. The towers were not removed because their removal would interrupt electrical services to the surrounding area.
- Fence Posts. Due to site security issues and the presence of fence posts embedded in the asphalt and road base next to the edge of the existing GJMB roadway, a number of fence posts were not removed.
- Pipes. A number of large pipes were not removed due to their size and their proximity to existing features such as the roadways or the wooden communication poles or high-voltage electrical transmission towers.
- Asphalt. Asphalt was left in place because the asphalt was part of an existing road or part of an apron left at gated site entrances, which were kept in place to provide stabilized construction site entrances to minimize erosion and dirt track-out onto the streets.

An estimated total of 140,000 lbs of cultural debris were left in place. Anomaly locations are shown in the DGM grid plots provided in Appendix E.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The FORA ESCA RP Team has successfully completed the Seaside MRA Phase II Removal Action for the SCAs (points and polygons) or portions of SCAs (polygons) within the roadway alignment and utility corridor and for the portion of the hillside west of GJMB that lies within the roadway alignment. The removal action was completed using BADT in accordance with the Final SSWP Addendum and associated FVFs. The BADT included both analog and digital instruments, which were used to detect subsurface anomalies in the SCAs and the hillside west of GJMB.

All subsurface target anomalies that potentially represented MEC were intrusively investigated and removed from the SCAs or portions of SCAs within the roadway alignment and utility corridor and within the hillside west of GJMB. The few exceptions where anomalies were left in place included the following features:

- existing culverts extending underneath GJMB and Eucalyptus Road;
- wooden communication poles and associated guy wires;
- high-voltage electrical transmission towers;
- portions of the existing fence line constructed of metal fence posts and 4-strand barbed-wire fencing along GJMB, particularly in areas where steep terrain prevented safe removal of the fence or where fence removal could potentially result in long-term damage to the integrity of GJMB; and
- asphalt aprons and metal access gates along GJMB.

These anomaly locations were defined in Section 5.7 as “left in place” because the areas could not be adequately investigated using BADT due to the metallic content of these features.

During the investigation and removal actions, all required QC and QA inspections were successfully completed in accordance with the Final SSWP Addendum and associated FVFs. The FORA ESCA RP Team QC and QA approach will result in a quality level that is greater than or equivalent to that performed by the Army during previous removal actions. In addition, the removal action activities were overseen by an independent QA professional on behalf of FORA.

In total, the removal action in the roadway alignment, utility corridor, and hillside west of GJMB included the following activities:

- Five structures and 10 debris piles were removed during site preparation activities
- approximately 40,300 cy of vegetation and surface soil were removed from approximately 67 acres of the roadway alignment, excluding SCAs, and stockpiled during clearing and grubbing operations
- approximately 35 acres of soil were scraped (which included SCA polygons outside of the roadway alignment and utility corridor) to improve geophysical operations

- approximately 89,300 cy of material were sifted (which included SCA polygons outside of the roadway alignment and utility corridor) to remove MEC, MD, and other debris
- 7,808 DGM anomalies were selected as targets for further investigation
- 5,431 anomaly targets were successfully reacquired and intrusively investigated (the remaining 2,377 anomaly targets resulted in NCs)
- 431 analog anomalies were selected as targets and intrusively investigated
- Soil sampling conducted by the Army at the location of the bulk explosives found in the hillside west of GJMB

In total, these activities resulted in the recovery and disposal of the following finds:

- 22 MEC items (consisting of 10 UXO items, 11 DMM items, and one MC item)
- approximately 208 pounds of MD (more than 375 MD items)
- approximately 6,225 pounds of cultural debris

Most of the MEC items were recovered during sifting operations (12 items) and clearing and grubbing activities (six MEC items). The remaining four MEC items were recovered during intrusive investigations resulting from the DGM surveys. Five of the six MEC items were recovered from the portion of the roadway alignment along Eucalyptus Road during clearing and grubbing activities, but were located outside the northern boundary of the Seaside MRA.

Based upon the results of the removal action, the potential for residual MEC risks to remain within the roadway alignment and utility corridor has been significantly reduced; however, due to the inherent uncertainty in the BADT used for MEC removal actions, some level of residual risk will always remain.

To manage any remaining risks related to the potential presence of MEC, UXO construction support will be utilized during intrusive construction activities, such as grading of the roadway alignment and trenching for the underground utility corridor. Active UXO construction support will be utilized for construction or any other intrusive activities within the left in place anomaly locations. In addition, construction personnel will be required to complete UXO recognition and avoidance training, as required by the Finding of Suitability for Early Transfer, the Administrative Order on Consent, and local regulations to include the Ordnance Ordinance. With these protective measures in place and based on the successful removal action efforts conducted to date in the Seaside MRA, the roadway alignment and utility corridor are considered safe and protective of human health for the intended reuse and have been deemed to be in acceptable condition for FORA to proceed with planned construction activities within these areas.

This TIP presents the results for only those portions of the removal action activities conducted within the roadway alignment, including the hillside west of GJMB and utility corridor. Additional activities are currently being conducted to complete the removal action in the remainder of the SCAs within the Seaside MRA. In addition to being presented in this TIP, the results of the removal action activities conducted within the roadway alignment, which includes the hillside west of GJMB, and the utility corridor, will be incorporated into the Group 1 RI/FS report along with the removal action activities currently being conducted in the remainder of the Seaside MRA to support a final remedial decision.

7.0 REFERENCES

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GUIDANCE DOCUMENTS

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27 CFR 55	Alcohol, Tobacco Products and Firearms
29 CFR 1910	Occupational Safety and Health Standards
29 CFR 1926	Safety and Health Regulations for Construction
49 CFR 100-199	Hazardous Materials Transportation
AR 190-11	Physical Security
AR 385-10	The Army Safety Program
AR 385-16	System Safety Engineering and Management
AR 385-64	Army Regulation, Ammunition and Explosives Safety Standards
ATF P-5400.7	ATF Explosives Laws and Regulations
DA PAM 385-64	Department of the Army Pamphlet, Ammunition and Explosives Safety Standards
DOD 4145.26-M	U.S. Department of Defense, Contractors' Safety Manual for Ammunition and Explosives
DOD 6055.9-STD	DOD Ammunition and Explosives Safety Standards
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HNC-ED-CS-96-8	Guide Selection and Sittings of Barricades for Selected Ordnance and Explosives, September 1997
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HNC-ED-CS-S-00-3	U.S. Army Engineering and Support Center, Huntsville Division, Use of Water for Mitigation of Fragmentation and Blast Effects Due To Intentional Detonation of

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Table 2-1 Historical Types of MEC Removed

Location	MEC Item	UXO	DMM	Hazard Classification
MRS-15 SEA.1	Cap, blasting, electric, M6	0	4	1
	Cartridge, 40mm, practice, M781	0	20	1
	Fuze, grenade, hand, M10 series	0	86	1
	Fuze, grenade, hand, practice, M205 series	0	2	1
	Fuze, grenade, hand, practice, M228	2	3	1
	Fuze, projectile, combination, M1907	1	0	1
	Fuze, projectile, point detonating, M48 series	1	0	2
	Fuze, trench mortar, point detonating, MK VI	1	0	2
	Grenade, hand, fragmentation, MK II	1	0	3
	Grenade, hand, incendiary, TH3, AN-M14	1	0	1
	Grenade, hand, riot, CS, M7A3	1	0	1
	Grenade, hand, smoke, M18 series	5	0	1
	Ordnance Components	19	0	NS
	Projectile, 22mm, subcaliber, practice, M744	1	0	1
	Projectile, 37mm, low explosive, MK I	3	0	3
	Projectile, 3-inch, trench mortar, practice, MK I (Stokes)	28	0	1
	Projectile, 40mm, parachute, illumination, M583 series	1	0	1
	Projectile, 4-inch, mortar, screening smoke, FM (Stokes)	6	0	3
	Projectile, 4-inch, mortar, smoke, HC (Stokes)	4	0	2
	Projectile, 4-inch, trench mortar, practice, MK I (Stokes)	5	0	1
	Projectile, 4-inch, trench mortar, smoke, white phosphorous, MK I (Stokes)	1	0	3
	Projectile, 75mm, high explosive, MK I	1	0	3
	Projectile, 75mm, Shrapnel, MK I	6	0	3
	Projector, Livens, screening smoke, FM	2	0	3
	Rocket, 35mm, subcaliber, practice, M73	1	0	1
	Signal, ground, rifle, parachute, M17 series	2	0	1
	Signal, illumination, M187	1	0	1
	Simulator, grenade, hand, M116A1	1	0	2
	MRS TOTAL	**95**	**115**	
MRS-15 SEA.2	Bulk, high explosive (model unknown) – 1 pound *	0	0	NS
	Fuze, grenade, hand, M10 series	0	2	1
	Fuze, grenade, hand, practice, M205 series	0	2	1
	Grenade, hand, smoke, M18 series	1	0	1
	Projectile, 3-inch, trench mortar, practice, MK I (Stokes)	6	0	1
	Signal, illumination, ground, M125 series	1	0	2
	MRS TOTAL	**8**	**4**	
MRS-15 SEA.3	Cap, blasting, electric, M6	0	1	1
	Fuze, grenade, hand, M10 series	98	10	1
	Fuze, grenade, hand, practice, M205 series	2	0	1
	Fuze, grenade, hand, practice, M228	0	4	1

Location	MEC Item	UXO	DMM	Hazard Classification
	Grenade, rifle, smoke, M22 series	1	0	1
	Projectile, 37mm, high explosive, MK II	1	0	1
	Projectile, 37mm, low explosive, MK I	1	0	3
	Rocket, 3.5-inch, practice, M29 series	1	0	0
	Rocket, 35mm, subcaliber, practice, M73	2	0	1
	Signal, ground, rifle, parachute, M17 series	1	0	1
	Signal, illumination, ground, M21A1	1	0	1
	MRS TOTAL	**108**	**15**	
MRS-15 SEA.4	Activator, mine, antitank, practice, M1	0	1	1
	Cap, blasting, non-electric, M7	0	1	1
	Cartridge, ignition, M2 series	39	3	1
	Flare, surface, trip, M49 series	3	0	1
	Fuze, grenade, hand, M10 series	2	12	1
	Fuze, grenade, hand, practice, M228	1	11	1
	Fuze, mine, antitank, practice, M604	0	1	1
	Fuze, mine, combination, M6A1	0	1	1
	Fuze, projectile, point detonating, M503 series	1	0	2
	Grenade, hand, fragmentation, MK II	3	0	3
	Grenade, hand, practice, M30	22	0	1
	Grenade, hand, practice, MK II	32	0	1
	Grenade, hand, smoke, M18 series	1	0	1
	Grenade, rifle, smoke, M22 series	15	0	1
	Mine, antitank, practice, M1	1	0	1
	Ordnance Components	7	0	NS
	Pot, 10lb, smoke, HC, screening, M1	3	0	1
	Primer, igniter tube, M57	2	0	1
	Projectile, 3-inch, Hotchkiss	1	0	3
	Projectile, 40mm, high explosive, M386	1	0	3
	Projectile, 57mm, high explosive, M306 series	14	0	3
	Projectile, 60mm, mortar, high explosive, M49 series	2	0	3
	Projectile, 75mm, Shrapnel, MK I	2	0	3
	Projectile, 81mm mortar, high explosive M43 series	1	0	3
	Rocket, 35mm, subcaliber, practice, M73	4	0	1
	Signal, illumination, ground, M125 series	1	0	2
	Simulator, flash artillery, M110	1	0	1
	MRS TOTAL	**159**	**30**	
	SEASIDE MRA TOTAL	**370**	**164**	

Notes: NS = Not Specified.

* = MMRP database identified item as UXO with a quantity of zero.

Reference: Fort Ord MMRP Database.

Please note: Munitions descriptions have been taken directly from the Army's MMRP Database and/or other historical documents. Any errors in terminology, filler type, and/or discrepancies between model number and caliber/size are a result of misinformation from the data sources.

Table 3-1
SCA Point Locations in Roadway Alignment and Utility Corridor

MRS Location	ESCA RP Team SCA Point ID	SCA Type as Previously Defined by the Army	Notes
Roadway Alignment			
MRS-15SEA.1	165	Scrape Area	
	166	Buried cable/wire	
	167	Backhoe Excavation	
	194	Scrape Area	
	207	Culvert	Inside SCA Polygon W048
	208	Flag poles/utility poles	Inside SCA Polygon W048
	209	Culvert	
MRS-15SEA.2	246	Asphalt/Concrete	
	247	Asphalt/Concrete	
	248	Asphalt/Concrete	Inside SCA Polygon W160
	272	Retaining wall	Inside SCA Polygon W160
	278	Field Latrine	Inside SCA Polygon W157
	279	Field Latrine	
	280	Field Latrine	Inside SCA Polygon W157
	281	Asphalt/Concrete	Inside SCA Polygon W160
	283	Tie Down	
	284	Flag poles/utility poles	
	286	Buried cable/wire	
	287	Buried cable/wire	
	288	Buried cable/wire	
	289	Buried cable/wire	
	290	Backhoe Excavation	
	291	Backhoe Excavation	
	292	Backhoe Excavation	
	293	Flag poles/utility poles	
	294	Flag poles/utility poles	
	295	Flag poles/utility poles	
	296	Backhoe Excavation	
	299	Backhoe Excavation	
	304	Buried cable/wire	Inside SCA Polygon W140
	308	Backhoe Excavation	Inside SCA Polygon W048
MRS-15SEA.3	317	Buried cable/wire	
	318	Backhoe Excavation	
	319	Fence	
	320	Backhoe Excavation	
	321	Backhoe Excavation	
	322	Backhoe Excavation	
	323	Backhoe Excavation	

MRS Location	ESCA RP Team SCA Point ID	SCA Type as Previously Defined by the Army	Notes
	324	Scrape Area	
	325	Scrape Area	
	326	Scrape Area	
	327	Scrape Area	
	328	Scrape Area	
	329	Scrape Area	
	330	Scrape Area	
	331	Scrape Area	
	332	Scrape Area	
	333	Scrape Area	
	334	Scrape Area	
	336	Culvert	Inside SCA Polygon W140
	337	Culvert	Inside SCA Polygon W140
	338	Scrape Area	
	339	Scrape Area	
	340	Scrape Area	
	341	Scrape Area	
	342	Scrape Area	
	343	Scrape Area	
	344	Scrape Area	
	345	Scrape Area	
	346	Scrape Area	
	375	Backhoe Excavation	
	376	Backhoe Excavation	
MRS-15SEA.4	384	Buried cable/wire	
	397	Tie Down	
	398	Flag poles/utility poles	
	399	Buried cable/wire	
	400	Burial pit	
	419	Asphalt/Concrete	
	420	Garbage pile	
	423	Backhoe Excavation	
	432	Backhoe Excavation	
	437	Buried cable/wire	
	438	Buried cable/wire	
	439	Flag poles/utility poles	
	441	Buried cable/wire	Inside SCA Polygon W140
	467	Asphalt/Concrete	
	468	Asphalt/Concrete	
	483	Asphalt/Concrete	Inside SCA Polygon W140
	484	Asphalt/Concrete	Inside SCA Polygon W140

MRS Location	ESCA RP Team SCA Point ID	SCA Type as Previously Defined by the Army	Notes
	485	Asphalt/Concrete	
	486	Asphalt/Concrete	Inside SCA Polygon W074
	513	Buried cable/wire	
	514	Buried cable/wire	
	516	Buried cable/wire	
	517	Buried cable/wire	
Utility Corridor			
MRS-15SEA.1	153	Target box/fighting position	
	154	Target box/fighting position	
	155	Asphalt/concrete	
	156	Asphalt/concrete	
	157	Asphalt/concrete	
	158	Asphalt/concrete	
	159	Target box/fighting position	
	160	Target box/fighting position	
MRS-15SEA.2	259	Buried cable/wire	
	260	Buried cable/wire	
	263	Buried cable/wire	
	264	Buried cable/wire	
	269	Asphalt/concrete	
	271	Asphalt/concrete	
MRS-15SEA.4	443	Garbage pile	
	447	Sandbags	
	448	Sandbags	
	449	Scrape Area	
	462	Burial pit	
	463	Burial pit	
	464	Backhoe excavation	
	507	Buried cable/wire	
	508	Buried cable/wire	
	521	Culvert	
	522	Culvert	
	523	Culvert	

Table 3-2
SCA Polygons Within Roadway Alignment and Utility Corridor

MRS Location	ESCA RP Team SCA Polygon ID	Polygon Area (sq ft)	SCA Type(s) as Defined by the Army	Notes
Roadway Alignment				
MRS-SEA15.1	W003	2496	Towers	High voltage electrical transmission tower in SCA, DGM survey performed around tower.
	W005	10,464	Data Gap, Scrape Area, Unknown, Asphalt/Concrete, Scrape Area, Exclusion Grid	
	W018	4,716	Backhoe Excavation, Asphalt Concrete, Data Gap	DGM in roadway portions of SCA only.
	W034	3,627	Scrape Area	
	W035	2,902	Asphalt/Concrete, Backhoe excavation, Towers,	High voltage electrical transmission tower in SCA. Analog performed along fence and terrain-related data gaps.
	W037	4,664	Asphalt/Concrete, Scrape Area	Analog performed for terrain-related data gap. DGM in roadway portion of SCA only.
	W039	2,267	Scrape Area	Analog performed for terrain-related data gap.
	W123	1,341	Towers	High voltage electrical transmission tower in SCA. Analog performed for terrain-related data gaps.
	W124	1,985	Towers	High voltage electrical transmission tower in SCA. Analog performed for terrain-related data gap.
	W125	566	Towers	High voltage electrical transmission tower in SCA. Analog performed for terrain-related data gap.
	W130	6,450	Asphalt/Concrete	Analog performed for terrain-related data gap. DGM in roadway portion of SCA only. Apron not scraped.
	W132	888	Reason undefined	
	W133	98	Reason undefined	
	W134	2,449	Asphalt/Concrete, Data Gap, Scrape Area	
	W135	1,510	Reason undefined	
	W137	166	Asphalt/Concrete	Gate, No DGM around Gate, Apron not scraped.
	W138	35	Scrape Area, Asphalt/Concrete	DGM in roadway portion of SCA only.
	W141	4,630	Inner Fence	

MRS Location	ESCA RP Team SCA Polygon ID	Polygon Area (sq ft)	SCA Type(s) as Defined by the Army	Notes
	W151	805	Data Gap	Analog performed for terrain-related data gap.
	W152	14	Data Gap	
	W153	17	Data Gap	Fiber Optic Pole, No DGM around pole due to interference.
	W162	4,706	Flag Poles/Utility poles, Asphalt/Concrete	Fence/gate, No DGM around gate/fence. Analog performed around fence/gate. Apron not scraped.
	W163	729	Asphalt/Concrete	
	W164	113	Asphalt/Concrete	
	W165	3,507	Data Gap, Asphalt/Concrete	Gate/Fence/Apron, no DGM around gate/fence/apron. Area not scraped.
MRS-SEA15.2	W006	27	Reason undefined	Fiber Optic Pole, No DGM survey due to interference.
	W007	19	Data Gap	
	W012	65	Data Gap	Fiber Optic Pole, No DGM survey due to interference.
	W013	88	Data Gap	
	W043	427	Scrape Area	
	W045	408	Scrape Area	
	W046	957	Scrape Area, Towers	High voltage electrical transmission tower in SCA.
	W047	232	Buried Cable/Wire	
	W049	873	Scrape Area	
	W080	162	Reason undefined	
	W126	1,861	Towers	High voltage electrical transmission tower in SCA.
	W127	1,005	Towers	High voltage electrical transmission tower in SCA.
	W128	1,357	Towers	High voltage electrical transmission tower in SCA.
	W129	1,357	Towers	High voltage electrical transmission tower in SCA, Analog performed for terrain-related data gap.
	W142	585	Data Gap	
	W157	861	Data Gap	
	W160	42,523	Asphalt/Concrete, Buried Cable/Wire, Data Gap	DGM in roadway portions of SCA only.
	W161	775	Extreme Terrain	Analog performed for terrain-related data gap.
MRS-SEA15.3	W000	131	Data Gap	
	W001	731	Data Gap	

MRS Location	ESCA RP Team SCA Polygon ID	Polygon Area (sq ft)	SCA Type(s) as Defined by the Army	Notes
	W014	6,182	Scrape Area, Backhoe Excavation	Fence/Gate, Analog around fence and gate. DGM in roadway portion of SCA only.
	W055	3,461	Garbage Pile, Scrape Area, Flag poles/Utility poles	Analog performed for terrain-related data gaps.
	W056	928	Backhoe Excavation	
	W057	1,276	Tie Down	Tie Down, Analog performed around tie down and terrain-related data gap.
	W058	172	Asphalt/Concrete	
	W059	566	Scrape Area	
	W143	145	Data Gap	Analog performed for terrain-related data gap.
MRS-SEA15.4	W066	3.2	Scrape Area	Analog performed for terrain-related data gap.
	W067	434	Scrape Area	
	W074	21,622	Asphalt/Concrete, Scrape Area, Buried Cable/Wire, Backhoe Excavation, Berm	Fence/Gate, Analog performed around fence/gate and terrain-related data gaps. DGM in roadway portion of SCA only.
	W087	9,056	Scrape Area, Range structure	DGM in roadway portion of SCA only.
	W101	780	Scrape Area	
	W111	16,202	Scrape Area	Discrete point excavations, soil scrape, then DGM, Analog performed for terrain-related data gap.
	W112	203	Flag Poles/Utility poles	
	W117	6.5	Weather Station	DGM in roadway portion of SCA only.
	W118	5,693	Asphalt/Concrete, Scrape Area, Backhoe Excavation, Garbage Pile	Fence/Gate, Analog performed around fence/gate and terrain-related data gaps. DGM in roadway portion of SCA only.
	W119	340	Scrape Area, Field Latrine	Analog performed for terrain-related data gaps. DGM in roadway portion of SCA only.
	W120	80	Garbage Pile	
	W122	4,626	Asphalt/Concrete	Analog performed for terrain-related data gap.
	W131	14,684	Asphalt/Concrete	
MRS-SEA15.1-3	W048	188,729	Inner Fence Line, Data Gap, Asphalt Concrete, Backhoe Excavation	Analog performed for terrain-related data gaps.
			Inner Fence Line, Scrape Area, Towers, Data Gap	Analog performed for terrain-related data gaps.

MRS Location	ESCA RP Team SCA Polygon ID	Polygon Area (sq ft)	SCA Type(s) as Defined by the Army	Notes
			Inner Fence Line, Flag Poles/Utility Poles, Asphalt/Concrete	Analog performed for terrain-related data gaps.
MRS-SEA15.1-4	W140	234,288	Existing Fence	Analog performed along existing fence and for terrain-related data gap, partial scrape.
			Existing Fence	DGM & Analog performed along existing fence and for terrain-related data gaps, partial scrape.
			Existing Fence	DGM & Analog performed along existing fence and for terrain-related data gaps, partial scrape.
			Existing Fence	DGM & Analog performed for terrain-related data gaps, partial scrape.
Utility Corridor				
MRS-SEA15.1	W018	1,340	Backhoe Excavation, Asphalt Concrete, Data Gap	
	W145	2	Data Gap	
MRS-SEA15.2	W158	900	Data Gap	Analog performed for terrain-related data gap.
	W159	260	Data Gap	Analog performed for terrain-related data gap.
	W160	5,180	Asphalt/Concrete, Buried Cable/Wire, Data Gap	DGM in utility corridor portions of SCA only.
MRS-SEA15.3	W015	980	Asphalt/Concrete, Data Gap	
MRS-SEA15.4	W068	600	Target Vehicle	
	W078	0.68	Backhoe excavation	
	W090	47	Scrape Area	
	W091	250	Target Vehicle	
	W110	440	Asphalt/Concrete	
	W114	1,020	Culvert	
	W166	80	Culvert	

Notes:
Large SCA polygons = polygons with surface area greater than or equal to 1,000 square feet
Small SCA polygons = polygons with surface area less than 1,000 square feet
DGM = Digital geophysical mapping
Polygon area is for only the portion of the polygon that lies within the roadway alignment or utility corridor.

Table 3-3
EM61-MK2 and G-858 Data Processing Parameters

Process	Parameter
Drift – Median Drift Correction (UCEDRIFT.GX)	Window Length: 100 Channels 1-4 were processed using the same parameters then were summed to create the Stack channel
Statistical Evaluation of Background Noise	Windowed section of background/using UX-Process QC module evaluated std dev, min, max, mean, mode
Grid	Cell Size: 0.25 ft Blanking Distance: 1.25 ft Search Radius: 2 ft
Blakely Peak Picking Algorithm	Smooth Filter: 3 Normal Peak Detection Grid Value Cutoff: Dependent on each individual SCA ranged from EM- 4.0 mV-10 mV / G858 3nt/ft
Target Decay Analysis	Performed based on each data channel
Target Review	Performed

Table 4-1
Summary of Known and Blind QC Seed Items for DGM Surveys

Seed ID	ESCA RP Team ID	Anomaly ID	Response Amplitude (mV)	Offset from Control (ft)
QC Seed Data (Known Seed IDs and Locations - SCA Polygons)				
SEA3-A7	SCA_W001	3	181.25	0.49
SEA1-A11	SCA_W003	13	558.08	1.13
SEA1-A18a	SCA_W005	15	380.25	0.38
SEA1-A18b	SCA_W005	34	676.00	0.55
SEA1-A6	SCA_W035	56	312.77	0.74
SEA1-A13	SCA_W039	4	605.51	0.27
SEA2-A3	SCA_W043	1	346.00	0.26
SEA2-A13	SCA_W045	1	281.62	1.18
SEA2-A14	SCA_W046	3	702.85	0.43
SEA2-A9	SCA_W047	3	369.18	0.79
SEA2-A10	SCA_W048	2291	974.61	0.47
SEA3-A3	SCA_W048	3719	805.90	0.42
SEA3-A5	SCA_W048	3808	869.62	0.07
SEA2-A12	SCA_W049	GPS location was wrong, seed recovered in different location		
SEA3-A4	SCA_W055	141	768.25	0.37
SEA3-A6	SCA_W056	1	223.69	0.36
SEA3-A8	SCA_W057	9	203.33	0.29
SEA3-A10	SCA_W058	1	196.20	1.11
SEA4-A9	SCA_W067	1	220.93	0.56
SEA4-A8A	SCA_W074	737	246.40	0.86
SEA4-A8b	SCA_W074	403	367.60	0.59
SEA4-A7	SCA_W087	27	215.57	0.57
SEA4-A40	SCA_W091	12	237.20	0.88
SEA4-A6	SCA_W101	18	268.51	1.01
SEA4-A33	SCA_W110	24	142.51	1.04
SEA4-A5a	SCA_W111	563	254.47	0.23
SEA4-A5b	SCA_W111	315	230.53	0.78
SEA4-A5c	SCA_W111	124	191.68	0.65
SEA4-A3	SCA_W118	146	184.03	0.92
SEA4-A4	SCA_W118	43	136.34	0.51
SEA4-A11	SCA_W122	26	254.37	0.39
SEA2-A1	SCA_W126	15	213.10	0.95
SEA2-A2	SCA_W127	6	249.99	0.05
SEA2-A5	SCA_W128	10	500.22	1.03
SEA2-A20	SCA_W129	13	133.45	1.40
SEA4-A10b	SCA_W131	75	225.18	0.55
SEA1-A17	SCA_W132	24	202.90	0.44
SEA1-A16	SCA_W133	1	146.11	0.45
SEA1-A14	SCA_W134	28	453.67	0.46
SEA1-A9	SCA_W135	8	250.63	0.43
SEA4-A10a	SCA_W140	999	610.50	0.89
SEA2-A17	SCA_W142	3	212.29	0.85

Seed ID	ESCA RP Team ID	Anomaly ID	Response Amplitude (mV)	Offset from Control (ft)
SEA2-A36	SCA_W158	20	178.79	0.72
SEA2-A8b	SCA_W160	4362	763.87	0.92
SEA2-A8c	SCA_W160	4175	438.62	0.49
SEA2-A35[2]	SCA_W161	29	262.60	2.67
SEA1-A8	SCA_W163	2	503.60	0.62
SEA1-A7	SCA_W048	618	199.10	1.24
SEA4-A52	SCA_W090	2	189.17	0.68
SEA1-A5	SCA_W034	Seed location compromised during soil moving activities		
SEA1-A12	SCA_W140	Recovered during analog survey		
SEA2-A8a	SCA_W160	Recovered during analog survey		
SEA2-A11	SCA_W048	Recovered during analog survey		
QC Seed Data (Known Seed IDs and Locations - Hillside West of GJMB)				
WOWQC-1		2840	283.88	0.72
WOWQC-2[1]		6377	10.02	0.57
WOWQC-3		1341	261.71	0.06
WOWQC-4		783	137.28	0.74
WOWQC-1[1]		6265	11.57	0.47
WOWQC-2[1]		6112	29.35	0.32
WOWQC-3[1]		6155	94.65	1.04
WOWQC-4[1]		6104	22.64	0.38
WOWQC-5[1]		6211	15.66	0.26
			Offset Stats (Known Seed Items)	
			Min	**0.05**
			Max	**2.67**
			Avg.	**0.65**

QC Seed Data (Blind Seed IDs and Locations)				
ESCA-SEA-001	SCA_W048	2296	155.59	1.66
ESCA-SEA-015	SCA_W055	3671	136.01	1.30
ESCA-SEA-016	SCA_W055	131	39.41	1.87
ESCA-SEA-019	SCA_W131	1122	98.18	0.46
			Offset Stats (Blind Seed Items)	
			Min	**0.46**
			Max	**1.87**
			Avg.	**1.32**

Notes:

1. The response values for these known seed targets are in nT/ft units. These targets were based on G858 DGM data.
2. SEA2-A35 was reported at 2.67 feet from its original location. SCA_W161 is steeply sloped, resulting in a terrain offset. This offset was within the 3-foot-radius criteria established for the anomaly excavation.
GJMB = General Jim Moore Boulevard

Table 4-2
Summary of QC-2 Survey Results

Munitions Response Sites	Special Case Areas	QC-2 Size Designation	Total Acreage of SCA Area in Roadway Alignment and Utility Corridor	Total Acreage of QC-2 Survey Area in Roadway Alignment and Utility Corridor	% QC-2	Total No. of Anomalies Identified	Pass/Fail
MRS-15SEA.1	SCA_W003	Large	0.05700	0.017	30%	0	Pass
	SCA_W005	Large	0.24020	0.08100	34%	1	Pass
	SCA_W018	Large	0.13800	0.06723	49%	17	Pass
	SCA_W034	Large	0.08330	0.01940	23%	23	Pass
	SCA_W035	Large	0.06660	0.01390	21%	17	Pass
	SCA_W037	Large	0.10710	0.01743	16%	1	Pass
	SCA_W039	Large	0.05200	0.05115	98%	0	Pass
	SCA_W123	Large	0.03080	0.00890	29%	2	Pass
	SCA_W124	Large	0.04560	0.01100	24%	5	Pass
	SCA_W125	Small	0.01300	0.01300	100%	3	Pass
	SCA_W130	Large	0.14810	0.04000	27%	0	Pass
	SCA_W132	Small	0.02040	0.02040	100%	9	Pass
	SCA_W133	Small	0.00220	0.00000	0%	NA	NA
	SCA_W134	Large	0.05620	0.05620	100%	5	Pass
	SCA_W135	Large	0.03470	0.00812	23%	0	Pass
	SCA_W137	Small	0.07500	0.00000	0%	NA	NA
	SCA_W138	Small	0.00080	0.00080	100%	0	Pass
	SCA_W141	Large	0.10630	0.06800	64%	11	Pass
	SCA_W145	Small	0.00005	0.00005	100%	0	Pass
	SCA_W151	Small	0.01850	0.00000	0%	NA	NA
	SCA_W152	Small	0.00032	0.00000	0%	NA	NA

Munitions Response Sites	Special Case Areas	QC-2 Size Designation	Total Acreage of SCA Area in Roadway Alignment and Utility Corridor	Total Acreage of QC-2 Survey Area in Roadway Alignment and Utility Corridor	% QC-2	Total No. of Anomalies Identified	Pass/Fail
	SCA_W153	Small	0.00039	0.00000	0%	NA	NA
	SCA_W162	Large	0.10800	0.02850	26%	0	Pass
	SCA_W163	Small	0.01670	0.01670	100%	2	Pass
	SCA_W164	Small	0.00250	0.00000	0%	NA	NA
	SCA_W165	Large	0.18818	0.00000	0%	NA	NA
MRS-15SEA.2	SCA_W006	Small	0.00061	0.00000	0%	NA	NA
	SCA_W007	Small	0.00041	0.00000	0%	NA	NA
	SCA_W012	Small	0.00149	0.00000	0%	NA	NA
	SCA_W013	Small	0.00196	0.00000	0%	NA	NA
	SCA_W043	Small	0.00949	0.00000	0%	NA	NA
	SCA_W045	Small	0.00907	0.00000	0%	NA	NA
	SCA_W046	Small	0.02200	0.01493	68%	0	Pass
	SCA_W047	Small	0.00516	0.00000	0%	NA	NA
	SCA_W049	Small	0.01941	0.00000	0%	NA	NA
	SCA_W080	Small	0.00360	0.00000	0%	NA	NA
	SCA_W126	Large	0.04270	0.01675	39%	0	Pass
	SCA_W127	Large	0.02310	0.01300	56%	3	Pass
	SCA_W128	Large	0.03210	0.00800	25%	2	Pass
	SCA_W129	Large	0.03110	0.02125	68%	5	Pass
	SCA_W142	Small	0.01302	0.00000	0%	NA	NA
	SCA_W157	Small	0.01980	0.01980	100%	12	Pass
	SCA_W158	Small	0.02000	0.02000	100%	43	Pass

Munitions Response Sites	Special Case Areas	QC-2 Size Designation	Total Acreage of SCA Area in Roadway Alignment and Utility Corridor	Total Acreage of QC-2 Survey Area in Roadway Alignment and Utility Corridor	% QC-2	Total No. of Anomalies Identified	Pass/Fail
	SCA_W159	Small	0.00600	0.00600	100%	0	Pass
	SCA_W160	Large	0.97620	0.33230	34%	16	Pass
	SCA_W161	Small	0.01780	0.01780	100%	2	Pass
MRS-15SEA.3	SCA_W000	Small	0.00290	0.00000	0%	NA	NA
	SCA_W001	Small	0.01680	0.01680	100%	0	Pass
	SCA_W014	Large	0.14190	0.03600	25%	6	Pass
	SCA_W015	Large	0.02647	0.02650	100%	7	Pass
	SCA_W055	Large	0.07940	0.02092	26%	8	Pass
	SCA_W056	Small	0.02130	0.02100	99%	0	Pass
	SCA_W057	Large	0.02930	0.02218	76%	12	Pass
	SCA_W058	Small	0.00400	0.00400	100%	0	Pass
	SCA_W059	Small	0.01273	0.00000	0%	NA	NA
MRS-15SEA.4	SCA_W143	Small	0.00334	0.00000	0%	NA	NA
	SCA_W066	Small	0.00007	0.00000	0%	NA	NA
	SCA_W067	Small	0.01000	0.01000	100%	1	Pass
	SCA_W068	Small	0.01346	0.01346	100%	2	Pass
	SCA_W074	Large	0.49640	0.05400	11%	3	Pass
	SCA_W087	Large	0.20800	0.03400	16%	9	Pass
	SCA_W090	Small	0.00105	0.00105	100%	1	Pass
	SCA_W091	Small	0.00554	0.00554	100%	5	Pass
	SCA_W101	Small	0.01790	0.00866	48%	0	Pass
	SCA_W110	Small	0.01003	0.01003	100%	20	Pass

Munitions Response Sites	Special Case Areas	QC-2 Size Designation	Total Acreage of SCA Area in Roadway Alignment and Utility Corridor	Total Acreage of QC-2 Survey Area in Roadway Alignment and Utility Corridor	% QC-2	Total No. of Anomalies Identified	Pass/Fail
	SCA_W111	Large	0.37190	0.03645	10%	2	Pass
	SCA_W112	Small	0.00466	0.00000	0%	NA	NA
	SCA_W114	Small	0.02352	0.02352	100%	57	Pass
	SCA_W117	Large	0.00015	0.00015	100%	2	Pass
	SCA_W118	Large	0.13070	0.13070	100%	4	Pass
	SCA_W119	Large	0.00780	0.00780	100%	3	Pass
	SCA_W120	Small	0.00499	0.00499	100%	3	Pass
	SCA_W122	Large	0.10620	0.03000	28%	1	Pass
	SCA_W131	Large	0.33710	0.08602	26%	5	Pass
	SCA_W166	Small	0.01000	0.01000	100%	6	Pass
MRS-15SEA.1-4	SCA_W048	Large	4.33260	1.00900	23%	97	Pass
	SCA_W140	Large	5.37900	1.36800	25%	224	Pass
Hill Side West of GJMB		Large	2.80000	0.35947	13%	54	Pass
Total			17.5097	4.393	25%		

Notes:
GJMB = General Jim Moore Boulevard

Table 5-1
Summary of MEC Results

Location	MEC Item	MEC Quantity			Hazard Classification	Date	Status
		UXO	DMM	MC			
Roadway Alignment Clearing and Grubbing Results							
MRS-15SEA.1	Grenade, hand, practice, MK II		1		1	1/25/2008	Transferred to the Army
North of MRS-15SEA.3	Grenade, M-69 Practice		1		1	1/30/2008	Transferred to the Army
	Grenade, hand, smoke, M18 (green)		1		1	1/30/2008	Transferred to the Army
North of MRS-15SEA.4	Projectile, 75mm, Shrapnel, MK I (unfuzed)	1			3	1/16/2008	Transferred to the Army
	Projectile, 57mm – HE M306 (unfuzed)	1			3	1/29/2008	Transferred to the Army
	Grenade, hand, smoke, M18 (purple)		1		1	2/6/2008	Transferred to the Army
Total		**2**	**4**	**0**			
Soil Sifting Results							
MRS-15SEA.1	Cap, blasting, electrical, M6	1			1	5/28/2008	Disposed of on 6-18-08
MRS-15SEA.4	Cartridge, 57mm, TP M306A1 (includes projectile, unfuzed)		1		3	6/4/2008	Field Magazine
	Fuze, mine, antitank, practice M1A1 (safety clip in place)		1		1	6/10/2008	Disposed of on 6-18-08
	Fuze, PD, French No. 5		1		2	6/12/2008	Field Magazine
	Fuze, mine, antitank, practice M1A1 (safety clip in place)		1		1	6/13/2008	Disposed of on 6-18-08
	Cartridge, 57mm, M60A1 (no projectile, primer live)		1		Army Reviewing	6/17/2008	Field Magazine
	Projectile, 57mm, TP, M306, (unfuzed, unfired with possible spotting charge)		1		Army Reviewing	6/12/2008	Disposed of on 6-18-08
	M407A1 40mm practice	1			1	6/18/2008	Disposed of on 6-18-08

Location	MEC Item	MEC Quantity			Hazard Classification	Date	Status
		UXO	DMM	MC			
	Igniter, flame thrower	2			1	6/24/2008	Field Magazine
	Rocket, 35mm, subcaliber, practice, M73	1			1	7/15/2008	Field Magazine
	M407A1 40mm practice	1			1	8/11/2008	Disposed of on 8-14-08
	Total	**6**	**6**	**0**			
MEC Removal Action SCA Polygons and Hillside West of GJMB							
Hillside West of GJMB	Charge, 2.5lbs, demolition, TNT			2.5 lbs	2	5/30/2008	Field Magazine
Hillside West of GJMB	Fuze, grenade, hand, practice, M205A2		1		1	7/21/2008	Field Magazine
MRS-15SEA.1 SCA_W048	Burster Tube	1			Army Reviewing	6/13/2008	Field Magazine
MRS-15SEA.4 SCA_W140	Projectile, 57mm – HE M306	1			3	7/22/2008	Disposed of on 7-22-08
	Total	**2**	**1**	**2.5 lbs**			

Notes:

MEC = munitions and explosives of concern
UXO = unexploded ordnance
DMM = discarded military munitions
MC = munitions constituents
GJMB = General Jim Moore Boulevard

Table 5-2
Summary of Munitions Debris Results

MRS Location	Item Count	MD Weight
Site Preparation Activity Results		
MRS-SEA15.4	296	100 lbs
Total	**296**	**100 lbs**
Soil Sifting Results		
MRS-SEA15.1		8 lbs
MRS-SEA15.2		6 lbs
MRS-SEA15.3		12 lbs
MRS-SEA15.4		45 lbs
Total	**N/A**	**71 lbs**
SCA Point Locations		
MRS-SEA15.1	1	0.5 lbs
Total	**1**	**0.5 lbs**
DGM Survey SCA Polygons		
MRS-SEA15.1	6	24 lbs
MRS-SEA15.2	43	4.3 lbs
MRS-SEA15.3	5	0.5 lbs
MRS-SEA15.4	24	2.4 lbs
Total	**78**	**31.2 lbs**
DGM Survey - Hillside West of GJMB		
Hillside West of GJMB	1	5 lbs
Total	**1**	**5 lbs**
MRA Summary		
MRS-15SEA.1		**32.5 lbs**
MRS-15SEA.2		**10.3 lbs**
MRS-SEA15.3		**12.5 lbs**
MRS-SEA15.4		**147.4 lbs**
Hillside West of GJMB		**5 lbs**
MRA Total		**207.7 lbs**

Notes:

MD = munitions debris
GJMB = General Jim Moore Boulevard

Table 5-3
Summary of Soil Sifting Results

	MRS-15SEA.1	MRS-15SEA.2	MRS-15SEA.3	MRS-15SEA.4	Totals
Total Soil Volume Sifted (cubic yards)	35,240	18,655	5,495	22,974	82,364
Total Volume Oversize (cubic yards)	4,444	350	150	2,000	6,944
Totals (cubic yards)	39,684	19,005	5,645	24,974	89,308
Total MD (lbs)	8	6	12	45	71

Notes:

MD = munitions debris
The total volume of material sifted and the total number of pounds of MD recovered are reported for the entire Seaside MRA.

Table 5- 4
SCA Point Location Results

MRS Location	SCA Point ID	Results	MD	Cultural Debris
Roadway Alignment				
MRS-SEA15.1	165	Ammo Links	0.5 lbs	
	166	NC		
	167	Pipe		2 lbs
	194	NC		
	207	Pipe buried next to power pole, not removed		
	208	Metal scrap		2 lbs
	209	NC		
		MRS Total	**0.5 lbs**	**4 lbs**
MRS-SEA15.2	246	NC		
	247	NC		
	248	NC		
	272	NC		
	278	Cultural feature		0.5 lbs
	279	NC		
	280	NC		
	281	NC		
	283	Iron scrap		30 lbs
	284	NC		
	286	NC		
	287	NC		
	288	NC		
	289	NC		
	290	NC		
	291	NC		
	292	NC		
	293	NC		
	294	NC		
	295	NC		
	296	NC		
	299	Metal scrap		2 lbs
	304	NC		
	308	NC		
		MRS Total	**0 lbs**	**32.5 lbs**
MRS-SEA15.3	317	Metal scrap		10 lbs
	318	NC		
	319	NC		
	320	NC		
	321	NC		
	322	NC		
	323	NC		
	324	NC		
	325	NC		

MRS Location	SCA Point ID	Results	MD	Cultural Debris
	326	NC		
	327	NC		
	328	NC		
	329	NC		
	330	NC		
	331	NC		
	332	NC		
	333	NC		
	334	Wire		0.5 lbs
	336	Culvert under Eucalyptus Road, not removed		
	337	NC		
	338	NC		
	339	NC		
	340	NC		
	341	NC		
	342	NC		
	343	NC		
	344	NC		
	345	NC		
	346	NC		
	375	NC		
	376	NC		
		MRS Total	**0 lbs**	**10.5 lbs**
MRS-SEA15.4	384	NC		
	397	Cable		5 lbs
	398	Nail		1 lbs
	399	Cable		5 lbs
	400	Iron scrap		10 lbs
	419	Iron scrap		5 lbs
	420	NC		
	423	Rebar reinforced concrete next to power pole, not removed		
	432	Nail		1 lbs
	437	Iron scrap		5 lbs
	438	Construction Debris		10 lbs
	439	NC		
	441	Iron scrap		5 lbs
	467	NC		
	468	NC		
	483	NC		
	484	NC		
	485	NC		
	486	NC		
	513	Wire		1 lbs
	514	Wire		1 lbs
	516	Wire		1 lbs
	517	Wire		1 lbs

MRS Location	SCA Point ID	Results	MD	Cultural Debris
		MRS Total	**0 lbs**	**51 lbs**
		Roadway Alignment Total	**0.5 lbs**	**98 lbs**
Utility Corridor				
MRS-SEA15.1	153	Cable		1 lbs
	154	Cable		0.5 lbs
	155	Cable		0.5 lbs
	156	Cable		0.5 lbs
	157	Cable		0.5 lbs
	158	Cable		1 lbs
	159	Cable		1 lbs
	160	Cable		0.5 lbs
		MRS Total	**0 lbs**	**5.5 lbs**
MRS-SEA15.2	259	NC		
	260	NC		
	263	NC		
	264	NC		
	269	Wire		1 lbs
	271	Wire		0.5 lbs
		MRS Total	**0 lbs**	**1.5 lbs**
MRS-SEA15.4	443	Metal scrap		5 lbs
	447	Metal scrap		1 lbs
	448	Metal scrap		0.5 lbs
	449	Metal scrap		0.1 lbs
	462	Metal scrap		0.5 lbs
	463	Metal scrap		0.5 lbs
	464	Metal scrap		0.5 lbs
	507	Wire		0.5 lbs
	508	Wire		0.5 lbs
	521	Pipe		2 lbs
	522	Pipe		5 lbs
	523	Pipe		2 lbs
		MRS Total	**0 lbs**	**18.1 lbs**
		Utility Corridor Total	**0 lbs**	**25.1 lbs**

Notes:
MD = munitions debris
NC = no contact

Table 5-5
DGM Investigation Results for SCA Polygons and Hillside West of General Jim Moore Boulevard

MRS Location	ESCA RP Team SCA Polygon ID	Total Target Anomalies	No. of Targets Marked NC	No. of Targets MEC Items Removed	No. of Targets MD Items Removed	MD Weight		No. of Targets Cultural Debris Items Encountered	Cultural Debris Weight	
MRS-SEA15.1	W003	18	4	0	0			13	7.3	lbs
	W005	30	4	0	0			24	5.3	lbs
	W018	85	5	0	1	10	lbs	69	57.9	lbs
	W034	84	16	0	0			68	108.1	lbs
	W035	74	27	0	0			44	904.3	lbs
	W037	17	0	0	0			17	1.9	lbs
	W039	6	4	0	0			1	0.1	lbs
	W123	17	5	0	0			12	121.8	lbs
	W124	13	10	0	0			3	0.7	lbs
	W125	16	2	0	0			13	3,997.24	lbs
	W130	61	46	0	0			15	1.5	lbs
	W132	24	2	0	0			21	179.4	lbs
	W133	4	0	0	0			3	1.2	lbs
	W134	26	12	0	0			13	2.6	lbs
	W135	10	1	0	1	1	lbs	7	2.6	lbs
	W137	Gate - Area not surveyed								
	W138	21	9	0	0			11	1.51	lbs
	W141	116	72	0	0			59	189.8	lbs
	W145	4	0	0	0			4	0.4	lbs
	W151	24	23	0	0			1	0.1	lbs
	W152	4	4	0	0			0		
	W153	Wooden Communication Pole - Area not surveyed								
	W162	37	0	0	0			23	165.6	lbs
	W163	6	1	0	0			4	0.3	lbs
	W164	2	0	0	0			2	5.1	lbs
	W165	Gate - Area not surveyed								

MRS Location	ESCA RP Team SCA Polygon ID	Total Target Anomalies	No. of Targets Marked NC	No. of Targets MEC Items Removed	No. of Targets MD Items Removed	MD Weight	No. of Targets Cultural Debris Items Encountered	Cultural Debris Weight
MRS-SEA15.2	W006	Wooden Communication Pole - Area not surveyed						
	W007	0	0	0	0		0	
	W012	Wooden Communication Pole - Area not surveyed						
	W013	0	0	0	0		0	
	W043	3	2	0	0		0	
	W045	1	0	0	0		0	
	W046	12	10	0	0		1	0.1 lbs
	W047	4	0	0	0		3	0.7 lbs
	W049	2	1	0	0		1	0.1 lbs
	W080	4	2	0	0		2	20 lbs
	W126	15	14	0	0		0	0
	W127	8	3	0	0		4	0.4 lbs
	W128	20	5	0	0		14	101,998.7 lbs
	W129	17	5	0	0		11	10,998.2 lbs
	W142	1	0	0	0		0	
	W157	24	0	0	0		12	43.25 lbs
	W158	67	14	0	0		9	1.7 lbs
	W159	6	3	0	0		3	0.3 lbs
	W160	798	170	0	40	3.3 lbs	385	122.5 lbs
	W161	14	1	0	0		10	1 lbs
MRS-SEA15.3	W000	0	0	0	0		0	
	W001	2	0	0	0		1	0.1 lbs
	W014	58	1	0	1	0.1 lbs	56	34.4 lbs
	W015	34	10	0	0		24	82.9 lbs
	W055	116	17	0	0		97	79.1 lbs
	W056	9	4	0	1	0.1 lbs	3	0.2 lbs
	W057	13	3	0	2	0.2 lbs	7	0.7 lbs
	W058	3	0	0	0		2	0.2 lbs

MRS Location	ESCA RP Team SCA Polygon ID	Total Target Anomalies	No. of Targets Marked NC	No. of Targets MEC Items Removed	No. of Targets MD Items Removed	MD Weight		No. of Targets Cultural Debris Items Encountered	Cultural Debris Weight	
	W059	3	3	0	0			0		
	W143	1	0	0	0			1	0.1	lbs
MRS-SEA15.4	W066	4	0	0	0			3	4.5	lbs
	W067	9	3	0	1	0.1	lbs	4	5	lbs
	W068	16	12	0	0			4	1.3	lbs
	W074	295	48	0	7	0.7	lbs	214	832.4	lbs
	W078	16	7	0	0			7	1.5	lbs
	W087	133	3	0	4	0.4	lbs	125	720	lbs
	W090	6	2	0	0			3	0.7	lbs
	W091	23	9	0	0			13	12.4	lbs
	W101	6	4	0	0			0		
	W110	57	33	0	10	1	lbs	13	1.3	lbs
	W111	247	123	0	0			119	139	lbs
	W112	3	0	0	0			3	0.7	lbs
	W114	85	34	0	0			51	23	lbs
	W117	4	0	0	0			4	0.8	lbs
	W118	123	15	0	0			103	208.5	lbs
	W119	8	1	0	0			7	0.7	lbs
	W120	7	1	0	0			5	0.9	lbs
	W122	30	3	0	0			26	16.8	lbs
	W131	180	16	0	2	0.2	lbs	77	59.7	lbs
	W166	12	1	0	0			5	0.5	lbs
MRS-SEA15.1-3	W048	1,546	710	1	8	14.1	lbs	810	17,490	lbs
MRS-SEA15.1-4	W140	1,854	133	1	0			1,718	6,623.9	lbs
MRS Totals		**6,598**	**1,673**	**2**	**78**	**31.2**	**lbs**	**4,387**	**145,283**	**lbs**
Hillside West of GJMB		1,210	704	2	1	5	lbs	493	250.2	lbs
SCA Polygon and Hillside West of GJMB Totals		**7,808**	**2,377**	**4**	**79**	**36.2**	**lbs**	**4,880**	**145,533.2**	**lbs**

Notes:
MEC = munitions and explosives of concern
MD = munitions debris
GJMB = General Jim Moore Boulevard
The totals for MEC and MD items are for those within the roadway alignment and utility corridor only. The totals for the number of target anomalies, number of targets marked NC, and number and weights of cultural debris encountered include results located outside the roadway alignment and utility corridor.
Several items were identified as cultural debris in the target database, but were cultural features that were left in place. Estimated weights of these cultural features were provided in the database and totaled approximately 139,000 lbs. Thus, approximately, 5,600 lbs of cultural debris were actually removed from the SCA polygons and the hillside west of GJMB.

Table 5-6
DGM Target Reacquisition Results

Anomaly Type	Number of Targets	Range (Response in mV or nT/ft)	Depth (inches)
QC Spike	72	10.02 – 94.65 nT/ft	0 – 8
		133.45 – 974.608 mV	
MD	79	6.291 – 3,636.41	0 – 60
Cultural Debris	4,880	-12.1407 – 437,204.31	0 – 60
NC	2,377	-128.2932 – 390,716.75	NA

Notes:
QC Spike = known and blind quality control items
MD = munitions debris
NC = no contact
nT/ft = nanoTeslas per foot
mV = millivolts
Range responses given in nT/ft are for the G-858 survey data.
Range responses given in mV are for the EM61-MK2 survey data.

Table 5-7
Summary of Response Ranges for MEC Items from DGM Survey

MEC Type	Number of Items	Range (Response)	Depth (inches)
Charge, 2.5lbs, demolition, TNT	1	6.3 (mV)	60
3” MK I (Stokes) – HE Igniter tube	1	189 (mV)	6
Hand Grenade Fuze – HE M205A2	1	49 (nT/ft)	0
57mm M306 Series Projectile	1	14.36 (mV)	12
Total		6.3 – 189 mV	0 – 60

Notes:
MEC = munitions and explosives of concern
DGM = Digital geophysical mapping
nT/ft = nanoTeslas per foot
mV = millivolts
Range responses given in nT/ft are for the G-858 survey data.
Range responses given in mV are for the EM61-MK2 survey data.