FINAL

Technical Information Paper

Parker Flats Munitions Response Area Phase II

Former Fort Ord
Monterey County, California

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FORT ORD REUSE AUTHORITY

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Phase II
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Monterey County, California

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ACRONYMS AND ABBREVIATIONS

AOC	Administrative Order on Consent
AR	Army Regulation
Army	United States Department of the Army
ASV	all-surface vehicle
ATF	Bureau of Alcohol, Tobacco, Firearms, and Explosives
BADT	best available (and appropriate) detection technology
bgs	below ground surface
CDR	Covenant Deferral Request
CEHNC	Corps of Engineers - Huntsville Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
cm	centimeter
CSUMB	California State University Monterey Bay
CTS	California tiger salamander
DA PAM	Department of the Army Pamphlet
DGM	digital geophysical mapping
DMM	discarded military munitions
DOD	United States Department of Defense
DQO	data quality objective
DTSC	Department of Toxic Substances Control
EDC	Economic Development Conveyance
EM	electromagnetic
EOD	Explosive Ordnance Disposal
EPA	United States Environmental Protection Agency
ERRG	Engineering/Remediation Resources Group, Inc.
ESCA	Environmental Services Cooperative Agreement
ESCA RP	Environmental Services Cooperative Agreement Remediation Program
FGCC	Federal Geodetic Control Committee
FORA	Fort Ord Reuse Authority
FVF	field variance form
GIS	Geographic Information System
GPS	Global Positioning System
GSV	Geophysical System Verification
GTP	geophysical test plot
HMP	Habitat Management Plan
IC	Institutional Control

IDW	investigation-derived waste
ISO	industry standard object
IVS	Instrument Verification Strip
km	kilometers
lbs	pounds
LUC	Land Use Control
m	meter
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MOA	Memorandum of Agreement
MPPEH	material potentially presenting an explosive hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
mV	millivolt
NAD	North American Datum
NCR	Non-Compliance Report
NPL	National Priorities List
OE	Ordnance and Explosives
PBC	Public Benefit Conveyance
Pd	Probability of Detection
PDA	personal digital assistant
QA	quality assurance
QASP	Quality Assurance Surveillance Plan
QB	Qualified Biologist
QC	quality control
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remediation Project Manager
RTK	real-time kinematic
SAA	small arms ammunition
SEDR	Summary of Existing Data Report
SS/GS	SiteStats/GridStats
SUXOS	Senior Unexploded Ordnance Supervisor
TCRA	Time-Critical Removal Action

TIP	Technical Information Paper
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
USACE EM	United States Army Corps of Engineers Engineering Manual
USFWS	United States Fish and Wildlife Service
UXO	unexploded ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist

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GLOSSARY

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

Anomaly Avoidance
Techniques employed on property known or suspected to contain unexploded ordnance (UXO), other munitions that may have experienced abnormal environments (e.g., discarded Military munitions [DMM]), munitions constituents in high enough concentrations to pose an explosive hazard, or chemical agent (CA), regardless of configuration, to avoid contact with potential surface or subsurface explosive or CA hazards, to allow entry to the area for the performance of required operations.

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

Construction Support
Assistance provided by the United States (US) Department of Defense (DOD), explosive ordnance disposal (EOD) or Unexploded Ordnance (UXO) qualified personnel, and/or by personnel trained and qualified for operations involving CA, regardless of configuration, during intrusive construction activities on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g., Discarded Military Munitions [DMM]), munitions constituents (MC) 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 CA hazards.

Covenant Deferral Request (CDR)
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. United States Environmental Protection Agency (EPA) requires that the information is: 1) of sufficient quality and quantity to support the request for deferral of the CERCLA Covenant; and 2) that it provides a basis for EPA to make its determination. This information is submitted to EPA in the form of a CDR.

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

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

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

Environmental Services Cooperative Agreement Remediation Program (ESCA RP) Team
ARCADIS U.S., Inc., Weston Solutions, Inc., and Westcliffe Engineers, Inc.

Exclusion Zone
A safety zone established around a munitions and explosives of concern (MEC) work area. Only essential project personnel and authorized, escorted visitors are allowed within the exclusion zone. Examples of exclusion zones are safety zones around MEC intrusive activities and safety zones where MEC are intentionally detonated.

Expended
The state of munitions debris (MD) in which the main charge has been expended leaving the inert carrier.

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

Explosive Hazard
A condition where danger exists because explosives are present that may react (e.g., detonate, deflagrate) in a mishap with potential unacceptable effects (e.g., death, injury, damage) to people, property, operational capacity, or the environment.

Explosive Ordnance Disposal (EOD)
The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded ordnance and of other munitions that have become an imposing danger, for example, by damage or deterioration.

Feasibility Study (FS)
A study conducted where the primary objective of the FS is "to ensure appropriate remedial alternatives are being developed and evaluated and an appropriate remedy selected" [NCP 40 CFR 300.430(e)].

Historical Impact Area
The historical impact area consists of approximately 8,000 acres in the southwestern portion of the former Fort Ord, bordered by Eucalyptus Road to the north, Barloy Canyon Road to the east, South Boundary Road to the south, and North-South Road General Jim Moore Blvd to the west.

Institutional Control (IC)
A legal or institutional mechanism that limits access to or use of property, or warns of a hazard. An IC can be imposed by the property owner, such as use restrictions contained in a deed, or by a government, such as a zoning restriction.

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

Land Use Controls (LUCs)
LUCs are physical, legal, or administrative mechanisms that restrict the use of, or limit access to, real property, to manage risks to human health and the environment. Physical mechanisms encompass a variety of engineering remedies to contain or reduce contamination and/or physical barriers to limit access to real property, such as fences or signs.

Magnetometer
An instrument that detects ferromagnetic objects by measuring the distortion the object imposes on the ambient field. This distortion is known as an anomaly.

Material Potentially Presenting an Explosive Hazard (MPPEH)
Material that, prior to determination of its explosives safety status, potentially contains explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or 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 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.

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

Military Munitions
All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DOD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, other than non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 U.S.C. 2011 et seq.) have been completed. (10 U.S.C. 101(e)(4)(A through C)).

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

Mortar
Mortars typically range from approximately 1 inch to 11 inches in diameter or larger, and can be filled with explosives, toxic chemicals, white phosphorus, or illumination flares. Mortars generally have thinner metal casing than projectiles but use the same types of fuzing and stabilization.

Munitions and Explosives of Concern (MEC)
A term distinguishing 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) DMM, as defined in 10 U.S.C. 2710(e)(2); or (C) Munitions constituents [e.g., TNT cyclotrimethylenetrinitramine)(RDX)], as defined in 10 U.S.C. 2710(e)(3), present in high enough concentrations to pose an explosive hazard.

Munitions and Explosives of Concern (MEC) Sampling
Performing MEC searches within a site to determine the presence of MEC.

Munitions Constituents (MC)
Any materials originating from UXO, discarded military munitions (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)

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)
OE is an obsolete term replaced by MEC. See MEC in the glossary for further definition.

Projectile
An object projected by an applied force and continuing in motion by its own inertia, as a bullet, bomb, shell, or rifle grenade. Also applied to rockets and guided missiles.

Qualified Biologist
Personnel who are qualified by the U.S. Fish and Wildlife Service to handle California Tiger Salamander and to perform other protection measures as per the Biological Opinions and the Habitat Management Plan.

Quality Assurance (QA)
The management system implemented by a United States Army Corps of Engineers (USACE) Safety Specialist or a Third Party Safety Specialist to ensure Quality Control (QC) is functioning and that project quality objectives are being met. QC components include planning, implementation, assessment, reporting, and quality improvement.

Quality Control (QC)
The system of inspections, typically performed by the munitions contractor performing the work, of operational activities, work in progress, and work completed to assess the attributes and performance of a process against defined standards that are used to fulfill requirements for quality.

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

Remedial Actions
Those actions consistent with a permanent remedy taken instead of or in addition to remedial actions in the event of a release or threatened release of a hazardous substance into the environment, to prevent or minimize the release of hazardous substances so that they do not migrate to cause substantial danger to present or future public health, welfare, or the environment. The term includes but is not limited to such actions at the location of the release as storage; confinement; perimeter protection using dikes, trenches, or ditches; clay cover; neutralization; cleanup of released hazardous substances and associated contaminated materials; recycling or reuse; diversion; destruction; segregation of reactive wastes; dredging

or excavations; repair or replacement of leaking containers; collection of leachate and runoff; on-site treatment or incineration; provision of alternative water supplies; and any monitoring reasonably required to assure that such actions protect the public health, welfare, and the environment. The term includes the costs of permanent relocation of residents and businesses and community facilities where the President of the United States determines that, alone or in combination with other measures, such relocation is more cost-effective and environmentally preferable to the transportation, storage, treatment, destruction, or secure disposition off site of hazardous substances, or may otherwise be necessary to protect the public health or welfare. The term includes off-site transport and off-site storage, treatment, destruction, or secure disposition of hazardous substances and associated contaminated materials.

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

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

SiteStats/GridStats (SS/GS)
Programs developed by QuantiTech for the Huntsville Corps of Engineers to predict the density of ordnance on sites with spatially random dispersal of ordnance.

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

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).

Surface Removal
Removal of MEC from the ground surface by UXO teams using visual identification sometimes aided by magnetometers.

Time-Critical Removal Action (TCRA)
Removal actions where, based on the site evaluation, a determination is made that a removal is appropriate, and that less than six months exists before on-site removal activity must begin [40 CFR 300.5].

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, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause [10 U.S.C. 101(e)(5)(A) through (C)].

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

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

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EXECUTIVE SUMMARY

This Technical Information Paper (TIP) describes the operations and results of field activities conducted by the Fort Ord Reuse Authority (FORA) to complete a munitions and explosives of concern (MEC) remedial investigation within the Parker Flats Munitions Response Area (MRA) at the former Fort Ord in Monterey County, California. For the purpose of completing the MEC remedial investigation, the Parker Flats MRA was divided into two phases identified in the Summary of Existing Data Report (SEDR) as Parker Flats MRA Phase I and Parker Flats MRA Phase II (ESCA RP Team 2008b). MEC removal actions in the Phase I portion of the Parker Flats MRA ("the Parker Flats MRA Phase I") were completed by the United States Department of the Army (Army) and documented in the Final Track 2 Munitions Response Remedial Investigation / Feasibility Study (RI/FS) and the signed Track 2 Munitions Response Site Record of Decision (ROD; MACTEC 2006 and Army 2008, respectively). The MEC remedial investigation in the Phase II portion of the Parker Flats MRA ("the Parker Flats MRA Phase II") conducted by FORA and documented in this TIP were completed in accordance with the Final Group 1 RI/FS Work Plan (ESCA RP Team 2008c) and the Administrative Order on Consent (AOC) Task 4.

The scope of work discussed in this TIP includes:

- Proposed future residential and non-residential development areas
  - Conducting digital geophysical surveys and investigation and removal of target anomalies that potentially represent MEC
  - Conducting analog geophysical surveys in areas that were not suitable for digital geophysical surveys and investigation and removal of anomalies that potentially represent MEC
- Habitat reserve area
  - Conducting digital geophysical surveys of trails and open areas adjacent to trails and investigation and removal of target anomalies that potentially represent MEC
  - Conducting instrument-aided surface and near-surface (within 3 inches below ground surface) analog geophysical surveys and investigation and removal of anomalies that potentially represent MEC

Approximately 426 acres of the Parker Flats MRA Phase II were investigated by FORA and associated anomalies that potentially represented MEC and munitions debris (MD) were removed. In total, the Phase II MEC remedial investigation conducted by FORA resulted in the recovery of the following:

- 1,042 MEC items
- 4,093 lbs of MD
- 38,086 SAA items
- 173,096 lbs of other debris

The results of the Phase II MEC remedial investigation conducted by FORA as well as results from historical actions conducted by the Army in the Parker Flats MRA Phase II will be incorporated into an RI/FS report for Group 1, which consists of the Seaside MRA and Parker Flats MRA Phase II, to support a final remedial decision for the Group 1 MRAs.

1.0 INTRODUCTION

This Technical Information Paper (TIP) describes the operations and results of field activities conducted by the Fort Ord Reuse Authority (FORA) to complete a munitions and explosives of concern (MEC) remedial investigation within the Parker Flats Munitions Response Area (MRA) at the former Fort Ord in Monterey County, California. A Parker Flats MRA location map is provided on Figure 1-1. For the purpose of completing the MEC remedial investigation, the Parker Flats MRA was divided into two phases identified in the Summary of Existing Data Report (SEDR) as Parker Flats MRA Phase I and Parker Flats MRA Phase II (ESCA RP Team 2008b). MEC removal actions in the Phase I portion of the Parker Flats MRA ("the Parker Flats MRA Phase I") were completed by the United States Department of the Army (Army) and documented in the Final Track 2 Munitions Response Remedial Investigation / Feasibility Study (RI/FS) and the signed Track 2 Munitions Response Site Record of Decision (ROD; MACTEC 2006 and Army 2008, respectively). The MEC remedial investigation in the Phase II portion of the Parker Flats MRA ("the Parker Flats MRA Phase II") was completed by FORA and is documented in this TIP. The Parker Flats MRA Phase I and Phase II areas are shown on Figure 1-2. This TIP will be used to support the RI/FS for the Group 1 MRAs (Seaside MRA and Parker Flats MRA Phase II).

On March 31, 2007, the Army and FORA entered into an Environmental Services Cooperative Agreement (ESCA) to provide MEC remediation services, thereby allowing the Army to transfer approximately 3,340 acres of property to FORA as an Economic Development Conveyance. In accordance with the ESCA and an Administrative Order on Consent (AOC), FORA is responsible for completion of the MEC remedial activities on the 3,340 acres. The AOC was entered into voluntarily by FORA, the United States Environmental Protection Agency (EPA) Region 9, the California Department of Toxic Substances Control (DTSC), and the United States Department of Justice Environment and Natural Resources Division on December 20, 2006 (EPA Region 9 Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Docket No. R9-2007-03). The AOC was issued under the authority vested in the President of the United States by Sections 104, 106, and 122 of CERCLA, as amended, 42 United States Code §§ 9604, 9606, and 9622.

This TIP was prepared in accordance with AOC Task 4. ARCADIS U.S., Inc. has prepared this document on behalf of FORA in accordance with industry standards and consistent with the requirements of the Remediation Services Agreement dated March 30, 2007 by and between ARCADIS U.S., Inc. and FORA including any applicable governing documents and applicable laws and regulations. As contractors to FORA under the Environmental Services Cooperative Agreement Remediation Program (ESCA RP), the MEC remedial investigation activities described in this TIP were conducted by ARCADIS U.S., Inc. , Weston Solutions, Inc., and Westcliffe Engineers, Inc. (collectively "the ESCA RP Team"), and their subcontractors. This effort was sponsored by the Army, Assistant Chief of Staff Installation Management. The content of the information does not necessarily reflect the position or policy of the Government and no official endorsement should be inferred.

The activities discussed in this TIP were conducted from October 2008 to November 2010 and in August 2012. Activities described in this TIP were conducted in accordance with the following project documents:

- Final Group 1 RI/FS Work Plan (ESCA RP Team 2008c)
- Approved field variance forms (FVFs) associated with the Final Group 1 RI/FS Work Plan, as presented in Section 3.9 of this report

1.1 Purpose and Scope

The purpose of this TIP is to document the MEC remedial investigation activities conducted to complete the evaluation of the nature and extent of potential MEC in the Parker Flats MRA Phase II prior to conducting a risk assessment as part of the Group 1 RI/FS.

The scope of the fieldwork covered under this TIP included:

- Proposed future residential and non-residential development areas
  - Conducting digital geophysical surveys and investigation and removal of target anomalies that potentially represent MEC
  - Conducting analog geophysical surveys in areas that were not suitable for digital geophysical surveys and investigation and removal of anomalies that potentially represent MEC
- Habitat reserve area
  - Conducting digital geophysical surveys of trails and open areas adjacent to trails and investigation and removal of target anomalies that potentially represent MEC
  - Conducting instrument-aided surface and near-surface (within 3 inches below ground surface [bgs]) analog geophysical surveys and investigation and removal of anomalies that potentially represent MEC

Improved roads (i.e., consisting of asphalt pavement) within the Parker Flats MRA Phase II were not intrusively investigated.

The results of the MEC remedial investigation activities as well as results from historical response actions conducted by the Army will be incorporated into the Group 1 RI/FS. A final remedy for Parker Flats Phase II will be selected based on the RI/FS and will be documented in a ROD prepared by the Army.

1.2 Report Organization

This TIP is presented in numbered sections, tables, and figures and lettered appendices. Tables and figures are numbered to correspond with the section in which they are first referenced. Introductory information for the MEC remedial investigation is presented in Section 1.0. Background information and a site description for the Parker Flats MRA Phase II are presented in Section 2.0. Section 3.0 presents the technical approach employed to

complete activities associated with the MEC remedial investigation. Quality control (QC) and quality assurance (QA) activities conducted throughout the course of the MEC remedial investigation are described in Section 4.0. The results of the MEC remedial investigation are discussed in Section 5.0. The conclusions and recommendations are presented in Section 6.0. References are provided in Section 7.0.

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2.0 SITE DESCRIPTION AND BACKGROUND

The following sections discuss the background, history, and previous response actions for the Parker Flats MRA Phase II.

2.1 Parker Flats MRA Phase II Location

The Parker Flats MRA Phase II is located in the central portion of the former Fort Ord, bordered by the California State University Monterey Bay (CSUMB) Off-Campus MRA (formerly referred to as the CSUMB MRA) and the County North MRA (formerly referred to as the Development North MRA) to the north, the Interim Action Ranges MRA to the south, additional CSUMB campus property to the west, and additional former Fort Ord property to the east and southeast (Figure 1-1). The Parker Flats MRA Phase II is contained within the jurisdictional boundaries of the City of Seaside and the County of Monterey (Figure 2-1).

The Parker Flats MRA (Phase I and Phase II areas) encompasses approximately 1,180 acres and fully contains United States Army Corps of Engineers (USACE) property transfer parcels E18.1.1, E18.1.2, E18.1.3, E18.4, E19a.1, E19a.2, E19a.5, E20c.2, E21b.3, L20.18, L23.2, and L32.1, and portions of USACE property transfer parcels E19a.3 and E19a.4 (Figure 2-1).

The Parker Flats MRA Phase II consists of approximately 482 acres, of which approximately 426 acres were investigated by FORA for the presence of MEC under the Final Group 1 RI/FS Work Plan and approximately 56 acres were previously the subject of MEC removal actions completed by the Army (Section 2.4). Therefore, Parcels E21b.3, L23.2, and L32.1 and portions of Parcels E18.1.3, E18.4, E19a.1, and L20.18, totaling approximately 56 acres, were not investigated as part of the Final Group 1 RI/FS Work Plan fieldwork conducted by FORA because these parcels were previously investigated by the Army and the associated removal actions were considered to be adequately completed, as identified in the SEDR (ESCA RP Team 2008b).

The Parker Flats MRA Phase II includes three different categories of proposed future land use: habitat reserve, non-residential development, and residential (Figure 2-1). The future land uses presented in this report are primarily based upon the 1997 Fort Ord Base Reuse Plan (FORA 1997) and the USACE and Bureau of Land Management Site Use Management Plan (USACE 1995). Other sources of future land use information include public benefit conveyance, negotiated sale requests, transfer documents, and the Installation-Wide Multispecies Habitat Management Plan (HMP; USACE, 1997a), and the Assessment East Garrison – Parker Flats Land Use Modifications (Zander 2002). The Fort Ord Base Reuse Plan identified approximately 20 land-use categories at the former Fort Ord (FORA 1997) including habitat management, open space/recreation, institutional/public facilities, commercial, industrial/business park, residential, tourism, mixed use, and others.

2.2 Parker Flats MRA Phase II Physical Description

2.2.1 Topography

The terrain of the Parker Flats MRA Phase II is primarily rolling hills with moderate to steep slopes. The elevation ranges from approximately 280 to approximately 490 feet above mean sea level with 2 to 15% slopes. The surface soils are characterized as eolian (sand dune) and terrace (river deposits), which consist of unconsolidated materials of the Aromas and Old Dune Sand formations. The primary soil type present in the Parker Flats MRA Phase II is Oceano Loamy Sand with smaller areas of Arnold-Santa Ynez complex and Baywood Sand. Soil conditions at the MRA consist predominantly of weathered dune sand.

2.2.2 Vegetation

Vegetation in the Parker Flats MRA Phase II consists primarily of coastal coast live oak woodlands with similar areas of maritime chaparral, grassland, and coastal scrub (USACE/Jones & Stokes 1992). Vegetation varies from sparsely vegetated areas to dense brush and woodlands. Past field activities have noted the presence of poison oak in the area.

2.2.3 Surface Water and Groundwater

Groundwater investigations associated with the Basewide RI/FS have resulted in the installation of a number of groundwater monitoring wells on former Fort Ord property near the Parker Flats MRA Phase II (HLA 1995). The Seaside and Salinas Groundwater Basins are the main hydrogeologic units that underlie the MRA. The depth to groundwater is estimated to be greater than 100 feet bgs. One groundwater monitoring well is located in the northwestern portion of the Parker Flats MRA Phase I, and two groundwater monitoring wells are located northwest of the Parker Flats MRA. The occurrence of groundwater beneath the MRA was not expected to influence geophysical surveys conducted for the MEC remedial investigation activities.

There are no aquatic features (i.e., vernal pools, ponds) or delineated wetlands reported to be present on the Parker Flats MRA Phase II. Several aquatic features are present to the east and southeast of the MRA.

2.2.4 Ecological Profile

In 2004, the California tiger salamander (CTS) was identified as a threatened species. CTS may be found as far as 2 kilometers (km) from aquatic breeding habitats. There was a possibility that CTS may be found in the Parker Flats MRA Phase II as the majority of the work area was within 2 km of aquatic features that may provide breeding habitat for the CTS.

As identified in the HMP, a number of sensitive species could be found on the Parker Flats MRA Phase II (USACE 1997a). The following sensitive species were identified in the HMP as having possible occurrence in the Parker Flats MRA Phase II: toro manzanita, sandmat manzanita, Hooker's manzanita, seaside bird's beak, Monterey ceanothus, Eastwood's

ericameria, California black legless lizard, and Monterey ornate shrew. Threatened or endangered plant species identified as having possible occurrence in the Parker Flats MRA Phase II included Monterey gilia (endangered; formerly referred to as sand gilia) and Monterey spineflower (threatened).

2.3 Site History

The former Fort Ord was used to train Army infantry, cavalry, and field artillery units until official closure in 1994. In support of the training of soldiers, military munitions were used at the ranges throughout the former Fort Ord. As a result of the training activities, a wide variety of conventional MEC have been encountered in areas throughout the former Fort Ord. The MEC encountered at the former Fort Ord have been either unexploded ordnance (UXO) or discarded military munitions (DMM).

The historical use of the Parker Flats MRA Phase II was for troop training and maneuvers. Prior to 1940, the northern portion of Parker Flats MRA was privately owned agricultural land and it is unlikely that this area was used for military until after this time. To facilitate previous MEC investigations and removal actions, the historical use areas were designated as Munitions Response Sites (MRSs). The Parker Flats MRA Phase II consists of all or portions of the following MRSs: MRS-04A, MRS-04A EXP, MRS-27A (portion), MRS-27B (portion), MRS-27C, MRS-44 EDC, MRS-44 PBC, and MRS-15 MOCO.02 (Figure 2-2). The remaining areas of the Parker Flats MRA Phase II were not within designated MRSs.

2.4 Previous MEC Investigations and Removal Actions

The Army performed MEC investigations and removal actions at MRS-04A, MRS-04A EXP, MRS-44 PBC, and MRS-15 MOCO.02 of the Parker Flats MRA Phase II and in the portions of MRS-27A and MRS-27B that extend into the Parker Flats MRA Phase I as part of the MEC removal actions for MRS-53 and MRS-55. The previous MEC investigations and removal actions conducted by the Army in the Parker Flats Phase II included the following:

- Preliminary Assessment/Site Inspection of MRS-27A, MRS-27B, and MRS-27C in 1996 (USACE 1997b)
- Investigation and removal action for field latrines in 1997 (USA 2001a)
- SiteStats/GridStats (SS/GS) investigation at MRS-04A in 1997 (USA 2000)
- SS/GS investigation at MRS-44 EDC in 1998 (USA 2001e)
- Grid sampling investigation at MRS-44 EDC in 1998 (USA 2001e)
- Grid sampling investigation at MRS-44 PBC in 1998 (USA 2001e)
- Grid sampling investigation at MRS-15 MOCO.02 in 1999 (USA 2001c)
- 4-foot removal action at MRS-04A in 1998 (USA 2000)
- 4-foot removal action at a fuel break in MRS-44 EDC in 1998 (USA 2001f)
- 4-foot removal action at MRS-44 PBC from 1998 to 2000 (USA 2001e)

- 4-foot removal action in a portion of MRS-27A overlapping with MRS-53 EXP from 1998 to 2000 (USA 2001b)
- 4-foot removal action in MRS-27A and MRS-27B overlapping with MRS-55 in 1999 (USA 2001d)
- 4-foot removal action in MRS-04A EXP in 2000 (USA 2001g)
- Visual surface removal action in accessible portions of the Parker Flats MRA in 2001 (Parsons 2002a)
- Non-time critical removal action to depth of detection (Phase 1) at MRS-15 MOCO.02 in 2003 (Parsons 2004)
- Non-time critical removal action to depth of detection (Phase 2) at MRS-15 MOCO.02 in 2005 (Parsons 2006)

Information summarized in this TIP was based on historical documents and previous MEC investigations and removal actions in the Parker Flats MRA. Table 2-1 lists the MEC that were encountered during the previous MEC investigations and removal actions within the Parker Flats MRA. Figure 2-3 shows the locations where MEC were encountered and removed during the previous MEC investigations and removal actions in the Parker Flats MRA.

Within the Parker Flats Phase II remedial investigation area, MEC removal actions were completed by the Army in four MRSs: MRS-04A, MRS-04A EXP, MRS-15 MOCO.02, and MRS-44 PBC. The MEC removal actions in these four MRSs were evaluated in the SEDR and determined to have been adequately completed (ESCA RP Team 2008b). The four MRSs will be included in the Group 1 RI/FS.

3.0 TECHNICAL OPERATIONS

This section describes the technical approach employed to complete activities associated with the MEC remedial investigation activities in the Parker Flats MRA Phase II, which were conducted from October 2008 to November 2010 and in August 2012.

3.1 Extent of MEC Remedial Investigation Activities

As described in the Final Group 1 RI/FS Work Plan, MEC remedial investigation activities were planned for the Parker Flats MRA Phase II work areas identified in Figure 3-1. The MEC remedial investigation areas included ESCA property proposed for future residential, non-residential development, and habitat reserve. Improved roads (i.e., consisting of asphalt pavement) were not intrusively investigated. Digital geophysical mapping (DGM) investigations, using the Best Available (and Appropriate) Detection Technology (BADT), were performed in proposed future residential and non-residential development areas. The investigation of proposed future residential and non-residential development areas consisted of DGM investigation to the depth of detection. Areas that were not suitable for DGM investigation (e.g., dense oak woodlands where data collection was not possible) were investigated using hand-held analog detection methods (Figures 3-2, 3-3, and 3-4).

Investigation of the habitat reserve area was conducted using two investigation methods. The trails and open areas adjacent to the trails (including a buffer extending a maximum of 5 feet off the trail), were investigated by performing DGM using the BADT similar to the proposed future residential and non-residential development areas. The investigation of trails consisted of DGM investigation to the depth of detection. The remaining habitat reserve area were investigated using analog instrument-aided surface and near-surface (within 3 inches bgs) methods (Figure 3-2).

3.2 General Approach

This section describes the general approach that was implemented to complete the activities associated with the Parker Flats MRA Phase II MEC remedial investigation. Contractor and subcontractor daily field reports are provided in Appendix A. The general approach is described below.

- Site preparatory activities – the following activities were conducted in preparation of MEC remedial investigation activities:
  - Preparatory inspection – this task included a site walk to determine the appropriate measures needed to complete the MEC remedial investigation
  - Boundary surveying – this task included marking the MRA and parcel boundaries in the Phase II work areas based on the coordinates as reported in the Army Geographic Information System (GIS) database
  - Vegetation cutting and removal – this task consisted of cutting of vegetation to ground surface, limbing up of tree branches, and removal of selected trees, when necessary, to facilitate the MEC remedial investigation activities

  - Structure demolition and related debris removal – this task consisted of demolishing designated existing structures and removal of the related debris from proposed future residential areas
  - Surface debris removal – this task consisted of removal of surface debris piles that would interfere in the MEC remedial investigation activities and ground surface inspection to remove metallic surface debris that may interfere with DGM surveys
  - Geophysical Test Plot – the geophysical test plot previously established in the Seaside MRA was used to demonstrate proper function of the digital geophysical instrumentation and data collection processes
- DGM survey and target investigation – this task consisted of DGM investigation to the depth of detection using BADT within areas that are proposed for future residential and non-residential development. Areas that were not accessible to DGM (e.g., dense oak woodlands and/or steep terrain) were investigated using analog geophysical methods. In addition, the unpaved roads and trails, including 5-foot buffer areas, within the habitat reserve area were investigated using DGM. The following activities were conducted using digital geophysical instruments during the MEC remedial investigation:
  - Collecting and processing digital geophysical data and selecting targets that potentially represent MEC items
  - Investigating the selected targets for potential MEC and recording the findings
  - Removing and disposing of MEC, munitions debris (MD), and other debris items encountered during target investigation and recording the findings
- Analog survey and anomaly investigation – the following activities were conducted using analog instruments to investigate areas in proposed future residential and non-residential development areas where DGM surveys could not be completed (e.g., dense vegetation, oak woodlands, and/or steep terrain) during the MEC remedial investigation:
  - Establishing 3-foot search lanes and searching each lane using a magnetometer to detect surface and subsurface anomalies
  - Investigating analog anomalies for potential MEC and recording the findings
  - Removing and disposing of MEC, MD, and other items encountered during analog anomaly investigation and recording the findings
- Analog instrument-aided surface and near-surface investigation of the habitat reserve area
- Soil screening operations in isolated areas to remove small metallic debris from soil that interfered with the DGM investigation
- MEC demolition operations to include blow in place detonations, munitions storage, and consolidated detonations
- Other related activities, such as environmental protection, erosion control, weed abatement, site restoration, and CTS protection

- QA/QC activities including:
  - QC of DGM surveys
  - QC surveys in DGM investigation areas
  - QC of analog survey investigation areas
  - Third Party QA reporting conducted by the FORA independent contractor

3.3 Site Preparation Operations

Preparatory inspections of the Parker Flats MRA Phase II investigation areas were conducted prior to MEC remedial investigation operations. The purpose of the inspections was to determine the site preparatory measures and to identify environmentally sensitive areas, degree of vegetation present, and areas containing metallic debris, scrap metal, or other material that would interfere with geophysical survey operations.

Site preparation activities, were conducted from October 2008 to September 2010 and in August 2012, were concurrent with the DGM and analog MEC remedial investigation activities in the Parker Flats MRA Phase II work areas. The site preparation activities were conducted with the escort of a qualified UXO Technician II.

3.3.1 Boundary Surveying

In October 2008, Whitson Engineering of Monterey, California, a licensed land surveyor in the state of California, began surveying the Parker Flats MRA Phase II work area boundaries. The survey work for Parker Flats MRA Phase II work areas was based on established monuments and used the North American Datum (NAD) 83 California State Plane Zone IV coordinate system for control points and other survey activities. The control points used for base lines met the standards established by the Federal Geodetic Control Committee (FGCC) for Third Order, Class 1 Surveys as published in the "Classification, Standards of Accuracy and General Specifications of Geodetic Control Surveys" (FGCC 1984) and "Specifications to Support Classification, Standards of Accuracy, and General Specifications of Geodetic Control Surveys" (FGCC 1980).

3.3.2 Vegetation Cutting and Removal

An ESCA RP Biologist oversaw the vegetation cutting and removal activities in support of DGM and analog surveys within the Parker Flats MRA Phase II work areas, which were conducted from October 2008 to September 2010 and in August 2012. These activities were performed by Ahtna Government Services Corporation, Soil Enterprises Inc., and Central Coast Clearing (Appendix A).

Once cut, the vegetation piles were removed from the work area to avoid interference with MEC remedial investigation activities. The vegetation cutting and removal activities varied depending on the following proposed future land uses:

- Habitat reserve – along unpaved roads and trails, which included a 5-foot wide buffers on both sides, vegetation consisting of shrubs, grass, and small trees (less than five inches in diameter) were cut to ground surface and low hanging branches on larger trees (five inches in diameter or greater) were removed to facilitate the DGM investigation. In the remainder of the habitat reserve area, vegetation consisting of shrubs and grass were cut to ground surface, while preserving Manzanita burls to the extent practicable, and low hanging branches on trees were removed to facilitate the analog survey.
- Non-residential development – vegetation consisting of shrubs, grass, and small trees (less than five inches in diameter) were cut to ground surface and low hanging branches on larger trees (five inches in diameter or greater) were removed to facilitate the DGM and analog investigations. In one area of Parcel E19a.3, a 6-inch diameter underground steel pipe and a considerable amount of metallic debris and MD beneath a former sidewalk were discovered in an area with larger trees. In this one area, larger trees, including portions of the root mass, were removed to complete the MEC remedial investigation and verify that MEC were not present in the area.
- Residential – vegetation consisting of shrubs, grass, and small trees (less than five inches in diameter) were cut to ground surface and low hanging branches on larger trees (five inches in diameter or greater) were removed to facilitate the DGM and analog investigations.

3.3.3 Structure Demolition and Related Debris Removal

Structure demolition and related debris removal within the Parker Flats MRA Phase II began in December 2008 and concluded in March 2010. As identified in the Final Group 1 RI/FS Work Plan, six aboveground structures were identified for possible removal to facilitate MEC remedial investigation within the proposed future residential area in the northern portion of the Parker Flats MRA Phase II. These structures were identified as buildings 4386 and 4387 (i.e., enlisted barracks/nurse's quarters) and concrete pads/foundations B-1, B-2A, B-2B, and B-3 in the Final Group 1 RI/FS Work Plan (Figure 3-4). To accommodate MEC remedial investigations activities in the proposed future residential area, the concrete pads/foundations B-1 and B-3 were demolished and the demolition related debris was removed and disposed. In addition, structure 4476 (i.e., softball field) was demolished and the demolition related debris was removed and disposed to facilitate DGM investigation in the area. Buildings 4386 and 4387 (i.e., enlisted barracks/nurse's quarters) were not removed as DGM investigation surrounding the buildings did not result in the discovery of munitions warranting further evaluation beneath the structures. Concrete pads/foundations B-2A and B-2B were not removed as analog investigation surrounding the structures did not result in the discovery of munitions warranting further evaluation beneath the structures.

In addition, structures 3950 (i.e., rappelling tower) and 2028A (i.e., field latrine) were removed from the proposed future non-residential development area in the northern portion of the Parker Flats MRA Phase II to facilitate MEC remedial investigation in the area (Figure 3-2).

3.3.4 Surface Debris Pile Removal

Numerous debris piles, primarily related to illegal dumping activities, located throughout the Parker Flats MRA Phase II were removed to facilitate DGM and analog surveys. The debris piles were inspected by UXO Technicians to ensure that no MEC hazards were present. The debris piles were separated according to waste stream and transported off site to appropriate receiving facilities.

3.4 MEC Investigation with Geophysical Detection Equipment

The following subsections discuss the digital and analog geophysical detection equipment and procedures used to perform the MEC remedial investigation in the Parker Flats MRA Phase II work areas.

3.4.1 Digital Geophysical Equipment

The MEC remedial investigation activities were conducted using the Geonics EM61-MK2 time domain metal detector. Two digital geophysical configurations were used; a three coil EM61-MK2 towed array platform ("the FORA ESCA Sled") and a manually towed single-array EM61-MK2 cart system. The EM61-MK2 is battery-powered and operates at a maximum output of 10,000 millivolts (mV). 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 conductive objects.

3.4.1.1 Three Coil EM61-MK2 Towed Array Platform

A specially configured three coil EM61-MK2 towed array platform, the FORA ESCA Sled, was designed, tested, and used during MEC remedial investigations and removal actions on ESCA property. The FORA ESCA Sled improves the capability for meeting the project scope and data quality objectives (DQOs) as discussed in the Final Group 1 RI/FS Work Plan (ESCA RP Team 2008c). A photograph of the FORA ESCA Sled is shown in Photo 3-1.

Photo 3-1 – The FORA ESCA Sled

Features of the FORA ESCA Sled include the following:

- Coils mounted with the long axis along the direction of travel, thereby increasing the power density introduced to the ground for the same area of coverage (i.e., three coils for an area 1.5 meters wide versus three coils for an area over 3 meters wide)
- Coils were configured to a (lower) height of approximately 7.9 inches (20 centimeters [cm]) above ground surface
- The platform was a heavy plastic sled made of high density polyethylene to minimize coil rocking due to surface irregularity (rough terrain)
- Sled had a hinge on the tow bar to reduce lifting of the EM61-MK2 sensors due to terrain differences between the sled and tow vehicle
- Coils were carried in a reconfigurable tray so total sensor width and height could be adjusted for terrain and the number of coils available; however, height remained consistent for the Parker Flats MRA Phase II MEC remedial investigation

QC function checks were performed following the instrument operating manuals and standard industry practices. The EM61-MK2 sensors on the FORA ESCA Sled were set to record and store data in a field laptop computer at 10 readings per second (10 Hertz). The system logging software cannot null the EM61-MK2 sensors; therefore, the values provided for the QC function checks are presented as raw data for the FORA ESCA Sled.

A Trimble Real-Time Kinematic (RTK) global positioning system (GPS) was utilized to position the data collected during the EM61-MK2 surveys to cm accuracy. The GPS antenna was mounted over the center of the FORA ESCA Sled sensors and connected to the logging device. This receiver captured 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.

3.4.1.2 EM61-MK2 Cart

The cart was operated exclusively with only 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 intervals (time gates) during the decay period. Data were collected from the bottom coil in the standard four-time-gate mode.

The cart was operated using two different positioning systems: line and fiducial and RTK, as discussed in Sections 3.4.2 and 3.4.4.2 respectively. The operating height of the manually towed single-array EM61-MK2 cart was either 16 inches or 7.9 inches above ground surface depending on site conditions such as terrain or vegetation. Information on the DGM survey procedures with the EM61-MK2 cart is provided in Section 3.4.5. Photo 3-2 shows the cart at 7.9 inch coil height.

Photo 3-2 – EM61-MK2 Wheeled Cart at 8-Inch Coil Height

3.4.2 Line and Fiducial Equipment

Surveyor's tapes (or graduated static ropes) were laid out in east-west or north-south directions as the terrain allowed. Range markers were then placed along the line to be surveyed and provided the geophysical operator with a navigation aid to traverse the line with the EM61-MK2 cart. Fiducial data markers were inserted manually into the ground by the operator at 10 foot intervals. These markers were used to accurately locate each data measurement point during the post-processing stages. The geodetic coordinates of the grid corners were used to geo-reference the geophysical data after data collection.

The field forms' recorded information and fiducial marks were used to correct the geophysical data to either compress or expand the recorded measurement locations for each line so that they covered the actual distance traveled. This operation was required to

compensate for variations in the terrain along the survey line, or to compensate for the walking speed of the operator. The survey data were then rotated and translated from the local coordinate system in which they were collected (where the southwestern corner of the grid surveyed was assigned a coordinate of 0E, 0N) to the NAD 83 California State Plane U.S. survey feet coordinate system.

3.4.3 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, the analog operator conducted and documented the analog checkout procedure. The handheld magnetometers were used to investigate digital geophysical targets and to investigate areas that were not accessible by digital geophysical systems.

3.4.3.1 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 (Parsons 2002b). Schonstedt® magnetometers are typically used to locate ferrous anomalies objects and are used in conjunction with the Whites XLT® E Series all-metals detector to ensure that both ferrous and non-ferrous anomalies objects are capable of being detected.

Ferrous metal (iron) objects cause local variations in the Earth's magnetic field, which can be detected by a magnetometer. The magnetometer is comprised of two fluxgate magnetometer sensors that measure the local magnetic field. The magnetometer sensors are aligned opposing so that the magnetic field measured by one sensor is the negative of the magnetic field measured by the other. The locator then sums the output of the two sensors. By summing the two output signals, the detector cancels the field common to both sensors, such as the Earth's magnetic field, and outputs an audible signal whose intensity is relative to the local variations in the magnetic field caused by a ferrous object.

Schonstedt® magnetometer sweeps (i.e., "mag and dig") are particularly effective in areas where vegetation and terrain limit the use of larger digital geophysical systems.

3.4.3.2 Whites XLT® E Series

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

The Whites XLT® all-metals detector is comprised of transmitting and receiving coils. Current moving through the transmitter coil creates an electromagnetic field that is transmitted into the ground. As the magnetic field pulses back and forth into the ground, it interacts with conductive objects (e.g., metal) it encounters, causing the objects to generate magnetic fields of their own.

The receiver coil is completely shielded from the magnetic field generated by the transmitter coil. However, it is not shielded from magnetic fields coming from objects in the ground. When the receiver coil passes over a conductive object, it detects the magnetic field created by the object as a result of the signal from the transmitter coil. The receiving coil amplifies the field and sends it to sensors in the control box of the metal detector.

3.4.3.3 EM61-MK2 Handheld

The EM61HH-MK2 is a handheld complement to the EM61-MK2 cart, providing greater sensitivity to smaller targets at shallow depths. The EM61HH-MK2 is used in this instance as an analog instrument during QC-1 (Section 4.2.1).

3.4.4 Geophysical Test Plot

Prior to beginning the DGM surveys, the FORA ESCA Sled instrumentation and the data collection processes were demonstrated to the EPA and the DTSC on January 15, 2009. The demonstration was conducted at a pre-established geophysical test plot (GTP) located in the northern portion of MRS-15SEA.2 within the Seaside MRA and was identified as Test Plot 1. The GTP location, Test Plot 1, was originally described in the Final Geophysical Test Plot Report, dated June 5, 2008 (ESCA RP Team 2008a). The Final Geophysical Test Plot Report evaluated the standard wheeled cart at two seeded test areas (Test Plot 1 and Test Plot 2) in March 2008. The FORA ESCA Sled was evaluated at Test Plot 1 to facilitate comparison between the standard wheeled cart configuration and the FORA ESCA Sled prior to initiation of DGM surveys, which is summarized in a program memorandum provided in Appendix B.

In addition to the GTP demonstration at Test Plot 1, a second demonstration of the FORA ESCA Sled was conducted over a test strip containing two inert 37 millimeter (mm) projectiles and three 1- by 4-inch hollow steel pipe nipples designed to represent 37mm projectiles (referred to as proposed industry standard objects [ISOs]), which is also summarized in the program memorandum provided in Appendix B. The five items were buried within the test strip at approximately 18 inches bgs and were oriented in the least favorable orientation for instrument detection, which is horizontal with the long axis perpendicular to the FORA ESCA Sled's direction of travel. The items were buried approximately 20 feet apart in a straight line.

The GTP demonstrations conducted to support DGM surveys are summarized as follows:

- Positioning of the EM61-MK2 coils at approximately 7.9 inches (20 cm) above ground surface on the FORA ESCA Sled is optimal for use during DGM surveys
- The system is validated by successfully achieving the MEC detection metric
- The target selection thresholds meet or exceed the Final Group 1 RI/FS Work Plan objective of detecting a 37mm projectile at 12 inches bgs (ESCA RP Team 2008c)
- Results of surveys at Test Plot 1 and the test strip provided information about the improved performance of the reconfigured array. In addition, QC seeding using proposed ISOs is appropriate for use to check sensor performance during production surveys. The concept of the physics-based approach is to capitalize on the known

performance of geophysical sensors being used under an approved work plan and monitor for the entire mapping effort (the approach of incorporating test strips for daily use into the geophysical survey program is consistent with the Geophysical System Verification [GSV] approach).

3.4.4.1 Geophysical System Verification

A physics-based GSV approach was implemented for DGM surveys of the proposed future residential areas in Parcels E18.1.3, E19a.1, and E20c.2 and the northern portions of Parcel E18.1.1, and portions of the proposed future non-residential development areas in Parcels E18.1.1 and E18.1.2. The GSV approach capitalized on the known performance of geophysical sensors used under the approved Final Group 1 RI/FS Work Plan and established metrics that monitored the entire mapping effort following GSV approach implementation rather than depending only on sensor evaluations made during initial geophysical prove out procedures.

As part of this GSV approach, an Instrument Verification Strip (IVS) was constructed in the northeastern portion of Parcel E20c.2. The IVS was seeded with target MEC-sized items in order to validate that the instrumentation was achieving detection performance metrics as established in the work plan. The IVS data was collected daily during pre- and post-production in conjunction with standard QC tests.

Items in the test strip were seeded linearly over a distance of approximately 60 feet. Three 1-inch-diameter by 4-inch-long small ISOs, as well as one inert 37mm projectile and one inert MKII hand grenade, were emplaced in the test strip. The five items were placed at depths of 12 inches, in a least-favorable horizontal orientation perpendicular to the along-track direction of travel.

The IVS constructed in Parcel E20c.2 was designed to accommodate geophysical sensors in either a three coil towed array configuration or in single coil man-portable mode. The design details of the IVS and approximate placement of each item is provided in the below diagram. The IVS was designed so that the sled runners (three) drop into furrows that run the length of the strip. This design ensured that the passes were consistent from one run to the next in terms of coils passing directly over each item (Illustration 1).

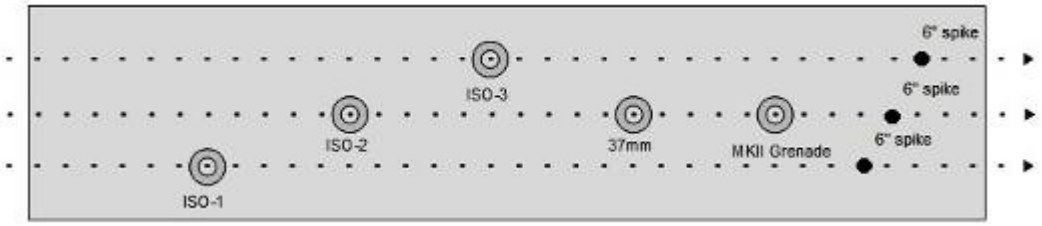

Illustration 1 - Parcel E20c.2 IVS Seed Locations

To accommodate the three coil towed array configuration, one ISO item per coil was placed along track, staggered at a 10-foot interval to eliminate signal overlap between items. The two inert MEC items were placed along the center coil track to increase the sample size of the

three coil towed array dataset, as well as to provide an adequate number of items for single coil use through collection of the IVS down the center track.

The IVS also contained three known seeds (i.e., grid corner spikes) used in the DGM survey areas to facilitate monitoring of the equipment performance (Section 4.1.4.1). The spikes were placed so that each coil passed directly over one of them. Additionally, blind seeds located within the DGM survey area grids were placed at depths consistent with the IVS to assist in validating detection results within the production data (Section 4.1.4.2).

The IVS approach provided an ongoing, quantifiable verification of equipment performance throughout the duration of the production DGM surveys. Results of the IVS and seeding program are located in Appendix B.

3.4.4.2 RTK GPS Operations and the Compass Correction Algorithm

The following section discusses the path correction algorithm that was used for the DGM survey in Parker Flats MRA Phase II habitat reserve area of Parcel E19a.4 where dense tree cover caused intermittent loss of the GPS signal.

The RTK GPS utilizes a base station located over a pre-established control point and broadcasts a correction signal to RTK GPS rovers operating on a similar frequency. These rovers (placed on the sled directly over the DGM equipment) receive GPS information from satellites while simultaneously acquiring a local correctional signal broadcasted by the RTK GPS base station. The RTK GPS is capable of real-time positioning to within cm accuracy when the correctional signal strength is of sufficient quality.

During data collection, the operator maintains an approximate constant speed. An electronic compass is used to record the changes in bearing. When the GPS sends a quality indicator less than 4 (4 indicates RTK Lock), the compass correction algorithm looks back in time several seconds to determine the velocity of the array. Using this start velocity (distance per time) and the time stamped bearing from the electronic compass, a course can be computed for the gap; therefore, it is important that the array velocity be constant throughout the gap, which is why there is a real-time audio warning to the driver that a gap has been detected. The estimated course is then fit into the gap using an error correction algorithm so that the end lines up with the next good GPS reading.

Later, during data pre-processing, the quality index field value was used as a trigger to indicate when the path correction algorithm should be applied. When the index value dropped to below 4 the data was submitted to the algorithm for correction.

The path correction algorithm was developed for use during pre-processing so the corrected data would be usable in areas where there was insufficient RTK correction signal quality. To ensure that there were sufficient data for the path correction algorithm to work, the algorithm was only used when the start and end points of a particular data survey line had a quality index value of 4 or greater. In areas where the starting and ending quality index were less than 4, the area of the survey with insufficient quality index values was considered to be a data gap and was investigated using analog instruments.

The path correction process functioned as follows:

1. A digital compass was fitted on the FORA ESCA Sled to provide heading information to the data logging software.
2. Data was recorded during the survey and, when the quality index value fell below 4, an audible alarm sounded to warn the operator to maintain a constant velocity until the alarm stopped.
3. Data files were exported from the DGM logging software following the standard operating procedure established in the Final Group 1 RI/FS Work Plan.
4. During data pre-processing the following steps were used to correct the positioning data in survey areas where the lack of RTK quality would otherwise have precluded use of the data:
    a. The survey data were scanned in line by line and in places where the quality index value fell below 4 the data were flagged.
    b. For flagged data, the two bracketing good data points (the last known point before the loss of signal quality and the first point after regaining signal quality) were used as reference points for the correction algorithm.
    c. Flagged data positioning coordinates were then mathematically corrected based on the original RTK signal heading, the timestamp on the flagged data point, and the heading logged from the rover mounted electronic compass.
    d. The corrected data were then re-exported as raw data files with the new positioning coordinate data.

A field test was performed to analyze the performance of the path correction algorithm. The test was conducted as follows:

1. A quality control spike was planted at a trail location under the tree canopy where the RTK signal quality index was expected to be below the allowable value of 4.
2. The spike location was then accurately positioned using the RTK GPS and a range extension pole to negate interference from the tree canopy.
3. The spike location was then surveyed with the towed array specifically positioned to ensure that the center coil of the FORA ESCA Sled was directly over the QC spike. During this survey pass the RTK signal was observed to ensure that the signal quality index was below the allowable value of 4.
4. The data collected from the survey pass were then processed through the path correction algorithm to determine if the process worked as anticipated.

The field test described above indicated a 75% improvement in positioning data when using the compass correction algorithm in trail DGM survey areas with a compromised RTK signal due to the presence of a dense tree canopy. However, to ensure that the MEC and MEC-like items were removed in areas with an insufficient RTK signal, the areas of the survey with corrected data from the algorithm were also subjected to an increased search radius of 4 feet

during target investigation (as opposed to the 3-foot radius used in areas with an allowable RTK quality index).

To ensure that the correction algorithm did not adversely affect positioning, a side by side comparison of the corrected and uncorrected data was performed and in the areas where the correction algorithm appeared to make a significant change in anomaly positions, an analog investigation was also performed.

3.4.5 Digital Geophysical Mapping Surveys

DGM investigations were conducted using Geonics EM61-MK2 time domain metal detectors. Two digital geophysical configurations were used: a three coil EM61-MK2 towed array platform ("the FORA ESCA Sled"; Section 3.4.1.1) and a manually towed single-array EM61-MK2 cart system (Section 3.4.1.2). The cart was operated using two different positioning systems: line and fiducial and RTK (Sections 3.4.2 and 3.4.4.2, respectively). RTK and the compass correction algorithm were used where dense tree cover caused intermittent loss of the GPS signal (Section 3.4.4.2).

DGM investigations were performed for unpaved roads, trails and open areas adjacent to the trails in the habitat reserve area using the FORA ESCA Sled (Figure 3-2). Loss or weakening signal from the RTK GPS in isolated areas of the habitat reserve area were resolved with the compass correction algorithm. Areas where the algorithm did not provide ample adjustment were investigated using analog instruments (Section 3.4.7).

DGM investigations were performed with the FORA ESCA Sled in accessible areas of the proposed future non-residential development areas (Figures 3-2 and 3-3). DGM investigations in some tree-covered areas were conducted using the EM61-MK2 cart operated at an 8-inch coil height with the RTK positioning system, or line and fiducial positioning and a 16-inch coil height due to rough terrain. These surveys were conducted as a verification following analog to depth investigations. Analog investigations were conducted in areas that were not accessible by digital geophysical systems (Section 3.4.6).

DGM investigations were performed using the FORA ESCA Sled in accessible areas of the proposed future residential areas and the manually towed EM61-MK2 cart in isolated areas where loss or weakening signal from the RTK GPS occurred (Figures 3-3 and 3-4). Analog investigations were conducted in areas that were not suitable for DGM investigations (e.g., dense oak woodland where data collection was not possible) (Section 3.4.6).

The DGM investigations were also conducted: 1) as a verification process in the tree-covered areas of the southern non-residential development area where analog surveys were initially conducted (Figure 3-3); 2) where a former sidewalk was discovered in the northern non-residential development area (Figure 3-2); 3) along soil berms located in the southern non-residential development area of Parcel E20c.2 (Figure 3-3); 4) along a unpaved road in the southern non-residential development areas of Parcels E18.1.1 and E18.1.2 (Figure 3-3); 5) in a small portion of the proposed future residential area in the southern portion of Parcel E20c.2 where a portion of the soil berms were spread out; and 6) in an area of high density anomalies in Parcel E20c.2. The activities in these areas are described below.

- DGM investigations were conducted in selected tree-covered areas (approximately 1.7 acres) in the southern non-residential development area due to the presence of MEC and MD discovered during analog surveys (Figure 3-3). The DGM investigations were conducted with the man-portable EM61-MK2 cart. The EM61-MK2 cart was operated at an 8-inch coil height with the RTK positioning system for approximately 0.5 acre of DGM survey. The remaining 1.2 acres of the DGM investigations were conducted with the EM61-MK2 cart utilizing line and fiducial positioning and a 16-inch coil height due to rough terrain, which would not allow for an 8-inch coil height. For the 1.2 acres where the 16-inch coil height was used the targets were selected at a 3mV stacked (i.e., summed) channel response. These investigations were conducted as a verification following analog to depth investigations. These surveys were conducted as a verification following analog to depth investigations.
- Analog investigations in the northern non-residential development area revealed the presence of a former sidewalk (Figure 3-2). The concrete from the sidewalk was removed during the investigation and a DGM investigation was performed in the area with the FORA ESCA Sled.
- Earthen berms (approximately 4 acres) were identified in the southern non-residential development area of Parcel E20c.2 (Figure 3-3). The initial DGM investigation of the berm area resulted in partial DGM coverage due to the steepness of side slopes, which prevented safe equipment operations. After completion of the initial DGM investigation, the remaining area of the berms was surveyed using a combination of the EM61-MK2 cart and analog instruments. Upon completion of the initial target investigation, the berm soil was spread out in the non-residential development area, where the MEC remedial investigation had been completed, for an additional DGM investigation using the FORA ESCA Sled. DGM target investigation was conducted over the original berm locations and in the adjacent area where the berm soil was spread out.
- DGM investigation was performed along the unpaved road leading to the water tower located in Parcels E18.1.1 and E18.1.2 using the FORA ESCA Sled (Figure 3-3).
- A small portion of the berm investigation conducted in the southern portion of Parcel E20c.2 extended into the adjacent proposed future residential area of Parcel E20c.2. After the soil from the berms was spread out, a subsequent DGM investigation of the berm soil was conducted with the FORA ESCA Sled.
- During the initial DGM survey data processing in the southern proposed future residential area (Parcel E20c.2), several areas with a high density of anomalies were identified (Section 3.8). These high density areas were determined to contain metallic debris during target investigation activities and were removed during soil scrape operations. To ensure that the targets in these areas had been retrieved, confirmation DGM investigations of these high density areas were performed following the soil scrape.

3.4.5.1 DGM Processing and Dig List Preparation

The data collected from the digital detection instruments were processed using the techniques described below.

The target selection threshold for DGM investigations in the habitat reserve area and proposed future non-residential development areas was 50mV stacked response (summed channels). This threshold was based on the Final Group 1 RI/FS Work Plan objective of detecting a 37mm projectile at 12 inches bgs. The instrument response for a 37mm projectile at 12 inches bgs in least favorable orientation was 120mV. However, to allow for potential influences related to terrain and fluctuations in background interference, which may influence the peak response of buried conductive items, a conservative threshold of 50mV was used.

The target selection threshold for proposed future residential areas was 20mV. This threshold surpasses the Final Group 1 RI/FS Work Plan objective of detecting a 37mm projectile at 12 inches bgs and meets an objective of detecting a 37mm projectile at 18 inches bgs.

The FORA ESCA Sled electromagnetic (EM) data were collected using MagLog software and pre-processed using MagMap 2000 software. MagLog is able to stream the EM signals as well as the GPS signal into one set of files. These files contain a main project file with a GPS file and four EM sensor files, along with ancillary header files. Then using MagMap 2000 software, the MagLog survey project file is opened. Once the project file is open, the ancillary files open for display and verification. At this step the GPS data is converted to Universal Transverse Mercator coordinates in meters. Next the data is examined for completeness and errors in data collection. Once verified the data is then exported into a Geosoft XYZ format which is composed of separate XYZ files one for each EM sensor. Each coil contains accurate position information along with the EM61 signal information. Finally, the XYZ files are imported into Geosoft using a custom script, which loads each file in succession. The data may then be corrected and gridded in Geosoft Oasis Montaj™ for viewing and target selection.

Raw Geosoft XYZ files were imported into Geosoft Oasis Montaj™ processing software and the data were checked for navigational accuracy, line distribution, and coverage. Latency values obtained during the pre- and post-survey QC tests and IVS were applied to the data, correcting for temporal lags 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 nonlinear median drift correction filter, which is a common filtering technique used to remove drift associated with each data channel occurring throughout the survey period. Velocity and sample separation were calculated for each dataset (Appendix B). After each of the four time-gate data channels was processed and evaluated, the channels were summed into a single “stack” channel.

Grid images for the EM61-MK2 data (stacked channels 1 through 4) 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 1.5 feet. EM61-MK2 data color plots were used to identify targets and locate anomalies requiring further investigation. The targets were selected for the gridded

data by running the Blakely Peak algorithm in Geosoft. The target threshold value was determined based upon the proposed future use of the area being surveyed. Target review consisted of manually evaluating selected targets, and merging multiple targets associated with large anomalies. Targets were also adjusted (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 subsequent time-gate channels. Atypical decay represents nonmetallic anomalies generated by ambient forces such as terrain-induced interference, magnetic rocks, and electrical interference. A maximum amplitude was also determined, by searching out from the target a radius of 3 feet for the maximum amplitude, and stored with the target information.

The data processing procedures were used to generate a target anomaly database (Section 5.0). Coordinate positions for each of the targets identified in the DGM were compiled by grid into a dig list, which was then provided to the UXO Dig Teams for reacquisition and excavation. The composite dig list includes the unique identification, position, anomaly characteristics, and dig information for each target selected. Navigation and target picking accuracy were checked by selecting a target over a known survey control (grid corner spike) and by measuring the anomaly target location to the actual geo-referenced location of the grid corner spike recorded during the grid survey. The measured offset was logged for each data set (Section 4.1.4.1).

3.4.5.2 Anomaly Reacquisition Procedures

UXO Dig Teams reacquired the target anomalies based on 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.

3.4.5.3 Excavation of DGM Anomaly Targets

Target intrusive investigations occurred in the Parker Flats MRA Phase II work areas from June 2009 to November 2010, and in August 2012. The flagged target anomaly locations were investigated by UXO Dig Teams using handheld analog instruments (Schonstedt® GA-52/Cx magnetometers and Whites XLT® E Series all-metals detectors) within a 3 to 4-foot radius around the flag. The UXO Dig Teams noted offset from the flag to the excavated anomaly source(s) and logged the information accordingly.

UXO Dig Teams consisting of UXO Technicians and equipment operators performed excavations at the target anomaly locations identified during the DGM survey. The target anomaly excavations were generally performed with hand tools, such as shovels. Photo 3-3 shows the hand excavation of anomalies. Those items considered too large or deep to be excavated by hand tools were investigated using heavy equipment, such as a mini-excavator.

Photo 3-3 – Hand Excavation of Anomalies

The UXO Dig Teams identified the source of the anomaly and utilized the personal digital assistant (PDA)-based RespondFast UXO 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 category (e.g., UXO, DMM, MD, other debris, QC item, no contact); item description (e.g., concrete, practice grenade); estimated weight of item; estimated depth of item; and confirmation of hole cleared. MEC items encountered were photographed for documentation purposes. At the end of each day, the data was uploaded from the PDAs to the RespondFast UXO database.

3.4.6 Analog Magnetometer Investigations

Analog surveys were conducted to investigate the portions of the proposed future residential and non-residential development areas of the Parker Flats MRA Phase II work areas that were not suitable for DGM (e.g., dense oak woodlands where data collection was not possible). Analog surveys were conducted in portions of the proposed future residential and non-residential development areas except for the proposed future residential portion of Parcel E20c.2 where a complete DGM survey to depth of detection was conducted, as described in Section 3.4.5 (Figures 3-2, 3-3, and 3-4).

The handheld Schonstedt magnetometer and the Whites all-metals detectors were used to locate anomaly responses in these areas utilizing 3-foot search lanes. When an anomaly was encountered, the UXO Technician investigated the anomaly to-depth. The to-depth investigation was conducted by excavating the anomaly location using either shovels and/or an excavator depending on the depth of the anomaly. During the to-depth investigation, anomaly responses were investigated until resolved. Once the anomaly source was found and removed, the UXO Technicians rechecked a 3-foot-radius area around the source location to determine if other items remained buried. Items recovered were logged into a PDA. At the end of each day, the data were uploaded to the RespondFast UXO database.

In addition, structures, such as latrines, buildings, and fighting positions (i.e., foxholes), were visually inspected for MEC and MD by UXO Technicians and the analog investigation was conducted to verify that MEC and/or MD were not located within the area surrounding the structures.

3.4.7 Analog Instrument-Aided Surface and Near-Surface Investigation of Habitat Areas

Investigation of the habitat reserve area was conducted using two separate investigation methods. The accessible areas, specifically trails and open areas adjacent to the trails were investigated using DGM survey to depth of detection, as described in Section 3.4.5. The remaining portions of the habitat reserve area were investigated using analog instrument-aided surface and near surface methods, as described below.

Analog instrument-aided surface and near-surface investigation were conducted by UXO Technicians in the habitat reserve area that are not easily accessible, such as areas outside the known trails and unpaved roads and associated 5-foot buffer area (Figure 3-2). This investigation was conducted using methods similar to those described in Section 3.4.6. When an anomaly response was located, the UXO Technician began excavation of the location using hand tools. If the source of the anomaly was not located within the top 3 inches of soil, the soil was replaced and the location was marked on the analog survey sheet. Items recovered were logged into a PDA. At the end of each day, the data was uploaded to the RespondFast UXO database.

In addition, structures, such as latrines, buildings, and fighting positions (i.e., foxholes), were visually inspected for MEC and MD by UXO Technicians and the analog investigation was conducted to verify that MEC and/or MD were not located within the area surrounding the structures.

3.5 Soil Screening Operations

During DGM target investigation, isolated areas contained a high density of small metallic debris and ammunition links within the soil, which were not feasible to manually remove from the soil. The soil from these areas, as shown in Figures 3-5 and 3-6, were scraped and screened to remove the metallic debris and complete the MEC remedial investigation activities. FVF No. G1WP-001 was developed and implemented to incorporate the use of a portable mechanical screen, the EZ Screen™ 500 XL (“the EZ Screen”), and document the process to separate the metallic debris from the soil. The FVF is discussed in Section 3.9. Soil screening operations were performed using the EZ Screen as discussed below.

Prior to soil scraping and screening operations, soil identified as containing a large amount of metallic debris was first investigated to remove peak anomalies, if present. The soil containing the metallic debris was then scraped off in thin lifts using an All-Surface Vehicle (ASV; Photo 3-4) with UXO Technicians present to observe and inspect the process in the event that potential MEC items were uncovered.

Soil scraping depth for an area was based on the response amplitude from handheld magnetometers used during the investigation process. Soil was removed until only minimal

responses were detected by the handheld instruments, indicating that the majority of the metallic debris had been removed. The scraped soil was loaded onto haul trucks and transported to a designated location in a proposed future non-residential development area for screening using the EZ Screen.

The soil containing the metallic debris was loaded into the EZ Screen using an ASV (Photo 3-4). The soil was then screened through a 3/8-inch mesh. A minimum of two UXO Technicians inspected the metallic debris captured by the mesh screen and cataloged and estimated the weight of the metallic debris for reporting purposes. Oversized, non-metallic debris (e.g., wood, rocks, and/or roots) were sorted from the metallic debris and stockpiled in a proposed future non-residential development area. Metallic debris recovered during screening operations will be disposed of appropriately following completion of the Parker Flats MRA Phase II MEC remedial investigation.

Photo 3-4 – EZ Screen™ 500 XL

Soil screened from the proposed future non-residential development areas was returned to the original location after QC procedures (i.e. QC-1) were completed (Figure 3-5). Soil screened from proposed future residential areas was returned to a designated location within the proposed future non-residential development area (Figure 3-7).

Following soil screening operations in the proposed future residential area (Figure 3-6), a confirmation DGM survey of the soil scrape areas was conducted to verify that the metallic debris and remaining target anomalies were removed from the area (Figure 3-8).

3.6 MEC Demolition Operations

Four in-place demolitions for MEC items that were determined to be unsafe for transport or storage were conducted during the MEC remedial investigation activities in the Parker Flats MRA Phase II. MEC items that were safe for transport were temporarily stored in the

Explosives Siting Location until scheduled for demolition. The demolition operations and explosives storage were performed in accordance with the Final Group 1 RI/FS Work Plan (ESCA RP Team 2008c).

3.7 MD Recycling

Following completion of MEC remedial investigation in the Parker Flats MRA Phase II, recovered MD, which has been characterized by the SUXOS and UXOQCS as material documented as safe (MDAS) in accordance with Department of Defense (DOD) standards and free from explosives (FFE) in accordance with the Final Group 1 RI/FS Work Plan, 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. Disposal in a landfill or to a scrap dealer where it may sit in a scrap pile is not approved. Recovered MD, characterized as MDAS and FFE, is secured in clearly marked lockable containers after discovery to prevent misidentification and potential commingling of materials that have been documented as having an explosive hazard (MDEH) or characterized as potentially having and explosive hazard (i.e., MPPEH) prior to demolition. The containers will remain locked until they are delivered to and signed for by a foundry and/or recycler. The lockable containers will also be certified as FFE by a SUXOS and a UXOQCS using Form 1348, which will accompany the locked containers when leaving the site for recycling. MD recycling efforts, to include FFE documentation, will be included in a future report.

3.8 Other Related Operations

Additional activities conducted during the MEC remedial investigation included biological monitoring and implementation of habitat mitigation measures, such as storm water and erosion control, weed monitoring, site restoration monitoring, and CTS monitoring, as described in the following subsections.

3.8.1 Environmental Protection

Within the Parker Flats MRA Phase II, the biological monitoring activities were the responsibility of a Qualified Biologist (QB). Efforts were made to the extent possible to preserve and protect environmental features within the Parker Flats MRA Phase II, including, but not limited to:

- Minimized vegetation removal and cutting where possible while ensuring that the required work could be completed in accordance with the Final Group 1 RI/FS Work Plan
- Awareness training for the CTS and other sensitive animal and plant species was provided for field personnel by the QB
- Avoided vernal pools and ponds whenever possible

The biological monitoring activities, to include Natural Resource Impact Mitigation (NRIM) checklists, were conducted in the Parker Flats MRA Phase II and were documented in annual

natural resources monitoring, mitigation, and management reports (ESCA RP Team 2009, 2010, 2011, and 2012).

3.8.2 Habitat Mitigation Measures

This section discusses the mitigation measures that were implemented in accordance with the United States Fish and Wildlife Service (USFWS) Biological Opinions (USFWS 1999, 2002, and 2005) and the HMP (USACE 1997a).

3.8.2.1 Erosion Control and Inspections

Erosion control measures were installed within the Parker Flats MRA Phase II to reduce erosion. Periodic erosion control inspections were conducted throughout the duration of the Parker Flats MRA Phase II field activities (ESCA RP Team 2010, 2011, and 2012).

3.8.2.2 Weed Inspections and Abatement

Weed monitoring was conducted to document preexisting weed populations and at locations where surface soil was disturbed during the Parker Flats MRA Phase II MEC remedial investigation. No weed infestations were identified in areas that had been disturbed at the Parker Flats MRA Phase II (ESCA RP Team 2009, 2010, 2011, and 2012).

3.8.2.3 Site Restoration

Implementation of site restoration for the Parker Flats MRA Phase II involved interim measures in the areas designated for development. These measures minimized impacts on sensitive species and prevented site degradation and/or impacts on adjacent areas and sensitive habitats.

In the habitat reserve area, restoration monitoring was conducted per the requirements described in the HMP and involved vegetation monitoring efforts for one pre-disturbance baseline and five post-disturbance annual monitoring events, if needed (ESCA RP Team 2009, 2010, 2011, and 2012). Restoration was anticipated to occur naturally (without intervention), but may be augmented by active restoration efforts if deemed necessary for long-term recovery to approximate baseline conditions (ESCA RP Team 2008c). The remaining restoration monitoring efforts will be documented annually in the natural resources monitoring, mitigation, and management reports.

3.8.2.4 California Tiger Salamander

Along with the general impact minimization practices, such as employee training, limiting ingress and egress to a work area to established roads and paths, and limiting soil disturbances to work areas only, further CTS-specific mitigation measures were implemented for the Parker Flats MRA Phase II MEC remedial investigation. In early October 2009 and 2010, at the beginning of the nominal wet season, a QB performed training of field personnel regarding CTS awareness, requirements and mitigation measures. This training was not

required but was performed as an additional protective measure in advance of the period when CTS were most likely to be encountered. Fieldwork supervisors also frequently coordinated with the QBs on the status of field operations so that the QBs were aware of where work was occurring, which enabled the QBs to notify the supervisors of additional mitigation measures, if needed. Field personnel were requested to immediately notify a QB if trapped CTS were encountered in an open pit. They were also instructed to cover the pit to prevent desiccation of the animal. No such encounters occurred during Parker Flats MRA Phase II work activities (ESCA RP Team 2010, 2011, and 2012).

3.9 Project Field Variances

During the course of the field activities the project field team encountered situations requiring different methodologies from those described in the original work plan. To address these issues the project team prepared FVFs to document each issue and how the work performed in addressing the issue varied from the procedures outlined in the work plan. The following sections provide an overview of the FVFs submitted during field operations and the FVF are provided in Appendix C.

3.9.1 Field Variance Form No. G1WP-001

During DGM anomaly investigation, isolated areas were found to contain a high density of small metallic debris or ammunition links. The use of a portable screen (Photo 3-4) was implemented to confirm and catalog metallic debris removed from the soil in the high-density areas.

3.9.2 Field Variance Form No. G1WP-002

An alternate instrument (EM61-MK2 handheld unit) was evaluated for QC-1 activities (Section 4.2.1). The EM61-MK2 handheld unit and the EM61-MK2 wheeled cart were evaluated on a test strip containing inert practice grenades positioned at various depths (0 feet bgs, 6 inches bgs, 12 inches bgs, and 18 inches bgs). The instruments were moved over each practice grenade and the digital readings were recorded. Based on the results, the QC-1 operator could confidently detect and recover grenades at depths of 18 inches bgs using the EM61-MK2 handheld unit; however, the EM61-MK2 wheeled cart readings for grenades at that depth were near background levels. Therefore, the EM61-MK2 handheld unit was selected as the QC-1 instrument for the project.

3.9.3 Field Variance Form No. PFMRA-1

The Army expressed concern about the intrusive nature of the brush rake that was being used for vegetation removal activities within the proposed future non-residential development area of Parcel E19a.3. The vegetation removal practices were reviewed and changes in field practices were implemented, to include a non-intrusive rotary brush cutter to replace the brush rake.

4.0 QUALITY ASSURANCE / QUALITY CONTROL

QA/QC activities, including QC and FORA independent QA, were conducted throughout the project. FORA independent QA activities were conducted by FORA's third party QA subcontractor Engineering/Remediation Resources Group, Inc. (ERRG) under the FORA Quality Assurance Surveillance Plan (QASP), as described in Section 4.5. The QC activities and results are discussed in the following sections.

4.1 Quality Control of Digital Geophysical Mapping

Geophysical survey QC is an appropriate evaluation performed to ensure that DGM instruments fully meet the prescribed requirements. The QC Geophysicist is responsible for overseeing and documenting the QC performed with respect to the DGM surveys. Instrument checks, data acquisition, navigational accuracy, data processing and evaluation and seeding are described in detail in the following sections.

4.1.1 Digital Instrument Survey and Data Acquisition

Prior to DGM target investigation, the following QC actions were performed to ensure that the DGM survey data acquisition activities were meeting the DQOs for the project.

4.1.1.1 Daily DGM Instrument Function Testing

The quality of geophysical data sets is dependent on the operational capabilities of the equipment used. To ensure that equipment was fully capable and performed in accordance with the project requirements, geophysical teams performed daily QC function tests. QC function checks were performed following the instrument operating manuals, standard industry practices, and the Final Group 1 RI/FS Work Plan. Following these checks, equipment that was found unsuitable for use was immediately removed from service.

The EM61-MK2 sensors were set to record and store data in a field laptop computer at 10 Hertz, as described in Section 3.4.1.1. The system logging software could not null the EM61-MK2 sensors; therefore, the values provided for the QC function checks were presented as raw data, which are presented in Appendix B. Calculated standard deviations for pre-and post-survey function tests were used to verify noise levels. The QC function checks and results are described below.

- Static Background - The static background tests consisted of collecting EM data at a relatively quiet area with normal background noise for a period of three minutes. The static test enabled the operator(s) to see if fluctuations in the data were occurring in real-time. The objective was for the standard deviation of the four EM61-MK2 data channels to be < 2 mV. The standard deviation of static background met the establish metric except when ambient temperature changes caused minor drift during the period of the test that were not considered a failure.
- Static Response - Static spike tests for the EM61-MK2 were performed with spike objects (2-inch pipes) positioned next to the coils and data collected for a period of

three minutes. The static response test enabled the operator(s) to monitor the instrument response to the spike objects and potential real-time fluctuations in the data. The objective was for the standard deviation of the four EM61-MK2 data channels to be < 2 mV. The responses between pre- and post-survey tests were not expected to vary more than 20%. The standard deviation of static background met the established metric except when ambient temperature changes caused minor drift during the period of the test that were not considered a failure. On days that the minor drift was observed, either the pre- or post-test met the established metrics.

- Cable Connection - The cable test was performed to measure the effect of moving the cables during data collection and to verify that the connections were in good condition and operating as designed. The cable test was conducted for no longer than 30 seconds. The objective was for standard deviation of the four EM61-MK2 data channels to be < 2 mV with no visible spikes observed in data. The standard deviation of cable tests met the established metric. Random spikes were observed during the cable connection tests, but were not considered a failure.

Evaluation of compliance with digital survey equipment verification DQOs was made in the field at the beginning of the day when the QC function tests were performed and reviewed by a geophysicist. QC function test data plots are presented in Appendix B.

4.1.1.2 Instrument Verification Strip

The IVS was performed by traversing the test strip in a single pass. This IVS contained seed test items (1- by 4-inch hollow steel pipe nipples), inert munitions, and positioning spikes (Section 3.4.4.1). The test strip was built with furrows so that the sled runners dropped into the furrows and the sled coils were located in the same position with respect to the items for each run. For the single unit cart the IVS was performed by traversing the center line of the strip in a single pass. The IVS was run both morning and evening to monitor daily equipment function and response consistency and to accomplish the purpose of repeat lines. The values of the test items were compared each day with the standard run to ensure proper functioning of the coils.

4.1.2 Quality Control of Digital Survey Data Acquisition

Data acquisition QC checks were performed for each DGM data set to verify compliance with survey DQOs. The DQOs for data acquisition, such as mean speed, along-track spacing, and across-track measurements, were evaluated by the data processing operator after the survey was completed (Appendix B).

- Mean Acquisition Speed – A mean speed of less than 3 miles per hour was maintained during data collection. The speed was evaluated based on sensor orientation and bounce in terms of the amount of noise introduced into the data and along line sample spacing.
- Along-Track Sampling – Along track measurements were reviewed to ensure adequate data density (sample separation) of less than 0.5 feet. Sample separation is calculated through Oasis Montaj™ Sample Separation Calculation tool. This tool

creates a map and lets the processing geophysicist examine if sample separation metrics are exceeded. Sample separation is reviewed for each complete set of data. In two line and fiducial verification DGM datasets, which were collected following analog investigation in the same area, it appeared that sample separation distances were exceeded (Appendix B).

- Across-Track Measurements – This metric is intended to control data gaps associated with inconsistent track plots that are not associated with trees or other obstructions. To achieve this measurement quality objective, the surveys were run to achieve a 2.5-foot spacing. Ninety-five percent (95%) of the data within a dataset must meet this metric. Up to 5% of the data is permitted between 2.5 feet and 3.0 feet to account for rough terrain. The across track line spacing did not exceed 3 feet, excluding data gaps due to trees or other obstacles that precluded the survey platform from providing complete coverage. These areas were unavoidable and within the acceptance criteria identified in the Final Group 1 RI/FS Work Plan. These areas were investigated with analog instruments to obtain maximum coverage.

4.1.2.1 Navigation 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 cm 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 (< 20 cm) was achieved, as documented in Tables 4-1 and 4-2 (note that the Navigational DQO is different from the Reacquisition DQO where 95% of the locations of reacquired anomalies should be within 1 meter of their original surface location as marked on the dig list). The 20 cm DQO relates strictly to the navigational system itself. It is independent of additional and/or cumulative "offsets" that may propagate when the geophysical sensors and the processing and/or target picking are considered.

4.1.3 Quality Control of Digital Data Processing and Analysis

QC checks were performed during DGM data processing and target selection as described below:

- Processing Statement – Leveling and/or filtering routines that were applied to data sets were evaluated, on a data set by data set basis, to confirm that those routines did not alter the nature of the original measured response.
- Leveling/Drift Correction – For a given data set of EM data, low frequency, long wavelength noise was removed.
- Instrument Latency – Instrument latency effects were monitored as part of the IVS. Three 6-inch spikes were seeded in the IVS track underneath each coil and offset along the direction of travel so as not to interfere with each other. Latency effects were then observed and corrected in the IVS data and these values were carried over

into the production data for that day's surveys. Instrument latency documentation is provided in Appendix B.

- Target Anomaly Selection – Anomalies meeting the target selection criteria were selected for further investigation and was verified by the Project Geophysicist. The target selection process for each dataset was verified.
- Geophysicist QC Checks – The project geophysicist examined each dataset by grid and verified anomaly target selection.

4.1.4 Quality Control of DGM Anomaly Reacquisition and Investigation

QC checks were performed during anomaly reacquisition and field investigation of target DGM anomalies to ensure anomalies were fully resolved as described in the following subsections. Section 4.2 describes the field QC checks (i.e., QC-1, QC-2 and QC-3) performed for DGM target investigation.

4.1.4.1 DGM Anomaly Reacquisition

The following QC checks were performed for the DGM anomaly reacquisition:

- Known Location QC Seeds – Grid corner spikes (i.e., known QC seeds) were established during site preparation activities at grid corner locations for use as known geospatial calibration points and known QC seeds. Known QC seeds consisted of 6-inch galvanized nails driven vertically into the ground. Known QC seed locations were recorded using RTK GPS. The digital anomaly response from each known QC seed was identified during data processing and analysis. Positional accuracy was determined by measuring the distance between (i.e., offset) the anomaly target location and the actual geo-referenced location of the known QC seed. In accordance with the positioning delta DQO established for the Parker Flats MRA Phase II MEC remedial investigation, the offset of the anomaly target location should not be greater than 2 feet from the recorded position. Known QC seeds were also used during QC-2 and QA surveys. The detection results for each known QC seed item are detailed in Table 4-2. The minimum offset was 0.00 foot and the maximum offset was 1.87 feet. The average offset for the MEC remedial investigation was 0.61 foot.
- Anomaly Reacquisition – Reacquisition was performed on DGM anomalies throughout the duration of the project. More than 95% of the locations of reacquired anomalies were within 1 meter of their original surface location as marked on the dig list.

4.1.4.2 DGM Anomaly Investigation

The following QC checks were performed for the DGM anomaly investigation:

- Reporting Checks – Recovered target anomaly characteristics were electronically logged into the handheld PDA data logger. Handheld PDA data logger information was uploaded and verified daily.

- Dig List Backcheck – The QC geophysicist examined each DGM anomaly and the excavation result. If the mV reading of the initial response did not correlate with the size and/or identity of the item recovered, the target anomaly was resubmitted to the UXO Dig Team for reinvestigation. The dig list backcheck resulted in 211 targets returned to the UXO Dig Team for reinvestigation.
- False Positives – False positives (also known as "No Contacts") were kept to a minimum. This was achieved by careful data collection activities (i.e., stable, fluid motion) and thorough data processing techniques. The false positives were reviewed by the geophysicist. If the geophysicist picked close to noise level, then the resolution was reclassified as noise. If it was a large anomaly, then the geophysicist submitted the anomaly to the UXO Dig Team for reinvestigation. No Contacts are reviewed during the dig list backcheck as discussed in the previous bullet.

4.2 QC Surveys in DGM Areas

4.2.1 QC-1

Following the excavation of the anomaly source by the UXO Dig Teams for DGM targets, the Unexploded Ordnance Quality Control Specialist (UXOQCS) conducted a QC-1 investigation within at least a 3-foot radius of each target location. The QC-1 investigation involved using a geophysical instrument (EM61-MK2 Handheld) to verify that the detectable MEC-like items within the search radius area around the target had been removed.

One QC-1 failure was reported during the Parker Flats MRA Phase II MEC remedial investigation, which was related to the blind QC seed discussed in Section 4.4. The UXOQCS identified the point of failure and reported it to the Remediation Program Manager (RPM). A copy of the Non-Compliance Report (NCR) and the corrective action are included in Appendix D. No other QC-1 failures were reported during the Parker Flats MRA Phase II MEC remedial investigation. QC-1 is documented as complete by the UXOQCS for each DGM target.

4.2.2 QC-2

Implementing the same procedures as the DGM survey operations discussed in Section 3.4, a minimum of 16% of the DGM survey area was subjected to a second survey known as QC-2 (Figures 4-1, 4-2, and 4-3). QC-2 target locations were identified by the project geophysicist for investigation. The selected target coordinates were imported into the target database for use by the UXO Technicians during QC-2 target reacquisition and investigation.

A QC-2 failure is constituted by 1) the discovery of MEC or similar item, 2) five re-acquirable anomalies as a result of QC-2, or 3) the discovery of five non-selected anomalies (with dimensions similar to a 37 mm projectile or greater) during the QC-2 process that should have been selected during the initial DGM survey within a single 100-foot by 100-foot grid. If a failure occurs, a NCR is generated, a root cause analysis is conducted, and corrective actions are implemented.

No QC-2 failures were reported during the Parker Flats MRA Phase II MEC remedial investigation. The QC-2 target investigation findings are provided in Section 5.0.

4.2.3 QC-3

Following completion of QC-2, a minimum of 10% of each DGM survey grid is subjected to an analog to-depth survey to verify that MEC-like items have been identified and removed. A QC-3 failure is constituted by 1) the discovery of MEC or similar item, 2) the discovery of five re-acquirable anomalies as a result of QC-3, or 3) the discovery of five non-selected anomalies (with dimensions similar to a 37 mm projectile or greater) during the QC-3 process that should have been selected during the initial DGM survey and QC-2 within a single 100-foot by 100-foot grid. If a failure occurs, a NCR is generated, a root cause analysis is conducted, and corrective actions are implemented.

No QC-3 failures were reported during the Parker Flats MRA Phase II MEC remedial investigation. The QC-3 is documented on QC Daily Field Reports in Appendix D.

4.3 Quality Control of Analog Surveys and Excavations

Prior to operating an analog instrument, the analog operator completed the analog checkout procedure. The UXO Technicians conducted a daily instrument standardization check by placing the instrument over a standard item prior to commencing daily field activities.

The following data acquisition parameter was used for analog operations:

- Survey Speed and Lane Spacing: UXOQCS, Senior Unexploded Ordnance Supervisor (SUXOS), and Team Leaders observed operations and verified that operator instrument swing speed did not exceed best practices, and that lane spacing did not exceed 3 feet.

The analog investigation areas were checked by the UXOQCS after the initial investigation was completed. The QC process consisted of the UXOQCS inspecting 10% of each grid. No QC failures were reported. QC of analog operations was documented in Appendix D.

4.4 Seeding Program

Blind seed items were used by QC and QA personnel to ensure the investigation meets the project DQOs and to measure instrument detection capability. The implementation and results of the seeding program at Parker Flats Phase II are discussed below.

The Final Group 1 RI/FS Work Plan identified three DQOs used to evaluate the effectiveness and thoroughness of the DGM investigation activities: the Probability of Detection (Pd) DQO, the Positioning Delta DQO, and the False Positive DQO.

Pd is a measure of whether the system successfully detects and recovers applicable MEC and MEC-like targets. The Pd DQO has a multi-level approach. The first level DQO is the goal of 100% Pd. The first level Pd DQO required that 100% of the blind QC seeds within the

established detection zone to be recovered during the DGM investigation. This metric was evaluated by the UXOQCS by checking 100% of the targets identified by the DGM survey after the excavation of that target was completed by the UXO Technicians. The UXOQCS evaluated the results of the blind seed program. If the UXOQCS discovered blind QC seed items that were not detected and removed during the investigation, a root-cause analysis was performed to identify the cause of the failure and a Corrective Action Report was generated to remediate the source of the QC failure. The second level of Pd was created in recognition of the fact that DGM has inefficiencies and rarely achieves the 100% Pd goal. The second level DQO for Pd is 85% with a 90% confidence level.

The Positioning Delta DQO states that the XY positioning provided to the reacquisition team is within 2 feet of the actual target. The DQO is that the target must be found within 2 feet of the reported position.

The false positive ("No Contact") refers to locations that are reported to the UXO Dig Teams, but nothing is recovered during the excavation. The DQO is that every false positive reported in the field will be resolved by the project geophysicist. The False Positive DQO is addressed during the geophysical activities prior to QC-1 of the initial DGM survey.

Blind QC seed items were placed within the Parker Flats MRA Phase II work areas in accordance with the Final Group 1 RI/FS Work Plan for both analog and DGM investigations. The blind QC seeds consisted of 1- by 4-inch hollow steel pipe nipples that were painted blue or orange with a specific control number (e.g., ESCA-PF-001). The pipe nipples were ISOs used to simulate 37mm projectiles. For DGM investigations, the blind QC seeds were buried at a depth interval between 6 and 12 inches, which was within the geophysical limits of 100% probability of detection. For analog instrument-aided surface and near-surface investigations (habitat reserve area), the blind QC seeds were placed on the ground surface. For analog to depth investigations (proposed residential and non-residential development areas), the blind QC seeds were placed at depths ranging from 2 to 18 inches bgs. UXO Technicians were shown the blind QC seed items so they could positively identify the item when found. The UXOQCS, in consultation with the RPM, determined the locations of the blind QC seed items. The locations of the blind QC seed items were not known to the survey, investigation, or data processing personnel for either the analog or the DGM operations.

Blind QC seed items were used by QC personnel to ensure the investigation was meeting the DQOs and to measure instrument detection capability. For analog investigations, the blind QC seed items were determined to pass QC if the item was detected and removed. For the DGM investigations, the blind QC seeds had to be successfully targeted and retrieved by the UXO Dig Teams.

Placement and retrieval details for the blind QC seed items are provided in Figure 4-4. The detection results for each blind QC seed item are detailed in Table 4-1. The minimum offset was 0.21 foot and the maximum offset was 1.96 feet. The average offset for the MEC remedial investigation was 1.31 feet. The blind QC seed placement and retrieval details for each work area, which were based on the proposed future land uses, are presented below.

Habitat Reserve Area

A total of 20 blind QC seeds were placed within the expected DGM survey boundaries by the UXOQCS. After completion of the DGM survey, five blind QC seeds (QC Seeds 3, 6, 9, 10, and 11) were excluded from the DQO evaluation because they were located outside the DGM survey boundaries. QC Seed 11 was recovered during analog operations (Table 4-1). QC Seeds 3, 6, and 9 were retrieved by the UXOQCS. QC Seed 10 was recovered during the investigation of a nearby DGM target, which the search radius extended outside the DGM survey boundary.

Of the remaining 15 blind QC seeds within the DGM survey boundaries, 14 were recovered within the DQO metric of 2 feet (Table 4-1). QC Seed 1 was recovered 2.30 feet from the selected target. This blind QC seed was located in an area of RTK GPS signal loss and, therefore, was selected using the compass correction algorithm described in Section 3.4.4.2.

A total of 20 blind QC seeds were placed within the analog survey boundaries by the UXOQCS (Table 4-1). After completion of analog investigation, 21 blind QC seeds were recovered, which included QC Seed 11 that was intended for DGM operations, as discussed above.

Non-Residential Development Areas

A total of 35 blind QC seeds were placed within the expected DGM survey boundaries by the UXOQCS. After completion of the DGM survey, seven blind QC seeds (QC Seeds PFDAQC-seed-1 through PFDAQC-seed-6, and PFDAQC-6) were excluded from the DQO evaluation because they were located outside the expected DGM survey boundaries. QC Seeds PFDAQC-seed-1 through PFDAQC-seed-6 were recovered during analog operations (Table 4-1). QC Seed PFDAQC-6 was recovered during soil scraping and screening operations described in Section 3.8.

Of the remaining 28 blind QC seeds within the DGM survey boundaries, 27 were recovered within the DQO metric of 2 feet (Table 4-1). QC Seed 34 was recovered within the search radius during the investigation of a nearby DGM target.

A total of 12 blind QC seeds were placed within the analog survey boundaries by the UXOQCS (Table 4-1). After completion of analog investigation, 18 blind QC seeds were recovered to include the six blind QC seeds that were placed outside the DGM survey boundaries as discussed above.

Residential Areas

A total of 48 blind QC seeds were placed within the expected DGM survey boundaries by the UXOQCS. After completion of the DGM survey, one blind QC seed (QC Seed 62) was excluded from the DQO evaluation because it was located outside the expected DGM survey boundaries and was retrieved by the UXOQCS.

Of the remaining 47 blind QC seeds within the DGM survey boundaries, 46 seeds were recovered within the DQO metric of 2 feet (Table 4-1). QC Seed 3 was selected as a target for investigation, but was not recovered by the UXO Dig Team. The target selected for QC Seed 3 was investigated and metal scrap items were recovered at approximately 3 inches bgs, but the seed, placed at 12 inches bgs, was not recovered by the UXO Dig Team. The UXOQCS identified the point of failure and reported it to the RPM. A copy of the NCR and the corrective action are included in Appendix D.

A total of 50 blind QC seeds were placed within the analog survey boundaries by the UXOQCS (Table 4-1). The 50 blind QC seeds were recovered during the analog investigation.

4.5 FORA Independent Quality Assurance

Third Party QA reports were submitted to FORA by ERRG and its subcontractor, InDepth. The Third Party QA work included periodic field observation, installation of blind QA seeds, and data review activities for both analog and DGM-related activities. ERRG and InDepth provided independent QA reports to FORA, which presented the results of their work. The reports are included in Appendix E. The performance audits were accomplished through independent blind QA seeding and procedural audits were accomplished through periodic inspection of field operation against established policies and procedures in accordance with the FORA QASP (Appendix E). There were no deficiencies during performance and procedural audits that were conducted for the Parker Flats Phase II MEC remedial investigation.

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5.0 MEC INVESTIGATION RESULTS

The following sections present the results of the Parker Flats MRA Phase II MEC remedial investigation field activities by the following proposed future uses: habitat reserve, non-residential development, and residential.

5.1 Habitat Reserve Area

The habitat reserve area was investigated between December 2008 and October 2009. Investigation of the habitat reserve area was conducted using two separate methods. The accessible areas, specifically the trail network (i.e., unpaved roads, trails, and open areas adjacent to the trails) were investigated using DGM survey to depth of detection (Figure 3-2). The remaining portions of the habitat reserve area were investigated using analog instrument-aided surface and near surface methods. The MEC remedial investigation results are presented in the following subsections.

5.1.1 DGM Survey Investigation Results of Trails

Approximately 11 acres of trails and open areas adjacent to the trails within the habitat reserve area were investigated utilizing the FORA ESCA Sled. Prior to the DGM survey, blind QC seeds were placed within the anticipated survey areas (Section 4.4). The DGM survey data were processed and targets were selected based on a threshold of 50 mV stacked (i.e., summed) channel response. DGM survey maps of the DGM data by grid showing anomalies and selected targets are provided in Appendix F. A total of 1,325 target locations were identified by the project geophysicist for investigation. The selected target coordinates were imported into the target database for use by the UXO Technicians during target reacquisition and investigation. The target database is provided in Appendix G.

Of the total 1,325 targets identified, 58 were determined to be “No Contact”, 74 were determined to be “Duplicate Targets”, and the remaining 1,193 target investigations resulted in the following physical finds:

- 8 MEC items (designated as DMM)
- 38 pounds (lbs) of MD
- 58 small arms ammunition (SAA) items
- 6,662 lbs of other debris items
- 22 QA/QC items (i.e., 15 blind QC seeds, 2 known QC seeds, and 5 blind QA seeds)

Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of MEC and MD items found within the habitat reserve area. A detailed list of identified targets and findings is located in Appendix G.

5.1.1.1 DGM Survey RTK GPS Signal Loss Evaluation

A total of 261 isolated areas were identified during the DGM survey data processing for the habitat reserve area trails where loss or weakening signal from the RTK GPS occurred when the FORA ESCA Sled was under dense tree cover. These isolated areas were reviewed using the compass correction algorithm and targets were selected when possible (Section 3.4.4.2). These targets were reacquired and investigated by the field crews; however, when using the correction algorithm, the investigation radius for these targets was increased from 3 to 4 feet. Once the targets were investigated, the areas of RTK GPS signal loss were outlined and included on the DGM survey maps provided in Appendix F.

Of the original 261 areas, 63 were investigated using the compass correction algorithm and the remaining 198 were investigated using analog instruments as a "mag and dig" operation to the depth of detection. The "mag and dig" operation areas were also outlined and included on the DGM survey maps provided in Appendix F. The physical items found during investigation of the signal loss areas were summarized in Section 5.1.1.

5.1.1.2 DGM Survey QC Results

To provide further evaluation of the DGM survey operation, approximately 4 acres of the initial DGM survey area were selected for QC-2, as described in Section 4.2.2. The DGM survey data were processed and targets were selected based on a threshold of 50 mV stacked (i.e., summed) channel response. DGM survey maps of the QC-2 DGM data by grid showing anomalies and selected targets are provided in Appendix F. In total, 141 QC-2 target locations were identified by the project geophysicist for investigation. The selected target coordinates were imported into the target database for use by the UXO Technicians during target reacquisition and investigation (Appendix G). Of the total 141 targets identified, 26 were determined to be "No Contact", 10 were determined to be "Duplicate Targets", and the remaining 105 resulted in the following physical finds:

- 0.4 lb of MD
- 96 lbs of other debris items

The MD items found were significantly smaller than a 37mm projectile. Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of MEC and MD items found within the habitat reserve area. A detailed list of targets and findings is located in Appendix G. The habitat reserve area trails and open areas adjacent to the trails passed QC-2 during the Parker Flats MRA Phase II MEC remedial investigation.

5.1.2 Surface and Near-Surface Analog Investigation Results

Approximately 168 acres of the habitat reserve area were investigated using analog instruments (i.e., Schonstedt magnetometers) to conduct a surface and near-surface (within 3 inches of the surface) investigation (Figure 3-2). A total of 6,659 items were found in the habitat reserve area during the analog survey resulting in the following physical finds:

- 156 MEC items (designated as 153 DMM and 3 UXO)

- 1,261 lbs of MD
- 4,823 SAA items
- 7,484 lbs of other debris
- 23 QC items (i.e., 23 blind QC seeds)

Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of MEC and MD items found within the habitat reserve area. A detailed list of the analog findings is located in Appendix H.

5.1.3 Summary of Types of MEC and MD Recovered

The primary types of MEC and MD items recovered during the Parker Flats MRA Phase II MEC remedial investigation in the proposed future habitat reserve area included practice hand grenades and fuzes, flares, signals, and simulators (Table 5-1). Other types of MEC and MD items were recovered in fewer quantities and included: firing devices; hand grenades (smoke, illumination, and fragmentations MD) and/or fuzes; practice rifle grenades; practice mines; practice rockets; electric squibs; smoke pots; and various projectiles (37mm, 40mm, 60mm, 75mm, and training 81mm; Table 5-1). Photographs of representative MEC items recovered during the Parker Flats MRA Phase II MEC remedial investigation are provided in Appendix I.

5.1.4 DGM Survey Coverage Evaluation

Areas within the DGM surveys that could not be completed due to dense tree cover causing intermittent loss of the GPS signal were investigated using analog geophysical instruments. The results of these analog investigations are summarized in Appendix F.

5.2 Non-Residential Development Areas

The proposed future non-residential development areas were investigated between January 2010 and April 2010. The investigation in these areas consisted of DGM surveys of accessible areas and analog surveys where DGM surveys could not be conducted due to dense vegetation (i.e., tree-covered areas) or terrain (Figures 3-2 and 3-3). The MEC remedial investigation results are presented in the following subsections.

5.2.1 DGM Survey Investigation Results

Approximately 44 acres of the proposed future non-residential development areas were included in the DGM survey investigation, which was performed with the FORA ESCA Sled. A ground surface sweep was conducted on approximately 13 acres of the DGM survey area to remove possible DGM signal interference sources prior to beginning the DGM survey.

As discussed in Section 3.4.5, the DGM survey was also conducted: 1) as a verification process in the tree-covered areas of the southern non-residential development area where analog surveys were initially conducted (Figure 3-3); 2) where a former sidewalk was

discovered in the northern non-residential development area (Figure 3-2); 3) along soil berms located in the southern non residential development area of Parcel E20c.2 (Figure 3-3); and 4) along an unpaved road in the southern non-residential development area of Parcels E18.1.1 and E18.1.2 (Figure 3-3).

The DGM survey data were processed and targets were selected based on a threshold of 50 mV stacked (i.e., summed) channel response. DGM survey maps of the DGM data by grid showing anomalies and selected targets are provided in Appendix F. A total of 7,722 target locations were identified by the project geophysicist for investigation. The selected target coordinates were imported into the target database (Appendix G) for use by the UXO Technicians during target reacquisition and investigation.

Of the total 7,722 targets identified, 447 were determined to be "No Contact", 974 were determined to be "Duplicate Targets", 394 were not investigated due to their location outside of the MRA (i.e., they were located outside of the MRA in an area where the towed array was turned around), and the remaining 5,907 target investigations resulted in the following physical finds:

- 33 MEC items (designated as 32 DMM and 1 UXO)
- 508 lbs of MD
- 167 SAA items
- 39,316 lbs of other debris
- 276 QA/QC items (i.e., 28 blind QC seeds, 227 known QC seeds, and 21 blind QA seeds)

Along the unpaved road in the southern non-residential development area of Parcels E18.1.1 and E18.1.2, a total of 424 targets locations were identified by the project geophysicist. Of the 424 targets, 96 targets were selected for investigation because investigation of the 424 targets would have impaired the access route to the water tower. The 96 targets were selected to evaluate if the roadway was part of an impact area for high explosive munitions. Based on a review of the investigation findings associated with the 96 targets, the unpaved road was not within an impact area for high explosives munitions.

Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of MEC and MD items found within the proposed future non-residential development areas. A detailed list of the targets and findings is provided in Appendix G.

5.2.1.2 DGM Survey QC Results

To provide further evaluation of the DGM survey operations, approximately 10 acres of the initial DGM survey area were selected for QC-2, as described in Section 4.2.2. The DGM survey data were processed and targets were selected based on a threshold of 50 mV stacked (i.e., summed) channel response. DGM survey maps of the QC-2 DGM data by grid showing anomalies and selected targets are provided in Appendix F. In total, 534 QC-2 target locations were identified by the project geophysicist for investigation. The selected target

coordinates were imported into the target database for use by the UXO Technicians during the target reacquisition and investigation. The target database is provided in Appendix G.

Of the total 534 targets identified, 18 were determined to be "No Contact" and 15 were determined to be "Duplicate Targets". The remaining 501 target investigations resulted in the following physical finds:

- 0.4 lb of MD
- 1 SAA item
- 95 lbs of other debris
- 33 QC items (i.e., 33 known QC seeds)

The MD items found were significantly smaller than a 37mm projectile. Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of the MEC and MD items found within the proposed future non-residential development areas. A detailed list of the targets and findings is located in Appendix G. The proposed future non-residential development areas passed QC-2 during the Parker Flats MRA Phase II MEC remedial investigation.

5.2.2 Analog Survey Investigation Results

Approximately 70 acres of the proposed future non-residential development areas, where DGM surveys could not be conducted due to terrain and/or dense vegetation (i.e., tree-covered areas), were investigated using analog instruments (i.e., Schonstedt magnetometers) to the depth-of-detection (Figures 3-2 and 3-3). A total of 28,821 items were found during the analog survey investigation of the proposed future non-residential development areas resulting in the following physical finds:

- 275 MEC items (designated as 273 DMM and 2 UXO)
- 1,388 lbs of MD
- 14,938 SAA items
- 9,139 lbs of other debris
- 25 QA/QC items (i.e., 19 blind QC seeds, 1 known QC seed, and 5 blind QA seeds)

Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of MEC and MD found within the proposed future non-residential development areas. A detailed list of analog findings is located in Appendix H.

5.2.3 Summary of Types of MEC and MD Recovered

The primary types of MEC and MD items recovered during the Parker Flats MRA Phase II MEC remedial investigation in the proposed future non-residential development areas included practice hand grenades and fuzes, hand grenades (smoke, illumination, and fragmentation MD) and fuzes, flares, signals, and simulators (Table 5-1). Other types of MEC and MD items were recovered in fewer quantities and included: practice mines and fuzes;

practice rifle grenades; practice rockets; smoke pots; and various projectiles (22mm, 37mm, 40mm, 60mm, 81mm, and training 81mm) and fuzes (Table 5-1). Photographs of representative MEC items recovered during the Parker Flats MRA Phase II MEC remedial investigation are provided in Appendix I.

5.2.4 DGM Survey Coverage Evaluation

Areas within the DGM surveys that could not be completed due to terrain or the presence of surface and/or subsurface feature (e.g., fighting positions) were investigated using analog geophysical instruments. The results of these analog investigations are summarized in Appendix F.

5.3 Residential Areas

The proposed future residential areas were investigated from September 2009 to May 2010, and August 2012. The investigation in these areas consisted of DGM surveys of accessible areas and analog surveys where DGM surveys could not be conducted due to dense vegetation (i.e., tree-covered areas) or steep terrain (Figures 3-3 and 3-4). The MEC remedial investigation results are presented in the following subsections.

5.3.1 DGM Survey Investigation Results

Approximately 51 acres of the proposed future residential areas were included in the DGM survey investigation, which was performed with the FORA ESCA Sled. A ground surface sweep was conducted to remove possible DGM signal interference sources prior to beginning the DGM survey.

The DGM data was processed and targets were selected based on a threshold of 20 mV stacked (i.e., summed) channel response. DGM survey maps of the DGM data by grid showing anomalies and selected targets are provided in Appendix F. A total of 11,112 target locations were identified by the project geophysicist for investigation. The selected target coordinates were imported into the target database for use by the UXO Technicians during the target reacquisition and investigation. The target database is provided in Appendix G.

As discussed in Section 3.4.5, DGM surveys were also conducted: 1) in a small portion of the proposed future residential area in the southern portion of Parcel E20c.2 where a portion of the soil berms were spread out (Figure 3-3); and 2) in an area of high density anomalies in Parcel E20c.2 (Figure 3-8).

Of the total 11,112 targets identified, 770 were determined to be “No Contact”, 1,486 were determined to be “Duplicate Targets”, 6 targets were not investigated due to their location outside of the primary survey area (i.e., they were located in sled turnaround areas outside the work area boundary), and the remaining 8,850 target investigations resulted in the physical finds:

- 4 MEC items (designated as 3 DMM and 1 UXO)

- 142 lbs of MD
- 95 SAA items
- 65,836 lbs of other debris
- 339 QA/QC items (i.e., 35 blind QC seeds, 274 known QC seeds, and 30 blind QA seeds)

Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of the MEC and MD items found within the proposed future residential areas. A detailed list of the targets and findings is located in Appendix G.

5.3.1.1 DGM Survey RTK GPS Signal Loss Evaluation

Isolated areas were identified during the DGM survey data processing for the proposed future residential areas where loss or weakening signal from the RTK GPS occurred when the FORA ESCA Sled was under dense tree cover. The areas that were inaccessible to the FORA ESCA Sled were surveyed using the man-portable EM61-MK2 cart. The man-portable EM61-MK2 operation areas were outlined and included on the DGM survey maps provided in Appendix F. The positioning system used to locate the areas was the Trimble RTK GPS, as used in the primary DGM survey. The EM61-MK2 cart was operated at the 8-inch coil height for this survey. The physical items found during investigation of the signal loss areas were summarized in Section 5.3.2.

5.3.1.2 DGM Survey QC Results

To provide further evaluation of the DGM survey operations, approximately 9 acres of the initial DGM survey area were selected for QC-2, as described in Section 4.2.2. The DGM survey data were processed and targets were selected based on a threshold of 20 mV stacked (i.e., summed) channel response. DGM survey maps of the QC-2 DGM data by grid showing anomalies and selected targets are provided in Appendix F. In total, 718 QC-2 target locations were identified by the project geophysicist for investigation. The selected target coordinates were imported into the target database for use by the UXO Technicians during the target reacquisition and investigation. The target database is provided in Appendix G.

Of the total 718 targets identified, 126 were determined to be “No Contact”, 50 were determined to be “Duplicate Targets”, and the remaining 542 target investigations resulted in the following physical finds:

- 0.2 lb of MD
- 14 SAA items
- 1,423 lbs of other debris
- 24 QC items (i.e., 24 known QC seeds)

MD items found were significantly smaller than a 37mm projectile. Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of MEC and MD items found within the proposed future

residential areas. A detailed list of targets and findings is located in Appendix G. The proposed future residential area passed QC-2 during the Parker Flats MRA Phase II MEC remedial investigation.

5.3.2 Analog Survey Investigation Results

Approximately 98 acres of the proposed future residential areas, where DGM surveys could not be conducted due to terrain and/or dense vegetation (i.e., tree-covered areas), were investigated using analog instruments (i.e., Schonstedt magnetometers) to the depth-of-detection (Figures 3-3 and 3-4). A total of 83,509 items were found during the investigation of the proposed future residential area resulting in the following physical finds:

- 566 MEC items (designated as 565 DMM and 1 UXO)
- 754 lbs of MD
- 17,990 SAA items
- 43,045 lbs of other debris
- 62 QC items (i.e., 62 bind QC seeds)

Table 5-1, Figure 5-1, and Figure 5-2 provide an overview of MEC and MD found within the proposed future residential areas. A detailed list of analog findings is located in Appendix H.

5.3.3 Summary of Types of MEC and MD Recovered

The primary types of MEC and MD items recovered during the Parker Flats MRA Phase II MEC remedial investigation in the proposed future residential areas included practice hand grenades and fuzes (Table 5-1). Other types of MEC and MD items were recovered in fewer quantities and included: signals; simulators; flares; smoke, igniting, and illumination hand grenades and/or fuzes; fragmentation hand grenade MD; practice mines and fuzes; rifle grenades; practice rockets; an electric squib; and various projectiles (4-inch, 20mm, 37mm, 40mm, 57mm, 75mm, and training 81mm) and fuzes (Table 5-1). Photographs of representative MEC items recovered during the Parker Flats MRA Phase II MEC remedial investigation are provided in Appendix I.

5.3.4 DGM Survey Coverage Evaluation

Areas within the DGM surveys that could not be completed due to terrain or the presence of surface and/or subsurface feature (e.g., fighting positions) were investigated using analog geophysical instruments. The results of these analog investigations are summarized in Appendix F.

6.0 CONCLUSIONS

The Parker Flats MRA Phase II MEC remedial investigation was successfully completed using BADT in accordance the Final Group 1 RI/FS Work Plan and associated FVFs. The BADT included digital geophysical systems in accessible areas and analog instruments in areas that were not accessible by digital geophysical systems. The scope of the fieldwork completed under this TIP included:

- Residential and non-residential development areas
  - digital geophysical surveys and investigation and removal of target anomalies that potentially represent MEC
  - analog geophysical surveys in areas that were not suitable for digital geophysical surveys and investigation and removal of anomalies that potentially represent MEC
- Habitat reserve area
  - digital geophysical surveys of trails and open areas adjacent to trails and investigation and removal of target anomalies that potentially represent MEC
  - instrument-aided surface and near-surface (within 3 inches bgs) analog geophysical surveys and investigation and removal of anomalies that potentially represent MEC

Approximately 426 acres of the Parker Flats MRA Phase II were investigated by FORA and associated anomalies that potentially represented MEC and MD were removed. In total the Phase II MEC remedial investigation conducted by FORA resulted in the recovery of the following:

- 1,042 MEC items
- 4,093 lbs of MD
- 38,086 SAA items
- 173,096 lbs of other debris

During the Phase II MEC remedial investigation, required QC and QA activities were successfully completed in accordance with the Final Group 1 RI/FS Work Plan and associated FVFs. In addition, the Phase II MEC remedial investigation activities were overseen by an independent QA professional on behalf of FORA.

Based upon the results of the Phase II MEC remedial investigation, the potential for residual MEC risks to remain in the Parker Flats MRA has been significantly reduced.

This TIP presented the results for only the Parker Flats MRA Phase II MEC remedial investigation. MEC removal actions in the Phase I portion of the Parker Flats MRA were completed by the Army and documented in the Final Track 2 Munitions Response RI/FS and the signed Track 2 Munitions Response Site ROD (MACTEC 2006 and Army 2008,

respectively). The results of the Phase II MEC remedial investigation conducted by FORA will be incorporated into the Group 1 RI/FS report to support a final remedial decision.

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Table 2-1
Parker Flats MRA Historical MEC Items Recovered

Land Use	MEC Item	Hazard Classification	UXO	DMM	ISD
Habitat Reserve Area	Projectile, 37mm, low explosive, MK I	3	3		
	Projectile, 37mm, low explosive, MK II	3	2		
	Charge, 0.25lbs, demolition, TNT	2	1		
	Charge, 0.5lbs, demolition, TNT	2	3		
	Charge, nitrostarch, 0.25lb	2	0		
	Flare, aircraft, parachute, M9A1	2	2		
	Flare, parachute, trip, M48	2	1		1
	Fuze, trench mortar, point detonating, MK VI	2	1		
	Signal, illumination, ground, M125 series	2	4		
	Signal, illumination, ground, M126 series	2	3		
	Activator, mine, antitank, practice, M1	1	1		
	Base, coupling, firing device	1	1		
	Cap, blasting, electric, M6	1	30		
	Cap, blasting, non-electric, M7	1	1		
	Cartridge, 35mm, riot control, E-23 (Civilian)	1	2		
	Cartridge, ignition, M2 series	1	9		
	Charge, propelling, M1A1	1	51		
	Firing device, pressure, M1A1	1	3		
	Firing device, pull friction, M2	1	1		
	Firing device, pull, M1	1	20		
	Firing device, release, M5	1	5		
	Firing device, tension and release, M3	1	1		
	Flare, surface, trip, M49 series	1	16		
	Fuze, grenade (model unknown)	1			3
	Fuze, grenade, hand, M10 series	1	37		
	Fuze, grenade, hand, practice, M205 series	1		10	
	Fuze, grenade, hand, practice, M228	1		12	1
	Fuze, grenade, igniting, M201	1	2		
	Fuze, mine, antitank, practice, M604	1	1		
	Grenade, hand, illumination, MK I	1	2		
	Grenade, hand, practice, M62	1	1		
	Grenade, hand, practice, M69	1	1		

Table 2-1
Parker Flats MRA Historical MEC Items Recovered

Land Use	MEC Item	Hazard Classification	UXO	DMM	ISD
	Grenade, hand, practice, MK II	1	5		
	Grenade, hand, riot, CS, M7A3	1	3		
	Grenade, hand, smoke, HC, AN-M8	1	2		
	Grenade, hand, smoke, M18 series	1	9		
	Grenade, rifle, smoke, M22 series	1	3		
	Grenade, rifle, smoke, M23 series	1	1		
	Igniter, time fuse, blasting, M60	1	1		
	Mine, antitank, practice, M10	1	1		
	Pot, 10lb, smoke, HC, screening, M1	1	18		
	Pot, 2.5lb, smoke, HC, screening, M1	1	10		
	Projectile, 25mm, subcaliber, M379	1	5		
	Projectile, 3inch, trench mortar, practice, MK I (Stokes)	1	22		
	Projectile, 40mm, CS, M651	1	1		
	Propellant, 60mm, wafers, mortar	1	1		
	Signal, illumination, ground, parachute, rifle, M19 series	1	5		
	Signal, smoke and illumination, marine, AN-MK13, MOD 0	1	1		
	Simulator, projectile, airburst, M74 series	1	19		
	Ordnance Components	999			5
	Rocket, 2.36inch, practice, M7	0	1		
	Rocket, 3.5inch, practice, M29 series	0	2		
	Ash, Pyrotechnic	999	3		
	Habitat Reserve Area Total	**--**	**318**	**22**	**10**
Non-Residential Development Areas	Grenade, hand, fragmentation, MK II	3	8		
	Grenade, rifle, antitank, M9 series	3	2	3	
	Grenade, rifle, smoke, white phosphorous, M19A1	3	1		
	Projectile, 20mm, high explosive (model unknown)	3	1		
	Projectile, 37mm, high explosive, M54	3	1		
	Projectile, 37mm, high explosive, M63	3	1		
	Projectile, 37mm, low explosive, MK I	3	7		
	Projectile, 37mm, low explosive, MK II	3	4		
	Projectile, 40mm, high explosive dual-purpose, M433	3	1		
	Projectile, 40mm, high explosive, M383	3	1		

Table 2-1
Parker Flats MRA Historical MEC Items Recovered

Land Use	MEC Item	Hazard Classification	UXO	DMM	ISD
	Projectile, 40mm, high explosive, M406	3	2		
	Projectile, 57mm, high explosive, M306 series	3	1		
	Projectile, 60mm, mortar, high explosive, M49 series	3	1		
	Projectile, 75mm, high explosive, M48	3	1		
	Projectile, 75mm, high explosive, MK I	3	3		
	Projectile, 75mm, Shrapnel, MK I	3	23		
	Projector, Livens, screening smoke, FM	3	1		
	Charge, 0.25lbs, demolition, TNT	2	5	1	
	Charge, 0.5lbs, demolition, TNT	2	1		
	Flare, aircraft, parachute, M9A1	2	2		
	Flare, parachute, trip, M48	2	5		6
	Fuze, projectile, base detonating, M534A1	2	1		
	Fuze, projectile, point detonating, M48 series	2	4		
	Fuze, projectile, point detonating, M521	2	3		
	Fuze, projectile, powder train time fuze, M84 series	2	1		
	Projectile, 60mm, mortar, illumination, M83 series	2	1		
	Signal, illumination, ground (model unknown)	2	2		
	Signal, illumination, ground, M125 series	2	25		
	Signal, illumination, ground, M126 series	2		2	
	Signal, illumination, ground, M126 series	2	18		
	Signal, illumination, ground, M131	2	2		
	Signal, illumination, ground, parachute, white star M127	2	1		
	Signal, smoke, ground, parachute, M128A1 series	2	1		
	Signal, smoke, ground, parachute, M129 series	2	1		
	Simulator, blast, stinger, civilian, M15	2	2		
	Simulator, grenade, hand, M116A1	2	7		
	Simulator, projectile, ground burst, M115A2	2	61		
	Base, coupling, firing device	1	5		
	Cap, blasting, electric, M6	1	234	1	
	Cartridge case, 40mm (projectile removed/case intact)	1	1	1	
	Cartridge, 20mm, target practice, M204	1	1		
	Cartridge, 40mm, practice, M781	1		23	

Table 2-1
Parker Flats MRA Historical MEC Items Recovered

Land Use	MEC Item	Hazard Classification	UXO	DMM	ISD
	Cartridge, grenade, auxiliary, M7	1	4		
	Cartridge, ignition, flamethrower, M2-2	1		1	
	Cartridge, ignition, M2 series	1	14	19	
	Cartridge, ignition, M4 series	1	2	2	
	Charge, black powder, practice grenade	1	0		
	Firing device, pressure, M1A1	1	2		
	Firing device, pull, M1	1	1		
	Firing device, release, M1	1	22		
	Firing device, tension and release, M3	1	6		
	Flare, surface, trip, M49 series	1	156		6
	Fuse, time, blasting, M700	1	2		
	Fuze, grenade (model unknown)	1	3		
	Fuze, grenade, hand, M10 series	1	107	496	
	Fuze, grenade, hand, M204 series	1	10	2	
	Fuze, grenade, hand, M206 series	1	5		
	Fuze, grenade, hand, M213	1	14		
	Fuze, grenade, hand, practice, M205 series	1	347	109	
	Fuze, grenade, hand, practice, M228	1	372	107	
	Fuze, mine, antitank, practice, M604	1	3		
	Fuze, projectile, combination, M1907	1	9		
	Grenade, hand, Illumination, MK I	1	24		
	Grenade, hand, incendiary, TH3, AN-M14	1	1		
	Grenade, hand, practice, M30	1	9		
	Grenade, hand, practice, M69	1	5		
	Grenade, hand, practice, MK II	1	28	1	
	Grenade, hand, riot, CS, M7A3	1	20	1	
	Grenade, hand, riot, CS-1, ABC-M25A2	1	3		
	Grenade, hand, smoke, HC, AN-M8	1	9		
	Grenade, hand, smoke, M18 series	1	32	2	
	Grenade, rifle, smoke, M22 series	1	10	8	
	Mine, antipersonnel, practice, M8 series	1	23		
	Mine, antitank, practice, M12 series	1	2		

Table 2-1
Parker Flats MRA Historical MEC Items Recovered

Land Use	MEC Item	Hazard Classification	UXO	DMM	ISD
	Mine, antitank, practice, M20	1	1		
	Pot, 10lb, smoke, HC, screening, M1	1	8		
	Pot, 2.5lb, smoke, HC, screening, M1	1	8		
	Pot, smoke, HC, MK III	1	2		
	Projectile, 22mm, subcaliber, practice, M744	1	12		
	Projectile, 3inch, trench mortar, practice, MK I (Stokes)	1	313		
	Projectile, 40mm, cluster, white star, M585	1	2		
	Projectile, 40mm, parachute, illumination, M583 series	1	2		
	Projectile, 40mm, smoke, M680 series	1	1		
	Propellant, 60mm, wafers, mortar	1	2		
	Rocket, 35mm, subcaliber, practice, M73	1	10		
	Signal, ground, rifle, parachute, M17 series	1	12		
	Signal, illumination, AN-M43 series	1	5		
	Signal, illumination, AN-M53A2 series	1	2		
	Signal, illumination, ground, M20A1	1	4		
	Signal, illumination, ground, parachute, rifle, M19 series	1	17	6	
	Signal, illumination, M187	1	2		
	Signal, smoke, ground, M62 series	1	1		
	Signal, smoke, ground, M65 series	1	1		
	Simulator, detonation, explosive, M80	1	2		
	Simulator, explosive boobytrap, flash, M117	1	3		
	Simulator, explosive boobytrap, illumination, M118	1	3		
	Simulator, explosive boobytrap, whistling, M119	1	1		
	Simulator, flash artillery, M110	1	5		
	Simulator, flash artillery, M21	1	5		
	Simulator, launching, antitank guided missile and rocket, M22	1	72		
	Simulator, projectile, airburst, M74 series	1	33		
	Squib, electric	1	1		
	Rocket, 2.36inch, practice, M7	0	3		
	Ash, Pyrotechnic	999	8		
	Bulk Pyrotechnic mixture (model unknown)	999	0		
	Cord, detonating	999	1	1	

Table 2-1
Parker Flats MRA Historical MEC Items Recovered

Land Use	MEC Item	Hazard Classification	UXO	DMM	ISD
	Ordnance Components	999	2		
	Non-Residential Development Area Total	**--**	**2,232**	**786**	**12**
Residential Areas	Grenade, hand, fragmentation, MK II	3	1		
	Grenade, hand, smoke, white phosphorous, M15	3	1		
	Grenade, rifle, antitank, M9 series	3	3		
	Grenade, rifle, smoke, white phosphorous, M19A1	3	1		
	Charge, nitrostarch, 0.25lb	2	0		
	Signal, illumination, ground, M125 series	2	1		
	Signal, illumination, ground, M126 series	2	1		
	Cap, blasting, electric, M6	1	2		
	Cartridge, 40mm, practice, M781	1		1	
	Cartridge, grenade, auxiliary, M7	1	9		
	Cartridge, ignition, M2 series	1		1	
	Flare, surface, trip, M49 series	1	1		2
	Fuze, grenade, hand, M10 series	1		2	
	Fuze, grenade, hand, M204 series	1	24		
	Fuze, grenade, hand, practice, M205 series	1	214	78	
	Fuze, grenade, hand, practice, M228	1	16	25	
	Fuze, projectile, combination, M1907	1	1		
	Grenade, hand, illumination, MK I	1	1		
	Grenade, hand, practice, MK II	1	2		
	Grenade, hand, riot, CS, M7A3	1	1		
	Grenade, hand, smoke, M18 series	1	5		
	Grenade, rifle, smoke, M22 series	1		2	
	Grenade, rifle, smoke, M23 series	1	1		
	Primer, ignition, percussion, M82	1	8		
	Projectile, 3inch, trench mortar, practice, MK I (Stokes)	1	4		
	Signal, ground, rifle, parachute, M17 series	1	2		
	Signal, illumination, aircraft, AN-M37 series	1	3		
	Simulator, explosive boobytrap, flash, M117	1	1		
	Simulator, projectile, airburst, M74 series	1	1		
	Ash, Pyrotechnic	999	5		

Table 2-1
Parker Flats MRA Historical MEC Items Recovered

Land Use	MEC Item	Hazard Classification	UXO	DMM	ISD
	Residential Area Total	--	**309**	**109**	**2**
	GRAND TOTAL	--	**2,859**	**917**	**24**

Notes: MRA = Munitions Response Area
MEC = Munitions and Explosives of Concern
UXO = Unexploded ordnance
DMM = Discarded Military Munitions
ISD = Insufficient Data (munitions)
mm = millimeter
lbs = pounds
TNT = trinitrotoleuene
CS = 0-chlorobenzalmalononitrile (white solid powder)
HC = hexachloroethane/zinc (smoke mixture)

MEC Hazard Classification Code:
0 = Inert, will cause no injury
1 = Will cause an injury or, in extreme cases, could cause major injury or death to an individual if functioned by an individual's activities.
2 = Will cause major injury or, in extreme cases, could cause death to an individual if functioned by an individual's activities.
3 = Will kill an individual if detonated by an individual's activities.
999 = Assigned to items in the Military Munitions Response Program (MMRP) database when the exact item could not be identified.

Reference: Fort Ord Military Munitions Response Program (MMRP) Database, 2011

Table 4-1
Parker Flats MRA Phase II Blind Quality Control Seeds

Land Use	Seed ID	Grid ID	Seed Size (inches)	Depth (inches)[c]	Orientation	Target ID	Offset from Control (feet)	Response Amplitude (millivolts)
DGM Operations								
Habitat Reserve Area	1	C3H6D9	1 x 4	6	Horizontal	1360	NA [1]	160.27
	2	C3G6J2	1 x 4	6	Horizontal	1271	1.96	145.30
	3	NA[6]	1 x 4	6	Horizontal	NA [6]	NA [6]	NA [6]
	4	C3G4F6	1 x 4	6	Horizontal	600	1.49	1263.30
	5	C3G3B6	1 x 4	6	Horizontal	309	0.75	188.28
	6	NA[6]	1 x 4	6	Horizontal	NA [6]	NA [6]	NA [6]
	7	C3H6D4	1 x 4	6	Horizontal	1286	1.50	327.92
	8	C3H5E5	1 x 4	6	Horizontal	913	1.05	281.95
	9	NA[6]	1 x 4	6	Horizontal	NA [6]	NA [6]	NA [6]
	10	C3G4C8	1 x 4	6	Horizontal	669	NA [2]	307.84
	12	C3G5J7	1 x 4	6	Horizontal	1034	0.47	131.65
	13 [a]	C3G5B6	1 x 4	6	Horizontal	1026	1.80	248.82
	14	C3G2B0	1 x 4	6	Horizontal	237	1.81	203.15
	15	C3G3G3	1 x 4	6	Horizontal	263	0.82	158.18
	16	C3H3A6	1 x 4	6	Horizontal	313	0.82	332.01
	17	C3G2G0	1 x 4	6	Horizontal	245	0.80	383.70
	18 [a]	C3G3F8	1 x 4	6	Horizontal	398	0.83	259.98
	19	C3G2B7	1 x 4	6	Horizontal	203	1.46	311.26
	20	C3G2D5	1 x 4	6	Horizontal	191	1.89	168.50
Non-Residential Development Areas	PFDAQC-seed-7 [a]	C3G3J1	1 x 4	8	Horizontal	52	0.89	141.86
	PFDAQC-seed-8	C3H2A0	1 x 4	8	Horizontal	62	0.39	139.00
	PFDAQC-1	C3G3A5	1 x 4	8	Horizontal	187	0.77	347.98
	PFDAQC-2	C3F2J9	1 x 4	8	Horizontal	61	0.55	201.21
	PFDAQC-3	C3F2J4	1 x 4	8	Horizontal	472	1.49	126.17
	PFDAQC-4	C3F2H3	1 x 4	8	Horizontal	217	1.60	353.82
	PFDAQC-5	C3G1A1	1 x 4	8	Horizontal	1074	1.63	96.13
	PFDAQC-7	C2G0H2	1 x 4	8	Horizontal	119	0.90	131.34
	PFDAQC-8	C2G0I2	1 x 4	8	Horizontal	530	1.71	283.87
	PFDAQC-9	C2H0A7	1 x 4	6	Horizontal	1513	1.59	312.74
	PFDAQC-10	C2H0B8	1 x 4	6	Horizontal	1939	1.69	321.99
	QC Seed 34[a]	C2D6A5	1 x 4	12	Horizontal	2138	NA[3]	NA[3]
	QC Seed 35	C2C6J7	1 x 4	12	Horizontal	2043	1.26	71.61
	QC Seed 36	C2C6I0	1 x 4	12	Horizontal	1907	0.43	129.51
	QC Seed 37	C2C7J1	1 x 4	12	Horizontal	1966	1.22	82.18
	QC Seed 38	C2C7H3	1 x 4	12	Horizontal	1601	1.47	104.75
	QC Seed 39	C2C7J3	1 x 4	12	Horizontal	1961	0.79	68.51
	QC Seed 40	C2C7I5	1 x 4	12	Horizontal	1891	1.15	69.01

Table 4-1
Parker Flats MRA Phase II Blind Quality Control Seeds

Land Use	Seed ID	Grid ID	Seed Size (inches)	Depth (inches)[c]	Orientation	Target ID	Offset from Control (feet)	Response Amplitude (millivolts)
	QC Seed 41	C2C7G5	1 x 4	12	Horizontal	1346	1.35	41.20
	QC Seed 42	C2C7F7	1 x 4	12	Horizontal	715	0.94	64.61
	QC Seed 43	C2C7H7	1 x 4	12	Horizontal	1574	1.91	74.31
	QC Seed 44	C2C7J7	1 x 4	12	Horizontal	1953	1.74	101.03
	QC Seed 45	C2C7G9	1 x 4	12	Horizontal	1278	1.41	82.42
	QC Seed 121	C2D7C3	1 x 4	6	Horizontal	31	NA [4]	57.11
	QC Seed 122	C2D7B2	1 x 4	6	Horizontal	35	NA [4]	30.15
	QC Seed 123	C2D6C9	1 x 4	6	Horizontal	60	NA [4]	52.95
	QC Seed 124	C2D6C8	1 x 4	6	Horizontal	64	NA [4]	65.30
	QC Seed 125	C2D6B8	1 x 4	6	Horizontal	57	NA [4]	347.22
Residential Areas	QC Seed 1	C2C7G1	1 x 4	12	Horizontal	14	1.75	66.68
	QC Seed 2	C2G6G0	1 x 4	12	Horizontal	4	1.94	67.02
	QC Seed 3 [b]	C2C6F9	1 x 4	12	Horizontal	31	0.21	57.11
	QC Seed 4	C2C6E0	1 x 4	12	Horizontal	23	1.02	76.48
	QC Seed 5	C2C6D9	1 x 4	12	Horizontal	73	1.51	56.62
	QC Seed 6 [a]	C2C6DO	1 x 4	12	Horizontal	13	0.67	81.46
	QC Seed 7	C2C6B9	1 x 4	12	Horizontal	10	1.49	81.99
	QC Seed 8	C2C6B8	1 x 4	12	Horizontal	10	1.15	92.26
	QC Seed 9	C2C6A8	1 x 4	12	Horizontal	45	1.91	85.20
	QC Seed 10	C2C6A9	1 x 4	12	Horizontal	9	1.65	86.18
	QC Seed 11	C2B6I8	1 x 4	12	Horizontal	20	1.78	78.17
	QC Seed 12 [a]	C2B6J7	1 x 4	12	Horizontal	10	0.52	69.00
	QC Seed 13	C2C6B7	1 x 4	12	Horizontal	10	1.49	80.95
	QC Seed 14	C2C6H8	1 x 4	12	Horizontal	14	1.29	128.45
	QC Seed 15	C2C6C2	1 x 4	12	Horizontal	21	1.61	142.03
	QC Seed 16	C2C6C5	1 x 4	12	Horizontal	8	1.26	65.15
	QC Seed 17	C2C6E3	1 x 4	6	Horizontal	15	1.19	229.50
	QC Seed 18	C2C6E3	1 x 4	12	Horizontal	15	NA [5]	229.50
	QC Seed 19	C2C6A2	1 x 4	12	Horizontal	10	1.72	86.74
	QC Seed 20	C2C6A3	1 x 4	12	Horizontal	8	1.23	85.62
	QC Seed 21	C2B6J2	1 x 4	12	Horizontal	61	1.31	49.66
	QC Seed 22	C2B6J3	1 x 4	12	Horizontal	112	1.54	41.52
	QC Seed 23	C2C6A5	1 x 4	12	Horizontal	5	1.55	79.52
	QC Seed 24	C2C6H4	1 x 4	12	Horizontal	7	1.25	96.49
	QC Seed 25	C2C6D7	1 x 4	12	Horizontal	11	1.14	99.87
	QC Seed 26	C2C6I6	1 x 4	12	Horizontal	14	1.17	62.70
	QC Seed 27	C2C6G7	1 x 4	12	Horizontal	26	0.29	50.44
	QC Seed 28	C2C6F5	1 x 4	12	Horizontal	18	1.69	94.39
	QC Seed 29	C2C6F7	1 x 4	12	Horizontal	1	1.34	53.37

Table 4-1
Parker Flats MRA Phase II Blind Quality Control Seeds

Land Use	Seed ID	Grid ID	Seed Size (inches)	Depth (inches)[c]	Orientation	Target ID	Offset from Control (feet)	Response Amplitude (millivolts)
	QC Seed 30	C2B6I5	1 x 4	12	Horizontal	10	1.82	75.20
	QC Seed 31	C2B6G4	1 x 4	12	Horizontal	17	1.46	45.86
	QC Seed 32	C2B6H2	1 x 4	12	Horizontal	11	1.58	94.69
	QC seed 33	C2B5G0	1 x 4	12	Horizontal	66	1.35	88.32
	QC Seed 49	C2G8H2	1 x 4	12	Horizontal	350	1.06	76.00
	QC Seed 50	C2G8H4	1 x 4	12	Horizontal	715	1.58	54.53
	QC Seed 51	C2G8E5	1 x 4	12	Horizontal	973	1.41	34.94
	QC Seed 52	C2G8G6	1 x 4	12	Horizontal	1189	1.36	101.60
	QC Seed 53	C2G8G8	1 x 4	12	Horizontal	1609	1.39	55.85
	QC Seed 54	C2G9F1	1 x 4	12	Horizontal	2074	1.47	73.86
	QC Seed 55	C2G9G2	1 x 4	12	Horizontal	2179	0.94	102.32
	QC Seed 56	C2G9H4	1 x 4	12	Horizontal	2297	1.84	92.89
	QC Seed 62	NA [6]	1 x 4	NA [6]	Horizontal	NA [6]	NA [6]	NA [6]
	QC Seed 63	C2H0A1	1 x 4	12	Horizontal	4336	1.24	68.80
	QC Seed 64	C2G9J9	1 x 4	12	Horizontal	4217	1.56	55.20
	QC Seed 65	C2F7H1	1 x 4	12	Horizontal	792	1.72	49.37
	QC Seed 66	C2F6J0	1 x 4	12	Horizontal	488	0.80	270.88
	QC Seed 67	C2G7B1	1 x 4	12	Horizontal	766	1.56	75.97
	QC Seed 68	C2G6A9	1 x 4	12	Horizontal	277	1.40	227.77
						Minimum Offset	0.21	
						Maximum Offset	1.96	
						Average Offset	1.31	
Analog Operations								
Habitat Reserve Area	QC Seed 19	C3G1E5	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 20	C3G1G1	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 17	C3G1G9	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 15	C3G2C8	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 18	C3G2D2	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 16	C3G2F5	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 9	C3G2H0	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 14	C3G3C2	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 13	C3G3E5	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 12	C3G3H7	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 11	C3G4I1	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 10	C3G4J5	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 8	C3G5F1	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 7	C3G5H4	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 1	C3G6J4	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 5	C3H4E7	1 x 4	0	Horizontal	NA	NA	NA

Table 4-1
Parker Flats MRA Phase II Blind Quality Control Seeds

Land Use	Seed ID	Grid ID	Seed Size (inches)	Depth (inches)[c]	Orientation	Target ID	Offset from Control (feet)	Response Amplitude (millivolts)
	QC Seed 6	C3H5B3	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 3	C3H5C9	1 x 4	0	Horizontal	NA	NA	NA
	QC Seed 4	C3H5G1	1 x 4	0	Horizontal	NA	NA	NA
	11	C3H5H5	1 x 4	6	Horizontal	NA [6]	NA [6]	NA [6]
	QC Seed 2	C3H6G6	1 x 4	0	Horizontal	NA	NA	NA
Non-Residential Development Areas	QC Seed 48	C2C7J7	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 112	C2D6C6	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 113	C2D6C6	1 x 4	12	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 114	C2D6C7	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 115	C2D6C7	1 x 4	12	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 116	C2D6D9	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 118	C2D6E8	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 120	C2D6G7	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 46	C2D7A2	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 47	C2D7A4	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 117	C2D7E2	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 119	C2D7F1	1 x 4	6	Horizontal	NA	NA	NA
	PFDAQC-6	C3F1J2	1 x 4	8	Horizontal	NA [8]	NA [8]	NA [8]
	PFDAQC-seed-6	C3H3B3	1 x 4	8	Horizontal	NA [7]	NA [7]	NA [7]
	PFDAQC-seed-4	C3H3B8	1 x 4	8	Horizontal	NA [7]	NA [7]	NA [7]
	PFDAQC-seed-5	C3H3C6	1 x 4	8	Horizontal	NA [7]	NA [7]	NA [7]
	PFDAQC-seed-3	C3H3D9	1 x 4	8	Horizontal	NA [7]	NA [7]	NA [7]
	PFDAQC-seed-2	C3H4D2	1 x 4	8	Horizontal	NA [7]	NA [7]	NA [7]
	PFDAQC-seed-1	C3H4E4	1 x 4	8	Horizontal	NA [7]	NA [7]	NA [7]
Residential Areas	QC Seed 58	C2F0I2	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 106	C2F6H9	1 x 4	2	Vertical	NA	NA	NA
	QC Seed 107	C2F6I5	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 69	C2F7J0	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 70	C2F7J9	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 74	C2F8I3	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 75	C2F8J4	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 76	C2F8J6	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 77	C2F8J8	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 57	C2F9H0	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 3	C2F9H8	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 85	C2F9J4	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 86	C2F9J7	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 59	C2G0A3	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 60	C2G0C2	1 x 4	6	Horizontal	NA	NA	NA

Table 4-1
Parker Flats MRA Phase II Blind Quality Control Seeds

Land Use	Seed ID	Grid ID	Seed Size (inches)	Depth (inches)[c]	Orientation	Target ID	Offset from Control (feet)	Response Amplitude (millivolts)
	QC Seed 108	C2G6A5	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 109	C2G6A5	1 x 4	12	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 100	C2G6A9	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 101	C2G6A9	1 x 4	12	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 102	C2G6A9	1 x 4	18	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 103	C2G6C0	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 104	C2G6C0	1 x 4	12	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 71	C2G7A8	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 72	C2G7A9	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 105	C2G7E2	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 73	C2G8A1	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 110	C2G8J3	1 x 4	2	Horizontal	NA	NA	NA
	QC Seed 111	C2G8J3	1 x 4	4	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 81	C2G9B2	1 x 4	2	Horizontal	NA	NA	NA
	QC Seed 87	C2G9B4	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 88	C2G9B6	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 84	C2G9C3	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 83	C2G9D4	1 x 4	2	Horizontal	NA	NA	NA
	QC Seed 2	C2G9D8	1 x 4	8	Horizontal	NA	NA	NA
	QC Seed 82	C2G9E7	1 x 4	2	Horizontal	NA	NA	NA
	QC Seed 79	C2G9F5	1 x 4	2	Horizontal	NA	NA	NA
	QC Seed 78	C2G9G4	1 x 4	2	Horizontal	NA	NA	NA
	QC Seed 80	C2G9G7	1 x 4	2	Horizontal	NA	NA	NA
	QC Seed 89	C2G9H3	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 97	C2G9H7	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 61	C2G9H9	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 96	C2G9I5	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 94	C2G9J4	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 95	C2G9J6	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 98	C2H9A7	1 x 4	6	Horizontal	NA	NA	NA
	QC Seed 99	C2H9A7	1 x 4	10	Horizontal	NA [5]	NA [5]	NA [5]
	QC Seed 91	C2H9B3	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 90	C2H9B5	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 93	C2H9C4	1 x 4	4	Horizontal	NA	NA	NA
	QC Seed 92	C2H9D2	1 x 4	4	Horizontal	NA	NA	NA

Notes: MRA = Munitions Response Area
DGM = Digital geophysical mapping

Table 4-1
Parker Flats MRA Phase II Blind Quality Control Seeds

NA = Not applicable (with the following additional numbered notes when applicable)

a. Multiple targets with overlapping dig radii; offset calculated from nearest selected target.
b. Seed was selected as a target; however, it was not retrieved during investigation (refer to NCR-002).
c. Depth of seed (inches) is based on depth that Unexploded Ordnance Quality Control Specialist (UXOQCS) placed the seed.

1. Area of real-time kinematic (RTK) signal loss; target selected with aid of compass correction algorithm, which was an offset of 2.30 feet.
2. Seed was buried outside the DGM survey area; a corresponding DGM target was placed on the edge of the DGM survey area boundary, which was an offset of 2.21 feet.
3. Seed millivolt (mV) reading was below the target selection threshold of 50 mV; seed was found during investigation of a nearby target, which was an offset of 2.30 feet.
4. Line and fiducial target.
5. Seed was stacked below the previously listed seed.
6. Seed was buried outside the DGM survey area; retrieved by the UXOQCS.
7. Seed was buried outside the DGM survey area; retrieved during analog operations.
8. Seed was retrieved during soil screening operations.

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
178331	C3F2G1	13	507.70	0.50
178333	C3F2G1	16	1760.80	0.54
178335	C3F2G3	17	1737.90	0.36
178337	C3F2G4	22	1022.10	0.00
178339	C3F2G4	10	730.00	1.39
179112	C3F1H0	251	1326.70	0.71
179114	C3F2I2	253	1054.70	0.20
179116	C3F2I3	249	285.50	NA [1]
179118	C3F2I4	256	1138.20	0.30
179120	C3F2I4	257	610.90	0.58
179122	C3F2H6	252	795.60	0.50
179861	C2F0J5	275	2834.30	1.13
179863	C2F0I5	268	1555.10	0.71
179865	C2F0J7	276	686.20	1.57
179875	C3F1J2	273	2513.40	0.30
179897	C3F2J2	411	1160.70	0.36
179899	C3F2J3	412	1524.40	0.36
179901	C3F2I4	408	561.20	0.41
179905	C3F2I6	410	1166.20	0.54
179907	C3F2J7	413	1801.20	0.58
180648	C2G0A4	672	1730.80	0.71
180650	C2F0J6	666	1602.40	0.00
180662	C3G1A2	671	2258.50	0.42
180664	C3G1A2	669	3709.70	0.70
180682	C3G2A2	499	1276.10	0.30
180696	C3G2A9	105	945.00	0.58
180698	C3G2A0	116	612.30	1.20
180700	C3F3J1	94	1039.70	0.71
180704	C3F3J3	91	1232.90	0.70
180706	C3F3J4	85	875.00	1.17
180708	C3F3J4	101	1684.20	0.28
180710	C3G3A5	106	709.30	0.54
180712	C3G3A7	107	1341.10	0.58
180714	C3G3A8	108	1547.40	0.50
180716	C3G3A8	109	1919.00	0.82
180718	C3F3J0	97	1287.40	0.50
180726	C3F4J4	99	631.70	1.12

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
180728	C3F4J5	100	1044.40	0.58
181427	C2G0B6	1219	1333.89	1.28
181429	C2G0A7	1211	1979.52	0.58
181431	C2G0A8	1214	1137.91	0.58
181433	C2G0A9	1209	1675.28	0.76
181437	C3G1A1	1215	2026.69	0.94
181503	C3G4B4	258	607.20	1.53
181505	C3G4B5	256	561.80	NA [2]
181507	C3G4A6	251	1741.50	0.76
181509	C3G4B7	257	862.00	0.57
182148	C2G0C6	1526	1945.90	0.50
182150	C2G0B7	1522	1722.20	0.58
182152	C2G0B8	1523	1773.90	0.50
182154	C2G0B9	1525	1187.10	0.54
182160	C3G1B2	1528	352.80	0.71
182162	C3G1C2	1531	675.30	0.71
182869	C2G0C5	1875	565.90	0.50
182871	C2G0D6	1880	2665.60	0.20
182873	C2G0D7	1882	2614.80	0.58
182875	C2G0D9	1881	1703.90	0.30
182883	C3G1C3	1878	1155.50	0.83
183594	C2G0E8	2021	1071.90	0.92
183596	C2G0D9	2019	1695.90	0.50
184309	C2G0F5	2096	1910.90	0.30
184311	C2G0E6	2094	825.60	0.86
185747	C2G0H3	82	613.50	1.28
185749	C2G0H4	81	753.30	0.80
186464	C2G0H1	323	1268.60	0.50
186466	C2G0H2	324	1383.90	0.80
186468	C2G0H3	319	1654.90	1.04
186472	C2G0I4	326	1020.50	0.54
187181	C2G9I9	780	1428.00	0.58
187183	C2G9I0	784	834.50	0.20
187185	C2G0I1	787	1062.10	1.00
187187	C2G0I1	774	642.60	1.08
187197	C2G0I7	789	1802.00	0.00
187199	C2G0J8	791	1661.10	0.85
187914	C2G0J1	1336	1122.90	1.22

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
187916	C2H0A1	1348	773.20	1.28
187922	C2G0J5	1338	846.40	1.04
187926	C2G0J6	1340	1127.20	0.54
187928	C2H0A7	1345	1773.80	0.71
187930	C2H0A8	1342	1494.50	0.36
187932	C2H0A9	1347	1851.50	0.54
187934	C2H0A0	1343	1952.20	0.36
187936	C3H1A1	1344	1873.50	0.76
187938	C3H1A3	1353	1437.50	1.39
188665	C2H0A6	1830	1536.90	0.83
188667	C2H0A7	1833	1915.30	0.00
188669	C2H0A7	1828	1118.70	0.54
188671	C2H0B9	1836	94.40	1.04
188673	C2H0A0	1829	1124.70	0.58
188675	C3H1A1	1827	622.90	0.73
189388	C2H0B7	1987	995.30	1.13
189390	C2H0B8	1988	1556.00	0.50
PF008	C2B5C7	1	1010.89	0.56
PF014	C2B5C7	41	586.14	0.74
PF015	C2B5C8	10	1156.69	0.25
PF016	C2B5D9	1	1691.40	0.56
PF025	C2B5D8	39	836.49	0.74
PF026	C2B5D9	16	1229.82	0.35
PF027	C2B6D1	9	1347.31	0.96
PF028	C2B6D2	6	1619.13	0.50
PF034	C2B5E8	47	1865.64	0.35
PF035	C2B5E9	34	510.54	0.56
PF036	C2B5E9	33	1110.66	1.12
PF037	C2B5E0	37	1181.21	0.56
PF038	C2B6E2	36	1615.56	0.90
PF039	C2B6E2	38	1412.89	0.37
PF040	C2B6E4	6	1911.80	0.00
PF049	C2B5G0	5	490.09	0.71
PF050	C2B5F0	31	1150.46	0.46
PF051	C2B6G1	2	884.29	0.79
PF052	C2B6G3	2	1212.46	0.56
PF053	C2B6F4	49	1321.26	0.56
PF054	C2B6G5	1	1145.79	0.50

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
PF055	C2B6G6	2	1763.00	0.25
PF056	C2B6G7	1	1245.79	0.75
PF061	C2B5G0	70	1188.43	0.71
PF062	C2B5H0	5	1544.30	0.56
PF063	C2B6G1	10	1215.74	0.38
PF064	C2B6H3	1	1664.73	0.00
PF065	C2B6H4	1	1177.34	0.56
PF066	C2B6H5	5	1452.35	0.35
PF067	C2B6G6	30	1411.57	0.35
PF068	C2B6G7	14	1590.75	0.35
PF074	C2B5I0	2	696.20	1.30
PF075	C2B6H1	7	504.18	0.64
PF076	C2B6I2	1	941.21	0.50
PF077	C2B6I3	2	1807.73	0.79
PF078	C2B6I4	2	2028.84	0.56
PF079	C2B6I5	1	1060.64	0.25
PF080	C2B6I6	2	1481.68	0.25
PF081	C2B6H7	18	1734.07	0.50
PF082	C2B6H8	93	2078.58	0.35
PF083	C2B6I8	2	1447.47	0.13
PF087	C2B6J1	3	867.20	0.58
PF088	C2B6I2	11	619.40	0.75
PF089	C2B6J3	1	1738.26	0.25
PF090	C2B6J4	3	795.72	0.20
PF091	C2B6I5	12	1669.01	0.30
PF092	C2B6I6	11	1770.81	0.25
PF093	C2B6I7	14	1598.47	0.75
PF094	C2B6I8	21	983.22	1.58
PF095	C2B6I8	22	582.08	0.48
PF099	C2B6J2	96	942.90	1.22
PF100	C2C6A2	4	2079.13	1.60
PF101	C2B6J4	6	1450.98	1.02
PF102	C2B6J5	9	1632.44	0.56
PF103	C2B6J6	9	1832.46	0.79
PF104	C2B6J7	19	1697.79	0.56
PF105	C2B6J7	20	1425.31	0.46
PF106	C2C6A9	1	1081.28	0.66
PF107	C2C6A0	1	1291.59	0.56

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
PF111	C2C6A2	28	1387.37	1.03
PF112	C2C6B3	4	1255.80	1.64
PF113	C2C6B4	2	1332.30	1.64
PF114	C2C6B5	1	1344.10	0.14
PF115	C2C6B6	2	1617.70	0.86
PF116	C2C6B7	1	1493.30	0.00
PF117	C2C6B8	2	1628.60	0.42
PF118	C2C6A9	15	1471.73	0.36
PF119	C2C6A0	4	882.10	1.01
PF122	C2C6B2	79	1503.10	0.56
PF123	C2C6B3	50	736.70	1.72
PF124	C2C6C4	3	567.32	1.03
PF125	C2C6C5	3	1116.20	0.86
PF126	C2C6C6	3	1252.83	1.12
PF127	C2C6C7	4	681.60	1.00
PF128	C2C6C7	5	1508.20	0.20
PF129	C2C6C8	3	725.10	0.76
PF130	C2C6C0	1	1010.23	0.75
PF134	C2C6C2	97	1519.17	1.06
PF135	C2C6D3	1	1330.90	1.00
PF136	C2C6D3	2	1840.10	0.82
PF137	C2C6D5	3	959.80	0.30
PF138	C2C6C6	9	1529.11	0.43
PF139	C2C6C7	59	1224.30	0.54
PF140	C2C6D8	1	1504.49	0.35
PF141	C2C6D9	1	1045.67	0.90
PF142	C2C6D0	1	1684.40	0.71
PF143	C2C7D1	1	1010.80	0.71
PF146	C2C6D1	56	2084.80	0.54
PF147	C2C6D3	54	1866.30	0.20
PF148	C2C6E3	5	991.80	0.76
PF149	C2C6D4	85	1168.20	0.28
PF150	C2C6E6	1	807.04	0.56
PF152	C2C6D8	78	840.64	0.25
PF153	C2C6E9	3	1351.70	0.86
PF154	C2C6E0	1	1392.40	0.50
PF155	C2C7E1	1	1131.90	0.42
PF158	C2C6E2	139	1091.90	1.46

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
PF159	C2C6E3	75	1377.70	0.50
PF160	C2C6E4	30	872.00	0.94
PF161	C2C6E5	11	998.40	0.36
PF162	C2C6F6	3	1676.90	0.58
PF163	C2C6F7	2	1382.80	0.30
PF164	C2C6E8	123	524.10	0.36
PF165	C2C6E9	11	200.40	0.36
PF166	C2C6F0	1	1317.10	0.30
PF167	C2C7F1	1	541.20	0.50
PF172	C2C6F3	16	1130.50	0.36
PF173	C2C6G4	1	1543.02	1.12
PF174	C2C6G5	1	1791.40	0.50
PF175	C2C6G6	1	578.10	0.71
PF176	C2C6F7	8	845.00	0.83
PF177	C2C6F8	35	1194.20	1.02
PF178	C2C6F9	52	1368.20	0.54
PF179	C2C6G0	2	1281.50	0.30
PF180	C2C7F1	38	1596.40	0.20
PF181	C2C7G2	1	1192.60	0.79
PF184	C2C6H3	2	412.30	1.53
PF185	C2C6H4	2	660.46	0.48
PF186	C2C6H5	3	1186.97	1.28
PF187	C2C6H6	8	1120.90	1.53
PF188	C2C6H7	2	586.00	0.25
PF189	C2C6G8	36	988.80	0.94
PF190	C2C6H9	1	1130.50	0.30
PF191	C2C6H9	2	843.20	0.20
PF192	C2C7G1	31	1422.57	0.39
PF193	C2C7G1	30	842.44	0.56
PF196	C2C6H3	38	989.90	0.73
PF197	C2C6I4	2	1016.13	0.79
PF198	C2C6I4	1	1365.29	0.25
PF199	C2C6I6	2	1906.12	0.71
PF200	C2C6H7	14	1099.85	0.79
PF201	C2C6I8	1	1578.63	0.25
PF202	C2C6H9	55	153.10	1.87
PF203	C2C6H0	56	1594.60	0.83
PF208	C2C6I3	92	1443.25	0.56

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
PF209	C2C6J5	1	1455.00	0.32
PF210	C2C6I6	37	611.11	0.35
PF211	C2C6I6	39	932.48	0.60
WA-IV_150954	C2C7D0	198	1331.30	0.20
WA-IV_151792	C2C7E8	447	1541.10	0.50
WA-IV_151796	C2C8E1	449	626.80	1.04
WA-IV_151798	C2C8E1	448	237.00	0.22
WA-IV_152630	C2C7F6	685	1230.90	0.36
WA-IV_152634	C2C7E8	684	1111.70	0.50
WA-IV_152636	C2C7F0	688	976.50	1.41
WA-IV_152638	C2C8F1	689	1458.40	1.53
WA-IV_152640	C2C8F2	687	857.60	0.71
WA-IV_153470	C2C7F5	959	524.90	0.00
WA-IV_153472	C2C7G6	961	1079.60	0.45
WA-IV_153474	C2C7G8	966	770.50	0.98
WA-IV_153476	C2C7G9	963	1235.80	0.58
WA-IV_153478	C2C7G0	967	1364.50	0.94
WA-IV_153480	C2C8G1	968	1185.40	0.94
WA-IV_153482	C2C8G2	964	1185.80	0.71
WA-IV_154306	C2C7H2_E18.1.2	1368	1098.70	0.20
WA-IV_154310	C2C7G5	1369	1035.40	0.82
WA-IV_154312	C2C7H6	1373	1627.60	0.30
WA-IV_154314	C2C7H7	1378	1522.20	0.94
WA-IV_154316	C2C7H8	1381	1329.00	0.80
WA-IV_154318	C2C7H9	1375	992.70	0.50
WA-IV_154320	C2C7G9	1371	1325.80	0.10
WA-IV_154322	C2C8H1	1379	1284.40	0.58
WA-IV_154324	C2C8G2	1384	393.80	0.30
WA-IV_155142	C2C6I0	1655	1212.90	0.50
WA-IV_155146	C2C7H2_E18.1.1	1656	557.20	0.89
WA-IV_155148	C2C7I3_E18.1.2	1667	1380.90	0.58
WA-IV_155150	C2C7I4	1670	1368.10	1.04
WA-IV_155152	C2C7I5	1663	1495.40	0.58
WA-IV_155154	C2C7I6	1659	73.80	NA [1]
WA-IV_155156	C2C7I7	1660	1653.80	0.36
WA-IV_155158	C2C7I8	1665	1509.50	0.71
WA-IV_155160	C2C7I9	1661	1119.70	0.42
WA-IV_155162	C2C7I9	3006	1549.10	0.50

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
WA-IV_155982	C2C6J9	1924	730.20	0.58
WA-IV_155984	C2C6I0	1919	1103.70	0.36
WA-IV_155986	C2C7J1	1926	1248.60	0.58
WA-IV_155988	C2C7J2	1934	831.00	0.81
WA-IV_155990	C2C7J3_E18.1.1	1920	264.10	0.50
WA-IV_155992	C2C7J4	1933	1329.20	0.80
WA-IV_155994	C2C7J5	1927	1406.70	0.58
WA-IV_155996	C2C7J5	1929	1249.40	0.30
WA-IV_155998	C2C7J6	1918	508.80	0.50
WA-IV_156818	C2C6J3_E18.1.1	2080	94.40	1.50
WA-IV_156822	C2C6J6_E18.1.1	2084	714.10	0.30
WA-IV_156824	C2C6J6_E18.1.1	2079	995.70	0.50
WA-IV_156826	C2C6J8	2081	1524.70	0.36
WA-IV_156828	C2D6A9	2090	1080.40	0.71
WA-IV_156838	C2C7J4	2085	1583.40	0.30
WA-IV_156840	C2D7A5	2089	1319.50	0.30
WA-IV_156842	C2D7A6	2086	376.90	0.50
LA183548	C2G8E4	949	986.40	1.03
LA183550	C2G8E5_E19a.1	1158	1715.00	0.82
LA183552	C2G8E6	1361	766.70	1.64
LA184269	C2G8F4	956	1545.00	0.00
LA184271	C2G8E6	1160	744.70	0.30
LA184273	C2G8F6	1359	91.10	0.85
LA184275	C2G8F7	1551	1395.70	0.82
LA184277	C2G8F8	1779	1672.00	0.00
LA184279	C2G8F9	1943	1771.90	0.50
LA184281	C2G8F0	2063	1308.60	0.54
LA184283	C2G9E2	2170	1541.70	0.00
LA184285	C2G9F2	2251	1059.60	0.86
LA184982	C2G7G0	68	564.60	0.78
LA184984	C2G8G2	280	1396.40	0.50
LA184986	C2G8G3	481	1292.40	0.45
LA184988	C2G8F4	683	760.30	0.54
LA184990	C2G8G5_E18.1.3	953	1268.30	0.41
LA184992	C2G8F6	1161	1387.50	0.82
LA184994	C2G8F7	1364	1013.90	0.51
LA184996	C2G8F8	1555	990.00	0.36
LA184998	C2G8F9	1785	1558.00	0.57

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
LA185000	C2G8G0	1945	1068.80	0.41
LA185002	C2G9G1	2065	1489.50	0.50
LA185004	C2G9G2	2171	896.20	0.80
LA185006	C2G9F2	2252	777.10	0.36
LA185008	C2G9G4	2296	1779.80	0.58
LA185703	C2G8H1	88	377.70	1.00
LA185705	C2G8G1	281	1312.70	0.00
LA185707	C2G8H2	486	708.60	0.20
LA185709	C2G8G4	685	510.80	0.63
LA185711	C2G8H5	942	834.50	0.32
LA185713	C2G8G5_E18.1.3	1159	680.80	0.10
LA185715	C2G8H7	1369	1481.10	0.30
LA185717	C2G8H8	1556	1382.60	0.42
LA185719	C2G8H9	1784	926.90	0.50
LA185721	C2G8G9	1942	241.10	1.04
LA185723	C2G8G0	2067	1805.70	0.50
LA185725	C2G9G1	2169	1379.30	0.54
LA185727	C2G9G2	2253	1189.50	0.20
LA185729	C2G9G4	2295	802.80	0.20
LA185731	C2G9H4	2339	1388.60	0.58
LA186424	C2G8I1	84	456.50	0.60
LA186426	C2G8I2	283	1483.60	0.30
LA186428	C2G8I3	487	1879.60	0.42
LA186430	C2G8H4	686	1115.10	0.58
LA187145	C2G8I1	90	489.10	0.78
LA187147	C2G8I2	282	1488.20	0.50
LA187149	C2G8J2	485	1076.40	0.10
AT185745	C2G0H2	4060	1418.80	0.30
AT186462	C2G9I0	4142	1557.30	0.00
AT186464	C2G0I1_E19a.1	4143	1472.70	0.50
AT187181	C2G9I8	4205	569.90	0.45
AT187183	C2G9I0	4207	391.30	0.36
AT187185	C2G9I0	4210	529.40	0.22
AT187187	C2G0I2_E19a.1	4209	1677.80	0.20
AT187912	C2G9J0	4290	702.50	0.71
AT187914	C2H9A0	4295	1102.20	0.50
AT188657	C2H0B1	4341	953.50	0.54
NQ182072	C2G6C7	39	1528.00	0.36

Table 4-2
Parker Flats MRA Phase II Known Quality Control Seeds

Known QC Seed (Grid Corner Spike) ID	Grid ID	Target ID	Response Amplitude (milivolts)	Offset from Burial Location (feet)
NQ182795	C2G6C8	337	1617.10	0.20
NQ183510	C2G6D5	770	913.50	1.12
NQ183512	C2G6D6	772	1222.70	0.54
NQ183516	C2G6D8	775	1020.10	0.28
NQ184233	C2G6F6	1611	1859.70	0.94
NQ184235	C2G6E8	1601	728.40	0.58
NQ184956	C2G6G7	2008	567.70	0.86
RT179010	C2F6I0_E18.1.1	320	668.40	NA [1]
RT179012	C2F6I0_E18.1.1	694	541.90	0.61
RT179789	C2F6J8_E18.1.1	138	1580.20	0.82
RT179791	C2F6J0_E18.1.1	328	1566.00	0.58
RT179793	C2F6J0_E18.1.3	698	1534.10	0.36
RT180576	C2F6J9_E18.1.3	140	1086.30	0.00
RT180578	C2F6J0_E18.1.3	326	815.00	0.20
RT180580	C2G7A1	702	1418.20	0.42
RT180582	C2F7J2	972	1267.40	0.50
RT181357	C2G6B0	684	1360.10	0.28
RT181359	C2G7A2	970	1904.00	0.36
RT182080	C2G7C1	969	1532.90	0.45
SW186472	C2G0I5	326	1020.53	0.54
SW187922	C2H0A5	1338	846.35	NA [1]
1	C2D6E9	1008	1406.80	1.04
2	C2D6D0	1003	908.10	0.94
3	C2D6C0	1000	945.40	0.89
			Minimum Offset	0.00
			Maximum Offset	1.87
			Average Offset	0.61

Notes: MRA = Munitions Response Area
QC = Quality Control
NA = Not applicable (with the following additional numbered notes)

1. Seed was buried outside the digital geophysical mapping (DGM) survey area and, therefore, was not selected as a target; seed was found during investigation of a nearby target.
2. DGM survey data indicated that the seed was not buried at the location specified.

Table 5-1
Parker Flats MRA Phase II MEC and MD Recovered

Land Use	MEC Item	MEC Quantity		MD Weight	SAA Quantity
		DMM	UXO	lbs	
Habitat Reserve Area	Small arms ammunition				4,881
	Firing device, multi-option, M142	7			
	Firing device, pull, M1			0.6	
	Flare, surface, trip, M49 series	18	1	4.8	
	Fuze, grenade, hand, M10 series	1		1.4	
	Fuze, grenade, igniting, M201			1.7	
	Fuze, grenade, hand, practice, M205 series	65	1	3.0	
	Fuze, grenade, hand, practice, M228	7		3.5	
	Fuze, mine, antitank, practice, M1A1			0.1	
	Grenade, hand, practice, M30	1			
	Grenade, hand, practice, M69	2		13.0	
	Grenade, hand, practice, MK II	2		306.5	
	Grenade, hand, practice, M62			4.0	
	Grenade, hand, smoke, HC, AN-M8	3		1.0	
	Grenade, hand, smoke, M18 series	3		25.0	
	Grenade, hand, fragmentation, MK II			6.0	
	Grenade, hand, illumination, MK I			0.5	
	Grenade, rifle, antitank, practice, M11 series			6.0	
	Grenade, rifle, antitank, practice, M29			6.5	
	Mine, antipersonnel, practice, M16			18.0	
	Mine, antitank, practice, M1			10.0	
	Pot, 10lb, smoke, HC, screening, M1	3			
	Projectile, 5inch mortar, practice (model unknown)			50.0	
	Projectile, 20mm, high explosive (model unknown)			0.1	
	Projectile, 37mm, low explosive, MK I			1.4	
	Projectile, 40mm, cluster, white star, M585			0.5	
	Projectile, 40mm, parachute, star, M662			2.0	
	Projectile, 40mm, smoke, M680 series			1.3	
	Projectile, 60mm, mortar, high explosive, M49 series	1			
	Projectile, 75mm, Shrapnel, MK I			49.00	
	Projectile, 81mm, mortar, training, M68			11.0	
	Rocket, 2.36inch, practice, M7			14.0	
	Rocket, 3.5inch, practice, M29 series	2			
	Rocket, 5inch HVAR Navy type, practice			40.0	
	Signal, ground, rifle, parachute, M17 series		1	3.5	
	Signal, illumination, ground, M125 series	3		632.5	

Table 5-1
Parker Flats MRA Phase II MEC and MD Recovered

Land Use	MEC Item	MEC Quantity		MD Weight	SAA Quantity
		DMM	UXO	lbs	
	Signal, illumination, ground, M126 series			25.0	
	Signal, illumination, ground, parachute, rifle, M19 series	20		17.8	
	Signal, smoke and illumination, marine, AN-MK13, MOD 0	1			
	Simulator, explosive boobytrap, flash, M117	10			
	Simulator, explosive boobytrap, whistling, M119	5			
	Simulator, flash artillery, M110	1		3.0	
	Simulator, projectile, airburst, M74 series	1		36.1	
	Squib, electric	5			
	Cartridge case, 40mm (projectile removed/case intact)			0.8	
	Habitat Reserve Area Total	**161**	**3**	**1,299.4**	**4,881**
Non-Residential Development Areas	Small arms ammunition				15,106
	Firing device, pull, M1			0.2	
	Flare, surface, trip, M49 series	49		40.8	
	Flare, illumination (model unknown)			3.1	
	Flare, illumination 75mm (model unknown)			2.0	
	Fuze, practice (model unknown)			5.5	
	Fuze, surface trip, M49 (model unknown)			0.6	
	Fuze, grenade, hand, M10 series	84		201.9	
	Fuze, grenade, igniting, M201	1		2.5	
	Fuze, grenade, hand, practice, M205 series	54		3.2	
	Fuze, grenade, hand, practice, M228	12		55.1	
	Fuze, mine, antitank, practice, M1A1			1.1	
	Fuze, mine, combination, M10 series	1		0.5	
	Fuze, projectile, combination, M1907			4.0	
	Fuze, projectile, base detonating, practice, M38 w/o booster			0.1	
	Fuze, projectile, point detonating, M48 series			15.4	
	Fuze, projectile, point detonating, M52 series			1.0	
	Grenade, hand, illumination (model unknown)			0.5	
	Grenade, hand (model unknown)			1.5	
	Grenade, hand, practice, M30			3.0	
	Grenade, hand, practice, M69	1		28.5	
	Grenade, hand, practice, MK II	1		103.5	
	Grenade, hand, practice, M62			5.5	
	Grenade, hand, smoke, HC, AN-M8	2		3.0	
	Grenade, hand, smoke, M18 series	5		17.0	

Table 5-1
Parker Flats MRA Phase II MEC and MD Recovered

Land Use	MEC Item	MEC Quantity		MD Weight	SAA Quantity
		DMM	UXO	lbs	
	Grenade, hand, fragmentation, MK II			7.5	
	Grenade, hand, illumination, MK I	26			
	Grenade, hand, training, MK1A1			21.5	
	Grenade, rifle, antitank, practice, M11 series			6.0	
	Grenade, rifle, antitank, practice, M29			15.0	
	Grenade, rifle, smoke, M22 series			3.5	
	Grenade, rifle, illumination (model unknown)			5.5	
	Grenada, rifle, (model unknown)			3.0	
	Igniter, time fuse, blasting, M60			0.1	
	Mine, antitank, practice, M1			20.0	
	Mine, practice , M48 (model unknown)			2.0	
	Rocket motors, M222/M223 (DRAGON)			2.0	
	Pot, 10lb, smoke, HC, screening, M1	8		40.0	
	Projectile, mortar (model unknown)			170.7	
	Projectile, 20mm, (model unknown)			1.0	
	Projectile, 22mm, practice (model unknown)			0.5	
	Projectile, 25mm (model unknown)			0.5	
	Projectile, 37mm, armor piercing tracer, M51 series			40.6	
	Projectile, 37mm, armor piercing tracer, M80			2.5	
	Projectile, 37mm, low explosive, MK I		1	4.5	
	Projectile, 37mm, high explosive, MK II			1.0	
	Projectile, 40mm, practice, M385			2.5	
	Projectile, 40mm, practice, M407A1			1.0	
	Projectile, 40mm, parachute, star, M662	1			
	Projectile, 40mm, practice, M781			1.7	
	Projectile, 4.2inch, mortar, high explosive			13.5	
	Projectile, 4.2inch, mortar (model unknown)			8.0	
	Projectile, 60mm, mortar, high explosive, M49 series		1	3.5	
	Projectile, 60mm, mortar, illumination (model unknown)			1.0	
	Projectile, 60mm, mortar, (model unknown)			1.7	
	Projectile, 81mm, mortar, high explosive, M43 series		1		
	Projectile, 81mm, mortar, training, M68			35.5	
	Rocket, high explosive antitank, M6 (Nose)	1			
	Rocket, 2.36inch, practice, M7			10.5	
	Rocket, 3.5inch, practice, M29 series			460.5	
	Rocket, 35mm, subcaliber, practice, M73	2			

Table 5-1
Parker Flats MRA Phase II MEC and MD Recovered

Land Use	MEC Item	MEC Quantity		MD Weight	SAA Quantity
		DMM	UXO	lbs	
	Signal, ground, rifle, parachute, M17 series			4.0	
	Signal, illumination, ground, M125 series	10		338.5	
	Signal, illumination, ground, M126 series			8.5	
	Signal, illumination, ground, rifle, M18A1			5.0	
	Signal, illumination, ground, parachute, rifle, M19 series	4		28.0	
	Signal, (model unknown)			0.5	
	Simulator, grenade, hand, M116A1	4			
	Simulator, projectile, ground burst, M115A2	1			
	Simulator, projectile, airburst, M74 series	33		26.7	
	Projectile, 22mm, subcaliber, practice, M744			1.5	
	Cartridge case, 40mm (projectile removed/case intact)			3.3	
	Cartridge case, 25mm (model unknown)			0.5	
	Signal, illumination, ground,white star cluster, M18A1	5			
	Fragments			92.5	
	Non-Residential Development Areas Total	**305**	**3**	**1,895.3**	**15,106**
Residential Areas	Small arms ammunition			1.5	18,099
	Cartridge case (model unknown)			19.5	
	Cartridge case, 25mm (model unknown)			0.5	
	Cartridge case, 40mm (projectile removed/case intact)			2.5	
	Cartridge, 40mm, practice, M781	1			
	Cartridge case, 57 mm (projectile removed/case intact)			12.5	
	Flare, surface, trip, M49 series	2		1.2	
	Fuze, grenade, hand, M10 series			0.7	
	Fuze, grenade, igniting, M201	1		1.2	
	Fuze, grenade, hand, practice, M205 series	479		41.4	
	Fuze, grenade, hand, practice, M228	13		5.3	
	Fuze, mine, antitank, practice, M604			0.5	
	Fuze, projectile, combination, M1907			8.0	
	Fuze, projectile, point detonating, M48 series			2.0	
	Fuze, projectile, point detonating, MK III	1			
	Fuze, surface trip, M49 (model unknown)			0.1	
	Fuze, practice (model unknown)			0.7	
	Fuze, point detonating (model unknown)			0.3	
	Fuze, smoke (model unknown)			0.2	
	Grenade, hand, practice, M30		1	79.0	
	Grenade, hand, practice, M69	4		19.0	

Table 5-1
Parker Flats MRA Phase II MEC and MD Recovered

Land Use	MEC Item	MEC Quantity		MD Weight	SAA Quantity
		DMM	UXO	lbs	
	Grenade, hand, practice, MK II			180.5	
	Grenade, hand, practice, M62			31.5	
	Grenade, hand, smoke, HC, AN-M8	3		1.0	
	Grenade, hand, smoke, M18 series	5		13.0	
	Grenade, hand, fragmentation, MK II			7.5	
	Grenade, hand, illumination, MK I			2.5	
	Grenade, hand, training, MK1A1			20.0	
	Grenade, rifle, antitank, practice, M11 series			1.5	
	Grenade, rifle, antitank, practice, M29			6.0	
	Grenade, rifle, antitank, M9 series			7.5	
	Grenade, rifle, smoke, M22 series	3			
	Grenade, rifle, illumination (model unknown)			6.6	
	Mine, antipersonnel, practice, M8 series			21.5	
	Rocket motors, M222/M223 (DRAGON)			0.1	
	Projectile, 3inch, Stokes mortar, practice, MK I			13.0	
	Projectile, 4inch, Stokes mortar, smoke, WP, MK I			6.5	
	Projectile, 4inch, Stokes mortar, high explosive, MK I			5.0	
	Projectile, 37mm, armor piercing tracer, M51 series			2.5	
	Projectile, 37mm, low explosive, MK I			1.5	
	Cartrige, 40mm, high explosive, M383	1		0.4	
	Projectile, 60mm, mortar, practice, M50 series			6.0	
	Projectile, 75mm, Shrapnel, MK I		1	53.0	
	Projectile, 81mm, mortar, training, M68			174.0	
	Projectile, 81mm, mortar, illumination, (model unknown)			6.5	
	Projectile, civilian, CS, (model unknown)	7		1.0	
	Rocket, 2.36inch, practice, M7			18.5	
	Rocket, 3.5inch, practice, M29 series			5.5	
	Rocket, 35mm, subcaliber, practice, M73			1.5	
	Rocket motor simulator (model unknown)			3.5	
	Signal, ground, rifle, parachute, M17 series	2		2.0	
	Signal, illumination, ground, M125 series	3		45.0	
	Signal, illumination, ground, M126 series			1.0	
	Signal, illumination, ground, M127series	5			
	Signal, illumination, ground, parachute, rifle, M19 series	12		30.8	
	Signal, smoke, ground, parachute, M128A1 series	2			
	Simulator, explosive boobytrap, flash, M117	2			

Table 5-1
Parker Flats MRA Phase II MEC and MD Recovered

Land Use	MEC Item	MEC Quantity		MD Weight	SAA Quantity
		DMM	UXO	lbs	
	Simulator, flash artillery, M110	1			
	Simulator, grenade, hand, M116A1	1			
	Simulator, projectile, ground burst, M115A2	1			
	Simulator, projectile, airburst, M74 series	16		5.5	
	Squib, electric	1			
	Projectile, 57mm, target practice, M306 series	1			
	Mine, antitank, practice (model unknown)			15.0	
	Projectile, 20mm, high explosive (model unknown)	1			
	Fragments			5.1	
	Residential Areas Total	**568**	**2**	**898.1**	**18,099**
	GRAND TOTAL	**1,034**	**8**	**4,092.7**	**38,086**

Notes: MRA = Munitions Response Area
MEC = Munitions and Explosives of Concern
MD = Munitions Debris
DMM = Discarded Military Munitions
UXO = Unexploded Ordnance
SAA = Small Arms Ammunition
lbs = pounds
mm = millimeter
HC = hexachloroethane/zinc (smoke mixture)
CS = 0-chlorobenzalmalononitrile (white solid powder)
WP = white phosphorous

Monterey Bay

Monterey County

Marina

IMJIN RD

8TH ST

ABRAMS RD

3RD AVE

INTER-GARRISON RD

RESERVATION RD

CSUMB Off-Campus MRA

County North MRA

8TH AVE

GIGLING RD

GIGLING RD

GENERAL JIM MOORE BLVD

HWY 1

MONTEREY RD

PARKER FLATS CUT-OFF RD

8TH AVE

Parker Flats MRA

PARKER FLATS RD

Future East Garrison MRA

Seaside

Monterey County

COE AVE

EUCALYPTUS RD

Interim Action Ranges MRA

EUCALYPTUS RD

BARLOY CANYON RD

GENERAL JIM MOORE BLVD

Seaside MRA

MOUT Site MRA

BROADWAY RD

WATKINS GATE RD

Historical Impact Area

Laguna Seca Parking MRA

Del Rey Oaks

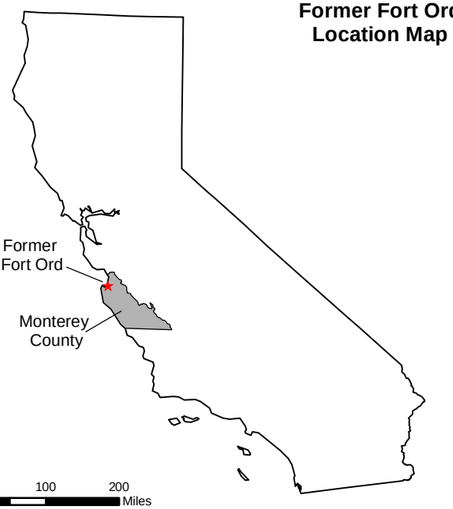
Del Rey Oaks / Monterey MRA

Monterey

Legend

- Major Roads
- Former Fort Ord Boundary
- Parker Flats MRA
- Other ESCA MRAs
- Historical Impact Area Boundary
- Jurisdictional Boundary

Former Fort Ord Location Map



N

0 3,000 6,000 Feet

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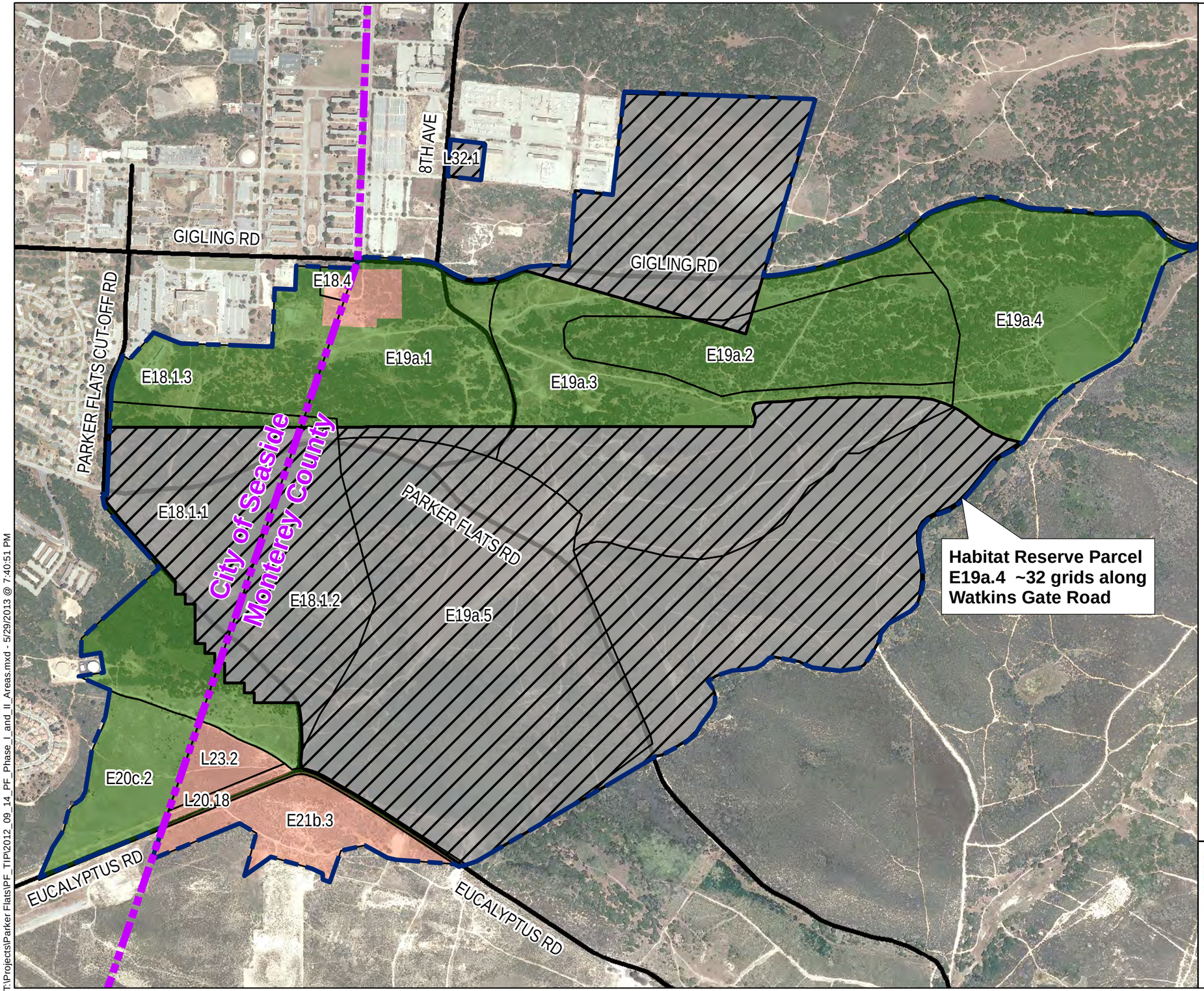
Parker Flats MRA Location Map

FORA ESCA RP
Monterey County, California

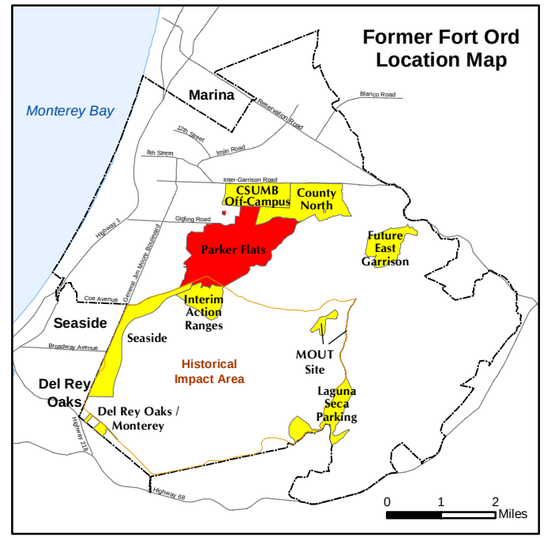
Figure 1-1

T:\Projects\Parker Flats\PF_TIP\2012_09_14_PF_Location_Map.mxd - 3/28/2013 @ 10:43:27 PM



Legend

- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Phase II Remedial Investigation Area Completed by FORA
- Munitions Response Area
- Major Road
- E23.1 USACE Parcel
- Jurisdictional Boundary



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2010 Aerial Shown

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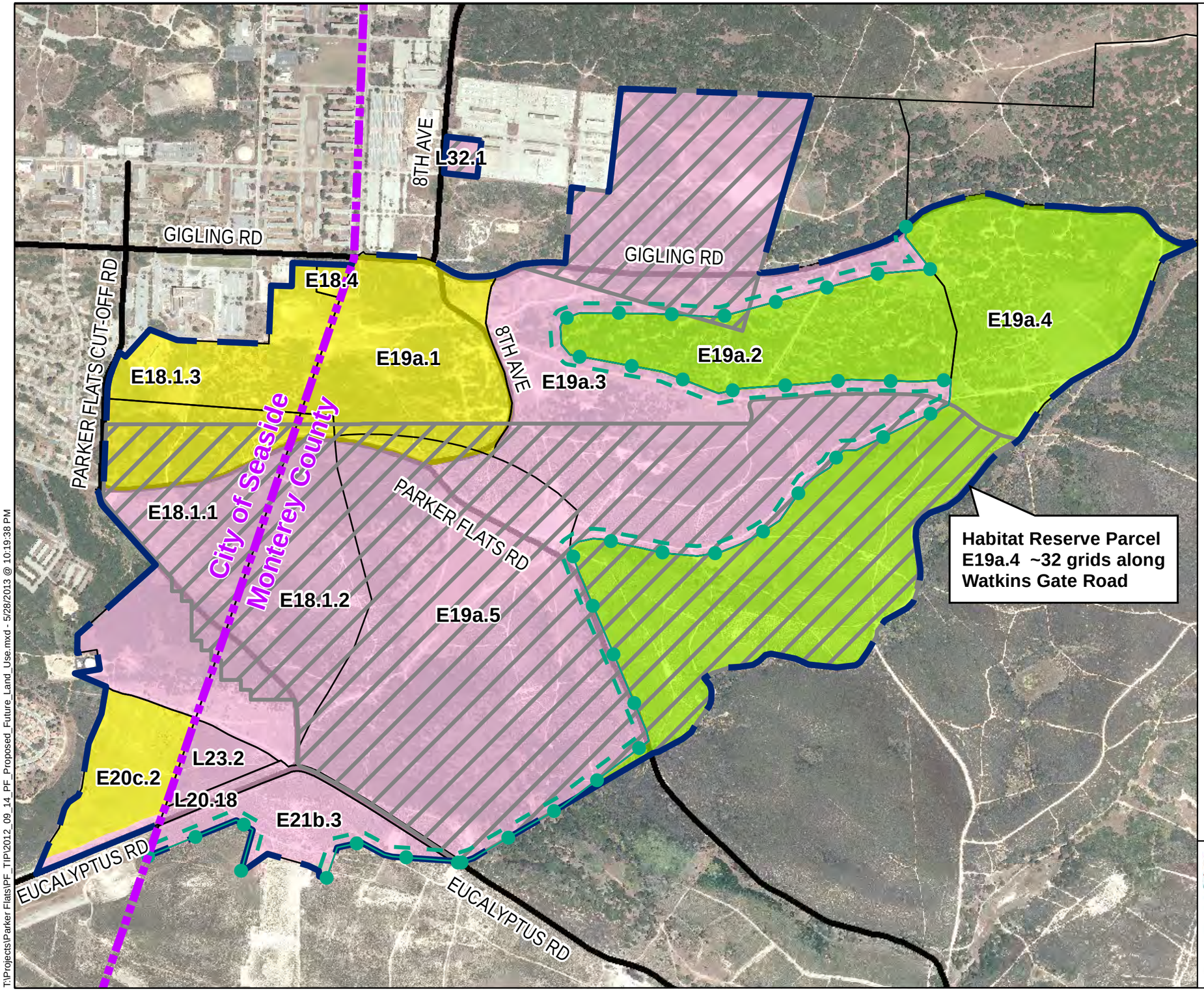
Parker Flats MRA
Phase I and Phase II Areas

FORA ESCA RP
Monterey County, California

Figure 1-2

T:\Projects\Parker Flats\PF_TIP\2012_09_14_PF_Phase_I_and_II_Areas.mxd - 5/29/2013 @ 7:40:51 PM

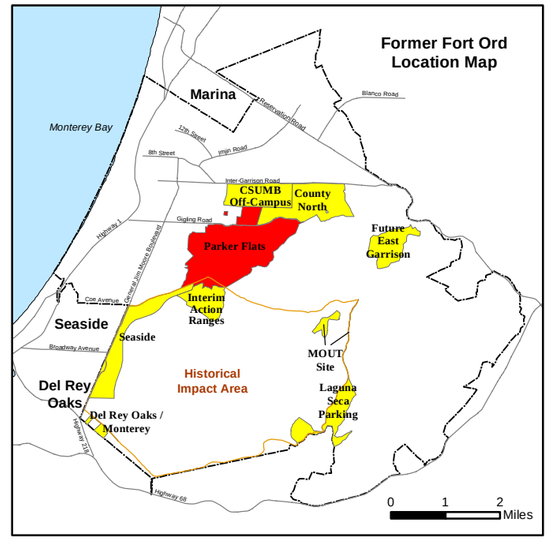


Legend

- Munitions Response Area
- Major Road
- Phase I Removal Action Area Completed by Army
- E19a.1 — USACE Parcel
- Borderland Interface
- 100-Foot Buffer from Borderland Interface
- Jurisdictional Boundary

Proposed Future Land Use

- Residential
- Non-Residential
- Habitat Reserve



2010 Aerial Shown

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Parker Flats MRA
Proposed Future Land Use

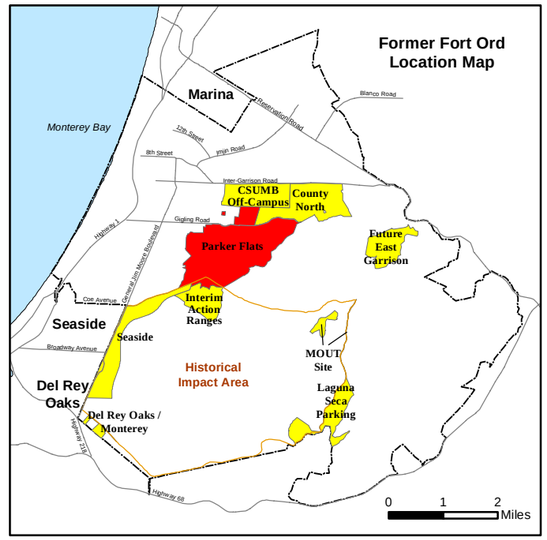
FORA ESCA RP
Monterey County, California

Figure 2-1

T:\Projects\Parker Flats\PF_TIP\2012_09_14_PF_Proposed_Future_Land_Use.mxd - 5/28/2013 @ 10:19:38 PM

Legend

- Munitions Response Area
- Major Road
- Phase I Removal Action Area Completed by Army
- MRS-53 — MRS Boundary
- Jurisdictional Boundary



2010 Aerial Shown

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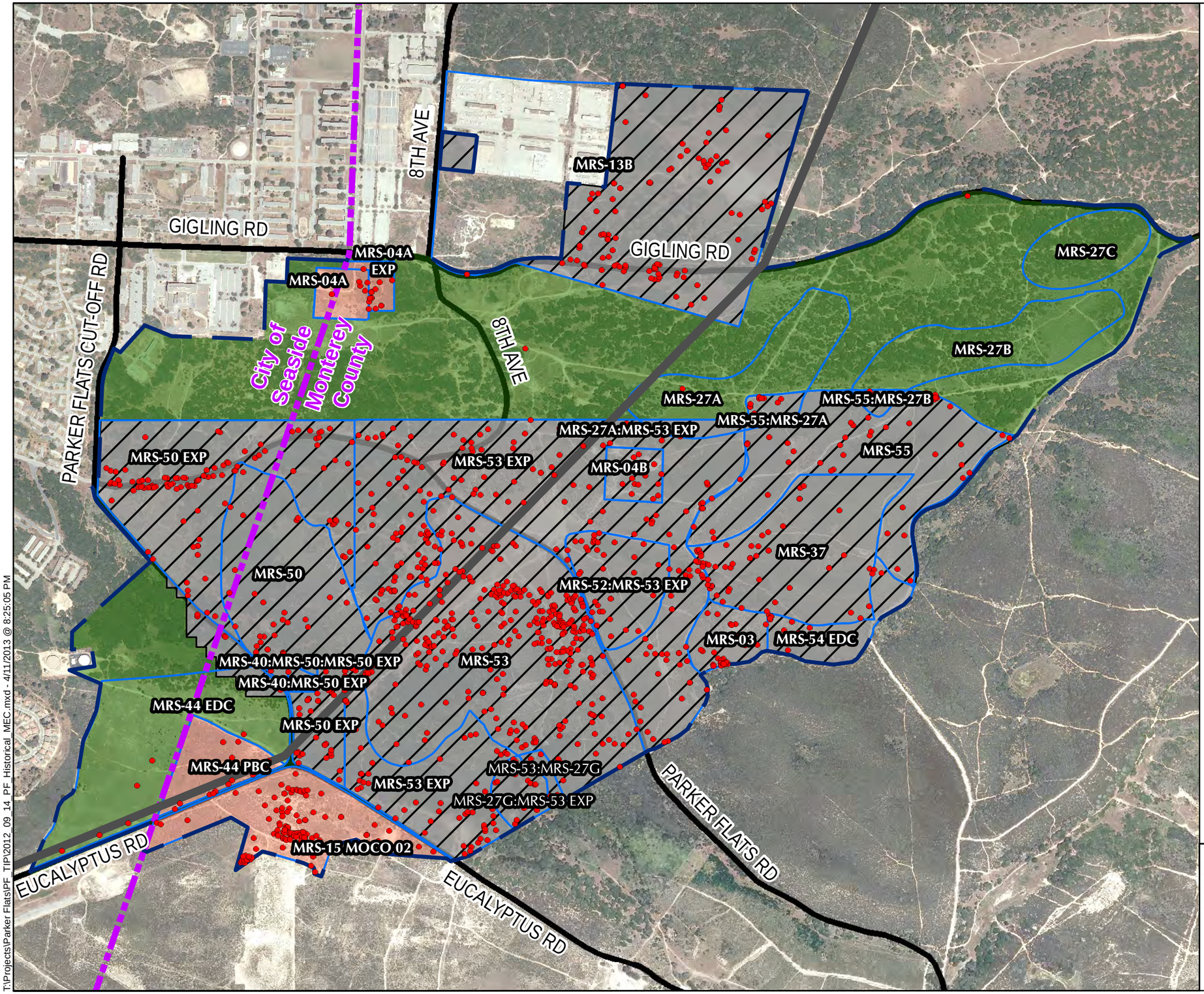
Parker Flats MRA
MRS Boundaries

FORA ESCA RP
Monterey County, California

Figure 2-2

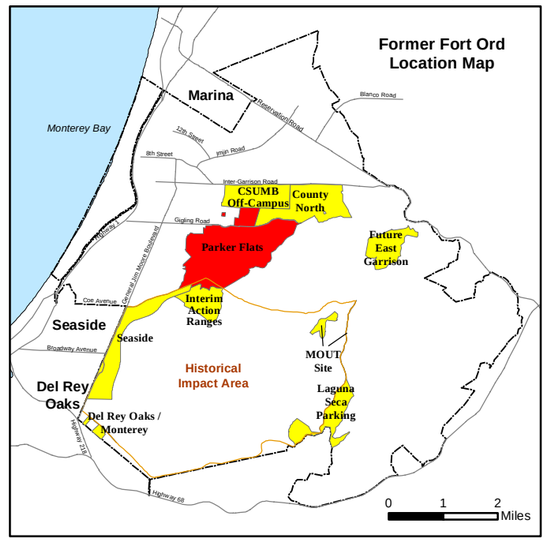
T:\Projects\Parker Flats\PF_TIP\2012_09_14_PF_MRS_Boundaries.mxd - 4/11/2013 @ 8:07:21 PM



Legend

- Historical MEC Find*
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Phase II Remedial Investigation Area Completed by FORA
- Munitions Response Area
- Major Road
- MRS-53 — MRS Boundary
- High-Power Transmission Line and Right of Way
- Jurisdictional Boundary

*Note: MEC items displayed may contain multiple items found anywhere within the grid cell in which the item is displayed.



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2010 Aerial Shown

0 1,000 2,000 Feet

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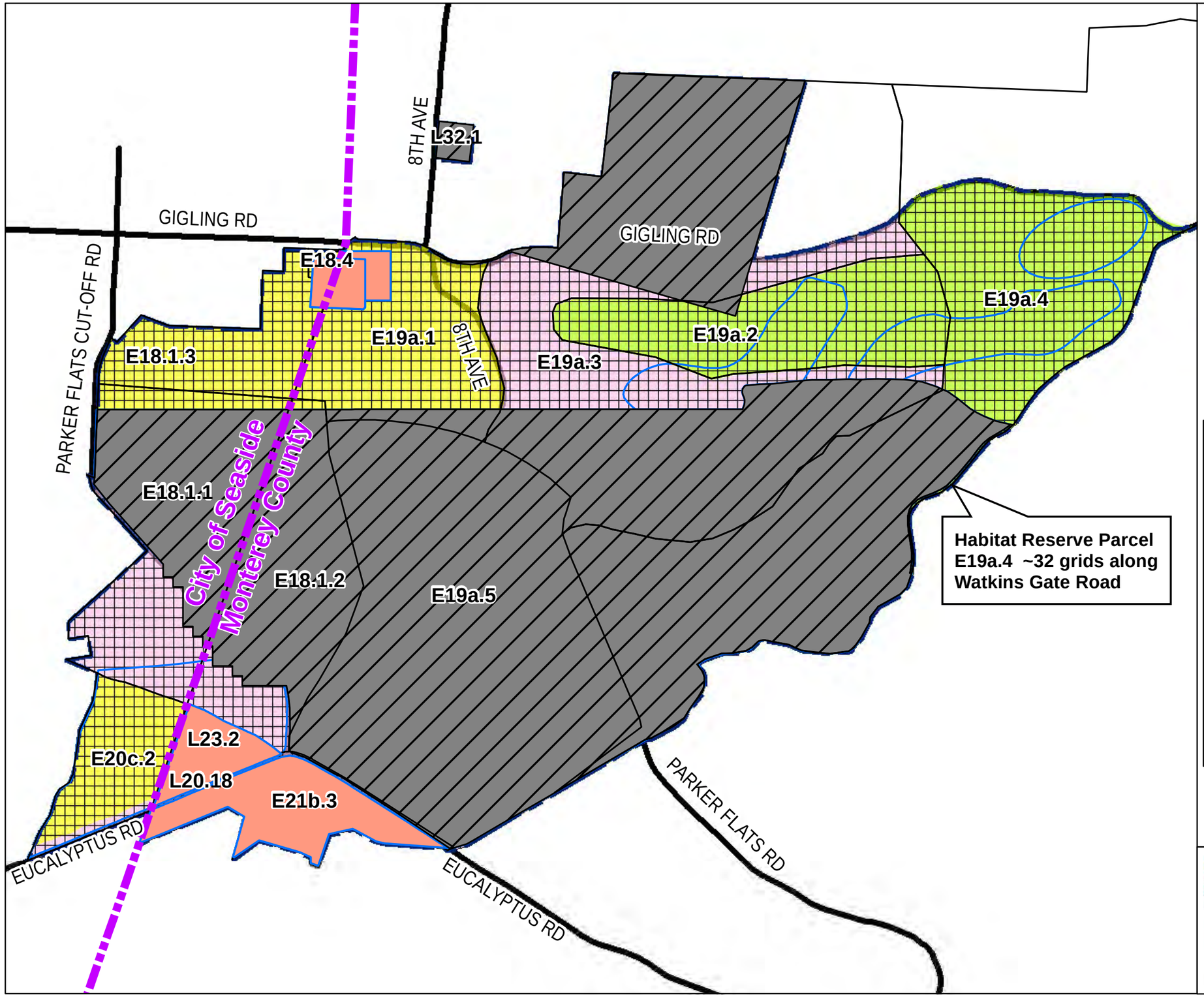
Parker Flats MRA
Historical MEC

FORA ESCA RP
Monterey County, California

Figure 2-3

T:\Projects\Parker Flats\PF_TIP\2012_09_14_PF_Historical_MEC.mxd - 4/11/2013 @ 8:25:05 PM



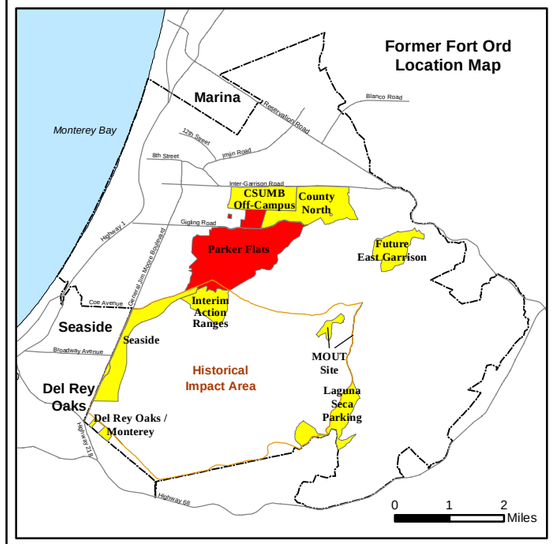
Habitat Reserve Parcel
E19a.4 ~32 grids along Watkins Gate Road

Legend

- Munitions Response Area
- Major Road
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Former Fort Ord 100-Ft by 100-Ft Grids
- E19a.1 — USACE Parcel
- MRS Boundary in Phase II Remedial Investigation Area
- Jurisdictional Boundary

Proposed Future Land Use

- Residential
- Non-Residential
- Habitat Reserve



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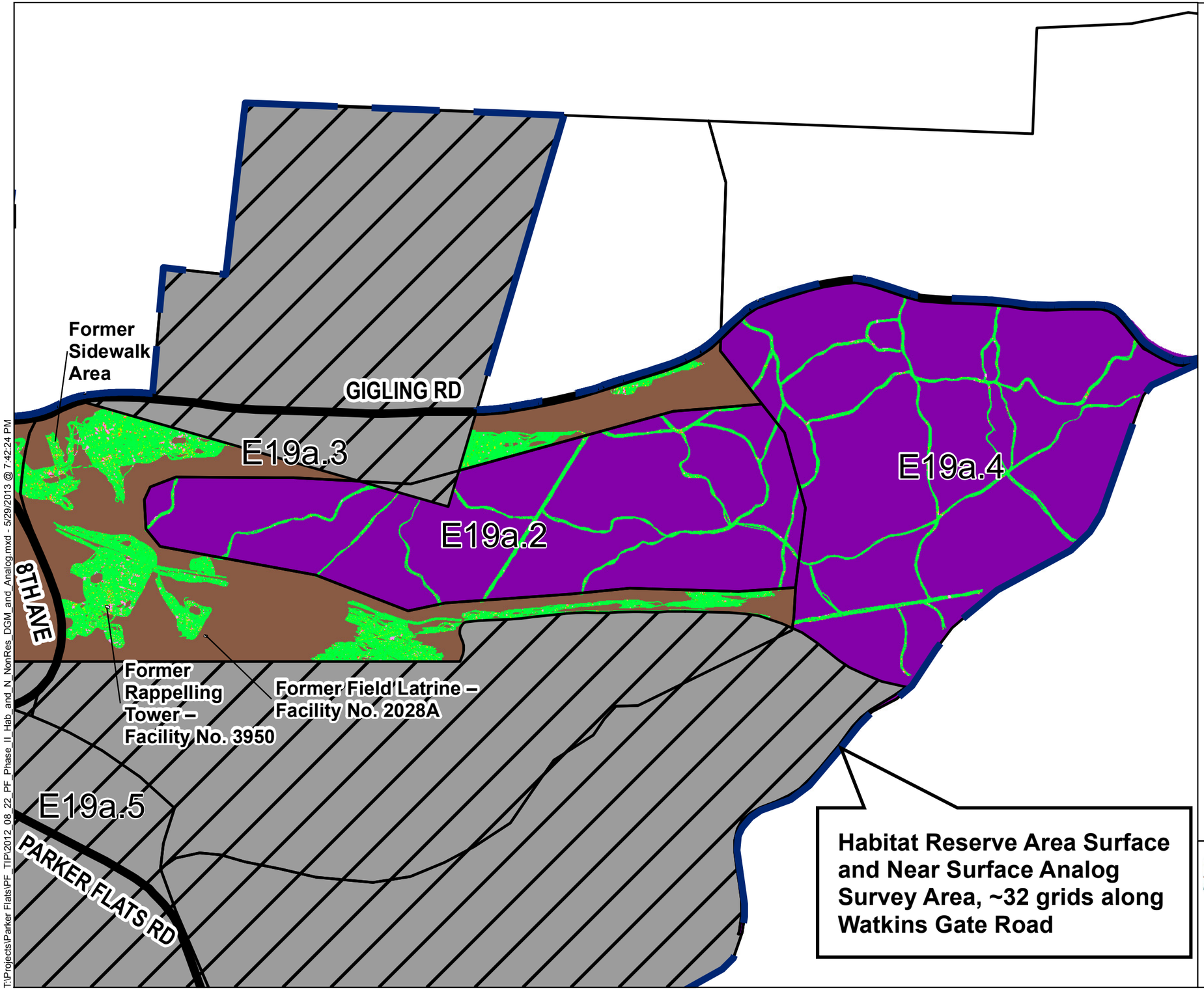
Parker Flats MRA
Phase II Remedial Investigation Work Areas

FORA ESCA RP
Monterey County, California

Figure 3-1

T:\Projects\Parker Flats\PF_TIP\2012_09_14_PF_Phase_II_RI_Work_Areas.mxd 5/28/2013 @ 11:26:56 PM

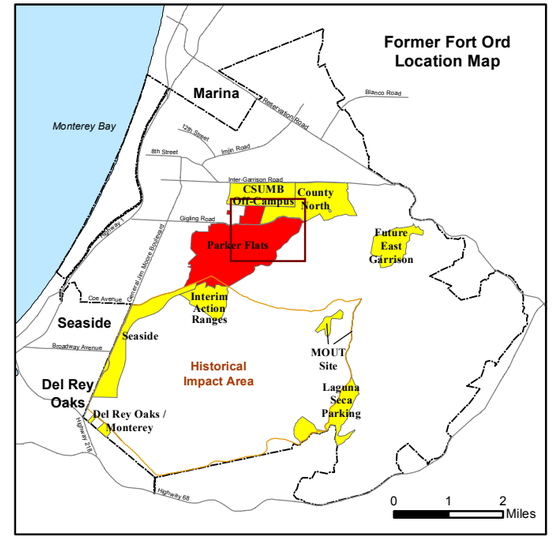


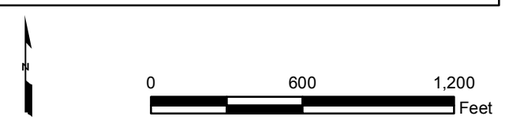
Legend

- Habitat Reserve Area Surface and Near-Surface Analog Survey Area
- Residential/Non-Residential Development Depth of Detection Analog Survey Area
- Phase I Removal Action Area Completed by Army
- Munitions Response Area
- Major Road
- E19a.3 — USACE Parcel

Response
50 milliVolts (mV)

5.1 20.5 41.0 61.5 82.1 102.6 128.2 153.8 179.5





Habitat Reserve Area Surface and Near Surface Analog Survey Area, ~32 grids along Watkins Gate Road

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Parker Flats MRA
Phase II Habitat Reserve and Northern Non-Residential Areas DGM and Analog Surveys
FORA ESCA RP
Monterey County, California

Figure 3-2

T:\Projects\Parker Flats\PF_TIP\2012_08_22_PF_Phase_II_Hab_and_N_NonRes_DGM_and_Analog.mxd - 5/29/2013 @ 7:42:24 PM

E18.1.1

E18.1.2

E19a.5

E20c.2

L23.2

L20.18

E21b.3

City of Seaside
Monterey County

PARKER FLATS CUT-OFF RD

EUCALYPTUS RD

EUCALYPTUS RD

Tree Covered Areas
(approx. 1.7 acres)

Water
Tower

Unpaved Road
(approx. 1.0 acre)

Earthen Berm
Investigation in
Proposed Future
Residential Reuse Area

Earthen Berm
Investigation Area
(Approx 4.0 Acres)

Legend

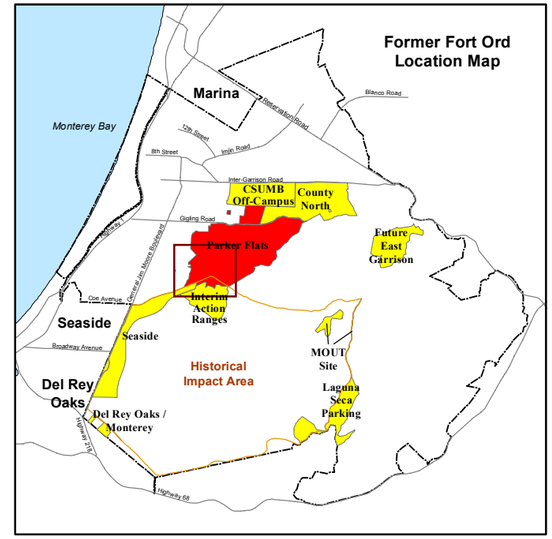
- Residential/Non-Residential Development Depth of Detection Analog Survey Area
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Munitions Response Area
- Major Road
- E20c.2 — USACE Parcel
- Jurisdictional Boundary

Response
50 milliVolts (mV) - For E18.1.1 and E18.1.2

5.1 20.5 41.0 61.5 82.1 102.6 128.2 153.8 179.5

Response
20 milliVolts (mV) - For E20c.2

2.6 10.3 20.5 30.8 41.0 51.3 61.5 71.8 82.1 92.3



N

0 500 1,000
Feet

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Parker Flats MRA
Phase II Southern Non-Residential and Southern Residential Areas
DGM and Analog Surveys

FORA ESCA RP
Monterey County, California

Figure 3-3

T:\Projects\Parker Flats\PF_TIP\2013_04_11_PF_Phase_II_S_Res_and_S_NonRes_DGM_and_Analog.mxd - 5/30/2013 @ 7:33:21 PM

GIGLING RD

L32.1

Water Tower –
Facility No. 4475

E18.4

Former Softball Field –
Facility No. 4476

Enlisted Barracks –
Facility Nos. 4386
and 4387

E19a.3

8TH AVE

PARKER FLATS CUT-OFF RD

E18.1.3

E19a.1

B-2A

B-2B

B-3
Removed

B-1
Removed

E18.1.1

City of Seaside
Monterey County

PARKER FLATS RD

E19a.5

E18.1.2

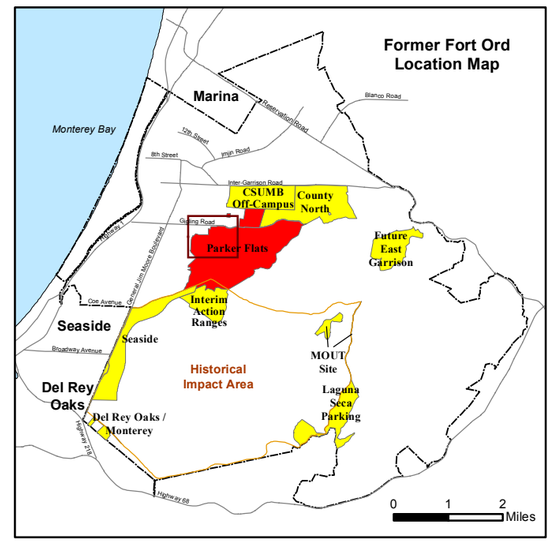
T:\Projects\Parker Flats\PF_TIP\2012_08_22_PF_Phase_II_N_Res_DGM_and_Analog.mxd - 4/11/2013 @ 8:37:09 PM

Legend

- Residential/Non-Residential Development Depth of Detection Analog Survey Area
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Munitions Response Area
- Major Road
- E18.4 — USACE Parcel
- Jurisdictional Boundary
- Concrete Pad/Foundation

Response
20 milliVolts (mV)

2.6 10.3 20.5 30.8 41.0 51.3 61.5 71.8 82.1 92.3



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0 400 800
Feet

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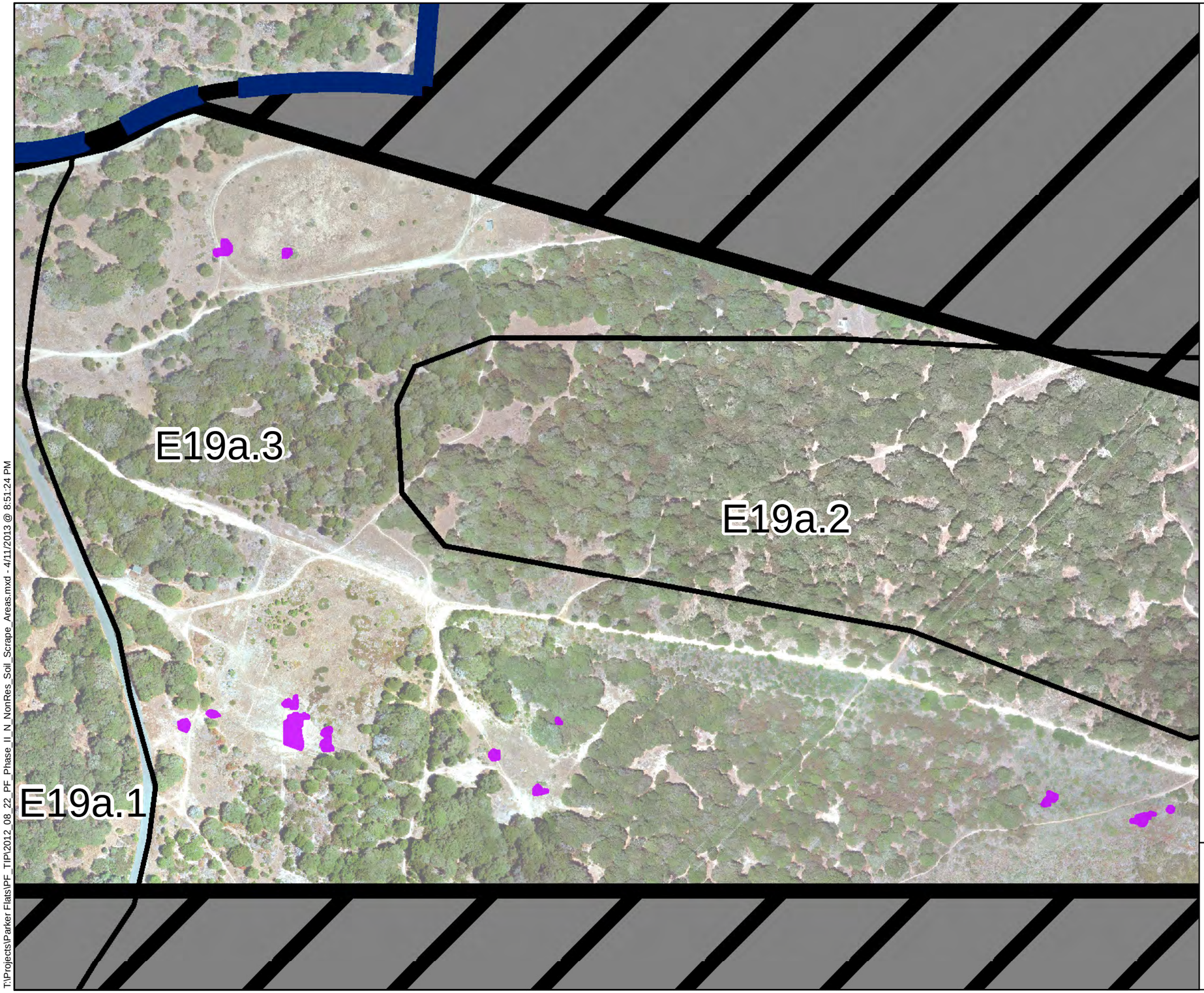
Parker Flats MRA
Phase II
Northern Residential Area
DGM and Analog Surveys

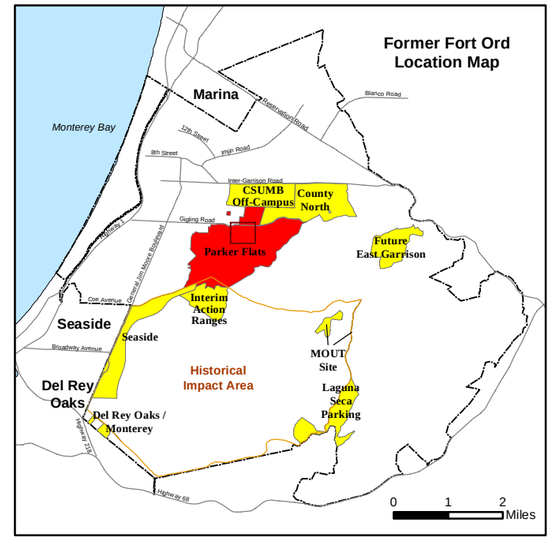
FORA ESCA RP
Monterey County, California

Figure 3-4



Legend

- Soil Scrape Area
- Munitions Response Area
- Phase I Removal Action Area Completed by Army
- E19a.1 — USACE Parcel



2007 Aerial Shown

N

0 200 400 Feet

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Parker Flats MRA
Phase II
Northern Non-Residential Area
Soil Scrape Areas
FORA ESCA RP
Monterey County, California

Figure 3-5

T:\Projects\Parker Flats\PF_TIP\2012_08_22_PF_Phase_II_N_NonRes_Soil_Scrape_Areas.mxd - 4/11/2013 @ 8:51:24 PM

E18.1.1

E18.1.2

City of Seaside

Monterey County

L23.2

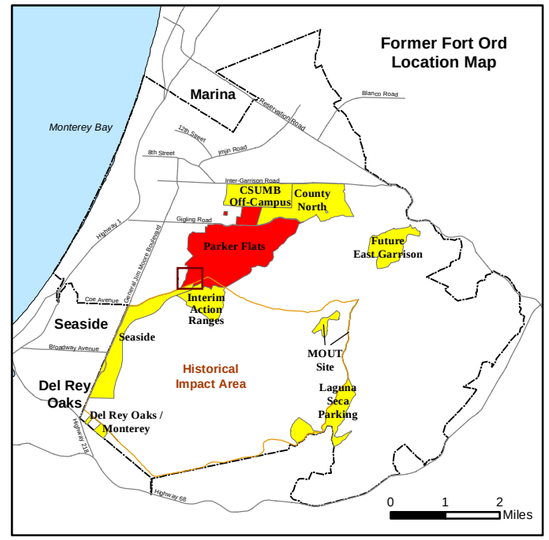
E20c.2

L20.18

E21b.3

Legend

- Soil Scrape Area
- Munitions Response Area
- E20c.2 — USACE Parcel
- Phase II Remedial Investigation Area Completed by Army
- Jurisdictional Boundary



2010 Aerial Shown

N

0 200 400 Feet

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WESTCLIFFE ENGINEERS

Parker Flats MRA
Phase II
Southern Residential Area
Soil Scrape Areas

FORA ESCA RP
Monterey County, California

Figure 3-6

T:\Projects\Parker Flats\PF_TIP\2012_08_22_PF_Phase_II_S_Res_Soil_Scrape_Areas.mxd - 4/11/2013 @ 8:52:22 PM

Northern Area

GIGLING RD

GIGLING RD

8TH AVE

Soil Lay Down Areas

Pile 4

Pile 3

Pile 2

Pile1

Southern Area

City of Seaside
Monterey County

Soil Lay Down Areas

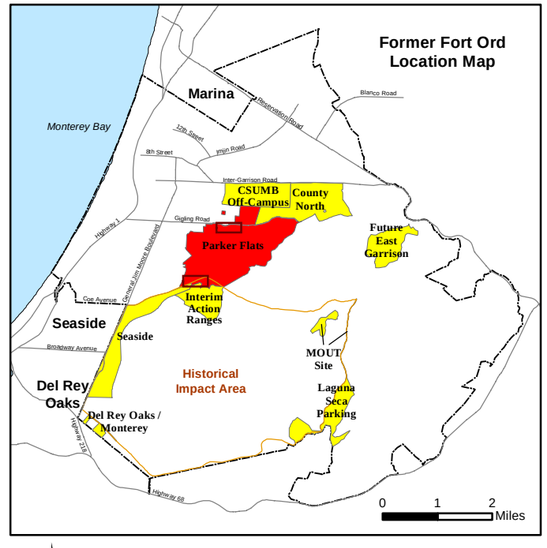
EUCALYPTUS RD

Legend

- Soil Lay Down Polygon Areas - 0.3 ac. in Northern Area and 0.2 ac. in Southern Area
- Soil Lay Down Piles
- Munitions Response Area
- Major Road
- Jurisdictional Boundary

Proposed Future Land Use

- Residential
- Non-Residential
- Habitat Reserve



N

2007 Aerials Shown

0 200 400 Feet

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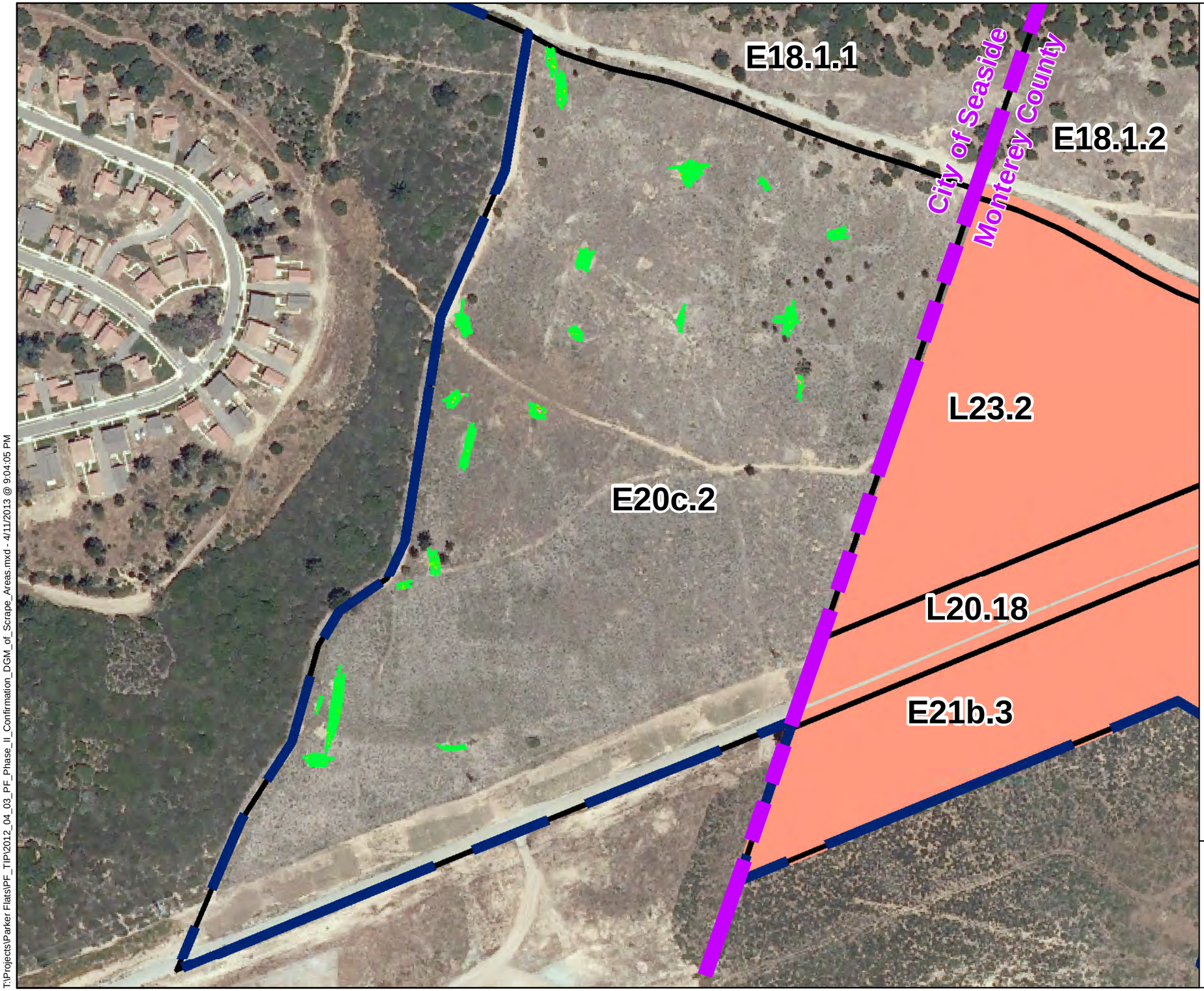
Parker Flats MRA
Phase II
Soil Scrape Lay Down Areas

FORA ESCA RP
Monterey County, California

Figure 3-7

T:\Projects\Parker Flats\PF_TIP\2013_04_11_PF_Phase_II_Soil_Scrape_Lay_Down_Areas.mxd 4/11/2013 @ 11:27:26 PM

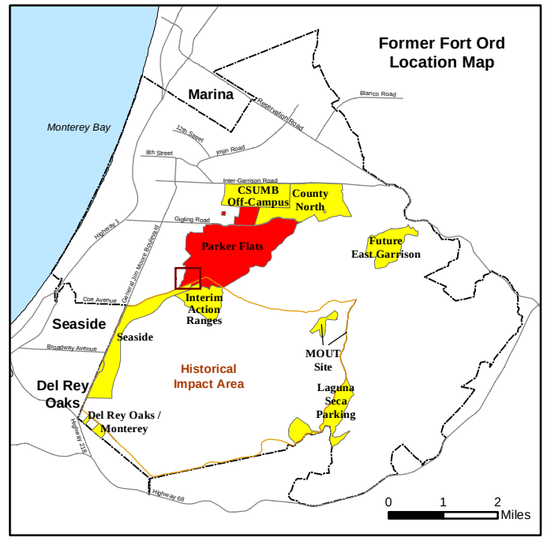


Legend

- Munitions Response Area
- E20c.2 — USACE Parcel
- Phase II Remedial Investigation Area Completed by Army
- Jurisdictional Boundary

Response
20 milliVolts (mV)

2.6 10.3 20.5 30.8 41.0 51.3 61.5 71.8 82.1 92.3



N

2010 Aerial Shown

0 200 400
Feet

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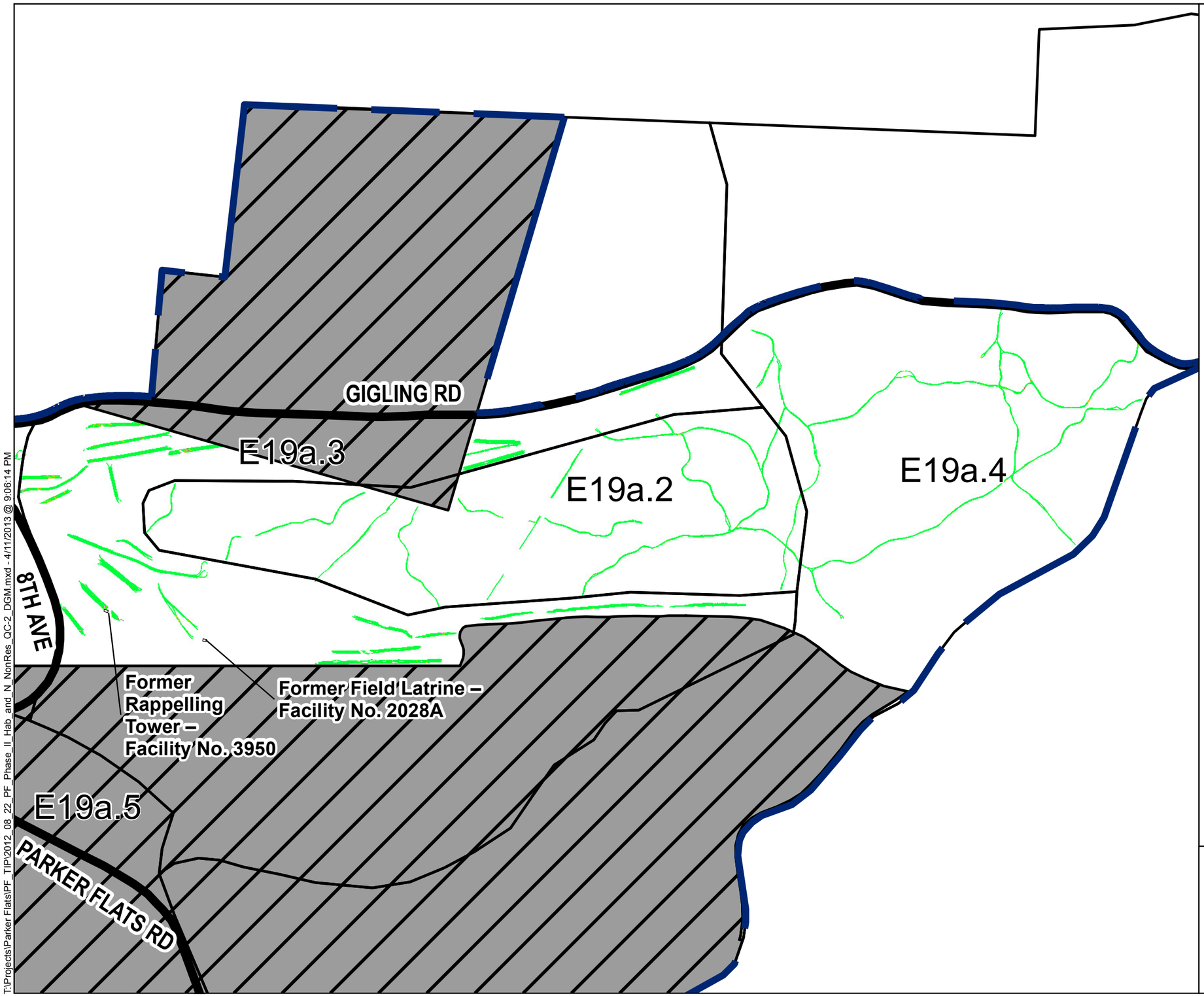
Parker Flats MRA
Phase II Southern Residential Area
Confirmation DGM Survey of Soil Scrape Areas

FORA ESCA RP
Monterey County, California

Figure 3-8

T:\Projects\Parker Flats\PF_TIP\2012_04_03_PF_Phase_II_Confirmation_DGM_of_Scrape_Areas.mxd - 4/11/2013 @ 9:04:05 PM

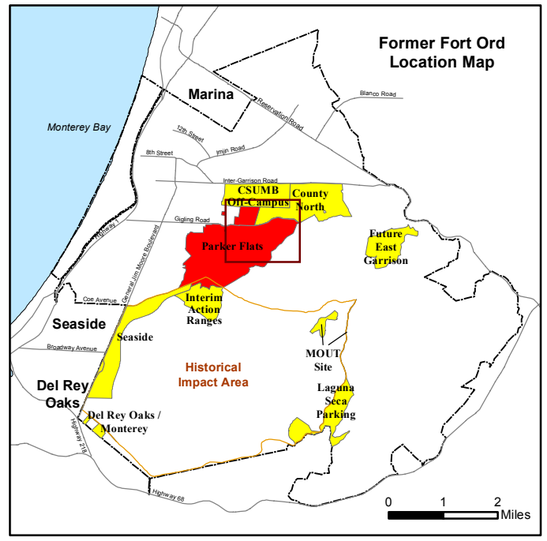


Legend

- Phase I Removal Action Area Completed by Army
- Major Road
- Munitions Response Area
- E19a.3 — USACE Parcel

Response
50 milliVolts (mV)

5.1 20.5 41.0 61.5 82.1 102.6 128.2 153.8 179.5



N

0 600 1,200 Feet

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Parker Flats MRA
Phase II Habitat Reserve and Northern Non-Residential Areas
QC-2 DGM Surveys
FORA ESCA RP
Monterey County, California

Figure 4-1

T:\Projects\Parker Flats\PF_TIP\2012_08_22_PF_Phase_II_Hab_and_N_NonRes_QC-2_DGM.mxd - 4/11/2013 @ 9:06:14 PM

E18.1.1

E18.1.2

E19a.5

E20c.2

L23.2

L20.18

E21b.3

PARKER FLATS CUT-OFF RD

City of Seaside
Monterey County

EUCALYPTUS RD

EUCALYPTUS RD

Legend

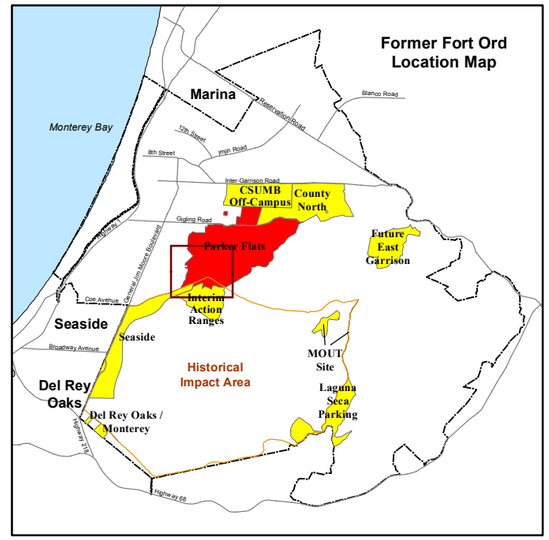
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Munitions Response Area
- Major Road
- E20c.2 — USACE Parcel
- Jurisdictional Boundary

Response
50 milliVolts (mV) - For E18.1.1 and E18.1.2

5.1 20.5 41.0 61.5 82.1 102.6 128.2 153.8 179.5

Response
20 milliVolts (mV) - For E20c.2

2.6 10.3 20.5 30.8 41.0 51.3 61.5 71.8 82.1 92.3



N

0 500 1,000
Feet

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Parker Flats MRA
Phase II Southern Non-Residential and Southern Residential Areas
QC-2 DGM Surveys
FORA ESCA RP
Monterey County, California

Figure 4-2

T:\Projects\Parker Flats\PF_TIP\2012_08_22_PF_Phase_II_S_Res_and_S_NonRes_QC-2_DGM.mxd - 4/11/2013 @ 9:10:02 PM

GIGLING RD

L32.1

Water Tower –
Facility No. 4475

E18.4

Former Softball Field –
Facility No. 4476

Enlisted Barracks –
Facility Nos. 4386
and 4387

PARKER FLATS CUT-OFF RD

8TH AVE

E19a.3

E18.1.3

E19a.1

B-2A

B-2B

B-3
Removed

B-1
Removed

E18.1.1

City of Seaside
Monterey County

PARKER FLATS RD

E19a.5

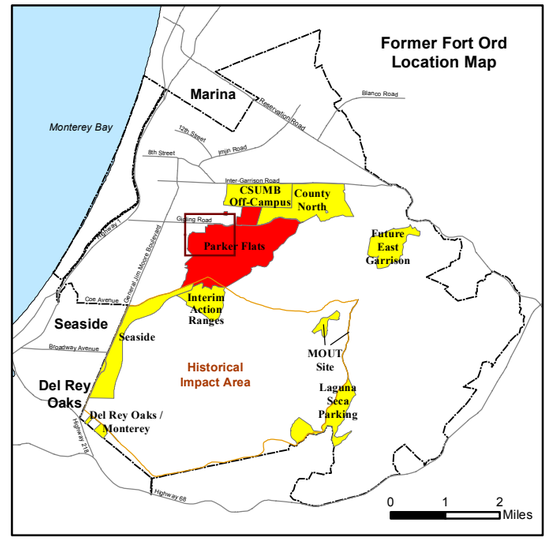
E18.1.2

Legend

- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Munitions Response Area
- Major Road
- E18.4 — USACE Parcel
- Jurisdictional Boundary
- Concrete Pad/Foundation

Response
20 milliVolts (mV)

2.6 10.3 20.5 30.8 41.0 51.3 61.5 71.8 82.1 92.3



N

0 400 800
Feet

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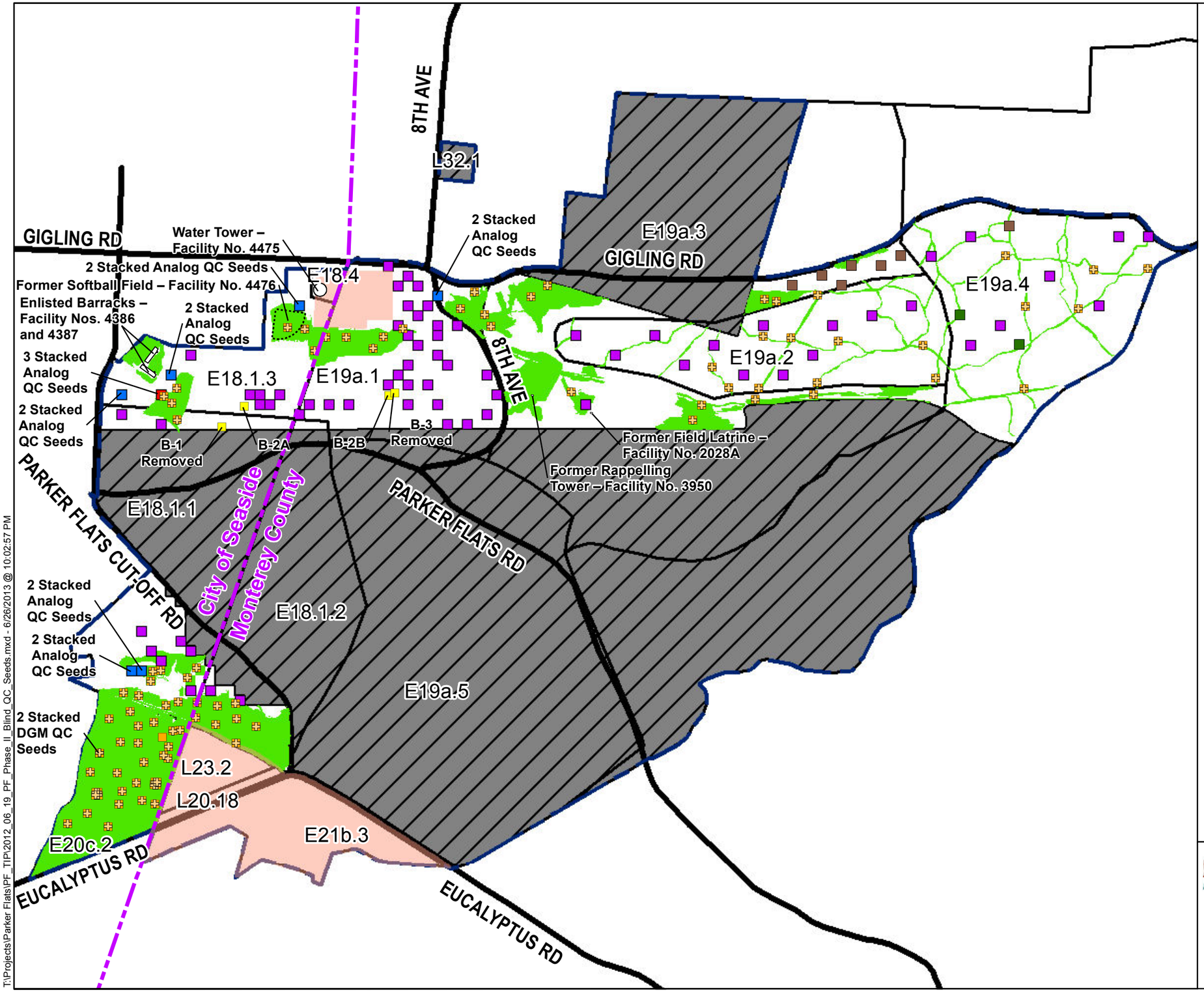
Parker Flats MRA
Phase II
Northern Residential Area
QC-2 DGM Survey

FORA ESCA RP
Monterey County, California

Figure 4-3

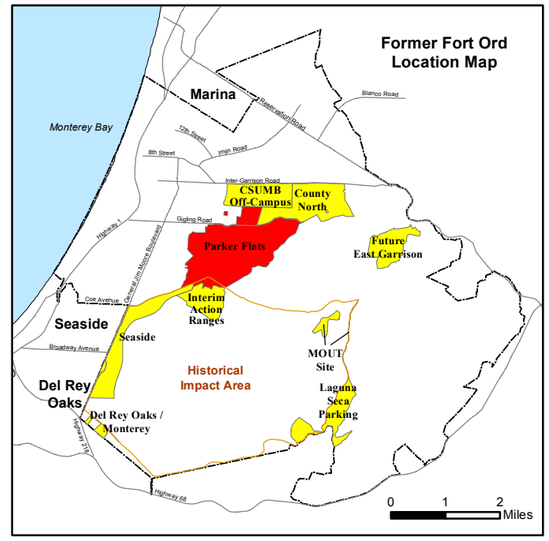
T:\Projects\Parker Flats\PF_TIP\2012_08_22_PF_Phase_II_N_Res_QC-2_DGM.mxd - 4/11/2013 @ 9:13:24 PM



T:\Projects\Parker Flats\PF_TIP\2012_06_19_PF_Phase_II_Blind_QC_Seeds.mxd - 6/26/2013 @ 10:02:57 PM

Legend

- DGM QC Seed Found Location
- DGM QC Seed Buried Location
- DGM QC Seed Found in Grid During Analog
- DGM QC Seed Recovered by UXOQCS
- 1 Analog QC Seed Buried/Found in Grid
- 2 Analog QC Seeds Buried/Found in Grid
- 3 Analog QC Seeds Buried/Found in Grid
- Munitions Response Area
- Major Road
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- E19a.1 — USACE Parcel
- Phase II DGM Survey Area
- Jurisdictional Boundary
- Concrete Pad/Foundation



N

0 1,000 2,000 Feet

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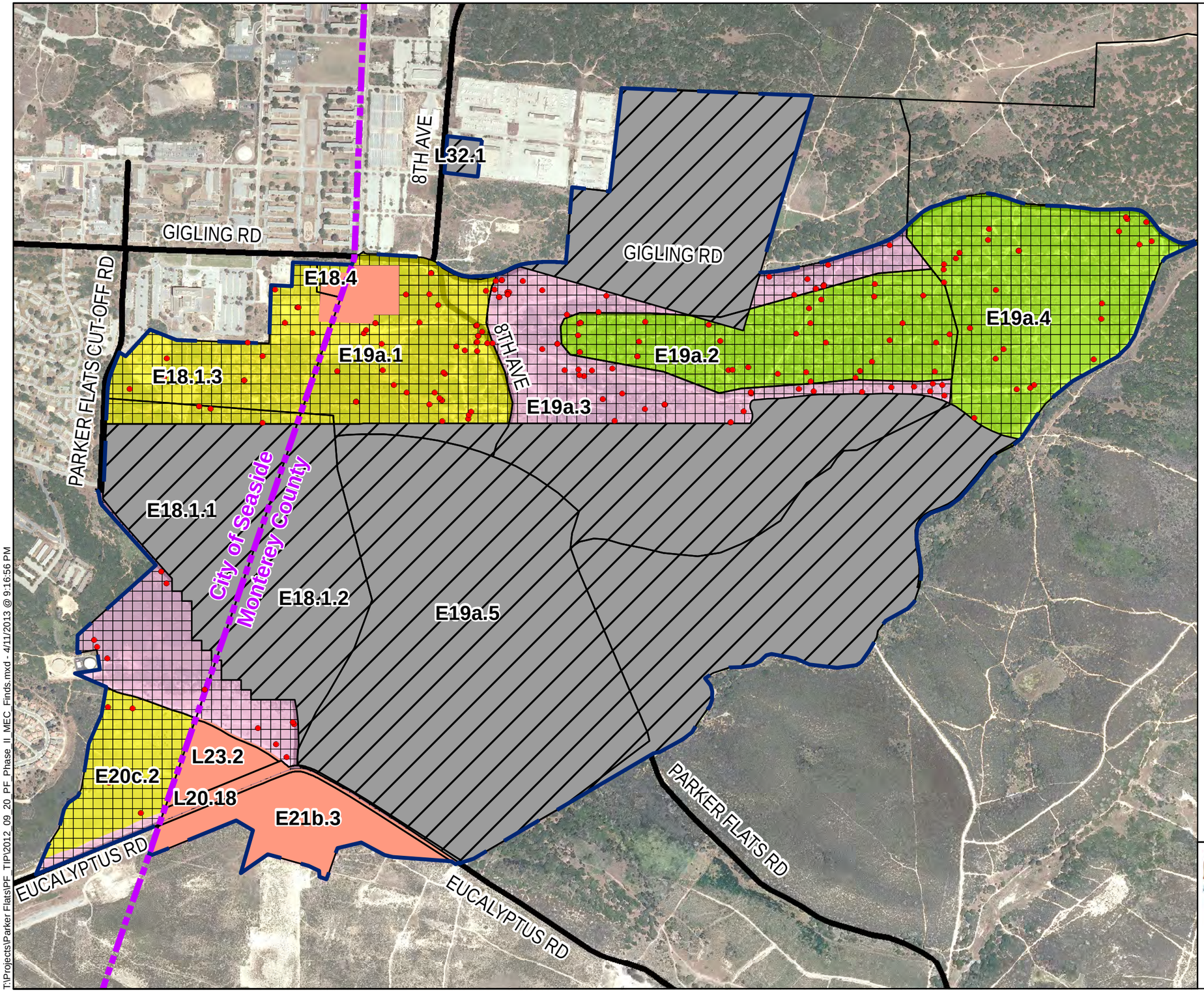
Parker Flats MRA
Phase II
Blind QC Seeds

FORA ESCA RP
Monterey County, California

Figure 4-4



T:\Projects\Parker Flats\PF_TIP\2012_09_20_PF_Phase_II_MEC_Finds.mxd - 4/11/2013 @ 9:16:56 PM

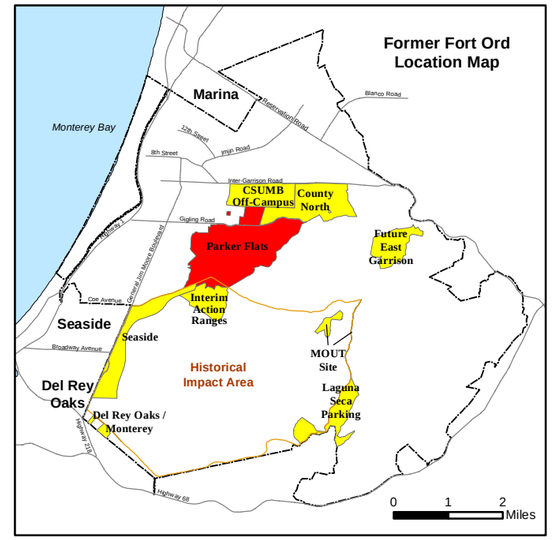
Legend

- Phase II MEC Find*
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Munitions Response Area
- Major Road
- E20c.2 — USACE Parcel
- Jurisdictional Boundary
- Former Fort Ord 100-Ft by 100-Ft Grids

Proposed Future Land Use

- Residential
- Non-Residential
- Habitat Reserve

*Note: MEC items displayed may contain multiple items found anywhere within the grid cell in which the item is displayed.



N

2010 Aerial Shown

0 1,000 2,000 Feet

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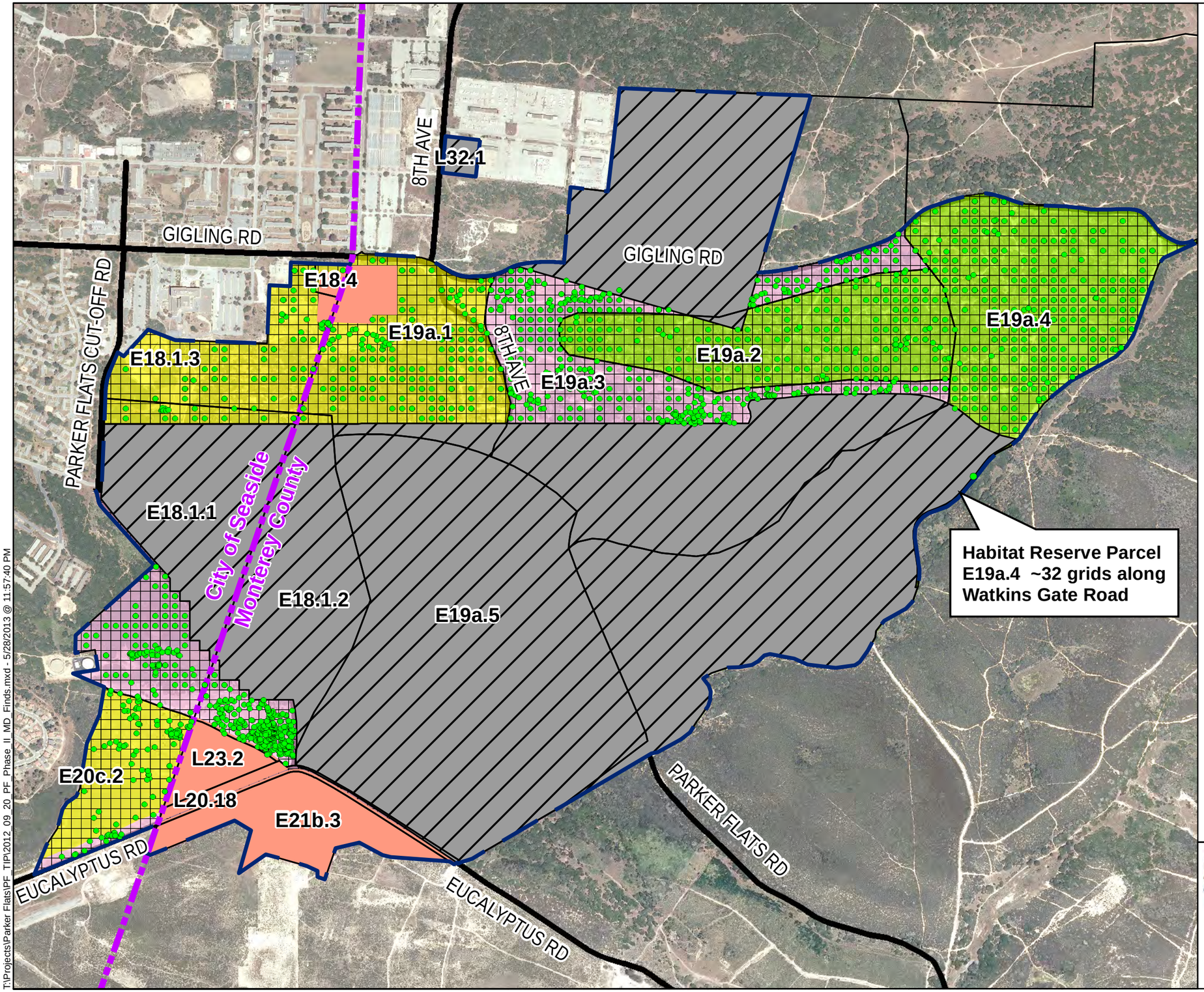
Parker Flats MRA
Phase II MEC Finds

FORA ESCA RP
Monterey County, California

Figure 5-1



T:\Projects\Parker Flats\PF_TIP\2012_09_20_PF_Phase_II_MD_Finds.mxd - 5/28/2013 @ 11:57:40 PM

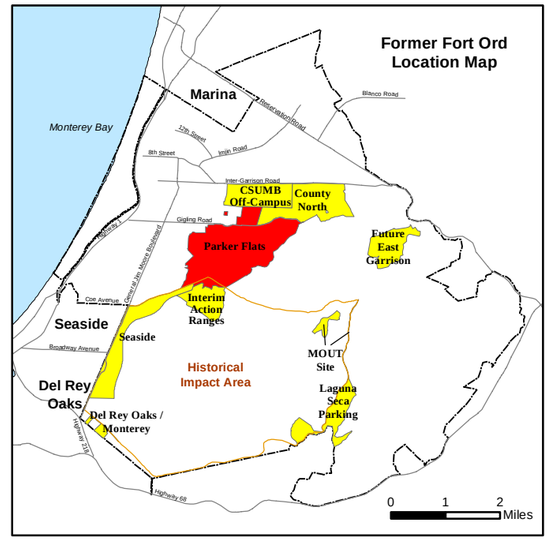
Legend

- Phase II MD Find*
- Phase I Removal Action Area Completed by Army
- Phase II Remedial Investigation Area Completed by Army
- Munitions Response Area
- Major Road
- E20c.2 — USACE Parcel
- Jurisdictional Boundary
- Former Fort Ord 100-Ft by 100-Ft Grids

Proposed Future Land Use

- Residential
- Non-Residential
- Habitat Reserve

*Note: MD items displayed may contain multiple items found anywhere within the grid cell in which the item is displayed.



2010 Aerial Shown

N

0 1,000 2,000 Feet

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Parker Flats MRA
Phase II MD Finds

FORA ESCA RP
Monterey County, California

Figure 5-2

APPENDIX A

through

APPENDIX L

(Please see the enclosed CD)