Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

Prepared for

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Base Realignment and Closure (BRAC)
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Acronyms and Abbreviations

AR	Administrative Record
Army	United States Department of the Army
ASP	Ammunition Supply Point
ASR	Archives Search Report
AT	antitank
ATT	Army Training Test
bgs	below ground surface
BLM	Bureau of Land Management
BRA	Basewide Range Assessment
BRAC	Base Realignment and Closure
CMS	CMS Environmental, Inc.
CSM	Conceptual Site Model
DQO	Data Quality Objectives
DTSC	California Department of Toxic Substances Control
EE/CA	Engineering Evaluation/ Cost Analysis
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
FFA	Federal Facility Agreement
ft	foot, feet
GPS	Global Positioning System
HE	high explosive
HUMRO	Human Research Resources Organization
ISD	insufficient data
MACTEC	MACTEC Engineering and Consulting, Inc.
MC	munitions constituents
MD	munitions debris
MEC	Munitions and Explosives of Concern
mm	Millimeter
MMRP	Military Munitions Response Program
MR	Munitions Response
MRA	Munitions Response Area
MRS	Munitions Response Site
NFA	No Further Action
NRMA	Natural Resources Management Area
ODDS	Ordnance Detection and Discrimination Study
OE	Ordnance and Explosives
QA/QC	Quality Assurance/Quality Control
PA/SI	preliminary assessment/site inspection
RAC	Risk Assessment Code
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
Shaw	Shaw Environmental, Inc.
SS/GS	Site Stats/Grid Stats
SUXOS	Senior UXO Supervisor
TM	Technical Manual
USA	USA Environmental, Inc.
USACE	U.S. Army Corps of Engineers

Acronyms and Abbreviations (cont.)

USAEDH	U.S. Army Corps of Engineers, Huntsville Division
UXB	UXB International, Inc.
UXO	Unexploded Ordnance

1.0 Introduction

The Munitions Response Remedial Investigation/Feasibility Study (MR RI/FS) for the former Fort Ord, California, is being implemented to evaluate and address all areas within the base regarding known and suspected areas containing munitions and explosives of concern (MEC) from past military training activities. The MR RI/FS program is being completed by grouping areas and sites within the former Fort Ord as a series of "tracks" numbered 0 through 3 that are based on MEC-related characteristics to expedite clean up, reuse, and/or transfer of Fort Ord property. The Track 1 portion of the MR RI/FS program addresses sites or areas that were suspected to have been used for military training with military munitions but based on the RI/FS, the sites fall into one of the following three categories:

- Category 1: There is no evidence to indicate military munitions were used at the site, i.e., suspected training did not occur.
- Category 2: The site was used for training, but the military munitions items used do not pose an explosive hazard, i.e., training did not involve explosive items.
- Category 3: The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an unacceptable risk based on site-specific evaluations conducted in the Track 1 MR RI/FS. Field investigations identified evidence of past training involving military munitions, but training at these sites involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact (i.e., inadvertent and unintentional contact).

This Track 1 Plug-In Approval Memorandum (Approval Memorandum) was prepared for the Bureau of Land Management (BLM) Area A located within the former Fort Ord in Monterey County, California. BLM Area A includes 3,976 acres located east of Barloy Canyon Road in the eastern portion of the former Fort Ord (Figure 1). The purpose of this Approval Memorandum is to provide the information necessary to place BLM Area A into the Track 1 Plug-In process. The Track 1 Plug-In process was described in the United States Department of the Army's (Army) *Record of Decision, No Further Action Related to Munitions and Explosives of Concern - Track 1 Sites, No Further Remedial Action with Monitoring for Ecological Risks from Chemical Contamination, Site 3* (Army, 2005). BLM Area A has been identified as eligible as a Track 1, Category 3 Plug-In site based on the location, physical features, types of past training activities, and MEC and munitions debris (MD) found.

When written concurrence from the United States Environmental Protection Agency (USEPA) and acknowledgement from the California Department of Toxic Substances Control (DTSC) are received, this Approval Memorandum will serve as the Decision Document stating that No Further Action (NFA) regarding munitions response is required for BLM Area A. The following sections provide an overview of the former Fort Ord background, the Track 1 Plug-In process, and site-specific information including

history of the area, future use, and rationale for the inclusion of BLM Area A into the Track 1 process. A glossary of MR Program terms is provided in Appendix A.

1.1 Fort Ord and Munitions Response RI/FS Background

The former Fort Ord is located in northern Monterey County approximately 80 miles south of San Francisco. The former Army base is made up of approximately 28,000 acres of land next to Monterey Bay and the cities of Seaside, Sand City, Monterey, and Del Rey Oaks to the south, and the city of Marina to the north. The former Fort Ord is bounded to the east and north by the Salinas Valley. Highway 1 passes through the western part of Fort Ord, separating the beachfront portions from the rest of the base. Laguna Seca Recreation Area and Toro Regional Park also border Fort Ord to the south and southeast, respectively, as well as several small communities along Highway 68.

Since it was established in 1917, Fort Ord served primarily as a training and staging facility for infantry troops. Fort Ord was a basic training center from 1947 to 1975, served as a base for the 7th Infantry Division after 1975, and was selected for closure in 1991. Ford Ord was officially closed in September 1994 in response to the 1991 Base Realignment and Closure (BRAC) Act. No active Army division is stationed at Fort Ord; however, Army personnel operate the areas of Fort Ord still held by the Army. Much of the installation has been or will be disposed to federal, state, local, and private entities through economic development conveyance, public benefit conveyance, negotiated sale, or other means.

Portions of the former Fort Ord were used by Army units between 1917 and 1994 for maneuvers, target ranges, and other purposes. The types of munitions used at the former Fort Ord include artillery and mortar projectiles, rockets, guided missiles, rifle and hand grenades, practice land mines, pyrotechnics, bombs, and demolition materials. As a result, a wide variety of conventional MEC, both unexploded ordnance (UXO) and discarded military munitions items, have been encountered at sites throughout the former Fort Ord.

In preparation for transfer and reuse of former Fort Ord property, various military munitions-related investigative and removal/remedial activities have been performed since 1993. Potential chemical contamination at the former Fort Ord was investigated under the *Basewide Remedial Investigation/Feasibility Study* (Harding Lawson Associates [HLA], 1995), and continues to be addressed under the Basewide Range Assessment and Site 39 programs.

A Federal Facility Agreement (FFA) was signed in 1990 by the Army, EPA, DTSC, and the Central Coast Regional Water Quality Control Board. The FFA establishes schedules for performing RI/FSs and required that remedial actions be completed as expeditiously as possible. In 1998, the Army agreed to evaluate military munitions at the former Fort Ord in a basewide MR RI/FS (formerly ordnance and explosives [OE] RI/FS) consistent with the Comprehensive Environmental Response, Compensation, and Liability Act. The basewide MR RI/FS program addressed MEC hazards on the former Fort Ord and evaluated past removal actions as well as recommended preferred remedial actions deemed necessary to protect human health and the environment for future uses. In April 2000, an agreement was signed

among the Army, EPA, and DTSC to evaluate military munitions at the former Fort Ord subject to the provisions of the FFA. The MR RI/FS uses a "tracking" process that categorizes areas with similar MEC-related characteristics to expedite cleanup, reuse, and/or transfer of former Fort Ord property. According to this "tracking" process, an area under investigation is assigned one of four tracks, Tracks 0 through 3, which are described as follows:

- Track 0: Areas that contain no evidence of MEC and have never been suspected as having been used for military munitions-related activities of any kind. Details of the Track 0 program and areas addressed are provided in the *Track 0 Record of Decision (ROD)* (Army, 2002), and the *Track 0 Explanation of Significant Differences* (ESD; Army, 2005a).

- Track 1: Sites where military munitions were suspected to have been used, but based on the RI/FS for each site, fall into one of the following three categories:

    - Category 1: There is no evidence to indicate military munitions were used at the site, i.e., suspected training did not occur; or

    - Category 2: The site was used for training, but the military munitions items used do not pose an explosive hazard, i.e., training did not involve explosive items; or

    - Category 3: The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an unacceptable risk based on site-specific evaluations conducted in the Track 1 RI/FS. Field investigations identified evidence of past training involving military munitions, but training at these sites involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact (i.e., inadvertent and unintentional contact).

  No further action related to munitions response is required for designated Track 1 sites. Details of the Track 1 program and sites addressed are provided in the *Track 1 ROD* (Army, 2005b).

- Track 2: Sites where MEC items were present and a MEC removal action has been conducted.

- Track 3: Areas where MEC items are known or suspected to be present, but MEC investigations have not yet been completed.

Elements of the MR RI/FS program include several completed RODs for Track 0, Track 1, Track 2, and Track 3 addressing significant portions of the former Fort Ord. The approach for completing the investigation for the remaining areas was developed and outlined in *Final Remaining RI/FS Areas management Plan, Former Fort Ord, California* (Management Plan; MACTEC/Shaw, 2010a). As part of the evaluation process, the remaining areas were divided into nine geographic areas to facilitate

investigation and documentation. These areas were established based on (1) the date the Army acquired the property, (2) the primary vegetation type, (3) MRS boundaries, and (4) geographic areas as appropriate. Portions of two of the geographic areas, "BLM-East/Post-1940 (Southern Portion)" and "BLM-East Post-1940 (Northern Portion)," comprise BLM Area A. Based on an evaluation of each of the geographic areas, the Management Plan outlined the following approach: additional field investigation through site assessment, where warranted; and completion of documentation through the Track 1 and Track 2 processes.

The Track 1 Plug-In process, which addresses Track 1 sites not included in the original Track 1 ROD, is described below.

1.2 Track 1 Plug-In Process

This section describes the Track 1 program and summarizes steps to address future sites eligible for Track 1 through the Plug-In process.

As described in the Track 1 ROD, NFA decisions for future Track 1 Plug-In sites (e.g., BLM Area A) will be proposed and documented in Approval Memoranda. This Approval Memorandum provides the same level of information that was included in the RI Site Reports and in the *Final Track 1 Ordnance and Explosives Remedial Investigation/Feasibility Study* (MACTEC, 2004), and describes the rationale for Track 1 designation. In accordance with the Track 1 ROD, the Approval Memorandum for BLM Area A includes the following:

1. A description of the site;
2. A description of the historical use of the site;
3. Rationale for the designation of BLM Area A as Track 1; and
4. Maps of BLM Area A detailing its location and any pertinent available MEC-related information.

There is a public review process for Approval Memoranda, and they will be primary documents under the FFA. Each Track 1 Plug-In Approval Memorandum will be submitted and finalized according to the agency consultation process outlined in Section 7 of the FFA. Following agency review of the draft Approval Memorandum and necessary revisions, the Army will submit the Approval Memorandum for a 30-day public review and comment period. A public notice will be posted in a local newspaper announcing the opportunity to review and comment on the proposed decision(s). Subsequently, the Army will submit to the agencies a summary of public comments and responses to the comments, and any needed revisions to the Approval Memorandum, at which time the Approval Memorandum will be considered a draft final document as defined in the FFA. Within 30 days of this submittal, the agencies will, in writing, either concur with or acknowledge the Army's decision(s), or initiate a dispute per Section 12 of the FFA.

When the written concurrence from EPA and acknowledgement from DTSC are received, a public notice will be posted in a local newspaper. Planned and completed "NFA Related to MEC" site determinations

will also be described in Fort Ord environmental cleanup newsletters prepared by the Army for local residents. Notification of these proposed and completed activities will also be distributed to appropriate local agencies. The Proposed Plan and ROD for Track 1 and other tracks, as well as associated Approval Memoranda, have been placed in the former Fort Ord Administrative Record (AR) and the local information repositories.

1.3 Approval Memorandum Organization

This Approval Memorandum contains two major elements: (1) a presentation and assessment of archival data (Section 2 and Section 3), and (2) a site evaluation (Section 4) that uses the archival data presented in the preceding sections.

The archival data presented in Section 2 includes a review of the area history, evaluation of potential military munitions in the area, and a summary of previous MR investigations. Section 3 presents the conceptual site model (CSM) for BLM Area A. The site evaluation in Section 4 was conducted in accordance with the procedures described in the *Final Plan for Evaluation of Previous Work* (HLA, 2000) and may restate some information presented in Section 2 and Section 3. The site evaluation discusses the evaluation of literature review, sampling, site walk, and MEC removal (within two MRSs) processes. These discussions are based upon information from standardized literature evaluation, sampling evaluation, site walk evaluation, and removal evaluation checklists (Appendix B) and summarize the conclusions for the area. The recommendations for BLM Area A are presented in Section 5. References cited in this Approval Memorandum are in Section 6.

2.0 Site Summaries

2.1 Site Location and Description

The Track 1 BLM Area A is located in the eastern portion of the former Fort Ord, with a total acreage of 3,976 acres. The property was purchased by the Army after 1940, and the majority of the property was transferred to the BLM in 1996. BLM Area A and associated parcels are shown on Figure 1. All parcels, with the exception of Parcel L20.4, were transferred in 1996.

The northern portion of BLM Area A includes the following Munitions Response Sites (MRSs): MRS-27N, MRS-27R, MRS-27U, MRS-61, MRS-67, and MRS-68, as well as portions of MRS-27Q, MRS-27W, MRS-64, and the northern portion of MRS-27T. It also includes approximately 748 acres of land between and around these MRSs (Figure 2). The proposed Track 1 area does not include 37 acres of MRS-69, which was evaluated under the Track 1 process and is included as an NFA site in the Track 1 ROD (Army, 2005). For the completed Track 1 site, information presented in this document is included as it pertains to the investigations in the surrounding areas.

The southern portion includes MRS-14C, MRS-17, MRS-27S, and MRS-32C, as well as portions of MRS-14B, MRS-27V, and the southern portion of MRS-27T. It also includes approximately 2,285 acres of land between and around these sites (Figure 2A). Several approved Track 1 NFA sites are located in the vicinity (MRS-27X, MRS-32A, MRS-32B, MRS-63, and MRS-70), but are not part of the proposed Track 1 area. Information about these five completed Track 1 sites is presented in this document as it pertains to the investigations in the surrounding areas.

Parcel L20.4, the remaining parcel to be transferred, lies mostly within completed Track 1 MRS-32A and 32B, which are not part of the proposed Track 1 area (Figure 1). The northern portion of Parcel L20.4 lies with in MRS-32C, which is part of the proposed Track 1 area. The parcel was initially proposed for transfer to Monterey County for use as an overflow parking for Laguna Seca Raceway. In 2002, as a result of Assessment East Garrison – Parker Flats Land Use Modifications, Fort Ord, California (BW-2180), BLM requested Parcel L20.4 in exchange for withdrawing the claim to the MOUT facility (Parcel F1.7.2) (BW-2180A). The parcel will be transferred to BLM.

2.2 Site History and Development

2.2.1 Aerial Photography Review

Aerial photographs covering BLM Area A are available for years 1965, 1966, 1975, 1978, 1986, 2000, and 2007. Of the aerial photographs reviewed, selected photographs are discussed and presented in this document.

The 1966 aerial photograph (Figure 3) shows disturbed areas immediately outside of the southern portion of MRS-27R along Skyline Road, which may be a turnaround area; a disturbed area is identified south of MRS-61 and MRS-67 adjacent to Jacks Road which may be a staging area for the activities associated

with MRS-67; a disturbed area located on a slope along a trail at the southeast border of MRS-27N, a disturbed area located at the top of the hill within MRS-27N may be associated with hand grenade training that took place in MRS-27N and MRS-61; and a disturbed area located in the northern portion of BLM Area A that is not associated with any MRSs and appears to be a turnaround area.

These areas from the 1966 photograph are also visible in the 1975 and 1986 photographs (Figure 4 and Figure 5). In these aerial photographs, there is an additional cleared area with two buildings in the northwestern portion of MRS-27R; and a cleared area located at the top of the hill at the north-northwest boundary of MRS-27N and MRS-61 that may be associated with hand grenade training.

The 1966 aerial photograph shows features that appear to be graded terraces in the area of the former tank gunnery range in MRS-32A, as well as disturbed areas along a trail connecting two sections of Oil Well Road just to the southwest of the former tank gunnery range (Figure 6) that may be just a shortcut/off road trail connecting two points of Oil Well Road; several disturbed areas approximately equidistant between Guidotti Road and MRS-63 (Figure 7) that may be parking areas or some kind of turnaround area; and a disturbed area with some kind of central feature in MRS-14B (just to the northwest of MRS-14C) (Figure 8).

In the 1975 aerial photograph, there is an additional disturbed area south of Guidotti Road and north of the trees (just south of the previously noted cleared area) (Figure 7) that is of unknown use/origin, and the 1978 aerial photo shows a disturbed area of unknown use/origin south of MRS-27T between MRS-27T and MRS-27V (Figure 8). These areas do not appear in any aerial photo from other dates.

2.2.2 Site History by Area

MRSs were identified and listed in the 1997 Revised Archives Search Report (ASR; USAEDH 1997). The site history, development, and use, based on review of aerial photographs and historical maps presented in the ASR (dated between 1940 and 1992), for the subject areas are summarized below and shown on Figure 9 and Figure 10. Additionally, significant historical record review was conducted during the development of site assessment technical memoranda for BLM-East/Post-1940 (Southern Portion) and BLM-East/Post-1940 (Northern Portion) (MACTEC 2010b and 2010c). Historical training information from these technical memoranda is provided on Figures 2 through 12 in this document.

Northern Portion of BLM Area A

General Training Areas

No specific training areas were identified on maps dated prior to 1954. The entire 1,250-acre area was labeled as C-2 on the August 1945 Training Map (Army, 1945). The area north of Jacks Road was marked as being used by the 34th Engineering Group in the training maps dated from 1954 through 1958 (Army, 1954, 1956, 1957, and 1958), and by the 84th Engineering Group in the training maps dated between 1964 and 1987 (Army, 1964, 1967, 1972, and 1987; U.S. Army Corps of Engineers [USACE], 1984). The northeastern and eastern border of this section (Figure 9) was marked as a "Noise Buffer Zone" (no firing of blank ammo, pyrotechnics, explosives, or simulators) in 1984 and 1987 training maps

(USACE, 1984, and Army, 1987). The area south of Jacks Road on the 1956 map was marked as being used by Division Artillery. The maps from 1957 through 1958 identify the area south of Jacks Road as being used by the First Brigade. This area changed use on the 1964 map and was divided into two where the area to the west was used by G-3 and the area to the east by the Third Brigade.

MRS-27N

MRS-27N was identified as Training Site 14 on the 1976, 1984, and 1987 training maps (Army, 1976, and 1987; USACE, 1984). Training sites were authorized for overnight bivouac training. Per an interview reported in the ASR with former Fire Chief Fred Stephani, this area was used in the 1960s for hand grenade training. Training at the Upper Engineer Canyon dirt road consisted of bazookas and rifle grenades fired on both sides of the canyon during the 1950s and 1960s. This site almost completely overlaps MRS-61 and was investigated as part of MRS-61. No MEC items were found during site reconnaissance activities at this site. Blank 5.56mm and 7.62mm small arms ammunition were encountered throughout the area in addition to an expended star cluster illumination signal (model unknown). No range features were identified during the site reconnaissance at MRS-61.

MRS-27R

MRS-27R is identified as Bivouac Area H on a 1972 training map (Army, 1972), and Training Site 18 on the 1976, 1982, and 1987 ranges and training maps (Army, 1976, 1982, and 1987). Training sites were designated for overnight bivouac.

MRS-27U

MRS-27U was identified as Training Site 21 on the 1976 Ranges and Training areas maps (Army, 1976, and 1987; USACE, 1984). Training sites were used for overnight bivouac. A tank gunnery range, located south of Training Site 21, is shown on 1956 through 1958 training maps. Based on 1956 through 1958 training maps, the probable range fans for an adjacent tank gunnery range would have been located to the northwest of MRS-32C. No MEC or munitions debris items have been found within MRS-27U.

MRS-61

MRS-61 was identified during interviews conducted with former Fort Ord Fire Chief Fred Stephani as an area used in the 1960s for hand grenade training. The ASR notes that soldiers would throw grenades from the top of the hill and the north side slope into Engineers Canyon (USAEDH, 1997). This area was reportedly used for approximately one year. This area overlaps Site MRS-27N. Mr. Stephani also stated that bazookas and rifle grenades were fired on both sides of the canyon along Upper Engineer Canyon Road during the 1950s to 1960s.

MRS-67

Historical maps do not identify any training areas or other features in the area of MRS-67. However, MRS-67 was identified based on interviews conducted with former Fire Chief Fred Stephani as an area where shoulder-launched projectiles were fired parallel to the road from a fixed point at the northwestern

portion of the site. As stated in the ASR, rifle grenades were reportedly fired on both sides of Jacks Road from the 1940s to 1960s (USAEDH, 1997).

MRS-68

Based on historical training maps of the area from the 1960s (Army, 1964 and 1967), MRS-68 contained an aviation training area and a Boy Scout Camp. In addition, a portion of site MRS-68 is included in the Noise Buffer Zone as shown on the 1978 through 1987 training maps (Army, 1978 and 1987). Further, based on interviews with Mr. Stephani, the grassy open area near the Boy Scout camp was used for shoulder-launched rockets and rifle grenades that were fired from the westerly dirt road into the hills.

MRS-27Q

A portion of MRS-27Q is included in BLM Area A (Figure 9). MRS-27Q was identified on an Army 1958 training and facilities map as "ST-5" (Army, 1958). ST might stand for Service Test as defined in Authorized Abbreviations, Brevity Codes, and Acronyms (Army, 1985). The MRS is identified as Training Site 17 on Army 1976 through 1987 ranges and training maps (Army, 1976 and 1987).

MRS-27W

A portion of MRS-27W is included in BLM Area A. MRS-27W is identified as Training Site 23 on 1970s through 1980s training maps. Training sites were authorized for overnight bivouac training. MRS-27W lies completely within the boundaries of MRS-64 and was evaluated as part of MRS-64. A mock Vietnam village was identified to the north of MRS-27W on the 1967 Back Country Roads map (Army, 1967) and 1972 training map (Army, 1972). This area is completely within the boundaries of MRS-64.

MRS-64

A portion of MRS-64 is included in BLM Area A. MRS-64 was identified in interviews with former Fire Chief Stephani and former Fort Ord Range Control Officer Lee Stickler reported in the ASR (USAEDH, 1997). Small arms and rifle grenades were reportedly fired from both sides of the road into the cliffs and up the canyon, according to Mr. Stephani. This use occurred until the 7th Infantry Division (light) took over the installation. Mr. Stickler mentioned that there had been a Vietnam village training area within MRS-27W, in which only small arms were used. MRS-27W is located completely within the boundaries of MRS-64. On the 1967 Back Country Roads map (Army, 1967) and a 1972 training map (USACE, 1972), a Vietnam village is identified within the site. The ASR notes that the village was torn down in the 1980s.

MRS-27T

MRS-27T was identified on a 1976 Ranges and Training Area Overlay map and was used as overnight bivouac area. Training is identified in this general area on available training maps dating back to about 1954 (USAEDH, 1997). On a 1964 training facilities map and the 1967 Back Country Roads map, Army Training Test (ATT) is identified in the site vicinity (Army, 1964 and 1967). ATT is defined as army

training test in Authorized Abbreviations, Brevity Codes and Acronyms, 1985, Regulations 310-50 (Army, 1985). The site vicinity is identified as Counter Ambush Techniques on a 1972 training map (Army, 1972).

In-Between Areas

Training identified in the northern portion "In-Between Areas" included Land Navigation Training shown on the 1961 Training Map (Army, 1961). This area extends between MRS-61 and MRS-68. The northern and eastern site boundary area is part of the Noise Buffer Zone shown beginning on 1976 training maps. No firing of ammunition was allowed, including pyrotechnics, explosives, or simulators, in the Noise Buffer Zone.

Southern Portion of BLM Area A

MRS-14B

Site 14 was identified based on interviews, and then subdivided into 5 sites including MRS-14B (USAEDH, 1997). A 1956 map (Army, 1956) shows a range originating at MRS-14B with a direction of fire toward the west-northwest. No evidence of firing points or range debris has been found in this area, and the range is not shown on any other maps. It is assumed that this range was never built. According to the 1997 Revised ASR, MRS-14B was suspected of containing 7-inch and 8-inch projectiles that overshot the impact area based on interviews (USAEDH, 1997). No evidence of 7- or 8-inch gun projectiles was found during sampling operations at the site (UXB, 1995a).

MRS-14C

MRS-14C is a subsite of former Site 14. No historical site-use information specific to MRS-14C was available; however, the site is located south of MRS-14D, which was used as a sub-caliber artillery training area (USAEDH, 1997). MEC sampling of this site was performed in 1995 by UXB (UXB, 1995b).

MRS-17

MRS-17 is approximately 9 acres in size and is located adjacent to Oil Well Road. MRS-17 was identified as a site in the 1997 ASR (USAEDH, 1997). ASR interviews indicated that MRS-17 was used in the early 1960s as a firing point and target area for shoulder launched (antitank) (AT) projectiles. These interviews also identified two training areas immediately adjacent to MRS-17.

MRS-27S

MRS-27S is a former training site. Oil Well Road is adjacent to the site, which is identified as a practice land mine training area. An aviation training area is apparent in the site vicinity on 1964 and 1968 training maps (Army, 1964 and 1967). On a 1972 training map, the site area is identified as Land Navigation "P" and Helicopter Training Area (USA, 2001). The site is identified as Training Site 19 on 1976 through 1987 training maps (Army, 1976 and 1987).

MRS-27T

MRS-27T is identified as Training Site 20 on 1976 through 1987 ranges and training maps (Army, 1976 and 1987). This site is located along the central western edge of BLM Area A. The site area was used as a Human Research Resource Organization (HUMRO) Test Area in the early 1960s. HUMRO was a soldier psychology project and did not involve the use military munitions. A Vietnam village is shown to the west of the site on a 1967 Back Country Roads map; and on a 1971 training facilities map, Demonstration Village appears just northwest of the site (Army, 1967 and USACE, 1971). On a 1964 training facilities map and the 1967 Back Country Roads map, ATT is identified in the site vicinity (Army, 1964 and 1967). The site vicinity is identified as Counter Ambush Techniques on a 1972 training map (Army, 1972).

MRS-27V

MRS-27V is identified as a former training site on 1976 through 1987 ranges and training maps, where the site is identified as Training Site 22 (Army, 1976 and 1987). On 1957 through 1964 training maps, the site vicinity is identified within the HUMRO Test Area (Army, 1957 and 1964).

MRS-32C

Site 32 was identified based on review of historical maps, and then subdivided into three sites including MRS-32C (USAEDH, 1997). MRS-32C includes a portion of the Oil Well Road Training area (Figure 10). The probable location of target locations for an adjacent tank gunnery range, located within the former location of the Oil Well Road training area, are shown on 1956 through 1958 training maps (Army, 1956, 1957, 1958). Based on training maps, target locations for the tank gunnery range would have been located to the northwest and outside of the MRS boundary.

In-Between Areas

A large portion of the southern portion of BLM Area A is not encompassed in an identified MRS. These In-Between Areas include to following areas.

- An area west of MRS-32A, which was shown to be within the fan of a tank gunnery on 1956 through 1958 training maps (Figure 10).

- The area from just south of MRS-27S to the eastern end of MRS-32C. A 1984 training facilities map has several hand-drawn notes based on an interview with Howard Beardsley of the 87th Explosive Ordnance Disposal (EOD) reported in the ASR, which shows this area marked as being used by trainees in the 1930s. This same map notes an AT practice mine area over the southwest portion of MRS-27S extending to the southwest (Figure 11).

- And a large area south of MRS-14B and southwest of MRS-32B. Training maps from 1984 and 1987 also identify a large area along the southern boundary as a Noise Buffer Zone (Figure 10). This noise buffer zone was reportedly established in July 1976.

2.3 Current and Future Land Use

Currently, BLM Area A is mostly undeveloped land. There are a few residual structures that were used in support of training activities, but these structures have been abandoned. The Fort Ord Reuse Plan (FORA, 1997) identified the proposed future use to include habitat conservation and protection.

Most of the area (Parcels F1.1.1, F1.1.2, and F1.1.3) was transferred to BLM in 1996. Only Parcel L20.4 remains to be transferred. At the time of transfer, available information indicated that the property was safe for reuse as a habitat management area with recreational access.

The property underlying BLM Area A is designated as Natural Resource Management Area (NRMA) under Installation-Wide Multispecies Habitat Management Plan for Fort Ord, California (HMP; USACE 1997). In general, BLM Area A is undeveloped and will remain in its natural state supporting habitat management with public access. The Army and BLM have been and will continue to coordinate MEC safety on an ongoing basis (signs/notices, MEC incident reporting procedures, and MEC recognition and safety training). Reporting of suspected munitions items discovered in federal property is currently being implemented according to the procedure described in Appendix G, paragraph 6.a. of *Munitions Response Site Security Program* (Army, 2012). Current standard procedure is for such incidentals to be reported directly to the USACE OE Safety Specialist.

2.4 History of Area Investigations

2.4.1 History of Area Investigations

The MRS locations, paths of the site walks and reconnaissance performed, and MEC and MD found at the MRSs and in-between areas at BLM Area A are shown on Figure 2 and Figure 2A. The MEC and MD items found prior to the development of the Management Plan are listed in Table 1. MEC and MD items recovered during site assessment investigations (following the development of the Management Plan) are listed in Table 2. Table 3 provides a listing of MRSs included in the proposed Track 1 area and their respective acreages. The historical information presented below is based on site investigations documented in the 1997 ASR (USAEDH, 1997) and as part of the Basewide Range Assessment (BRA) site reconnaissance (MACTEC/Shaw, 2009) and site assessments (Shaw, 2011a, 2012). Prior to the development of the Management Plan, MEC-related field investigation, sampling, and removal activities have been conducted by various Army contractors within the remaining RI/FS areas since 1994. Following the development of the Management Plan, site assessments were conducted by Shaw in 2011. MEC sampling and removal were conducted in specific MRSs.

UXB International, Inc. (UXB) – July 1994 through August 1995 (UXB, 1995a, b, c)

UXB was contracted by the Army with the objective of performing sampling and removal actions. Site locations were taken from the 1993 ASR and 1994 ASR Supplement. Site perimeter surveys were done prior to MEC sampling and removal work. Sample grids were 100 feet (ft) by 100 ft square and spaced so that no two grids were any closer than 200 ft, to provide maximum dispersion of the sample grids. Sample grids were required to cover at least 10% of the site being sampled. Once the sample grid

locations were established, each grid was divided into 5-ft-wide search lanes. Each lane was investigated visually while simultaneously searching for subsurface anomalies with the magnetometer.

Excavation to a depth of 4 ft below ground surface (bgs) (3 feet prior to December 14, 1994) was required to identify or confirm the presence of MEC. QC checks were performed on each grid after UXO operations were complete. UXB QC specialists checked a minimum of 10% of each investigated grid to insure that MEC removal was done properly.

CMS Environmental, Inc./USA Environmental, Inc. (USA) – August 1995 to 2001 (CMS, 1997; USA, 1997, 2000, 2001)

CMS Environmental, Inc. (CMS) was contracted by the Army to perform sampling and removal of MEC at selected sites within the Former Fort Ord. CMS began sampling operations at Fort Ord from August 1995. In June of 1998, CMS was sold and the name of the company became USA Environmental, Inc. (USA). In July 1998, USA began to conduct work on Fort Ord as a subcontractor to CMS.

The objective of the CMS contract was to safely locate, identify, sample and/or dispose of all MEC located on the project site down to a depth of 4 ft bgs. Sites within BLM Area A were sampled using 100 percent sampling.

Sample grids for 100 percent sampling were generally 100 ft by 100 ft square and spaced so that no two sample grids were any closer than 200 ft for 100 percent sampling. SS/GS grids are usually 100 ft by 200 ft.

In 100 percent grid sampling, 100-ft by 100-ft grids were selected, surveyed, and investigated with a magnetometer along maximum 5-ft-wide search lanes. Whenever a subsurface anomaly or metallic surface object was encountered, it was investigated. Near surface anomalies were excavated with hand tools. While digging, a magnetometer was used to check and verify the location of the anomaly.

Basewide Range Assessment (MACTEC/Shaw, 2009 and revised 2012)

In March 2005, MACTEC/Shaw submitted the BRA, which documents the status of sites identified for investigation for the presence of potential chemicals of concern at the known or suspected small arms ranges, multi-use ranges, and military munitions training areas within the former Fort Ord site. The work was performed under the direction of Shaw (MACTEC/Shaw, 2009 and revised 2012).

The BRA process involved five steps, as appropriate for each range,: (1) A review of historical documents including historical training maps, historical aerial photographs, range control records, and military munitions after action removal reports, (2) site reconnaissance and mapping of MEC or munitions debris identified during the site walk, fighting positions, accumulations of spent small arms ammunition, pits, targets, range fan markers, areas of thick vegetation, and evidence of possible chemical contamination, (3) limited soil sampling for screening purposes, (4) site characterization, and (5) remediation/habitat mapping.

Site walks as part of the BRA were completed in: MRS-32C, MRS-27S, MRS14B, MRS-27V, MRS-27R, MRS-27T, MRS-27U, MRS-27W, MRS-61, MRS-64, MRS-68, and MRS-67.

Site Assessments – 2011 (MACTEC/Shaw, 2010b, 2010c)

Based on the evaluation of available data, the Management Plan outlined additional field investigation through site assessment for BLM-East/Post-1940 (Southern Portion) and BLM-East/Post-1940 (Northern Portion) (MACTEC/Shaw, 2010a). This site assessment process consists of two parts: (1) the pre-field data evaluation and (2) the site assessment field investigation. The pre-field data evaluation, which was described in the site assessment Technical Memorandums for the Northern and Southern Portions of the BLM East/Post-1940 Area (MACTEC/Shaw, 2010b, 2010c), consisted of an extensive review of maps, records, interviews, reports, and previous investigations. The site assessment field investigation included visual and instrument-aided mapping of site features related to past training activities, mapping of MEC or MD identified during the site assessment, and mapping of the paths walked.

The site assessment process was designed to collect data necessary to fill data gaps identified in the management plan. Northern portion data gaps consisted of follow-up evaluation of: two M18 series smoke hand grenades identified by BLM along trails between MRS-64 and MRS-69 in 1997; and MEC and munitions debris identified within the existing MRS boundaries (Table 1). Southern portion data gaps consist of follow-up evaluation of: one M9 AT rifle grenade that was identified by USACE in October 1999 on the western edge; one M18 smoke hand grenade identified by the USACE in 1999 on the northern boundary; one M22 series smoke rifle grenade on the southwestern part of the geographic area; and several practice land mines near MRS-17.

MRS-specific investigation history is presented below.

Northern Portion

MRS-27N

MRS-27N was identified as Training Site 14, an approximately 60-acre training site shown on 1970s through 1980s training maps located in the central northern portion. This MRS almost completely overlaps with northern portion of MRS-61 (Figure 2). Training sites were authorized for overnight bivouac training. Small arms blanks were identified in this area during a site walk by a USACE OE Safety Specialist (USAEDH, 1997). This MRS was also recommended for reconnaissance as part of the BRA literature review. The BRA field investigation was completed as part of the MRS-61 BRA site reconnaissance and is described as part of MRS-61. No range features, MEC, or MD were identified during the site reconnaissance at MRS-27N and MRS-61.

MRS-27R

MRS-27R is identified as an approximately 39-acre former training site located in the west-southwest portion of the northern portion, north of Pilarcitos Canyon Road, and west of Jacks Road (Figure 2). A USACE OE Safety Specialist performed a site inspection in January 1996 and found expended small arms

ammunition blanks and expended pyrotechnic items. This area was also investigated as part of the BRA conducted in January 2002. Items found at the MRS include a wood structure, an expended signal, and several blank small arms ammunition casings. No fighting positions or evidence of targets were found during the MRS visit (MACTEC\Shaw, 2009).

MRS-27U

MRS-27U is an approximately 37-acre former training site located in the center of BLM Area A. MRS-27U is adjacent to MRS-32C. The MRS was used from the 1970s to closure as an overnight bivouac area. MRS-27U was included in the area walked as part of the site walks conducted under supervision of the USACE in October 1999 (USA, 2001). No MEC or munitions debris items have been found within MRS-27U.

MRS-61

MRS-61 is located in the central northern portion. During a site walk conducted in December 1995 by a USACE OE Safety Specialist, blank 5.56mm and 7.62mm small arms ammunition were encountered throughout the area in addition to an expended star cluster illumination signal (model unknown). This area was also investigated as part of the BRA site reconnaissance in January 2002. The only items identified and subsequently mapped during the site reconnaissance were bench seats, a wooden structure, and a fighting position. No targets or other range features were found. It should be noted that access to the southern portion of the MRS was limited due to dense vegetation.

MRS-67

MRS-67 was identified based on interviews conducted with former Fire Chief Mr. Stephani (USAEDH, 1997). This MRS is located in the south central portion of the northern portion of BLM Area A, east of Pilarcitos Canyon Road and west of Engineer Road. A site inspection conducted in 1995 by a USACE OE Safety Specialist led to the recovery of expended small arms blanks and one expended M-18 smoke grenade. This area was also investigated as part of the BRA conducted in 2002. No evidence of ranges or MEC or MD was found (MACTEC/Shaw, 2009).

MRS-68

MRS-68 was identified based on interviews with Mr. Stephani (USAEDH, 1997). This MRS is located in the northeastern portion of BLM Area A, east of Engineer Road along Boy Scout Road. A USACE OE Safety Specialist found small arms ammunition blanks and recovered an expended star cluster illumination flare during the ASR (USAEDH, 1997). This area was also investigated as part of the BRA conducted in January 2002. No small arms ammunition, MEC, or MD were identified during the site visit. Several fighting positions were mapped; however, no evidence of targets or range features was identified. Other items mapped include two buildings, a water tank, a metal storage bin, and an outdoor briefing area (MACTEC/Shaw, 2009). The existing water tank reportedly has been repaired at least twice due to being hit (possibly by munitions) (USAEDH, 1997). It should be noted that access to the

northwestern portion of the area was limited due to steep terrain, and access to the southwestern portion of the MRS was limited due to thick vegetation.

MRS-27Q

MRS-27Q is identified as an approximately 15-acre former training site located on the western edge of the northern portion, at the intersection of Jacks Road and Pilarcitos Canyon Road. The northwestern portion of MRS-27Q (approximately 75 percent) lies outside the boundary of BLM Area A.

This MRS was investigated as part of the BRA conducted in January 2002. Expended blank small arms ammunition casings and several range-related debris items were found; however, no MEC or MD were identified during the site reconnaissance (MACTEC\Shaw, 2009). According to the ASR, one M201 igniting grenade fuze was found at the MRS within the portion of the MRS that is northwest of BLM Area A. Access to the southwest and northeast portions of the MRS during the BRA was not possible due to dense vegetation and steep terrain.

MRS-27W

MRS-27W was identified as Training Site 23 on 1970s through 1980s training maps located on the north western edge of BLM Area A. MRS-27W is approximately 23 acres. Training sites were in general authorized for overnight bivouac training. This area is completely within the boundaries of MRS-64 and is further detailed under MRS-64. MRS-27W was included in the site reconnaissance conducted as part of the BRA.

MRS-64

MRS-64 is located on the western edge of BLM Area A and was identified in interviews with Mr. Stephani and former Fort Ord Range Control Officer Lee Stickler during the ASR. The northwestern portion of MRS-64 (approximately 40 percent) lies outside of Area A.

During a site inspection conducted in 1995 by a USACE OE Safety Specialist, 5.56mm and 7.62mm blanks, ground illumination signals, and expended M-18 smoke grenades were discovered along the roads within MRS-64 (USAEDH, 1997). This area was also investigated as part of the BRA conducted in October 2001. Expended blank small arms ammunition casings were found during the site visit; however, no MEC or MD was found at the MRS. Two fighting positions were mapped, although no evidence of targets or other range features was identified. Other items found during the site visit include a concrete debris area, one wood structure, four utility poles, one range flagpole, one hunting sign, and two pits.

The BLM found a MK 1 75mm shrapnel projectile in June 1997 (listed as MD) on the portion of MRS-64 west of BLM Area A. This projectile was found on the surface and was not found as part of a scheduled removal operation.

MRS-27T

MRS-27T is approximately 36 acres and is located primarily between Pilarcitos Canyon Road and Skyline Road. The southwest corner of MRS-27T lies on the west side of Pilarcitos Canyon Road and overlaps the northeast corner of MRS-14E.

Sampling of adjacent MRS-14E was conducted in 1996 by CMS. As part of this sampling investigation, one of several sample grids associated with MRS-14B was located in the area where MRS-14E and MRS-27T overlap but outside the MRS-14B boundary. All anomalies detected within the grids were investigated to a depth of four ft. No MEC was found in the sample grid associated with MRS-14E that lies within MRS-27T. One MD item, a 22mm sub-caliber practice projectile, was found in the grid (USA, 1997). No other sampling or removal operations have been conducted at MRS-27T. MEC and MD were not found in any of the MRS-14E grids that are adjacent to MRS-27T.

This area was investigated as part of the site reconnaissance conducted in January 2002 under the BRA. Items found include blank small arms casings. No MEC or MD or fighting positions were encountered during the site visit.

To address the potential threat to the public posed by the potential presence of MEC on the ground surface, trails, and roads located on the east side of Barloy Canyon Road and lying outside of the MRSs, were investigated for the presence of MEC in October 1999. A visual sweep of the roads and trails was conducted by representatives of USACE and their removal contractor (USA, 2001). Portions of Pilarcitos Canyon road and Skyline Road within and adjacent to MRS-27T were inspected. No MEC or MD was observed in and around MRS-27T.

In-Between Areas

BRA site reconnaissance walks extended into the northern portion in between MRS-27Q and MRS-27R. The results of the site walks are included above under the MRS specific discussions. The in-between area just to the east of MRS-27U was identified as a potential target area for shoulder-launched projectiles by Mr. Stephani (Figure 12). Helipads are shown in the northern part of the site west of MRS-69.

Site Assessment Results

The site assessment process was designed to collect data necessary to fill data gaps identified in the management plan. Northern Portion data gaps consisted of follow-up evaluation of: two M18 series smoke hand grenades identified by BLM along trails between MRS-64 and MRS-69 in 1997, and MEC and munitions debris identified within the existing MRS boundaries.

MEC and MD items found during the site assessment field investigations are summarized in Table 2. Item locations are shown on Figure 13. The only MEC item was found at MRS-27N. This MEC item was a simulator, projectile, air burst, M74A1 that is designed to simulate artillery fire air bursts.

Southern Portion

MRS-14B

According to the 1997 ASR, MRS-14B (Figure 2A) was suspected of containing 7-inch and 8-inch naval projectiles that overshot the impact area based on interviews (USAEDH, 1997). MRS-14B was included in a random sampling by UXB. The sampling consisted of 2,043 100-ft by100-ft grids, of which five percent (109 grids) were 100 percent sampled (all detected anomalies were investigated) to a depth of four ft (UXB, 1995a). UXB recovered a total of 402 blank small arms cartridges, one small arms casing, one live 12-gauge shotgun cartridge, and 35 MD items, including two 81mm training mortar projectiles and a 3-inch MK1 practice trench mortar projectile. The 3-inch MK1 practice trench mortar projectile was found in the area of MRS-14B located outside of BLM Area A. No evidence of 7- or 8-inch projectiles or heavy fragment MD was found during sampling operations at MRS-14B.

This area was also investigated as part of the BRA reconnaissance (MACTEC/Shaw, 2009) conducted in November 2001. Small arms casings, four signal flares (condition unknown), and one fin assembly for a 22mm sub-caliber mortar projectile were found during the site visit. Several fighting positions were mapped; however, no evidence of targets or range features was identified.

MRS-14C

MRS-14C covers 28 acres in the northwest area of the southern portion (Figure 2A). No historical site-use information specific to MRS-14C was available; however, the site is located south of MRS-14D which is outside of BLM Area A and was used as a sub-caliber artillery training area (USAEDH, 1997).

MEC sampling of this site was performed in 1995 by UXB (UXB, 1995a). Fifteen 100-ft by 100-ft grids out of 118 grids were 100 percent sampled (all detected anomalies were investigated) to a depth of four ft. Two MD items (an M18 hand smoke grenade and an M22 rifle smoke grenade) were found during sampling along with 129 .30 caliber small arms ammunition blanks, and 0.1 pounds of pyrotechnic compound.

Based on the sampling results, USA performed a 100 percent MEC removal operation to one-foot depth over the entire 27 acres of the site (148 100-ft by 100-ft grids and partial grids) between February and March 1998. In addition, permission was obtained from USACE OE Safety Specialists to completely excavate two large burial pits: one containing 36 DMM items (M37 rocket motor simulator squibs) buried four ft deep, and one approximately two ft deep containing 12 MEC items (one M22 smoke rifle grenade and eleven M37 rocket motor simulator squibs). Review of the grid specific removal records indicates that in addition to the MEC found in two large burial pits, the majority of the other MEC items were found in three groups buried within 1 ft of the ground surface. In total, 73 MEC items and two expended M22 rifle grenades (smoke) were found at the site during the 1998 removal operations (USA, 2000).

MRS-17

MRS-17 is approximately nine acres in size and is located in the northeastern southern portion) (Figure 2A). MRS-17 was identified as a site in the 1993 ASR. In an interview conducted with military personnel, it was stated that an inert training AT mine was removed from the ground by EOD personnel from this area. The ASR recommended that spot sweeps of the area should be considered (USAEDH, 1997).

Sampling of MRS-17 was conducted in 1994 by UXB. Sampling included the investigation of six 100-ft by 100-ft grids that were randomly distributed throughout the site. The grids were 100 percent sampled (all anomalies detected were investigated) to a minimum depth of three ft. Ninety-six items were removed, 94 of which were small arms ammunition. Two MD items (an expended illumination signal and an expended booby trap simulator) were found during grid sampling. No MEC items were found during sampling (UXB, 1995c).

In 1995, portions of the site were investigated as part of an ASR site reconnaissance conducted by the USACE OE Safety Specialist. No evidence was found to support the use of the area as an impact area (e.g., fragmentation, fuzes, projectiles, targets, or firing points). The ASR reports that three inert training mines were discovered during reconnaissance activities in the area. However, the exact location where they were found is not known.

MRS-27T

MRS-27T was one of 25 training sites identified on a 1976 Ranges and Training Area Overlay map that were used as overnight bivouac areas (Training Site 20). Training is identified in this general area on available training maps dating back to about 1954 (USAEDH, 1997). This area was investigated as part of a BRA reconnaissance conducted in January 2002. Items found during the site visit include blank small arms ammunition casings, a wood structure, and several utility poles. No MEC, MD, or fighting positions were encountered during the site visit.

MRS-27V

MRS-27V (Figure 2A) is a former training site. The southwestern portion of the site overlaps with MRS-14B and the northwestern portion of the site overlaps with MRS-14E. MRS-14B was suspected of containing 7-inch and 8-inch naval projectiles that overshot the impact area. In 1994, a portion of the site was sampled by UXB as part of the MRS-14B evaluation. This area was investigated as part of the BRA reconnaissance conducted in January 2002. Two wood structures were mapped and blank casings were found during the site visit.

MRS-32C

MRS-32C includes a portion of the Oil Well Road Training area (Figure 2A). The probable locations of what would have been target locations for an adjacent tank gunnery range located within the former location of the Oil Well Road training area are shown on 1956 through 1958 training maps (Figure 10).

Based on training maps, targets for the tank gunnery range would have been located to the northwest and outside of the MRS boundary.

In 1995, CMS conducted 100 percent sampling to a depth of four ft in 92 100-ft by 100-ft grids within MRS-32C. These grids were randomly placed throughout the entire site (Figure 2A). The site-specific sampling report prepared by CMS documents the discovery of one 81mm M301A2 illuminating mortar projectile (CMS, 1997). This item is considered MEC, but is categorized as insufficient date (ISD) in the Military Munitions Response Program (MMRP) database, because the original grid records were not provided in the CMS report. Based on the results of the 1995 investigation, MEC removal to four foot removal depth was conducted in 1997 in eight grids surrounding the grid where the 81mm M301A2 illuminating mortar projectile was found during sampling. The protocol at the time was to expand the removal area if any additional MEC item were encountered. No MEC item was encountered during the removal action.

In total, 101 randomly placed grids were 100 percent sampled to four ft bgs. This constitutes approximately 16 percent of the total land area of the site. In addition to the 81mm illumination mortar projectile, Army EOD found 30 expended smoke pots (model unknown) and small arms ammunition (type not noted) in February 1996 (MMRP Data Base, Incidental Items, 2012).

Site Assessment Results

Southern portion data gaps consist of follow-up evaluation of: one M9 antitank rifle grenade that was identified by USACE in October 1999 on the western edge, one M18 smoke hand grenade identified by the USACE in 1999 on the northern boundary, one M22 series smoke rifle grenade on the southwestern part of the geographic area, and several practice land mines near MRS-17.

The items found in the southern portion are generally associated with maneuver areas or mine training and do not suggest artillery, or that high explosive (HE) items would have been used for training in this area (Table 2). For example, only inert, unfuzed practice mines were found.

2.4.2 Completed Track 1 Sites

These sites are designated as Track 1 sites and no further action is required in accordance with the Track 1 ROD. They are not part of the proposed Track 1 area; information herein is presented merely as it pertains to the investigations in the surrounding areas.

MRS-69

MRS-69 was identified as an area of suspected military munitions during interviews with former Fort Ord Fire Chief, Fred Stephani, that were conducted as part of the ASR. According to Chief Stephani, MRS-69 was encompassed by an area identified as "AN," which was an area potentially used for munitions training. The area identified as "AN" was reportedly used for firing small arms and possibly rifle grenades at a fixed target. The 1961 training map shows the southwest portion of MRS-69 within the "Land Navigation Area." A 1978 training map shows that MRS-69 is within Fort Ord's Noise Buffer

Zone (Army, 1978) in which no firing of blank ammo, pyrotechnics, explosives, or simulators was allowed.

Expended blank and live small arms ammunition were found during a site walk performed as part of a Risk Assessment Code (RAC) site investigation of selected sites in November 1995 by a UXO safety specialist. No evidence of rifle grenades was encountered during the site walk. This area was mapped as part of the BRA site reconnaissance conducted in August 2001. No evidence of MEC or MD, small arms ammunition, or fixed targets was found at MRS-69 during the BRA site reconnaissance as well.

MRS-27X

MRS-27X was identified as Training Site 24 on 1970s and 1980s era training maps. Training sites were used for troop training and for overnight bivouac. A helipad is shown on a 1967 training map and an aviation training area is indicated on a 1964 Training map. This site was sampled by UXB in 1994, 65 small arms blank cartridges were encountered and removed and one expended M22 smoke rifle grenade.

MRS-32A

MRS-32A was depicted on a historical map dated circa 1953, as Oil Well Road Training Area in the ASR. The probable location of what would have been the firing line for a Tank Gunnery Range is located within the former location of the Oil Well Road training area based on a 1956 training map.

During the Track 1 RI/FS evaluation of MRS-32A, it was suggested that the adjacent Tank Gunnery Range was used for firing tank-mounted .30 caliber and/or .50 caliber machine guns. Based on training maps, tank target locations would have been located to the northwest and outside of the site boundary. No indication of tank firing or related evidence in expected downrange areas were found within MRS-32A during sampling (e.g., shell casings and military munitions fragments).

UXB conducted sampling and found 239 small arms blanks and three expended military munitions items (M18 series smoke grenade and ground illumination signals).

MRS-32B

MRS-32B includes a portion of the Oil Well Road Training area MRS-32A. The probable location of what would have been a portion of the firing line for an adjacent Tank Gunnery Range is located within the former location of the Oil Well Road training area shown on 1956 through 1958 training maps and located within MRS-32B.

Based on training maps, target locations for the Tank Gunnery Range would have been located to the northwest and outside of the site boundary. UXB conducted military munitions removal and found 263 small arms blanks and three military munitions inert items. No indication of tank firing was found within MRS-32B during sampling. During the Track 1 RI/FS evaluation of MRS-32B, it was suggested that the Tank Gunnery Range was used for firing tank-mounted .30 caliber and/or .50 caliber machine guns. Based on interviews conducted as part of an archives search, shoulder-launched projectiles may have

been used in this area in the 1950s and 1960s; however, no evidence of the use of shoulder-launched projectiles was found within MRS-32B during sampling.

MRS-63

MRS-63 was identified during an interview conducted with Mr. Fred Stephani, and was reportedly used in 1948 and 1950 for training with small arms weapons and flares. According to the ASR, soldiers would use weapons in the canyon (USAEDH, 1997). A 1978 ranges and training map indicates that the area is within a Noise Buffer Zone (no firing of blank ammo, pyrotechnics, explosives, or simulators) on the southeast side of Fort Ord (Army, 1978).

During a site inspection conducted in 1996 by an OE Safety Specialist, small arms ammunition was discovered, however, no evidence of military munitions, fragments, fuzes, or projectile casings was found. This area was mapped as part of the BRA reconnaissance in September 2001. Blank small arms casings were found during the site visit; however, no military munitions or targets were identified. Other items found included two fence posts, one pit, concertina wire, and some scrap metal.

MRS-70

MRS-70 was identified as an area of suspected military munitions during interviews with Mr. Fred Stephani that were conducted as part of the ASR. This site is located in the eastern portion of Fort Ord. According to Mr. Stephani, training occurred in this area before 1948. The ASR indicates that there is evidence of firing berms in the flat area of the site (USAEDH, 1997). The ASR also notes that the existing firing points were stacked railroad ties with dirt piled in front of the timbers, and that firing was directed up the valley from the south end of the site. A 1978 training map shows the site within Fort Ord's Noise Buffer Zone (Army, 1978) in which no firing of blank ammo, pyrotechnics, explosives, or simulators was allowed.

No evidence of small arms or military munitions items was found during a site walk performed as part of a RAC determination of selected sites in November 1995 by a UXO safety specialist. This area was mapped as part of the BRA site reconnaissance conducted in August 2001. No military munitions, small arms ammunition, or evidence of use such as berms or fighting positions were identified during the site visit. Items mapped during the site visit include barbed wire and one pit of unknown origin. Blank casings were the only small arms ammunition found at the site.

3.0 Conceptual Site Model Development

CSMs are developed to provide a basis for identification of potential release (functioning of the military munitions item, e.g., detonation) and exposure routes. CSMs incorporate information regarding the physical features and limits of the area of concern (the site), nature and source of the contamination (in this case, MEC), and exposure routes (potential scenarios that may result in contact with MEC).

The CSMs for BLM Area A are based on currently available site-specific and general information summarized in Section 2.0. The following sections present a summary of training practices identified for the area, the site features, the potential sources and locations of MEC, and the potential exposure pathways.

3.1 Identified Training Practices

The types of training identified within BLM Area A include practice landmine training, general training and maneuver, bivouac training, practice rifle grenade training, practice hand grenade, aviation training, tank gunnery training, and practice mortar training. Brief descriptions of these types of training identified above are provided below.

Practice Landmine Training

According to current field manuals, practice and inert mines, or explosive booby trap simulators are used to train personnel in the precautions and proper methods to be observed in the care and handling, arming, booby trapping, and disarming of mines (Army, 1997). Training manuals for years prior to 1997 could not be located, but there is no reason to believe that training practices prior to 1997 would have been significantly different from methods used after 1997. The 1997 training manuals indicate that live mines are used as part of post-1997 training practices, but that live mine training and simulators training will not take place concurrently at the same location in order to preclude a live mine being mistaken for an inert mine (Army, 1997).

Army training manual instructions about how to place mines serves as guidance about how the site vicinity may have been used for mine and booby trap training (Army, 1997 and 2001). Current training in mine warfare includes installation and removal of antipersonnel and antitank mines, and antihandling devices. Training also includes installation, recovery, or transfer of a hasty protective minefield as well as emplacing tactical minefields, and row, standard pattern, and scatterable minefields. Training also includes breach of minefields (including use of explosives) as well as mine awareness training.

Based on practices described in field manuals, it is likely that during training, the trainees would learn to mark mine locations as well as practice mine removal operations. It is also likely that the trainees would practice clearing a path or lane through the minefield by probing, marking, and possibly destroying the mines with explosives or grappling hooks. Based on available historical data, practice mine training likely occurred south of MRS-61 and in and around MRS-17 and MRS-27S.

Maneuver Area

A maneuver area may have included using the site for squad patrols. Infantry platoons and squads conduct three types of patrols: reconnaissance, combat, and tracking (Army, 1992). Each patrol includes specific objectives using infantry troops, sometimes with engineer support, to gather information or conduct combat operations. Combat patrols would include the use of blank small arms ammunition and possibly pyrotechnics and smoke-producing items (e.g., signals, flares, and smoke grenades). Maneuver areas were likely present throughout BLM Area A.

Bivouac Area

Bivouac areas at Fort Ord were used for overnight training and field exercise. Twenty-six bivouac areas had been established by 1980 and are documented in Fort Ord Regulation 350-5 (Army, 1980). Ammunition storage was not allowed within 100 ft of a bivouac area. Normally, only blank cartridges, simulators, pyrotechnics, and smoke items were allowed to be stored near bivouac areas. However, field storage of sensitive items, demolition materials, and small arms ammunition (other than blanks) was permitted if clearance was obtained from the division ammunition officer (Army, 1980). Ammunition holding areas were to be individually fenced with triple concertina wire or comparable fencing. Depending on the quantity of ammunition stored, an armed guard may have been required to maintain access control. According to Fort Ord Regulation 350-5 "Strict accountability will be maintained so that items cannot be buried or discarded to avoid returning unspent ammunition." To discourage the burial or discarding of unspent ammunition, ammunition was inventoried when checked out from the Ammunition Supply Point (ASP), daily while stored in the field, and again upon turn in of the unused ammunition at the ASP.

Fort Ord range regulations required that units be checked into and out of all bivouac areas. Joint inspections of the bivouac areas were conducted by the unit representative and a representative of Range Control prior to releasing the bivouac area from unit responsibility. All tactical digging or holes were to be filled in and all wire removed. All garbage (wet or dry) was to be hauled to the sanitary landfill for disposal or placed within dumpsters in the main garrison, if the landfill was closed.

Regulations for use of bivouac areas prior to 1980 were not found, so it is possible that prior to 1980, garbage was buried on site. The garbage areas would likely have been marked with signs. It is also possible that field latrines were dug, treated with lime, and then covered with soil upon leaving. It is possible that prior to 1980 some unused munitions could have been buried on site.

Although it is unlikely (for the reasons stated above) that unspent ammunition authorized for use in the bivouac areas would have been buried, the possibility that burial occurred does exist. If the burial of spent small arms ammunition occurred, these items would not present a hazard if encountered. Training sites that may have been used as bivouac areas included MRS-27N, MRS-27R, MRS-27U, MRS-27Q, MRS-27W, MRS-27S MRS-27T, and MRS-27U.

Practice Rifle Grenade Training

Review of available information indicates that practice rifle grenade training could have occurred in portions of BLM Area A. Information on potential range configurations is provided below.

Range configuration information for practice rifle grenade training was obtained from *Policies and Procedures for Firing Ammunition for Training, Target Practice, and Combat* (Army, 1983). Military munitions descriptions for recent training rifle grenades was obtained from Technical Manual (TM) 43-0001-29, TM 9-1985, and information on World War II grenade launchers and information on the available World War II military munitions was obtained from The American Arsenal (Hogg, 2001). According to the policies and procedures (Army, 1983), live rifle grenades are fired from behind a protective barrier equivalent to a screen of sandbags 0.5 meters thick or reinforced concrete walls 0.16 meters thick. It is suspected that this would be simulated in the practice training area. The maximum range of the practice rifle grenade M11 series (version found in TM 9-1985) is 260 yards, therefore, it is expected that the training area used would be at least 260 yards in length. The range of the M11 practice rifle grenade varied with the elevation angle. Elevation angles of the firing rifle with the M7 launcher would achieve the following associated ranges: 35 degrees = 256 yards; 40 degrees = 261 yards; and 45 degrees = 260 yards. Therefore, it is expected that targets would be placed at various distances to practice firing at different ranges. Because the practice rifle grenades are inert, no MEC associated with practice rifle grenade training would be expected. Based on an interview with Former Fire Chief Stefani, practice rifle grenade training may have occurred in canyons within MRS-27N, MRS-61, MRS-67, MRS-68, MRS-64 and in canyons southwest of MRS-27X.

Practice Hand Grenade Training

Based on available information practice hand grenade training may have occurred within portions of BLM Area A. Hand grenade training areas usually consist of throwing bays or trenches and targets. According to current training manual FM3-23.30, the targets should include silhouettes in the open at 20 meters, a fortified mortar pit at 20 meters, a fighting position at 30 meters, and a trench target at 40 meters. Practice training would include practice in the proper way to hold and throw the grenade (Army, 2000a). According to FM3-23.30, all soldiers must go through a mock-bay training before going through to the live bay. It is anticipated that historical practice hand grenade training areas would have been similar to the training areas used today and that the practice training may have occurred within BLM Area A in a mock area. Based on available information practice hand grenade training may have occurred in MRS-27N and MRS-61.

Aviation Training

According to the Fort Ord Range Control officer present at Fort Ord from 1970 through 1990, training at the aviation training areas included helicopters landing and taking off as part of a practice emergency evacuation scenario (Stickler, 2003). He also stated that the use of military munitions was not a part of this training. The former Range Control officer also noted that Range Control was responsible for the

scheduling and the inspection of these training areas prior to checkout of the unit using the area. No CSM is provided for this training activity because the use of military munitions at this training area is not expected. Based on available information, practice aviation training may have occurred in MRS-68.

Tank Gunnery Training

A tank gunnery range is identified on historical training maps within BLM Area A in the southern portion. A tank gunnery range is used for direct fire from a static position and includes an impact area around the target and ricochet areas to either side of the target. The minimum direct fire distance to a target (impact) for a 90mm gun is 550 meters. Direct fire distances are the minimum required to protect exposed personnel from hazardous fragments resulting from the firing of HE projectiles at hard or fragment producing targets (Army, 1983). The maximum extent of the range safety fan displayed on the 1950s training areas maps is not large enough to accommodate the minimum direct fire distance requirements for a 90mm tank gun (550 meters). Based on the findings within BLM Area A, the likely explanation for the presence of the tank gunnery range on historical training maps is that it was used for firing tank mounted .30 caliber and/or .50 caliber machine guns rather than tank guns.

Practice Mortar Training

Practice mortar training using M68 training cartridges may also have occurred in BLM Area A based on the discovery of two M68 practice mortars during sampling activities at MRS-14B.

Information obtained from the USACE St. Louis District indicates that training cartridges, models M68 and M69, could have been used at a practice mortar range. These mortars had a range of 235 yards and 310 yards, respectively. Both mortars consist of an iron pear-shaped body, which was of a size and weight that simulated the HE version of the 60mm or 81mm mortar. The mortars were assembled by attaching a fin assembly that contained an ignition cartridge. The ignition cartridge, similar to a shotgun cartridge, was used to propel the inert portion of the mortar. If the ignition cartridge failed to function, the mortar would not be fired; therefore, it would not be possible for a live practice mortar projectile to be found downrange as a result of firing. Both the M68 and M69 projectiles were reusable and could be collected and reused by inserting a new ignition cartridge. Based on the results of sampling at MRS-14B, practice mortar training may have occurred in the southwestern portion of MRS-14B.

3.2 Site Features

The area is characterized by a series of ridges and valleys with slopes greater than 30 percent present in many of the areas. Vegetation in the northern portion consists predominately (greater than 80 percent) of Maritime Chaparral with some Coast Live Oak Savanna, Coastal Scrub, Coast Live Oak Riparian Forest, Inland Coast Live Oak Woodland, and grasslands. The Inland Coast Live Oak Woodland and the Coast Live Oak Riparian Forest are present on the western boundary. The Inland Coast Live Oak Woodland is located adjacent to the coastal scrub on the northeastern edge of the northern portion.

Vegetation in the southern portion consists predominately (greater than 90 percent) of grasslands with some coast live oak savanna, coastal scrub, coastal riparian forest, inland coast live oak woodland, and some mixed riparian forest. The costal scrub and inland coast live oak woodland are primarily on the northern and southeastern edge of this area. The mixed riparian forest is present on the eastern side.

3.3 Potential Sources and Locations of MEC

Based on review of historical information and MEC sampling performed within and adjacent to the site, the types of MEC that could potentially be encountered include practice items associated with practice land mine training, general training and maneuver, bivouac training, practice rifle grenade training, practice hand grenade, aviation training, tank gunnery training, practice mortar training, and practice AT weapons training. The types of munitions associated with bivouac and maneuver types of training include blank cartridges, simulators, pyrotechnics, and smoke items. Use and storage of items that require additional control, such as demolition materials and small arms ammunition (other than blanks), were allowed by permission of the division ammunition officer. Ammunition holding areas were to be individually fenced with triple concertina wire or comparable fencing. These types of military munitions identified for use in bivouac and maneuver areas are generally nonpenetrating items and would be expected to be found on the surface or near surface.

During mine training, personnel are trained in the precautions and proper methods to be used in the care and handling, arming, booby trapping, and disarming of mines (Army, 1997). Based on the discovery of several practice landmines in the northeastern part of the southern portion of BLM Area A, it is expected that the area was used as a practice training area. It is expected that the practice landmines would be at or near the ground surface.

Practice hand grenade training would include practice in the proper way to hold and throw the grenade. Practice hand grenades would be expected to be present on the ground surface. Practice rifle grenade training may have occurred within the canyons based on an interview with Former Fire Chief Stefani. Practice rifle grenade training involved using inert practice rifle grenades. Inert practice rifle grenades would not present a safety risk because the only live components associated with inert practice rifle grenades are blanks required to launch it. If smoke rifle grenades were used, the possibility exists that some live smoke grenades could be present at or near the ground surface.

Based on the interview with Mr. Stefani, it is possible that training included shoulder-launched projectiles. Based on this identified use, the types of military munitions that could be present include practice 2.36-inch and practice 3.5-inch rockets. Based on the design and use of the projectiles and rockets, they would normally be found at the surface or near surface. No evidence of the use of shoulder-launched projectiles (e.g., firing points, targets, fragments) was found at BLM Area A during BRA site reconnaissance, the ASR site inspections, and the site assessment field investigations. In addition, as stated above, no range fans are identified for these weapons in this area.

Tank gunnery training was identified on several 1950s training maps; however, the range safety distance requirements needed for firing of tank projectiles are not met by the dimensions of the range safety fan depicted on the 1950s era facilities training map. Based on this information, it is unlikely that the range was used for firing of projectiles. The likely explanation for the presence of the tank gunnery range is that it was used for firing tank-mounted .30 caliber and/or .50 caliber machine guns rather than tank guns; however, no accumulations of spent ammunition of this type has been discovered in the area. The tank gunnery range area was later used for training and maneuver areas.

The other type of training that potentially occurred at the site was practice mortar training. M68 and M69 practice mortars could have been used during training; two M68 MD items were identified in the MMRP Data Base as found in 1995. The practice mortars were assembled by attaching a fin assembly that contained an ignition cartridge. The ignition cartridge, similar to a shotgun cartridge was used to propel the inert portion of the mortar projectile. If the ignition cartridge failed to function, the mortar would not be fired; therefore, it would not be possible for a live practice mortar projectile to be found downrange as a result of firing. The projectiles were reusable and could be collected and reused by inserting a new ignition cartridge. The practice mortar projectiles would be expected to be present on or near the surface.

A complete listing of MEC and MD found at BLM Area A is presented in Table 1 and Table 2.

3.4 Potential Exposure Pathways

Based on review of the existing data it is possible that military munitions items related to training may remain on the surface and that they could be encountered by the public or BLM personnel. The following discussion provides information on: (1) how the item was designed to function; (2) the likelihood the item would function if found on site and handled; and (3) the type of injury the item could cause if it functions.

Flare, parachute, trip, M48

This pyrotechnic device is designed to project a parachute-suspended flare to detect infiltrating troops. The flare consists of a hollowed steel base with a 2.5-inch-diameter, 7.3-inch-long tube extending upward, with a smaller 3/8-inch-diameter, 5-inch-long tube adjacent to it, which is threaded to accommodate a M6A1 mine fuze that is shipped with the flare. The fuze is functioned by a pressure of 10 to 12 pounds on the prongs on its head, or by a pull of 6 to 10 pounds on the release pin. When the firing pin hits the primer, a flame sets off a relay charge, which carries the flame to the propelling charge. The propelling charge propels the flare assembly upward and simultaneously ignites the 3-second delay fuze. When the delay fuze burns through, it ignites the expelling charge, which expels the flare and parachute and ignites the quickmatch. The quickmatch ignites a priming charge that sets off the first-fire composition that ignites the pyrotechnic candle, which is suspended by the parachute (Navy 2001).

Summary: It is possible that a person could cause the parachute trip flare to function through casual (inadvertent or unintentional) contact if one remained in a "prepared to function" condition (e.g., fuze was installed in the flare, was armed, and attached to a trip wire or other triggering mechanism, or placed in

the ground with the prongs exposed). Upon functioning, injury, such as minor to serious burns, could occur from the ignitable components, or by being struck by the ejecting flare and parachute assembly. If the fuze is not installed, the parachute trip flare would not function through casual (inadvertent or unintentional) contact but could function if exposed to heat or flame (Army 2006b).

Flare, surface, trip, M49 series

This pyrotechnic device is designed to give warning of infiltrating troops by illuminating the field of the advancing enemy. The trip flare consists of an illuminant assembly, cover loading assembly, and mounting bracket. The illuminant assembly is in an aluminum case containing an ignition increment and three illumination increments. The waterproof cover loading assembly holds a percussion primer, intermediate charge, and a spring-loaded striker. A pull on the trip wire causes either the trigger tongue or pull pin to release the lever, which causes the firing pin to strike the primer. The primer sets off the intermediate charge, which ignites the first-fire composition on the ignition increment of the flare (Army, 1977).

Summary: It is possible that a person could cause the surface trip flare to function through casual (inadvertent or unintentional) contact, if one remained in a "prepared to function" condition (e.g., attached to a trip wire or other triggering mechanism). If it existed in a fixed position (e.g., attached to a tree), serious injury beyond burns would not be expected because the flare is designed to burn "in place" where it was placed or mounted. If one was in a "prepared to function" condition and left on the ground, it could function upon casual (inadvertent or unintentional) contact, and it would burn in a manner similar to a road flare, but with greater heat and illumination, and could cause burns.

Fuze, grenade, hand, practice M228

Hand grenade practice fuze M228 is a pyrotechnic delay-igniting fuze. The body contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin with pull ring, safety clip, and igniter assembly (older models do not have the safety clip). The split end of the safety pin has an angular spread or a diamond crimp. The hand grenade safety clip is designed to keep the safety lever in place, should the safety pin be unintentionally removed from the grenade. It is an additional safety device used in conjunction with the safety pin. The safety clip is assembled to the fuze (older models have the safety clip assembled to the grenade and positioned around the safety lever). Safety clips from expended grenades may be reused, provided that visual examination indicates the clip is not damaged or distorted. The fuze is a separate component of the practice hand grenade M69. The M69 is a grenade body of steel essentially spherical in shape. The body is empty, i.e., without any explosive filler and may be recovered and reloaded with a new fuze.

Functioning: Release of the safety clip and removal of the safety pin permit release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense spit of flame, igniting the delay element. The delay element burns for 4 to 5 seconds and

then sets off the igniter. A loud report, like that of a firecracker, and a puff of white smoke follows (Army, 1994c).

Summary: It is not likely but possible that a person would be able to function a fuze, grenade, hand, practice, M228, if one were found at the site and sustain minor burn injuries. The following conditions would need to be met for the fuze to function: (1) The striker spring would need to be viable and provide sufficient force to function the percussion primer when struck after the safety pins is removed, and (2) the components have not been exposed to moisture, degradation, and weathering.

Grenade, hand, smoke M18 series

The M18 is a colored-smoke hand grenade used for ground-to-air or ground-to-ground signaling. The grenades may be filled with any one of four smoke colors: red, green, yellow, or violet. Each grenade will emit smoke for 50 to 90 seconds. The grenade body is of thin sheet metal and is filled with smoke composition and topped with a starter mixture. The hand grenade fuze M201A1 is a pyrotechnic delay igniting fuze. The body contains a primer, first-fire mixture, pyrotechnic delay column, and ignition mixture. Assembled to the body are a striker, striker spring, safety lever, and safety pin with pull ring. The grenade weighs 19 ounces and contains 11.5 ounces of smoke composition. It was functioned when a soldier removed the safety pin from the safety lever and threw the grenade allowing the safety lever to fly free, releasing the spring-loaded striker to strike the primer. The percussion primer ignited the first fire mixture. The fuze delay element, which burns for 0.7 to 2 seconds, ignition mixture, and grenade starter mixture and filler, are ignited by the preceding component. The pressure sensitive tape is blown off the emission holes from which the colored smoke emits (Army, 1977). Assuming an M18 smoke grenade was discovered in an unfired condition and caused to function, the type of injuries that could be sustained would be burns from the burning smoke composition. Due to the heat generated, it is unlikely that a person who found a grenade and caused it to function would hold onto it after ignition. Given that these items have been exposed to the elements for many years, moisture can penetrate and degrade the pressure sensitive tape, the smoke composition, and the condition of the sheet metal case of the grenade.

Summary:: It is possible that a person could cause the smoke grenade to function if one were found at the site and be burned, but it would have been exposed to moisture, degradation, and weathering for many years, which would likely decrease the effectiveness of the components that cause it to function.

Grenade, hand, practice M62

The M62 delay practice grenade is used for training in care, handling and throwing of fragmentation hand grenade M61. The grenade body is of cast iron. The body is not loaded with an HE filler but may have a small, separate black powder charge. The hand grenade fuzes M205A1 and M205A2 are pyrotechnic delay-igniting fuzes. They differ in body construction only. The body contains a primer and a pyrotechnic delay column. Assembled to the body are a striker, striker spring, safety lever, safety pin with pull ring, and an igniter assembly. The split end of the safety pin has an angular spread or a diamond crimp. The hand grenade safety clip is designed to keep the safety lever in place, should the safety pin be unintentionally removed from the grenade. It is an additional safety device used in conjunction with the

safety pin. The hand grenade safety clip, of spring-steel wire, is shaped in a special configuration for installation on the grenade. It consists of a clamp which fits around the fuze body and over the safety lever. It serves to prevent release of the grenade safety lever, if the safety pin is accidentally released. Release of the safety clip and removal of the safety pin permit release of the safety lever. When the safety lever is released, it is forced away from the grenade body by a striker acting under the force of a striker spring. The striker rotates on its axis and strikes the percussion primer. The primer emits a small, intense spit of flame, igniting the delay element. The delay element burns for 4 to 5 seconds and then sets off the igniter. The igniter initiates the black powder charge (when installed). The stopper (when installed) is forced from the base of the body. A loud report, like that of a firecracker, and a puff of white smoke follow (Army, 1994).

Summary: It is unlikely but possible that a person would be able to function a practice hand grenade if one were found at the site and sustain minor burn injuries. The following conditions would need to be met for the practice hand grenade fuze to function: (1) The safety pin would need to be in place holding the striker spring in the cocked position, (2) the striker spring would need to be viable and provide sufficient force to function the percussion primer when struck after the safety pins is removed and the safety lever is released, and (3) and the components have not been exposed to moisture, degradation, and weathering.

Grenade, rifle, smoke M22 series

The grenade, rifle, smoke M22 and M22A2 (green, red, violet, and yellow) was designed for signaling and laying smoke screens. The M22 and M22A2 consist of three basic parts: a steel stabilizer assembly, an integral fuze and a body. The fuze is a mechanical impact-igniting type. The body is filled with a burning-type smoke charge that contains a dye to color the smoke. The surfaces of the smoke charge within the body are coated with a starter mixture charge to facilitate ignition. A nose-closing plug covers a small opening or air hole in the nose of the ogive. After being fired from a rifle equipped with a grenade launcher, it was functioned by impact with the ground or other hard target, causing the firing pin to strike the primer (like a small arms primer), which ignites the starter mixture charge, and in turn starts the smoke charge to burn. The smoke charge, consisting of baking soda, potassium perchlorate, sugar, and dye, burns for approximately 60 seconds (Army, 1994). These would be very difficult to cause to function by incidental contact. They would have to be thrown against a hard surface, hard enough for the firing pin to overcome the anti-creep spring and strike the primer. If caused to function, the type of injuries that could be sustained would be burns from the burning smoke charge (Army, 1997).

Summary: It is unlikely that a person could cause a smoke grenade to function through casual contact if one were found at the site and be burned, because the grenade: (1) was designed to be functioned by a hard nose-on impact with the ground or other hard target, and (2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Mine, anti-personnel, practice, M8 series

The mine, anti-personnel, practice, M8 and M8A1 were designed to simulate the M2 (bounding) series of anti-personnel mines. They were used for training in the proper methods and precautions to be observed in the care, handling, laying, booby-trapping, arming, and disarming of the M2 and M15 series mines. The fuze firing mechanism is activated by applying pressure (8 to 20 pounds) on any of the three prongs on the M10 or M10A1 combination fuze, or a pull of 3 to 10 pounds of pressure on the trip wire. The fuze firing train ignites the delay element in the projectile and also propels it about 2 meters into the air. The delay initiates the spotting charge which explodes with a loud report and emits smoke (Army, 1977). The M8A1 mine with the M10A2 fuze functions the same, except that the fuze firing train ignites the yellow smoke pellets through a 4 to 5 second delay and expels a plastic plug into the air allowing the yellow smoke to be emitted from the top of the container (Army, 1977). Assuming that a mine was left emplaced and armed, and that it survived many years of degradation from exposure, it could be functioned by incidental contact by applying sufficient pressure to any of the prongs or trip wire on the M10, M10A1, or M10A2 combination fuze by stepping upon the fuze or tripping on the trip wire. If caused to function, the type of injury that could be sustained from the M8 mine would be injury from the projectile propelled out of the mine body, burns from the 170-grain black powder spotting charge, and possible injury from falling parts. If caused to function, the M8A1 would propel a plastic plug into the air allowing yellow smoke to be emitted from the container. Because the spotting charge is black powder, it will function if it dries out after being exposed to moisture.

Summary: It is unlikely that a person would be able to trigger the practice antipersonnel mine through casual contact, if one were found at the site and be burned or exposed to smoke or falling parts, because the mine: (1) would have to contain a live fuze, and (2) these components would have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

Mine, anti-tank, practice, M12 and M20 series

The fuze, mine, AT, practice (M604) was designed for use in the M12, M12A1, and the M20 AT practice mines. The fuze is an instantaneous, mechanical, pressure-activated type fuze consisting of a steel body containing the firing pin assembly, cover assembly, primer and smoke charge, and a safety fork. The fuze is issued separately and assembled to the mine in the field. After it is fired and the mine is recovered, a new fuze can be installed and the mine reused. A minimum force of 140 to 240 pounds depressed the pressure plate that caused the Belleville spring to snap into reverse, driving the firing pin into the primer. The primer ignites the smoke composition which flashes, emitting a cloud of smoke and creating a noise. The primer contains 1.62 grains of primary explosive and 2.96 grains of black powder, and the smoke composition weighs 262.3 grains or 0.6 ounces (Army, 1977). The mine was designed to be triggered by the weight of a vehicle and would require more weight than a large person can apply by just stepping on the pressure plate to trigger it. If caused to function, the type of injuries that could be sustained would be a burn injury from the 262.3 grains of smoke composition.

Summary: It is highly unlikely that a person would be able to trigger a fuze through casual contact if one were found at the site and sustain a burn injury, because the fuze: (1) was designed to be triggered by the

weight of a vehicle, and (2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Projectile, 81mm, mortar, illumination M301 series

This projectile is used for illuminating a desired point or area. The complete round consists of a body tube and tail cone assembly, an illuminant candle, a parachute assembly, a time fuze with a built in expelling charge, a fin assembly with propellant charge, and an ignition cartridge with percussion primer. The nose of the thin-walled steel tubing body is fitted with a steel adapter and internally threaded to accept the fuze. The tail cone is internally threaded to accept the fin assembly and is attached to the body tube with four equally spaced shear pins. The illuminant assembly, consisting of a first-fire charge and an illuminant charge, is contained in a boxboard case and attached to the parachute with a 30-inch suspension line. When the cartridge is loaded, it slides down the mortar tube until the percussion primer in the ignition cartridge strikes the firing pin in the base cap of the mortar. The primer ignites the ignition cartridge, and the cartridge ignites the propellant charge. Rapidly expanding gases from the burning propellant expel the projectile from the tube and propel it to the desired height. The projectile is fin-stabilized in flight. Functioning of the time fuze detonates the expelling charge and ignites the first-fire charge by means of a length of quick match. The expelling charge separates the cone from the tube allowing the illuminant candle and parachute to fall free. The first-fire charge ignites the illuminant, and the parachute deploys to support the burning candle. Burning time is at least 60 seconds with a minimum of 500,000 candlepower. The M84 fuze component has a brass head containing an inertial plunger acting from setback and a brass body containing a primer, variable-time powder train rings, and a black powder expelling charge. An outer adjustment ring on the body has six vent holes and six raise ribs to adapt to fuze setter M25 component, and a setting rib for alignment with the desired time setting. As issued, the fuze is equipped with a safety wire to be removed before firing.

Fuze Functioning: After removal of the safety wire, the inertial plunger is held by two shear pins passing through the plunger guide. Setback from weapon firing causes the plunger to shear these pins and strike the percussion primer at the base of the plunger guide. Ignition of the primer starts burning of the variable time powder train selected according to the time setting. The burning powder train then ignites a black powder pellet and the expelling charge. The expelling charge ejects the parachute and illuminant assemblies through the base of the projectile (Army, 1994b).

Summary: It is highly unlikely that a person would be able to function the mortar and the M84 fuze through casual contact, if one were found at the site, and sustain an injury, because the fuze was designed to be functioned by the internal shear wires being cut during the firing of the mortar igniting the primer. The powder train, black powder pellet, and expelling charge would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Squib, rocket simulator

The simulator is used to provide a credible simulation of the weapon signature including report, flash, and smoke. The simulator is a three-piece injection-molded unit consisting of cylindrical housing with a flange on one end, a snap-in primer plate, and a snap-in closure disc for the flanged end of the unit. The primer plate has a hole in its center to accept a standard primer. A pre-formed pellet of magnesium Teflon composition is coated with a first fire composition that accelerates ignition of the pellet. This pellet is contained in a cardboard tube within the simulator and provides the flash and smoke upon functioning. The bang composition is composed of 60 milligrams of loose magnesium Teflon powder and is loaded into the bang composition chamber. The housing of the simulator assembly is cylindrical and sized to fit the LAW/VIPER launch tube. For TOW and DRAGON launch tubes, adapter rings are used to accommodate the larger tube diameters. The firing chamber is sized to accept the simulator. When the simulator is inserted and the breech door is closed, an electrical circuit is completed along the copper contacts on the face of the simulator. This circuit path must be complete for the Multiple Integrated Laser Engagement laser transmitter to fire. The simulator has a small printed circuit contact disc on its face, which before it is fired provides the electrical path. When the simulator is fired, the center of the contact disc is blown out, and the circuit path is broken. Thus the simulator will not fire again until a new simulator is inserted (Army, 1994a).

Summary: It is highly unlikely that a person would be able to function the simulator through casual contact, if one were found at the site, and sustain a burn injury, because the signal was designed to be functioned through an electrical charge. The charge would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Signal, ground, rifle, parachute M17 series

The signal case is a drawn aluminum body secured at one end to an aluminum fuze housing by four crimps. This fuze housing is chambered to hold the 15-grain smokeless powder propelling charge. A retaining disk holds the charge in place. The stabilizer is located at this end. It is a hollow tube with a circular fin at one end and threaded on the other to screw onto the fuze housing. A cork plug with plug tape closes the finned end of the stabilizer. The upper end of the fuze housing contains a circular time-train grove filled with black powder and covered with an aluminum ring seal, except for the pellet of black powder connected to the fuze train by means of a flash hole in the fuze housing. When the fuze train burns through, it ignites the expelling charge. This expelling charge is held in place by means of an onionskin retaining disk. Above the retaining disk is a set-back wad of black felt, which is open in the center to allow the passage of the flame. Resting on the set-back wad is the candle case which is covered by the gas-check washer of black felt. Over this may be found the parachute of cloth or paper; the wooden parachute protector around which the parachute is wound; the notched cardboard closing disk; and finally, steel identification top whose upper surface is painted the same color as the star. Parachute shrouds are attached to a 12-inch suspension cable which is secured to the candle assembly. The candle case itself is of cardboard, with the end nearest the expelling charge closed by a perforated aluminum cap.

A strip of quick match and is itself followed by a first-fire charge, and then the signal composition is an aluminum ring seal. Gases produced when the grenade cartridge is fired launch the signal. However, the thrust produced is not enough to lift the signal to the required altitude. Therefore, a propelling charge, which is ignited by flame from the fired cartridge, is assembled in the base of the signal to provide the necessary additional boost. At the same time, the flame from the propelling charge ignites the black powder pellet of the time train which ignites the time train itself. The time train burns in both directions giving a delay of 5-1/2 seconds, the flashes the flame through the flash hole to the expelling charge. This allows the signal to reach a minimum height of 600 ft. When the expelling charge is ignited, the pressure of the gases forces the candle and parachute assembly from the signal case and, at the same time, the flame ignites the piece of quick match. This ignites the ignition charge, then the first fire charge, and finally the signal composition (Army, 1951).

Summary: It is highly unlikely that a person would be able to operate the signal through casual contact, if one were found at the site, and sustain a burn injury, because the signal was designed to be functioned immediately after being fired. The time train and expelling charge would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Simulator, projectile, air burst, M74A1

This projectile simulates artillery fire air bursts. It consists of a one-piece aluminum case with an extracting rim and resembles a large shotgun shell. The case contains a percussion primer mounted in the base, a black powder propelling charge, a delay fuse, and an inner case containing a flash charge. The simulator is fired from pyrotechnic pistol AN-M8. The firing pin of the pistol strikes the primer, igniting the propelling charge. The propelling charge expels the self-contained flash charge from the case, at the same time igniting the igniting charge. The igniting charge ignites the delay fuse, and the fuse in turn ignites the flash charge producing a bright flash and a loud noise. The total delay from actuation of the firing pin to ignition of the flash charge is 2 to 3 seconds. Aimed at a 45-degree elevation, the height of burst is about 100 ft (Army, 1977).

Summary: It is unlikely that a person could cause an airburst projectile simulator to function through casual (inadvertent or unintentional) contact, if one were found at the site, and be injured, because it would require a hard, precise blow to the primer to function. If an airburst projectile simulator is found at the site and subjected to an open flame (i.e., fire), it may function and could cause nonfatal burns and/or lacerations.

Rocket motor simulator (unknown)

A simulator is used to provide a credible simulation of the weapon signature including report, flash, and smoke. The unknown rocket motor simulator model is likely a squib, rocket simulator. The use of other rocket motor simulators is unknown. The squib, rocket simulator is discussed above.

4.0 Site Evaluation

The available data (e.g., archival and reconnaissance data) regarding BLM Area A were reviewed and evaluated according to procedures described in the Final Plan for Evaluation of Previous Work (HLA, 2000). The evaluation process is documented through the completion of a series of checklists. Copies of the checklists are provided as Appendix B. This section presents a summary of the results of the checklist evaluation. It is divided into three sections, an assessment of the literature review, an assessment of the site walks, including the site assessment, and an assessment of the sampling and removal performed at the site.

4.1 Literature Review

4.1.1 Type of Training and Military Munitions Expected

Based on a review of Fort Ord facilities and training maps and aerial photographs, BLM Area A has been used for general training and maneuvers since the Army acquired the property in 1940. Types of specific training documented on historical training maps include bivouac training area, tank gunnery training in the 1950s, possibly for small arms ammunition training, practice landmine training, aviation training (helipads), and land navigation training. Interviews conducted as part of the *Draft Final Data Summary and Work Plan, Site 39-Inland Ranges* (HLA, 1994) reported that training may have occurred in the 1930s prior to the Army purchase of the property in 1940. It was also reported that 7- and 8-inch naval projectiles that overshot the impact area were suspected on the western part of the area; however, no 7- or 8-inch naval projectiles were discovered during sampling. The former fire chief stated in interviews that several areas within BLM Area A were used for shoulder-launched projectile training; however, this was not shown on available historical training maps. Based on the suspected training at the site, pyrotechnics, smoke-producing items, and practice munitions could be present at the site.

4.1.2 Subsequent Use of the Area

The area has not been developed. It is maintained as an open space, recreational area by the BLM.

4.1.3 Establishment of Site Boundaries

The boundaries of BLM Area A are based on analysis conducted during the development of *Final Remaining Remedial Investigation/Feasibility Study Areas Management Plan, Former Fort Ord, California* (MACTEC/Shaw, 2010a). The boundaries were based on acquisition of the property in 1940.

4.1.4 Summary of Literature Review Analysis

Based on the literature review, the area was primarily for general training with designated areas used for bivouac, practice hand grenade training, land navigation training, and possibly for small arms training at the tank gunnery range. No evidence of 7- or 8-inch naval projectiles within the western part of the site has been established. Munitions that could be present at the site include small arms ammunition, practice tank and antipersonnel training mines, pyrotechnic items, smoke-producing items, and various simulators.

4.2 Site Walk Review

This section describes the items that were found during the site walks and how these items support historical information concerning past use of the site. Site boundaries are assessed in terms of the items found. There is also a discussion regarding equipment used during site walks, where appropriate, as well as methods and quality control measures.

4.2.1 Site Walk Results (Items Found)

Site walks were completed within BLM Area A as part of the ASR (USAEDH, 1997), the Basewide Range Assessment (MACTEC/Shaw, 2009), 1999 USA investigation under direction of the USACE (USA, 2001), and the 2010/2011 site assessments (Shaw, 2011a, 2011b). During these site walks, several MEC and MD items, including inert unfuzed antipersonnel and AT landmines, smoke and practice hand grenades, practice hand grenade fuzes, M48 and M49 trip flares, ground illumination signals, star cluster illumination flare, illumination mortars, rocket simulators, expended pyrotechnics (type and model not specified), and M74A1 air burst projectile simulators were found (see Table 1and Table 2). These items are consistent with the types of training identified for the site in the literature review.

4.2.2 Site Boundaries Review

The site boundaries for BLM Area A are based on analysis conducted during the development of the *Final Remaining RI/FS Areas Management Plan, Former Fort Ord, California*. The boundaries were based on acquisition of the property in 1940 and because the area was identified as a general training area through most of its active use. Munitions items detected during site walks conducted as part of the site assessments and previous site walks conducted as part of the 1999 USA site investigation, ASR, and BRA were of the type expected based on the training identified during the review of historical documents and previous sampling and removal activities. Based on the results of the site walks, no change to BLM Area A boundaries are suggested.

4.2.3 Quality Assurance/Quality Control

Quality Assurance/Quality Control (QA/QC) associated with the four different phases of site walks is described below.

PA/SI Site Walks

The site walks conducted as part of the preliminary assessment/site inspection (PA/SI) reported in the 1997 ASR were performed in accordance with USACE guidance (USAEDH, 1997). The site walks were conducted to look for evidence of past munitions use. Visible evidence found during the site walks provide information on the type extent, and magnitude of the munitions present. Physical features that may be present at a former site include impact craters caused by penetrating munitions, the presence of MEC or MD on the ground surface, and soil staining associated with the use of bulk explosives. Upon completion of the reconnaissance at each site, a RAC worksheet was completed and submitted to the Mandatory Center of Expertise and Design Center as required.

USA 1999 Site Walks

The results of the site walks conducted by USA were reported in the *Final Sampling & OE Removal, Inland Range Contract Closure, After Action Report, Former Fort Ord, California* (USA, 2001). The site walks were conducted under the direction of the USACE.

Through a review of source documentation during site assessment pre-field evaluation, it was determined that an M9 HE AT rifle grenade found in 1999 had been misidentified in the Fort Ord MMRP database. The item was identified in the original field documentation, and later reported in the *Final Sampling & OE Removal, Inland Range Contract Closure, After Action Report, Former Fort Ord, California* (USA, 2001) as an M49 trip flare. No other discrepancies between the database and the site walk data were identified.

Basewide Range Assessment

Although not formally part of the MMRP, many of the Data Quality Objectives (DQOs) identified in the site assessment phases of the BRA are the same DQOs established for the site assessment phase described in the *Final Remaining RI/FS Areas Management Plan* (Shaw/MACTEC, 2010a). The DQOs for the BRA and the Management Plan identify similar inputs to the decisions used to answer questions regarding historical site use and to define boundaries of the area of use. The DOQs for the site assessment identify various inputs to the decision, such as compilation of historical information regarding potential munitions at the site (e.g., the review of interview records, field notes, aerial photographs, and historic maps). The DQOs for the BRA historical review identified similar sources of information, including review of interview records, historical maps, and aerial photographs. As part of the DQOs for the site assessments, site walks conducted under the Management Plan, and documentation of the types and locations of MEC and MD, if found, is recorded. Both programs include using the results of the site assessments to determine if additional work (i.e., sampling for MEC or MC) is necessary. The BRA site walks were conducted in accordance with the DQOs and procedures presented in the *Basewide Range Assessment Work Plan and Contractor Quality Control Plan, Small Arms and Multi-Use Ranges, Fort Ord, California* (IT, 2001). The results of the BRA site assessments are presented in the Final Comprehensive Basewide Range Assessment Report (MACTEC/Shaw, 2009, updated in 2012).

Site Assessment

The site assessments conducted in 2010 and 2011 included both instrument-aided site walks using a Schonstedt GA-52CX magnetometer, and visual site walks, and were completed according to the DQOs presented in Section 6.0 of the Management Plan and site walk requirements specified in the Management Plan (MACTEC/Shaw, 2010a). QA/QC activities for this project consisted of both instrument checks of magnetometers and global positioning system (GPS) equipment completed on a daily basis and field QA/QC. These QA/QC activities are documented in the Site Assessment Data Reports for the BLM East/Post-1940 Area (Northern Portion) and the BLM East/Post-1940 Area (Southern Portion) (Shaw, 2011a and 2011b).

Instrument checks included the following daily checks:

- Calibration and maintenance of instruments, both the Schonstedt GA-52CX, and Personal Digital Assistant.

- Daily pre- and post-operation navigation equipment (GPS) testing to ensure navigational precision within manufacturer's specifications.

Other QA/QC procedures included field QA/QC inspections by the Contractor Quality Control System Manager, UXO Safety Officer, and the USACE OE Safety Specialist; and field inspections and reviews of mapping activities were conducted on a daily basis by a representative from MACTEC. In addition, the UXO Safety Officer and UXO OE Safety Specialist were notified about mapped features that needed further investigation, and they assisted with the confirmation and identification of site features and anomalies identified with the Schonstedt GA-52CX. Field and data QA/QC inspections did not identify the need for corrective actions or process changes.

4.3 Sampling and Removal Action Review

This section describes the items that were found at the site during sampling and removal activities and how these items support historical information concerning past use of the site. Site boundaries are assessed in terms of the items found. There is also a discussion regarding sampling equipment, methods, and quality control measures used during prior munitions response sampling and removal programs.

4.3.1 Sampling and Removal Results (Items Found)

As summarized in Section 2.4, investigation and removal actions at MRSs within BLM Area A were performed by UXB and by USA (UXB, 1995a, 1995b, 1995c; USA, 2001), which included 100 percent grid sampling for a percentage of selected grids at a portion of MRS-14B, MRS-14C, MRS-17, and MRS-32C. An 8-grid removal action to depth at MRS-32C and a one-foot removal over the entire MRS-14C was conducted by USA. A listing of MEC and MD discovered during sampling and removal actions is provided in Table 1 and Table 2. A discussion of the MEC and MD items found during the sampling and removal actions at each MRS is provided below.

Portion of MRS-14B: One MEC item, a M17 series signal, ground, rifle, parachute, as well as MD from ground and rifle signals, M68 81mm training mortars (inert bodies), and four M18 smoke grenades were found in BLM Area A portion of MRS-14B during random sampling operations. No evidence of suspected 7- or 8-inch naval projectiles, which were found in the adjacent portion of MRS-14B was found during sampling operations at the site (UXB, 1995a). There was also no evidence found of 3-inch Stokes mortar projectiles during the sampling operations.

MRS-14C: Partial sampling of the site by CMS occurred in 1995 followed by a 100 percent MEC removal to one-foot depth over the entire site in 1998. MD items (M18 series smoke hand grenades and a M22 series rifle smoke grenade) were found during sampling in 1995, along with 0.1 pounds of pyrotechnic compound.

Seventy-two MEC items, including rocket motor simulators, rocket squib simulators, M22 series rifle smoke grenades, a practice hand grenade fuze, a M18 series smoke grenade, and two rifle grenades, smoke (MD) were found during the 1998 removal action. Most of the MEC items were found within two burial pits. The burial pits were excavated beyond 1-ft depth.

MRS-17: Two MD items (a ground illumination flare and an explosive booby-trap simulator) were found during 1994 sampling operations of six randomly placed 100-ft by 100-ft sampling grids. No practice landmines were found during the sampling activities; however, practice landmines were found in the vicinity of the site during the site walks described in Section 4.2. No MD associated with suspected shoulder-launched projectile training identified as having occurred in the area during interviews was discovered.

MRS-32C: One possible MEC, an M301 series 81mm illumination mortar projectile (identified as ISD in the database), was found during sampling in 1995. No additional MEC or MD was found during the sampling and removal operations conducted by USA in 1997 in eight grids surrounding the grid in which the 81mm illumination mortar projectile was found. The Phase 1 Final EE/CA recommended a three-foot removal action in the grids surrounding the grid where the UXO was found during the CMS sampling action on Site "OE"-32C. The EE/CA also stated that "if no live OE is found, no further action is required". Because no MEC or MD was found in the eight grids, no further removal was conducted. As stated above in Section 4.2, 30 smoke pots were identified during a site walk (MMRP Database, 2012). No indication of the use of military munitions other than small arms was found.

The results of the sampling support the identified use of the area as a general training and maneuvers area with designated training areas for practice land mine training and bivouac training. Training using simulators also occurred within the site footprint. Sampling results did not indicate the presence of shoulder-launched projectiles potentially present in several areas, or 7- or 8-inch naval projectiles identified as potentially being present in MRS-14B and MRS-14C based on interview records. The presence of two M68 training mortar MD items within MRS-14B indicates that some practice mortar training could have occurred on the western boundary of the site near or within MRS-14B; however, no further evidence of practice mortar training in MRS-14B was identified during the instrument-aided site walk performed along the MRS-14B Track 1 boundary As described in Section 3.4, even if practice mortar training did occur using M68 training mortars, it would not be possible for live practice mortars to be found downrange as a result of firing; therefore, only the inert bodies of the practice munitions would be expected at the site.

4.3.2 Site Boundaries Review

Site sampling and MEC removal operations were conducted by UXB and USA within the designated site boundaries of four MRSs. Results of the sampling and removals conducted at the site and review of historical documents do not indicate that the overall site boundaries require any changes.

4.3.3 Equipment Review

The equipment review evaluation presented in this section applies to both the sampling and removal discussion and the use of the Schonstedt GA-52CX employed for the site walks.

Schonstedt Magnetometer

The Schonstedt Models GA-52/C or GA-72/Cv magnetometers were used by UXB prior to October 1994 and Schonstedt Model GA-52CX was used by UXB after October 1994 and by USA and Shaw during site walks, sampling, and removal work in 1995, 1997, 1998, 2010, and 2011. The Schonstedt instruments are passive dual flux-gate magnetometers that are highly sensitive magnetic locators that detect ferrous (iron) metal objects; however, they cannot detect non-ferrous metal objects (e.g., lead, brass, copper, and aluminum). Magnetometers make passive measurements of the earth's natural magnetic field; ferrous metal objects and rocks are detected because they produce localized distortions (anomalies) in the magnetic field. The Schonstedt magnetometers actually detect slight differences in the magnetic field (the "gradient") by means of two sensors mounted a fixed distance apart within the instruments' staffs. Because the magnetic response falls off (changes) greatly even over a short distance, a gradient magnetometer like the Schonstedt GA-52CX is especially sensitive to smaller, near-surface ferro-metal objects (Breiner, 1973).

The performance of the Schonstedt GA-52/C, GA-52CX, and GA–72/Cv magnetometers was evaluated as part of the Ordnance Detection and Discrimination Study (ODDS) (Parsons, 2002). Studies were performed as part of ODDS to evaluate:

- Signatures of inert military munitions items suspended in air at varying orientations and distances from the geophysical sensor (static tests).

- The ability of various geophysical instruments to detect and discriminate between different military munitions items buried at various depths (seeded tests).

- Geophysical instrument performance at actual munitions response sites (field trial site testing).

The Schonstedt tools were not evaluated during the static tests; therefore, only the seeded test results and the field trial tests are discussed herein. It is recognized that the ODDS study areas may not represent the same field conditions as BLM Area A; therefore, differences in field conditions, if applicable, should be considered when using information from the ODDS. For the purposes of evaluating the geophysical instruments used at this site, it is assumed that the majority of munitions potentially used for training at BLM Area A would be located at the surface or potentially buried just below ground surface. As part of the ODDS, non-penetrating items (signal flares and hand grenades [ODDS Type I]) were evaluated as were penetrating items (2.36-inch and 3.5-inch rockets, rifle grenades, and 14.5mm projectiles [ODDS Type II]). Therefore, the Type I and Type II seeded test results were used for comparison purposes in evaluating the performance of the geophysical equipment used at this site in identifying surface and buried munitions items.

During the seeded tests, the Schonstedt Model GA-52/C located between 56 (search radius of 1.6 ft and maximum lane width of 5 ft) and 59 (search radius of 3.3 ft and maximum lane width of 5 ft) percent of the Type I items buried at depths ranging from just below the ground surface to one ft bgs. The Schonstedt Model GA-72/Cv located between 63 (search radius of 1.6 ft and lane width of 5 ft) and 78 (search radius of 3.3 ft and lane width of five ft) percent of the Type I items. The detection rate for Type I items for the Schonstedt Model GA-52/CX ranged between 67 and 78 percent of Type I items. The detection rate for Type II items for the Schonstedt Model GA-52/C ranged from 44 (search radius of 1.6 ft and lane width of 5 ft) to 49 (search radius of 3.3 ft and lane width of 5 ft) percent. The detection rate for Type II items for the Schonstedt Model GA-72/Cv ranged from 41 (search radius of 1.6 ft and lane width of 5 ft) to 51 (search radius of 3.3 ft and lane width of 5 ft) percent. The detection rate for Type II items for the Schonstedt Model GA-52/CX ranged from 64 to 85 percent using the Schonstedt Model GA-52/CX.

The detection rate percentages presented in the ODDS varied according to the search radius which ranged from 1.6 ft to 3.3 ft and the search lane width which was 3 ft to 5 ft wide. A maximum 5-ft wide search lane was used during the munitions response sampling programs at the site. Results for the 3-ft wide search lanes were not included in the detection percentages presented above because 3-ft search lanes were not used during the site investigations. A standard search radius for investigation anomalies was not specified in work plans or reports; therefore, the detection range for the different search radii are presented above.

The seeded test detection rates are considered conservative because one ft was added to the item's calculated penetration depth to allow for soil deposition over time. Because the field conditions at the seeded test site and orientation of the subsurface item may not be comparable to BLM Area A conditions, the results should only be used as an indication that the equipment is capable of detecting the same types of items at depths that are the same as used in the seeded tests.

Results of the ODDS field trial sites were also reviewed for potential use in evaluating instrument performance at the site. Detection rates were calculated for four of the six test sites; the remaining sites did not have enough MEC or MEC-like MD detected to allow calculation of site statistics. The calculated detection rates for the combined sites ranged from 52 to 96 percent for the Schonstedt Model GA-52/C, 64 to 98 percent for the Schonstedt Model GA-72/Cv, and from 97 to 100 percent for the Schonstedt GA-52/CX, depending on the search radius used for the calculation. As previously discussed, results for the 3-ft wide search lanes were not included in the detection percentages presented above because 3-ft search lanes were not used during the site investigations. The lower detection rates were for a 1.6-ft search radius and the higher detection rates were for a 3.3-ft search radius. It should be noted that the ODDS field trial sites were selected to represent areas with high MEC or munitions debris density. In comparison, Track 1 sites, such as BLM Area A, are expected to have very low densities of munitions debris, if any. Therefore, the field trial results may not be applicable to this site.

Although not directly comparable to BLM Area A, the results of the ODDS indicate that the Schonstedt Models GA-52/C, GA-72/Cv, and GA-52/CX are capable of detecting ferrous surface and subsurface

MEC if present in the surface or shallow subsurface at the site. In addition, the munitions potentially present are either non-penetrating or otherwise expected to be in the subsurface at shallow depths. The following bullets summarize the equipment review.

- The ODDS supports that the models of Schonstedt magnetometers used during sampling and removal actions are capable of detecting the types of munitions that can be expected at the site.

- The potentially present munitions types discussed in Section 3.4 are either non-penetrating or otherwise expected to be in the subsurface at shallow depths where detection capabilities are best.

- Although detection capabilities appear to decrease with depth for smaller and more deeply buried items and the instrument is not effective at detecting non-ferrous items such as hand grenade fuzes; hand grenades have been detected at the site.

- Burial pits, which can contain multiple MEC, have been detected at the site using the Schonstedt magnetometers.

4.4 Sampling Methods Discussion

During the investigation and clearance work, the site boundaries and grids were surveyed and marked to provide control on the areas investigated. In addition, field logs were prepared to note depth, location, and description of the MD or MEC items found. The subsurface sampling and removal actions were performed at the four MRSs as detailed in Section 4.3.1. Sampling typically consisted of 100-ft by 100-ft grids. Once grids were established, the grid was divided into 5-ft-wide search lanes. The search lanes were visually inspected while simultaneously searching for subsurface anomalies with a magnetometer. Each magnetic anomaly identified with the magnetometer was marked with a pin flag and hand-excavated to identify or confirm the presence of MD or MEC. If munitions or other metal debris were not encountered within a specific depth, the on-site USACE OE Safety Specialist determined whether deeper excavation was required.

4.5 Quality Assurance/Quality Control

The QA/QC procedures used during sampling are described below.

4.5.1 Field Sampling QA/QC

1994 and 1995 UXB Sampling Actions: The report that documented UXB's sampling investigation indicated that QC checks were performed on each investigated grid after munitions sampling operations were completed. A minimum of 10 percent of each investigated grid was checked to verify that the grid had been surveyed and munitions related items removed. If munitions-related items (other than small arms) were found during the QC sweep, the grid would need to be resurveyed. The work plan stated that after the QC check the site would undergo a QA check by the USAEDH OE Safety Specialist.

1997 and 1998 USA Environmental Sampling and Removal Actions: The After Action Reports for MRS-14C and MRS-32C indicated that USA performed operational checks and QC inspections as

specified in their work plan. The work plan specified that QC consisted of daily and periodic QC audits as described below.

Daily QC Audits. According to the work plan, instruments and equipment requiring maintenance and/or calibration were checked prior to the start of each workday. Batteries were replaced as needed, and the instruments were checked against a known source. The QC Specialist was responsible for ensuring that personnel accomplished all operational checks and that the appropriate log entries were made. The QC Specialist performed random, unscheduled checks of the various sites to ensure that personnel followed procedures in the work plan and submitted a report of findings to the USA Senior UXO Supervisor (SUXOS).

Periodic QC Audits. The QC Specialist conducted a quality audit of completed sites within a reasonable time after the completion of the work. These audits were performed by USA's QC Specialist and consisted of a magnetometer inspection (using a Schonstedt Model GA-52CX magnetometer) of at least 10 percent of each search grid. The QC Specialist inspected each operating grid using a zigzag pattern that covered at least 10 percent of the entire grid and submitted a written report of their findings to the Project Manager (PM). The pass/fail criterion for these audits was zero munitions items. If the QC Specialist did not pass the grid, the PM scheduled the area for reworking. In addition to the physical inspection of the site, the QC Specialist conducted an audit of logs to ensure the proper entries were made. The PM and SUXOS analyzed all grid QC failures to determine required corrective action. According to QC and QA logs, no munitions items were found during the 10 percent QA/QC.

4.5.2 Data Management QA/QC

The requirements of the QA review are described in the Standard Operating Procedures provided in the *Final Track 1 Ordnance and Explosives Remedial Investigation/Feasibility Study, Former Fort Ord, California* (MACTEC, 2004). The purpose of the data review was to complete a 100 percent check of all available grid records to identify discrepancies between the reports documenting field activities and the grid records. Discrepancies were then researched and corrections made, if appropriate, prior to loading the data into the project database. MEC and MD removed by UXB were assigned location coordinates that correspond to the center of the grid in which the item was found as part of the QC review. Information concerning the depth of MEC and MD was also not collected by UXB. As a result, the MMRP database has assigned the depth of zero (on the surface) to these items.

4.5.3 Data Quality Conclusions

The following conclusions can be made regarding the quality of the data.

- Schonstedt magnetometers were used for selected site walks, and sampling and removal actions. The Schonstedt magnetometers are capable of detecting the types of munitions items potentially present at BLM Area A. Results of sampling and removal actions at MRS-14C demonstrate that the Schonstedt was also capable of detecting burial pits.

- The Schonstedt is less effective at detecting items that are primarily composed of non-metallic components such as grenade fuzes; however these items would be expected at the surface and should be detected using a combination of visual and instrument aided techniques.

- All work passed contractor QC and USACE QA.

- Although data collection and management procedures employed during previous MEC sampling and removal efforts performed at MRS-14B, MRS-14C, MRS-17, and MRS-32C were less rigorous than requirements in place today, the quantity and quality of the available information is sufficient to make an informed decision regarding the sites. The sampling and removal data are sufficient to confirm the types of military munitions used at the sites.

- Coordinate data were collected for MEC and MD items found at the site, except for some of the items found during the USACE site walks conducted in 1995. Information concerning depth of found items was not collected by UXB, and MEC items are located at the center of the grid in which they were found.

- Review of the data collected at MRS-14C indicates that the types of items found during the sampling and removal actions would meet the criteria established in the Track l ROD, specifically, Category 3. Category 3 is described as "The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an unacceptable risk based on site-specific evaluations conducted." Field investigations at MRS-14C identified evidence of past training involving military munitions, but training involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact. Based on the data review described above and evaluation of the quality of data collected, MRS-14C is included as part of this BLM Area A Track 1 Approval Memorandum,

- Review of the data indicates that the types of items found during the removal actions within MRS-32C would meet the criteria established in the Track l ROD, specifically, Category 3. Category 3 is described as "The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an unacceptable risk based on site-specific evaluations conducted" in the Track 1 OE RI/FS. Field investigations at MRS-32C identified evidence of past training involving military munitions, but training involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact. Based on the data review described above and evaluation of the quality of data collected, MRS-32C is included as part of this BLM Area A Track 1 Approval Memorandum.

5.0 Conclusions and Recommendations

This section presents conclusions and recommendations for BLM Area A that are based on review of historical information and sampling data.

5.1 Conclusions

Based on the literature review, site assessment, and site sampling and removal results, the site appears to have been used as a general training and maneuver area with designated training areas for bivouac, land mine training, and training using simulators from the 1940s until base closure in 1994. The site is currently maintained as an open space recreational area by BLM.

Most of the MD and MEC items discovered at the site were on the ground surface or just below the ground surface. The following MEC or MD items, if present at the site, and, if encountered, are considered to pose an acceptable risk for the following reasons:

Flare, parachute, trip, M48: It is possible that a person could cause the parachute trip flare to function through casual (inadvertent or unintentional) contact if one remained in a "prepared to function" condition (e.g., fuze was installed in the flare, was armed, and attached to a trip wire or other triggering mechanism, or placed in the ground with the prongs exposed). Upon functioning, injury, such as minor to serious burns, could occur from the ignitable components, or by being struck by the ejecting flare and parachute assembly. If the fuze is not installed, the parachute trip flare would not function through casual (inadvertent or unintentional) contact but could function if exposed to heat or flame.

Flare, surface, trip, M49 series: It is possible that a person could cause the surface trip flare to function through casual (inadvertent or unintentional) contact if one remained in a "prepared to function" condition (e.g., attached to a trip wire or other triggering mechanism). If it existed in a fixed position (e.g., attached to a tree), serious injury beyond burns would not be expected because the flare is designed to burn "in place" where it was placed or mounted. If one was in a "prepared to function" condition and left on the ground, it could function upon casual (inadvertent or unintentional) contact, and it would burn in a manner similar to a road flare, but with greater heat and illumination, and could cause burns.

Fuze, grenade, hand, practice M228: It is not likely but possible that a person would be able to function a fuze, if one were found at the site, and sustain minor burn injuries. The following conditions would need to be met for the fuze to function: (1) the striker spring would need to be viable and provide sufficient force to function the percussion primer when struck after the safety pins is removed, and (2) the components have not been exposed to moisture, degradation, and weathering.

Grenade, hand, smoke M18 series: It is possible that a person could cause the smoke grenade to function, if one were found at the site, and be burned, but it would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Grenade, hand, practice M62: It is unlikely but possible that a person would be able to function a practice hand grenade, if one were found at the site, and sustain minor burn injuries. The following conditions would need to be met for the practice hand grenade fuze to function: (1) the safety pin would need to be in place holding the striker spring in the cocked position, and (2) the striker spring would need to be viable and provide sufficient force to function the percussion primer when struck after the safety pins is removed and the safety lever is released, and (3) and the components have not been exposed to moisture, degradation, and weathering.

Grenade, rifle, smoke M22 series: It is unlikely that a person could cause a smoke grenade to function through casual contact, if one were found at the site, and be burned, because the grenade: (1) was designed to be functioned by a hard nose-on impact with the ground or other hard target, and (2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Mine, antipersonnel, practice, M8 series: It is unlikely that a person would be able to trigger the practice antipersonnel mine through casual contact, if one were found at the site, and be burned or exposed to smoke or falling parts, because the mine: (1) would have to contain a live fuze, and (2) these components would have been exposed to moisture, degradation, and weathering for many years, which could decrease their effectiveness.

Mine, antitank, practice, M12 and M20 series: It is highly unlikely that a person would be able to trigger a fuze through casual contact, if one were found at the site, and sustain a burn injury, because the fuze: (1) was designed to be triggered by the weight of a vehicle, and (2) would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Projectile, 81mm, mortar, illumination M301 series: It is highly unlikely that a person would be able to function the mortar and the M84 fuze through casual contact, if one were found at the site, and sustain an injury, because the fuze was designed to be functioned by the internal shear wires being cut during the firing of the mortar igniting the primer. The powder train, black powder pellet, and expelling charge would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Pyrotechnic mixture, illumination: It is highly unlikely that a person would be able to ignite the pyrotechnic mixture through casual contact, if one were found at the site, and sustain a burn injury, because mixture requires an ignition source as in the first-fire charge. The illumination pyrotechnic mixture would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Rocket motor simulator (unknown): It is highly unlikely that a person would be able to function the simulator through casual contact, if one were found at the site, and sustain a burn injury, because the signal was designed to be functioned through an electrical charge. The charge would have been exposed

to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Signal, ground, rifle, parachute M17 series: It is highly unlikely that a person would be able to function signal through casual contact, if one were found at the site, and sustain a burn injury, because the signal was designed to be functioned immediately after being fired. The time train and expelling charge would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

Simulator, projectile, air burst, M74A1: It is unlikely that a person could cause an airburst projectile simulator to function through casual (inadvertent or unintentional) contact, if one were found at the site, and be injured, because it would require a hard, precise blow to the primer to function. If an airburst projectile simulator is found at the site and subjected to an open flame (i.e., fire), it may function and could cause nonfatal burns and/or lacerations.

Squib, rocket simulator: It is highly unlikely that a person would be able to function the simulator through casual contact, if one were found at the site, and sustain a burn injury, because the signal was designed to be functioned through an electrical charge. The charge would have been exposed to moisture, degradation, and weathering for many years, which could decrease the effectiveness of the components that cause it to function.

5.2 Sampling Adequacy and Data Quality

The following provides conclusions regarding data adequacy and quality.

- Schonstedt GA-52/C, GA-52CX, and GA-72/Cv magnetometers were used by during investigations and removal actions and instrument-aided site walks. These instruments were evaluated as part of the ODDS, and these instruments are capable of detecting ferrous MEC items at the depths expected at this site.

- MEC and MD items found at the site (practice grenade fuzes, smoke grenades, ground illumination signal, practice landmines, simulators, and flares) were expected to be present at the surface or near surface at the site based on historical uses. The munitions items found in the subsurface, primarily at MRS-14C, were likely related to disposal within burial pits.

- Investigation of the site included sampling or removal actions at about 53 acres, walking over 153 miles during the site assessment conducted in 2010, and site walks covering additional portions of the site during the BRA and USA 1999 site walk.

- The sampling data indicate that practice munitions were used at the site. The types of items identified are consistent with the types of practice identified on historical training maps.

- Training involving shoulder-launched projectiles and other projectiles identified during interviews conducted as part of the ASR were not substantiated by site assessment and sampling conducted at the site.

- Because the site was investigated through the site assessment process including site walks, BRA site walks, USACE PA/SI site walks, USA site walks, MEC sampling at MRS-14B, MRS-14C, MRS-17, and MRS-32C, and MEC removal at MRS-14C and MRS-32C, and results of the sampling confirmed the use as a general training and maneuver area with designated practice training areas, the quantity and quality of available information is sufficient to make an informed decision regarding the site. Because the military munitions items found during field investigations at the site are considered to pose an acceptable risk (see Section 3.4), additional MEC sampling at the site would not add significantly to the understanding of the site or change the conclusions of this report.

5.3 Recommendations

Based on review of existing information and historical document, No Further Action related to MEC is recommended for this site. BLM Area A meets the Track 1, Category 3 criteria because historical research and field investigations indicate that the site was used for training with military munitions, but the military munitions that potentially remain as a result of that training do not pose an unacceptable risk based on site specific evaluation conducted in this Approval Memorandum. MEC removal actions were conducted in MRS-14C and a portion of MRS-32C. The military munitions items recovered during the removal actions confirm that the types of military munitions found, and potentially remain in the sites, are practice and pyrotechnic items that are not designed to cause injury. Therefore, MRS-14C and MRS-32C are included in the BLM Area A. The type of munitions recovered at these sites during the removal action do meet the definition of Track 1, Category 3 because the types of MEC and MD found do not pose an unacceptable risk based on the evaluation conducted in Section 3 of this Approval Memorandum. In the unlikely event that a MEC item is found of the type previously found within BLM Area A, it is not expected that it could be caused to function through casual contact (i.e., inadvertent and unintentional contact). The munitions items found at BLM Area A have been exposed to moisture, degradation, and weathering for many years which would likely decrease the effectiveness of the components that cause it to function.

No actionable risk was identified through the remedial investigation process. However, in the interest of safety, reasonable and prudent precautions should be taken when conducting intrusive operations at this site. As a basewide effort to promote safety and because of Fort Ord's history as a military base, the Army provides MEC safety training to anyone who requests that training. Personnel involved in intrusive operations at the former Fort Ord may attend the Army's MEC safety training to increase their awareness of and ability to identify MEC items. Section 1.3.1 (Description of the Remedy) of the Track 1 ROD (Army, 2005) describes the scope of the safety training. Trained construction personnel will contact an appropriate local law enforcement agency if a potential MEC item is encountered. The local law enforcement agency will arrange a response by the Army.

In the future, should any military munitions-related item be found at BLM Area A, the Army will take an appropriate immediate action (i.e., removing the found item, recording the incident), and within 90 days of the discovery, submit a plan for appropriate follow-on action to EPA and DTSC for consultation, pursuant to Section 7.7(b) of the Fort Ord FFA.

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Tables

Table 1
BLM Area A, Pre-RI/FS Management Plan, MEC and MD Items Found

Site	Grid	MM Item Description	MM Type	Quantity	Depth (in)	Date
Non-MRS Site		Expended pyrotechnic items	MD	--	0	1/1/1996
Non-MRS Site		Expended signal	MD	--	0	1/1/2002
Non-MRS Site	LB4-MH07-SA10	Grenade, hand, practice, M62	MEC	1	0	11/27/2001
Non-MRS Site	LB4-MF06-SE01	Flare, surface, trip, M49 series	MEC	1	0	10/4/1999
Non-MRS Site	LB4-ME01-SH06	Practice landmine (model unknown)	MD	1	0	6/17/1998
Non-MRS Site	LB5-MJ04-SE-04	Grenade, hand, smoke, M18 series	MEC	1	0	11/1/1997
Non-MRS Site	LB5-MJ05-SD02	Grenade, hand, smoke, M18 series	MEC	1	0	11/6/1997
MRS-61 - Grenade Range	MRS-61_AJ	*Star cluster illumination signal (model unknown)	MD	1	0	11/16/1995
MRS-67 - Unnamed	MRS-67	Grenade, hand, smoke, M18 series	MD	1	0	11/20/1995
MRS-14B - Pilarcitos Canyon	MRS-14B	Signal, ground, rifle, parachute, M17 series	UXO	1	0	2/14/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_01 AA	Signal, illumination, ground, M125 series	MD	1	0	7/25/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_07 Z	Projectile, 81mm, mortar, training, M68	MD	1	0	7/24/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_10 BB	Projectile, 81mm, mortar, training, M68	MD	1	0	7/25/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_10 EE	Grenade, hand, smoke, M18 series	MD	1	0	7/21/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_10 EE	Signal, illumination, ground, M125 series	MD	1	0	7/21/1995
MRS-14B - Pilarcitos Canyon	MRS-14B-16 O	Signal, illumination, ground, M125 series	MD	1	0	7/28/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_19 W	Signal, illumination, ground, M125 series	MD	1	0	8/3/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_1N-21E	Signal, ground, rifle, parachute, M17 series	MD	1	0	7/19/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_1N-24E	Signal, illumination, ground, M125 series	MD	1	0	7/19/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_22 P	Grenade, hand, smoke, M18 series	MD	1	0	8/4/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_28 F	Signal, illumination, ground, M125 series	MD	1	0	8/7/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_28 O	Signal, illumination, ground, M125 series	MD	1	0	8/7/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_31 N	Signal, illumination, ground, parachute, rifle, M19 series	MD	1	0	8/7/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_31 Q	Signal, illumination, ground, parachute, rifle, M19 series	MD	3	0	8/8/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_37 N	Fuze, grenade (model unknown)	MD	1	0	8/7/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_43 H	*Grenade, rifle, illuminating (model unknown)	MD	1	0	8/9/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_43 H	Grenade, hand, smoke, M18 series	MD	2	0	8/9/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_43 H	Signal, illumination, ground, M125 series	MD	1	0	8/9/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_46 G	Signal, illumination, ground, M125 series	MD	1	0	8/16/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_46 J	Grenade, hand, smoke, M18 series	MD	3	0	8/17/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_46 J	Grenade, rifle, illuminating (model unknown)	MD	1	0	8/17/1995
MRS-14B - Pilarcitos Canyon	MRS-14B_46 P	Grenade, hand, smoke, M18 series	MD	1	0	8/15/1995
MRS-14C - Site 14 Southeast	LA4-MH02-SI09	Rocket motor simulator (model unknown)	DMM	36	48	3/16/1998
MRS-14C - Site 14 Southeast	LA4-MH03-SI03	Fuze, grenade, hand, practice, M228	UXO	1	3	2/25/1998
MRS-14C - Site 14 Southeast	LA4-MH03-SI10	Flare, surface, trip M49 series	UXO	1	3	3/12/1998
MRS-14C - Site 14 Southeast	LA4-MH03-SJ01	Grenade, rifle, smoke, M22 series	UXO	1	24	2/18/1998

Table 1
BLM Area A, Pre-RI/FS Management Plan, MEC and MD Items Found

Site	Grid	MM Item Description	MM Type	Quantity	Depth (in)	Date
MRS-14C - Site 14 Southeast	LA4-MH03-SJ01	Squib, rocket, simulator	UXO	11	24	2/18/1998
MRS-14C - Site 14 Southeast	LA4-MI03-SA01	Grenade, rifle, smoke, M22 series	UXO	2	2	2/11/1998
MRS-14C - Site 14 Southeast	LA4-MI03-SA01	Squib, rocket, simulator	UXO	18	2	2/11/1998
MRS-14C - Site 14 Southeast	LA4-MI03-SB02	Grenade, rifle smoke, M22 series	MD	2	2	2/24/1998
MRS-14C - Site 14 Southeast	LA4-MI03-SB02	Squib, rocket, simulator	UXO	1	2	2/24/1998
MRS-14C - Site 14 Southeast	LA4-MI03-SB09	Fuze, grenade, hand, practice, M228	UXO	1	12	3/11/1998
MRS-14C - Site 14 Southeast	LA4-MI03-SB09	Grenade, hand, smoke, M18 series	UXO	1	12	3/11/1998
MRS-14C - Site 14 Southeast	MRS-14C_8N 1W	Grenade, hand, smoke, M18 series	MD	27	0	1/18/1995
MRS-14C - Site 14 Southeast	MRS-14C_8N 3E	Grenade, hand, smoke, M18 series	MD	1	0	1/19/1995
MRS-14C - Site 14 Southeast	MRS-14C_8N 3E	Grenade, rifle smoke, M22 series	MD	1	0	1/19/1995
MRS-14C - Site 14 Southeast	MRS-14C_8N 3E	Pyrotechnic mixture, illumination	UXO	1	0	1/19/1995
MRS-17 - Anti-tank Practice Mine Area	MRS-17_03 A	Signal, illumination, ground, M125 series	MD	1	--	9/22/1994
MRS-17 - Anti-tank Practice Mine Area	MRS-17_09 B	Simulator, explosive booby-trap, flash, M117	MD	1	--	9/26/1994
MRS-32C - Oil Well Road III	LB4-MC08-SJ08	Projectile, 81MM, mortar, illumination, M301 series	ISD	1	0	12/4/1995
MRS-32C - Oil Well Road III	LB4-MC09-SE05	*Smoke pot (model unknown)	MD	30	0	2/29/1996
In-Between Area 2	LB5-MG03-SB06	Antitank, mines (model unknown)	ISD	2	--	11/14/1995
In-Between Area 3	LA4-MC01-SJ04	Grenade, rifle smoke, M22 series	MD	1	--	6/9/2003

Source: April 2012 version of the MMRP database used.

Legend:

DMM = Discarded military munitions

in = inches

ISD = Insufficient data

MD = Munitions debris

MEC = Munitions and explosives of concern

UXO = Unexploded ordnance

-- = unknown

Table 2
BLM Area A, Site Assessment, MEC and MD Items Found

Site	MM Item Description	Type	Quantity	Depth	Date	Map Number
Non-MRS Site, between MRS-69 and MRS-27N	Simulator, Projectile, Air Burst, M74A1 (expended)	MD	1	--	11/01/10	17
Non-MRS Site, between MRS-69 and MRS-27N	Components of a Flare, Surface, Trip, M49 series	MD	2	--	11/01/10, 11/02/10	19, 34
Non-MRS Site, between MRS-69 and MRS-27N	Simulator, Projectile, Air Burst, M74A1 (expended)	MD	1	--	11/03/10	35
Non-MRS Site, between MRS-69 and MRS-27N	Fuze, Grenade, Hand, Model Unknown (expended)	MD	1	--	11/03/11	36
Non-MRS Site, between MRS-69 and MRS-27N; MRS-27W; MRS-27N	Signal, Illumination, ground, M127A1 (expended)	MD	3	--	11/03/11, 12/08/10, 01/05/11	37, 83, 104
Non-MRS Site, next to MRS-27N	Grenade, Hand, Smoke, M18 (expended)	MD	1	--	11/03/11	39
Non-MRS Site, next to MRS-61	Container for a Grenade, Rifle, Smoke (green, red, violet, or yellow), M23 series	MD	1	--	01/05/11	106
MRS-27N	Simulator, Projectile, Air Burst, M74A1	UXO	1	--	01/05/11	107
MRS-27N	End cap of a TNT block	MD	1	--	03/02/11	112
Non-MRS Site, between MRS-27S and MRS-32C	Flare, Parachute, Trip, M48 (holder)	MD	1	--	09/13/10	2
Non-MRS Site, between MRS-27S and MRS-32C	Signal, Illumination, Ground, M21A1 (expended)	MD	1	--	09/14/10	8
Non-MRS Site, between MRS-32C and MRS-14B	Flare, Parachute, Trip, M48 (holder)	MD	1	--	09/16/10	47
Non-MRS Site, near MRS-63	Links, M13	MD	1	--	09/30/10	90
Non-MRS Site, between MRS-63 and MRS-14C	Simulator, Projectile, Airburst, M74 series (expended component)	MD	1	--	10/04/10	93
Non-MRS Site, near MRS-27S	Mine, Antipersonnel, Practice, M8 Series (inert and unfuzed)	MD	1	--	10/04/10	98
Non-MRS Site, near MRS-27S	Mine, Antipersonnel, Practice, M8 Series (inert and unfuzed)	MD	1	--	10/04/10	102
Non-MRS Site, near MRS-27S	Mine, Antitank, Practice, M20 (inert and unfuzed)	MD	1	--	10/04/10	103
Non-MRS Site, near MRS-27S	Links, M13	MD	1	--	10/06/10	115
Non-MRS Site, near MRS-27S	Mine, Antipersonnel, Practice, M12 Series (inert and unfuzed)	MD	1	--	10/06/10	116
Non-MRS Site, near MRS-27S	Mine, Antipersonnel, Practice, M8 Series (inert and unfuzed)	MD	1	--	10/06/10	116
Non-MRS Site, near MRS-27S	Mine, Antipersonnel, Practice, M12 Series (inert and unfuzed)	MD	1	--	10/06/10	119
Non-MRS Site, near MRS-27S	Mine, Antipersonnel, Practice, M8 Series (inert and unfuzed)	MD	1	--	10/06/10	119
Non-MRS Site, near MRS-27S	Mine, Antipersonnel, Practice, M8 Series (inert and unfuzed)	MD	1	--	10/12/10	143

Source: *Draft Final Site Assessment Data Report BLM East/Post-1940 (Northern Portion and Southern Portion) Former Fort Ord, California*, Shaw, 2011a, 2011b

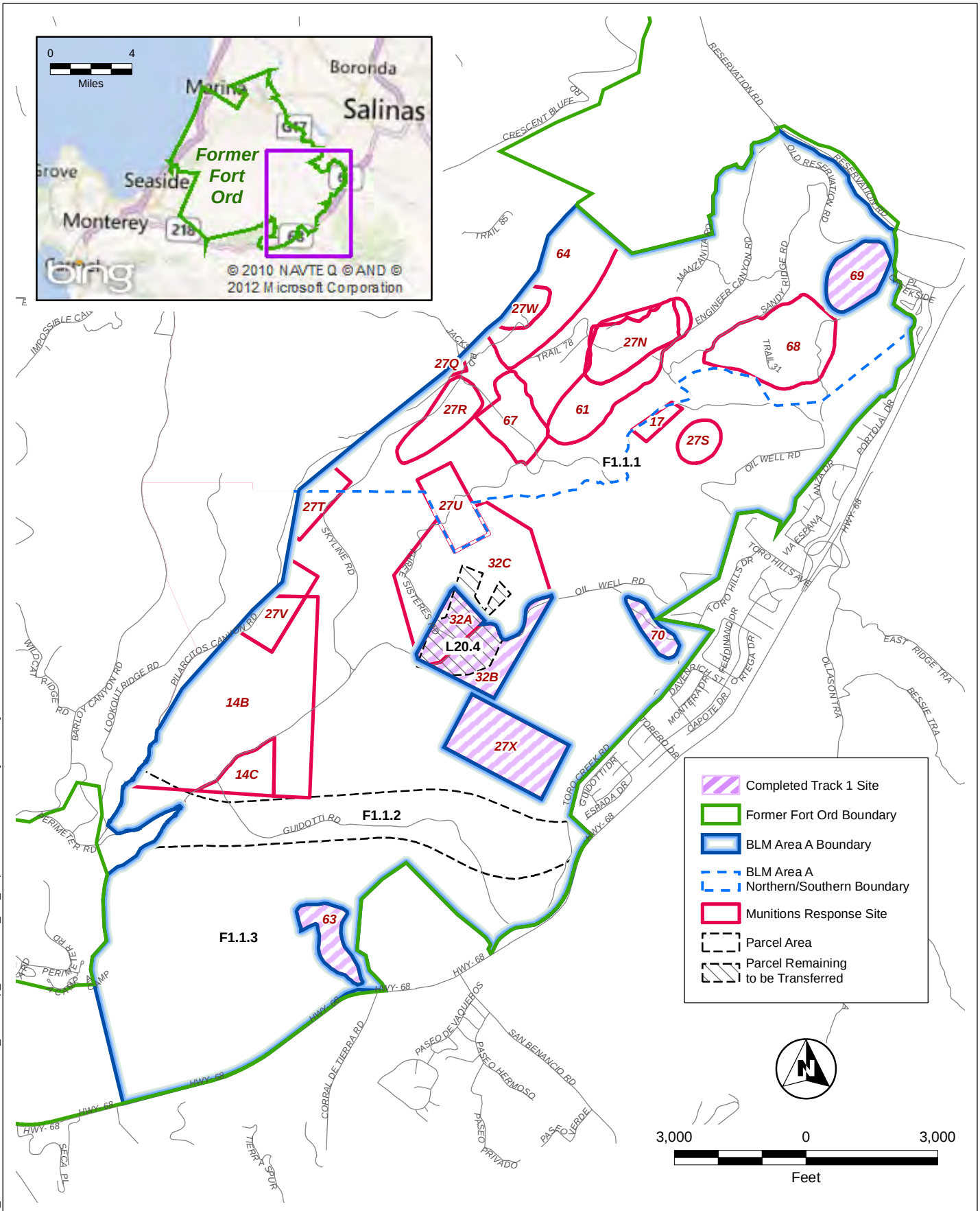
Legend:
MD = Munitions debris
UXO = Unexploded ordnance
-- unknown

Table 3
BLM Area A, Proposed Track 1 Munitions Response Sites

Site Number	Site Name	Site Acreage
MRS-27W (Excludes portion located in BLM East Pre-1940)	Training Site 23	16 acres
MRS-27N	Training Site 14	60 acres
MRS-27Q (Excludes portion located in BLM East Pre-1940)	Training Site 17	3 acres
MRS-27R	Training Site 18	39 acres
MRS-27U	Training Site 21	37 acres
MRS-61	Grenade Range	101 acres
MRS-64 (Excludes portion located in BLM East Pre-1940)	Unnamed	94 acres
MRS-67	Unnamed	42 acres
MRS-68	Unnamed	93 acres
MRS-14B (Excludes portion located in BLM East Pre-1940)	Pilarcitos Canyon	243 acres
MRS-14C	Site 14SE	28 acres
MRS-17	Unnamed	9 acres
MRS-27S	Training Site 19	17 acres
MRS-27T (Excludes portion located in BLM East Pre-1940)	Training Site 20	25 acres
MRS-27V (Excludes portion located in BLM East Pre-1940)	Training Site 22	37 acres
MRS-32C	Oil Well Road III	148 acres
Non-MRS, northern portion	Unnamed	748 acres
Non-MRS, southern portion	Unnamed	2,285 acres
BLM Area A Acreage		3,976 acres

Note:
1. MRS acreages shown include only the area of the MRS within BLM Area A.
2. Listed acreages are not additive due to overlap of some MRSs.

Figures



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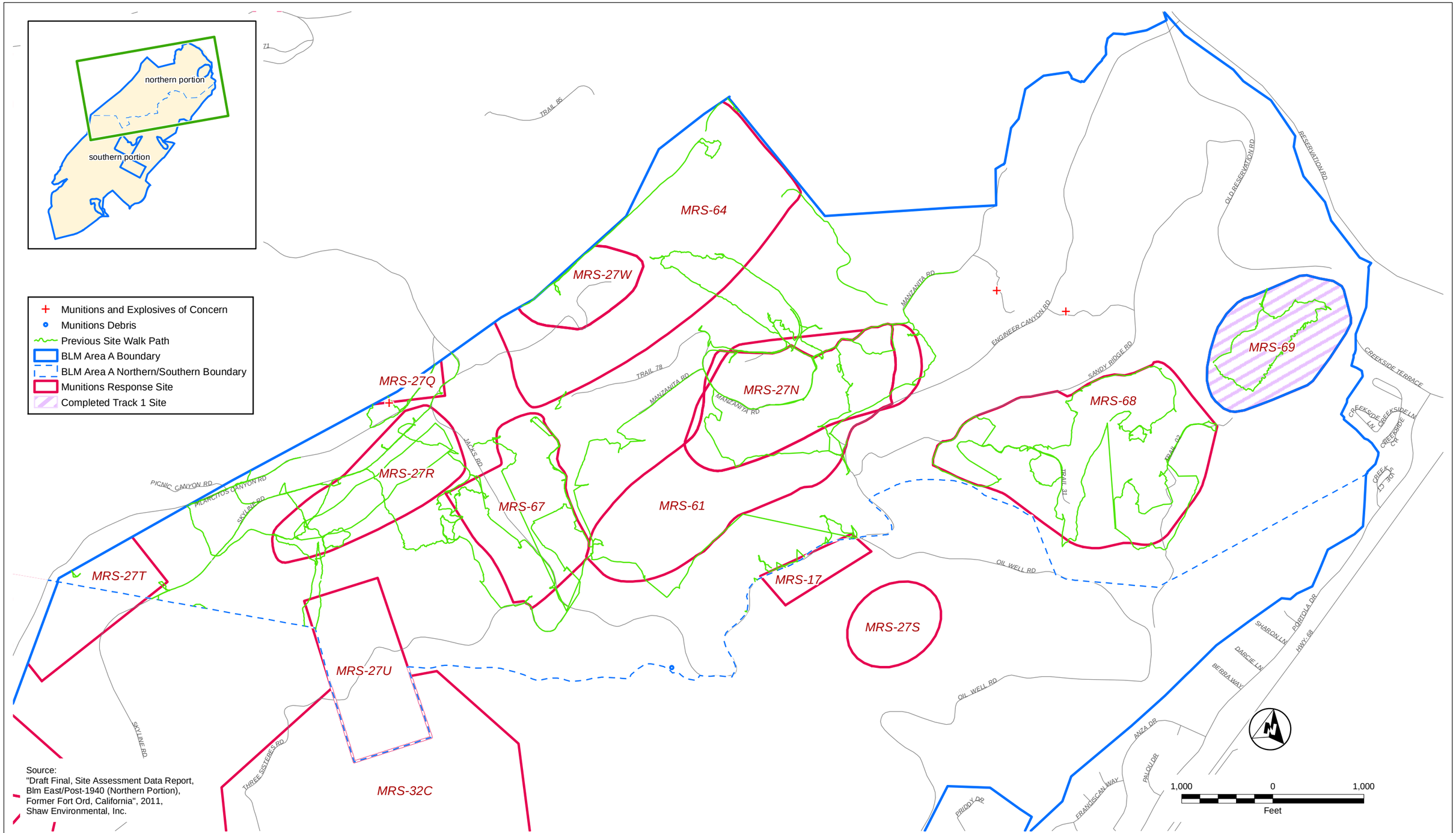
Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 1
Proposed Track 1
Location Map
Former Fort Ord

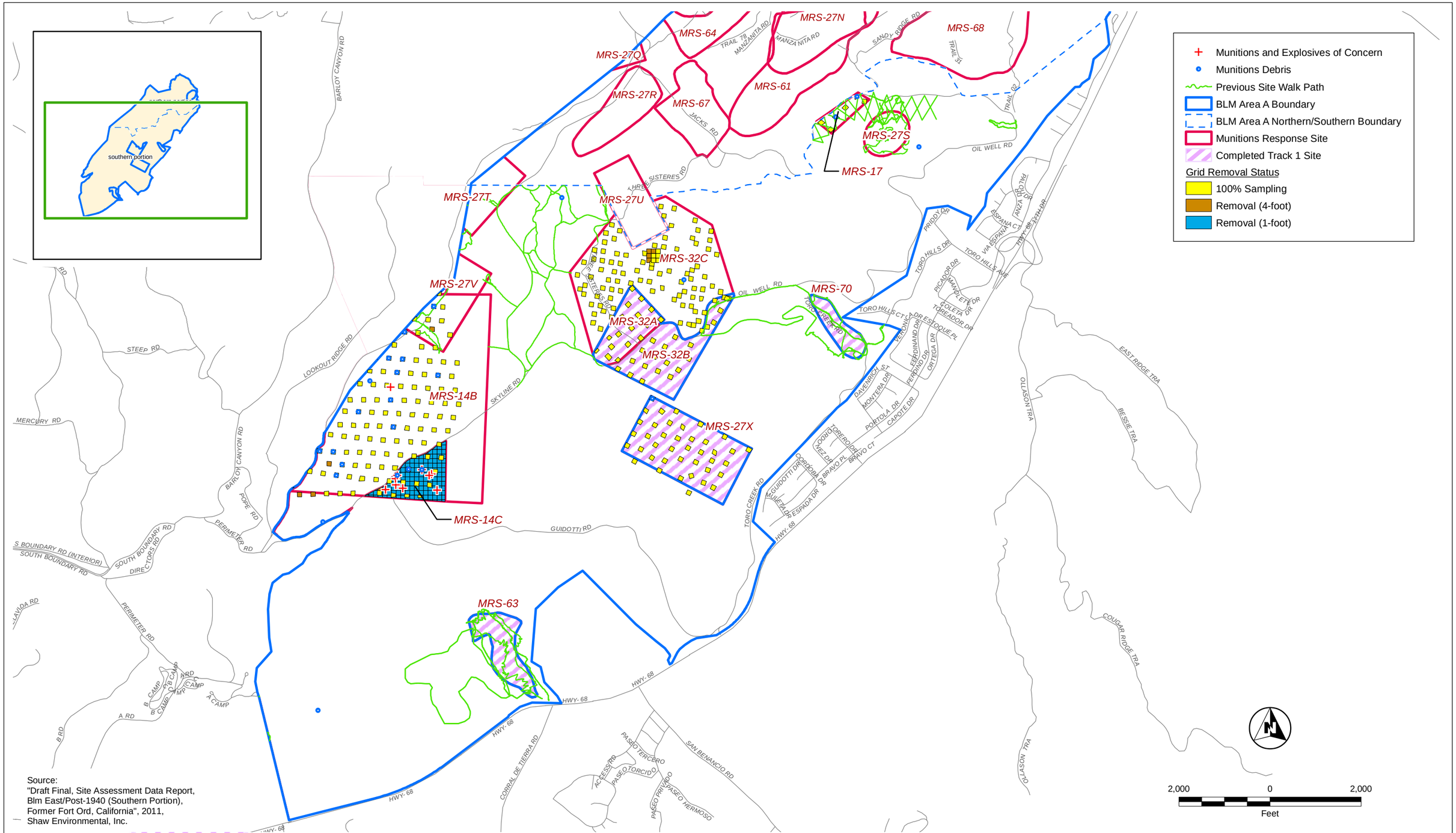


Source:
"Draft Final, Site Assessment Data Report, Blm East/Post-1940 (Northern Portion), Former Fort Ord, California", 2011, Shaw Environmental, Inc.

Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 2
Pre-RI/FS Management Plan
Investigation Results
(northern portion)

G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\N_Previous_Report.mxd 8/15/2012 [13:50 PM] AZHUK, ITSI

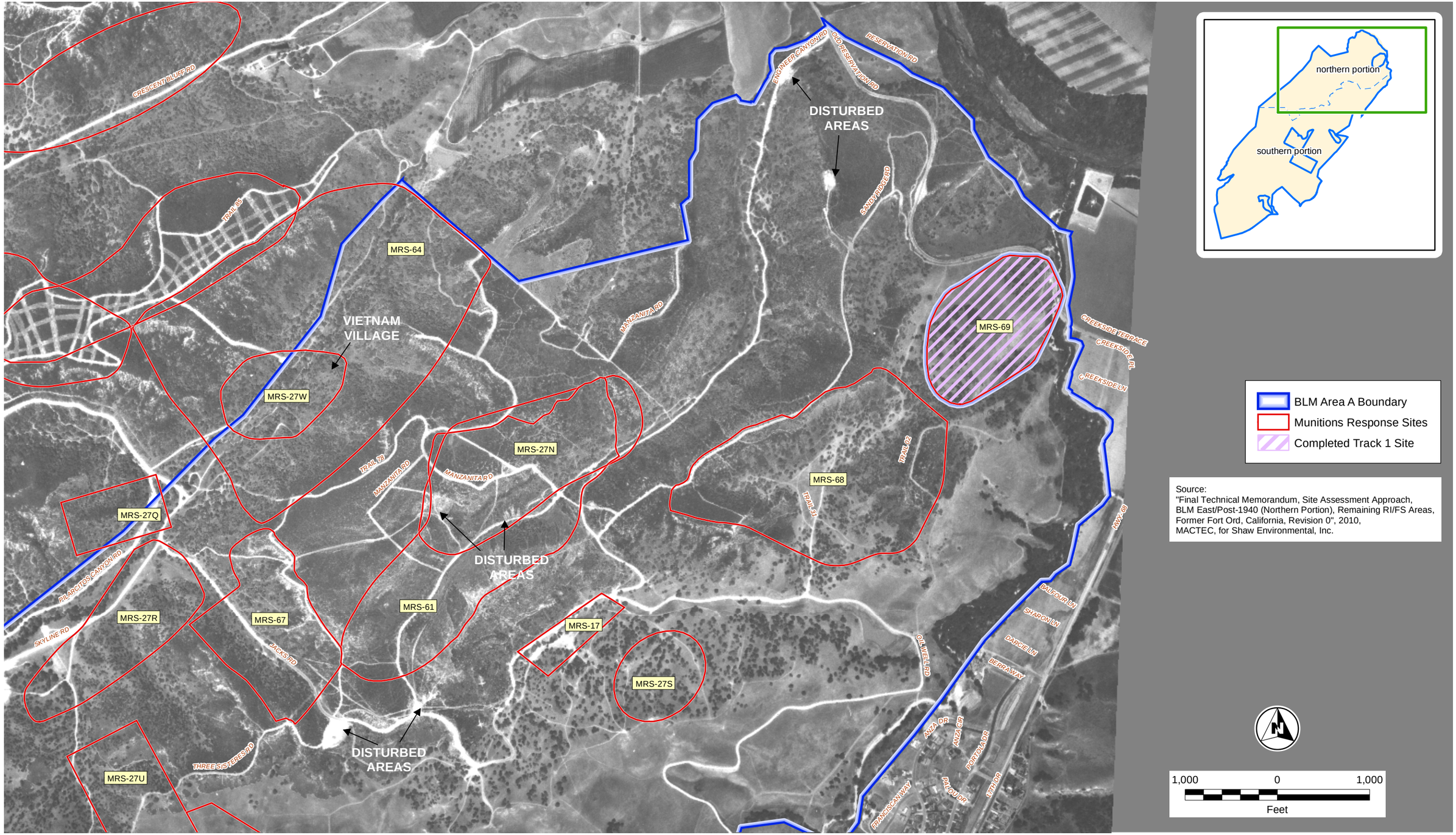


Source:
"Draft Final, Site Assessment Data Report,
Blm East/Post-1940 (Southern Portion),
Former Fort Ord, California", 2011,
Shaw Environmental, Inc.

Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 2A
Pre-RI/FS Management Plan
Investigation Results
(southern portion)

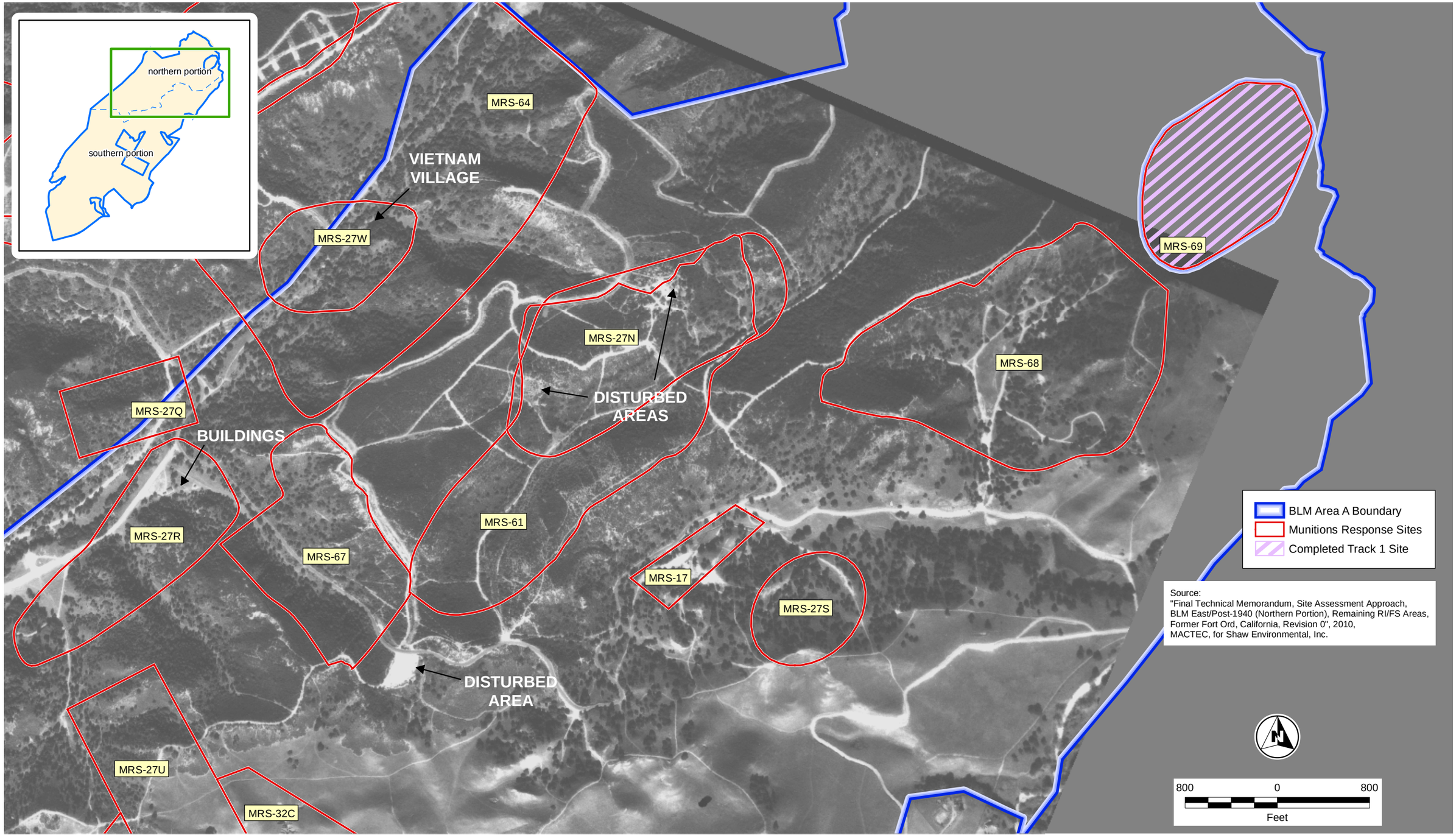
G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\S_Previous_Report.mxd 8/15/2012 [13:54 PM] AZHUK, ITSI



Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 3
1966 Aerial Photograph

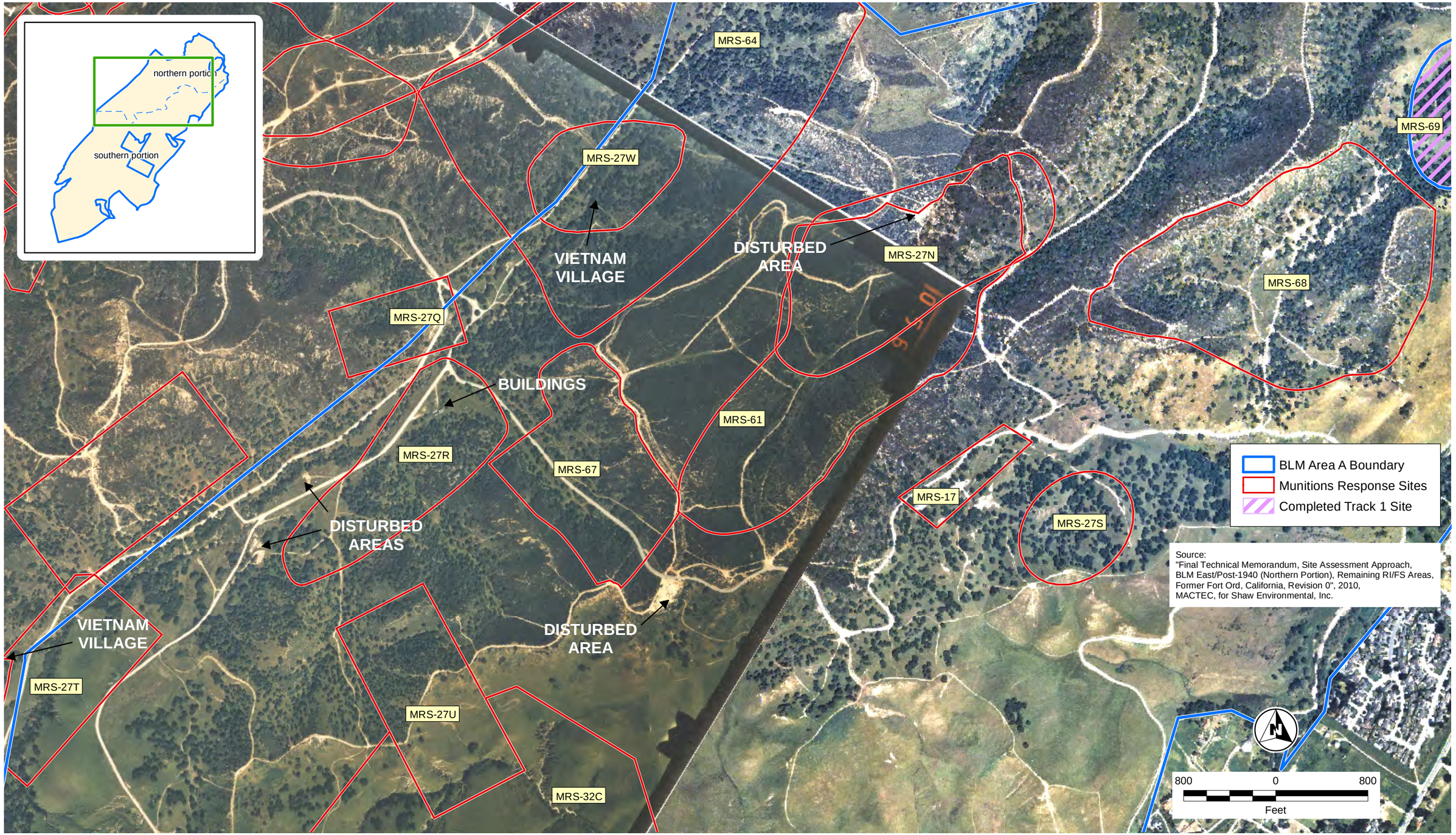
G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\N_1966_AirPhoto.mxd 8/15/2012 [16:41 PM] AZHUK, ITSI



Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 4
1975 Aerial Photograph

G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\N_1975_AirPhoto.mxd 8/15/2012 [16:39 PM] AZHUK, ITSI



Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 5
1986 Aerial Photograph

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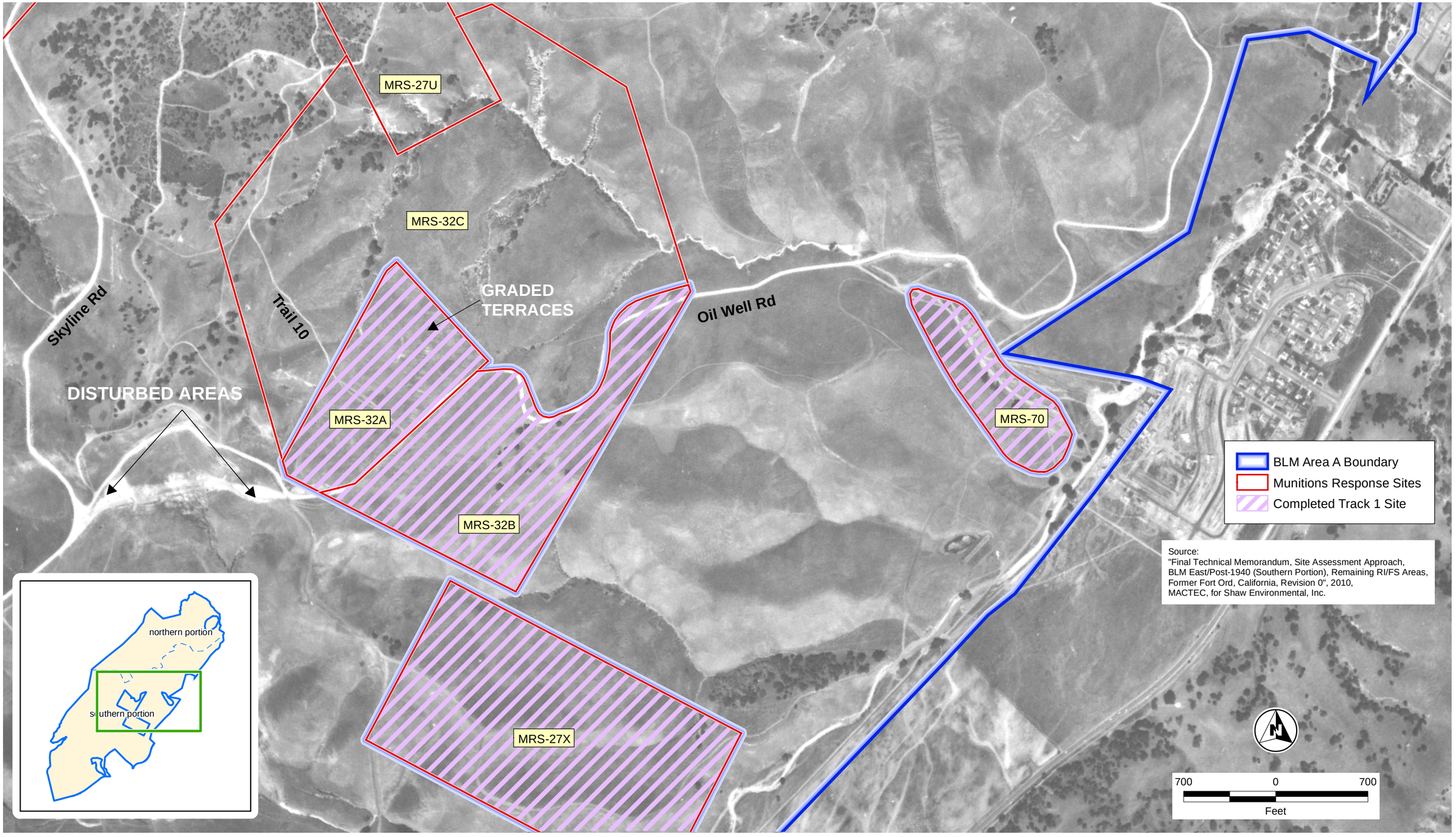
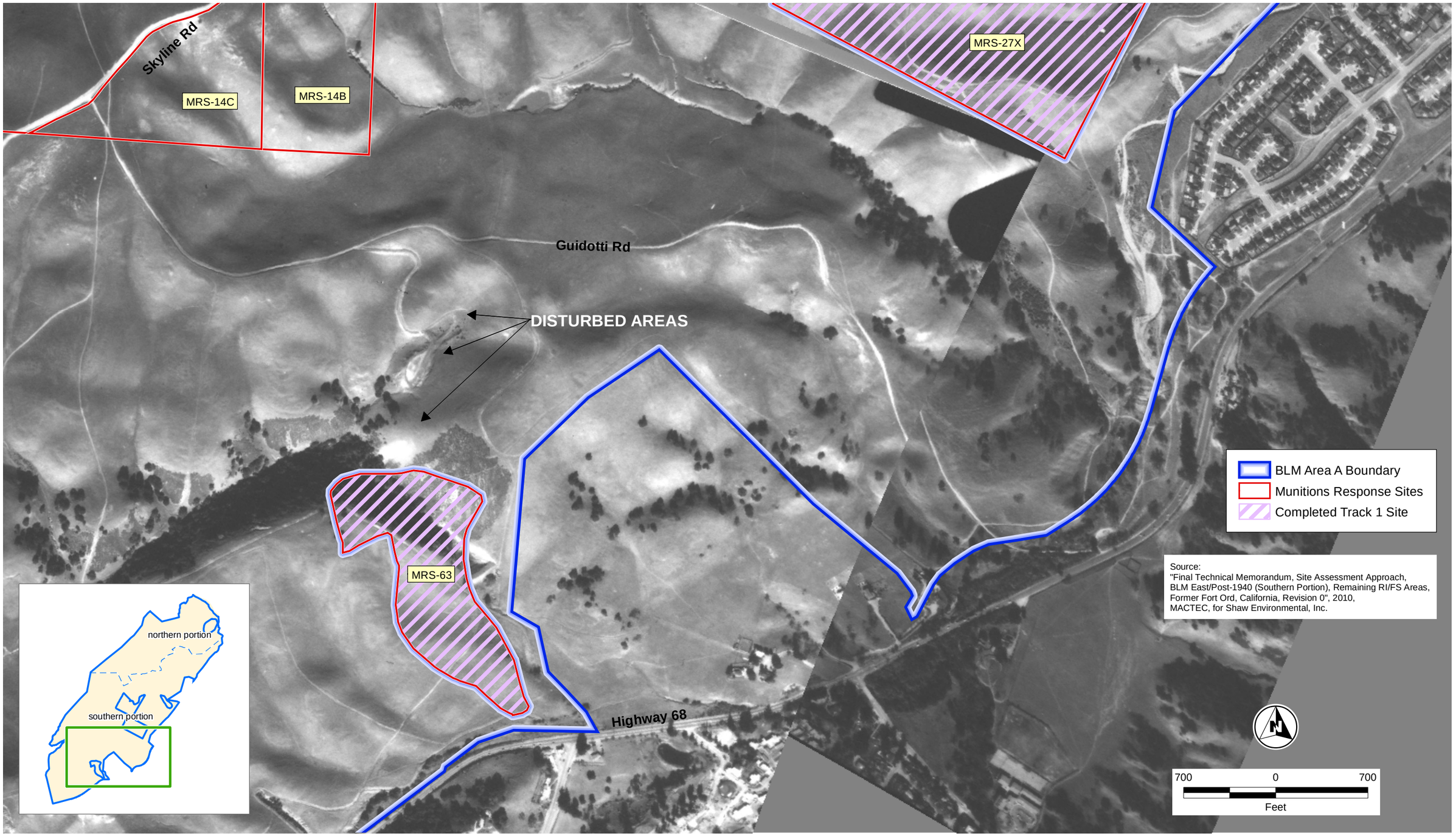


Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 6
1966 Aerial Photograph

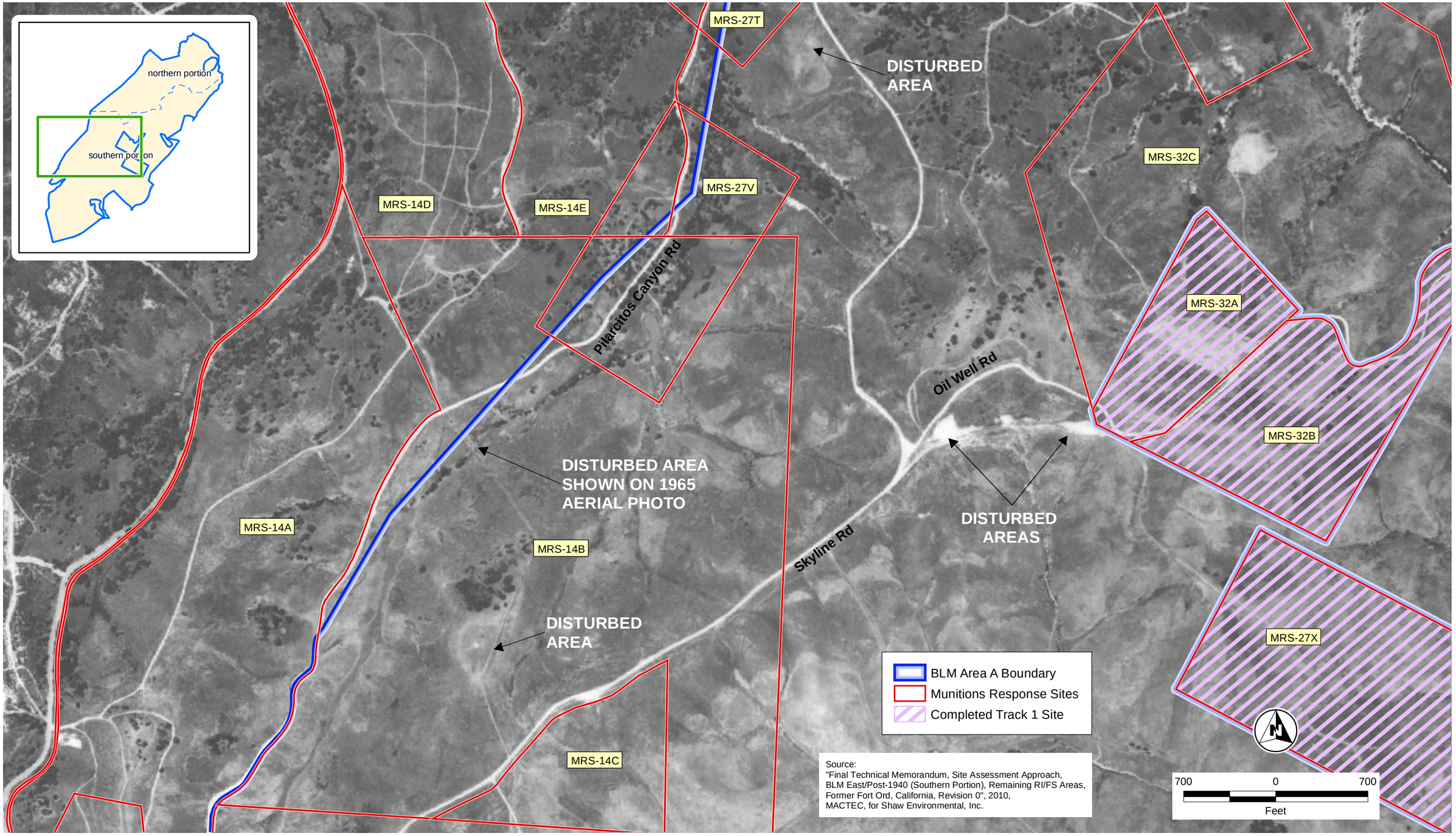
G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\S_1966_AirPhoto.mxd 8/15/2012 [16:38 PM] AZHUK, ITSI



Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 7
1975 Aerial Photograph

G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\S_1975_AirPhoto.mxd 8/15/2012 [16:32 PM] AZHUK, ITSI



Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 8
1978 Aerial Photograph

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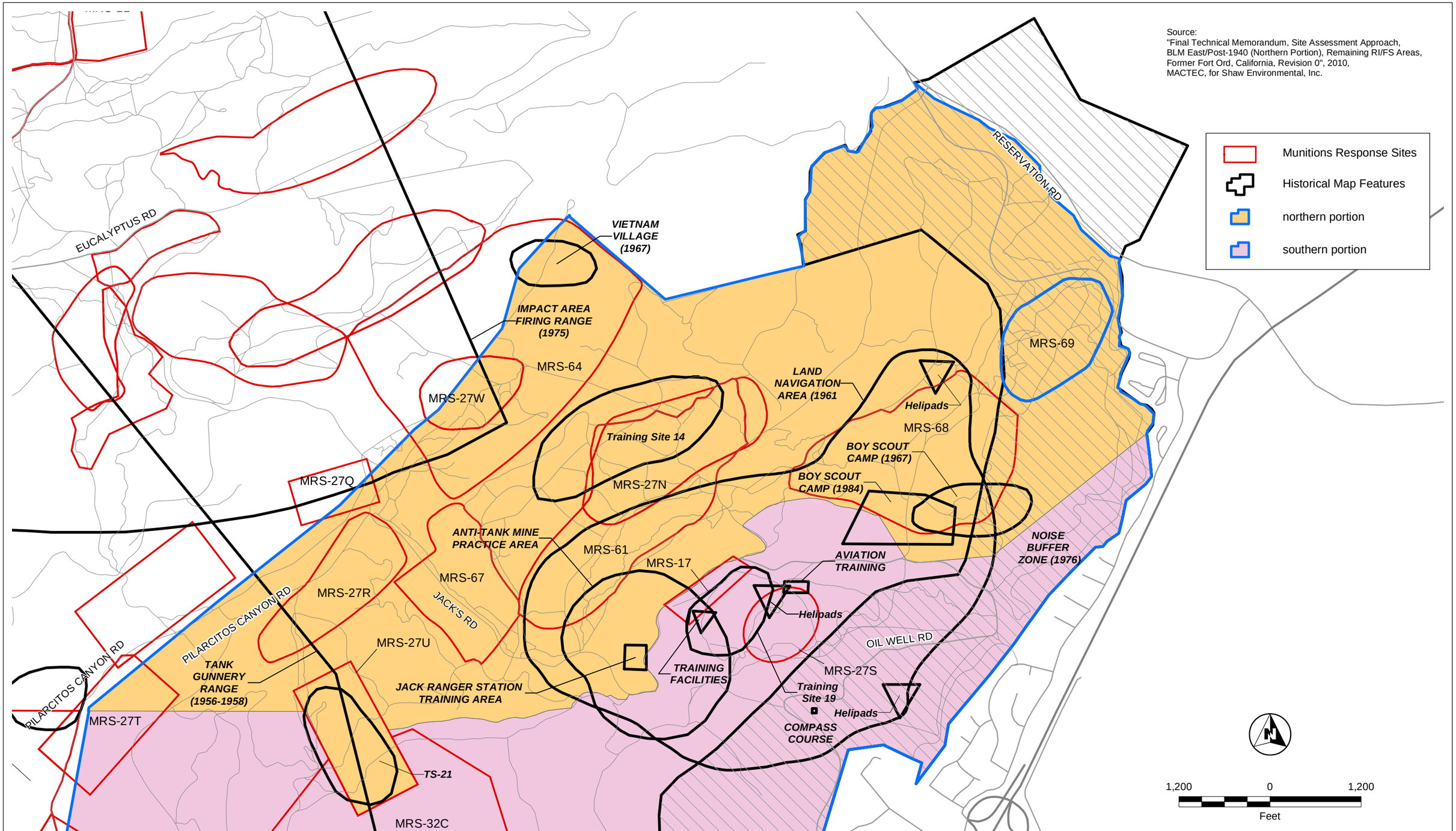
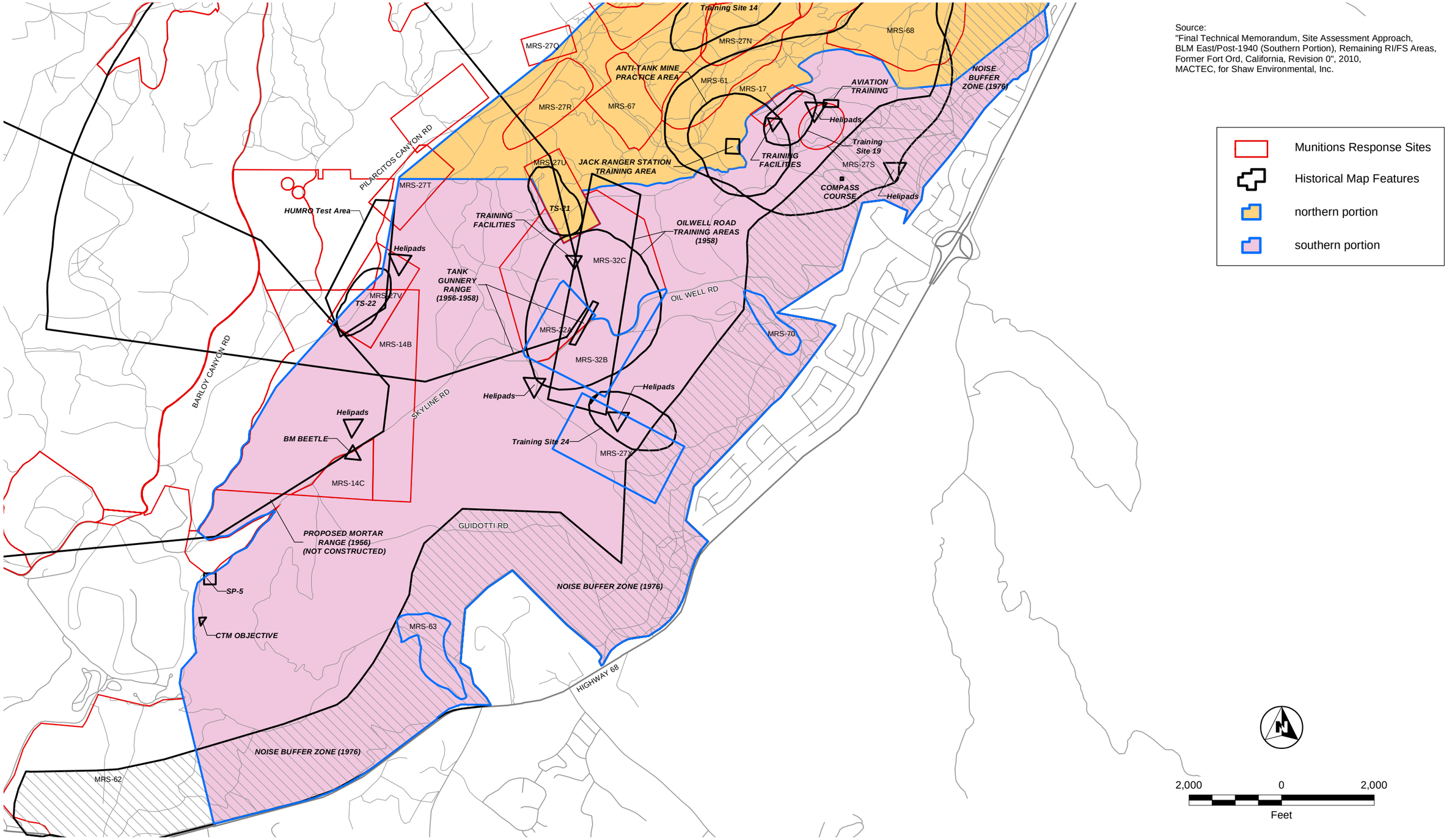


Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 9
Features Identified on Historical Training Maps
(northern portion)

G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\N_Features_from_Histor_Tmaps.mxd 8/15/2012 [17:10 PM] AZHUK, ITSI



Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 10
Features Identified on Historical Training Maps
(southern portion)

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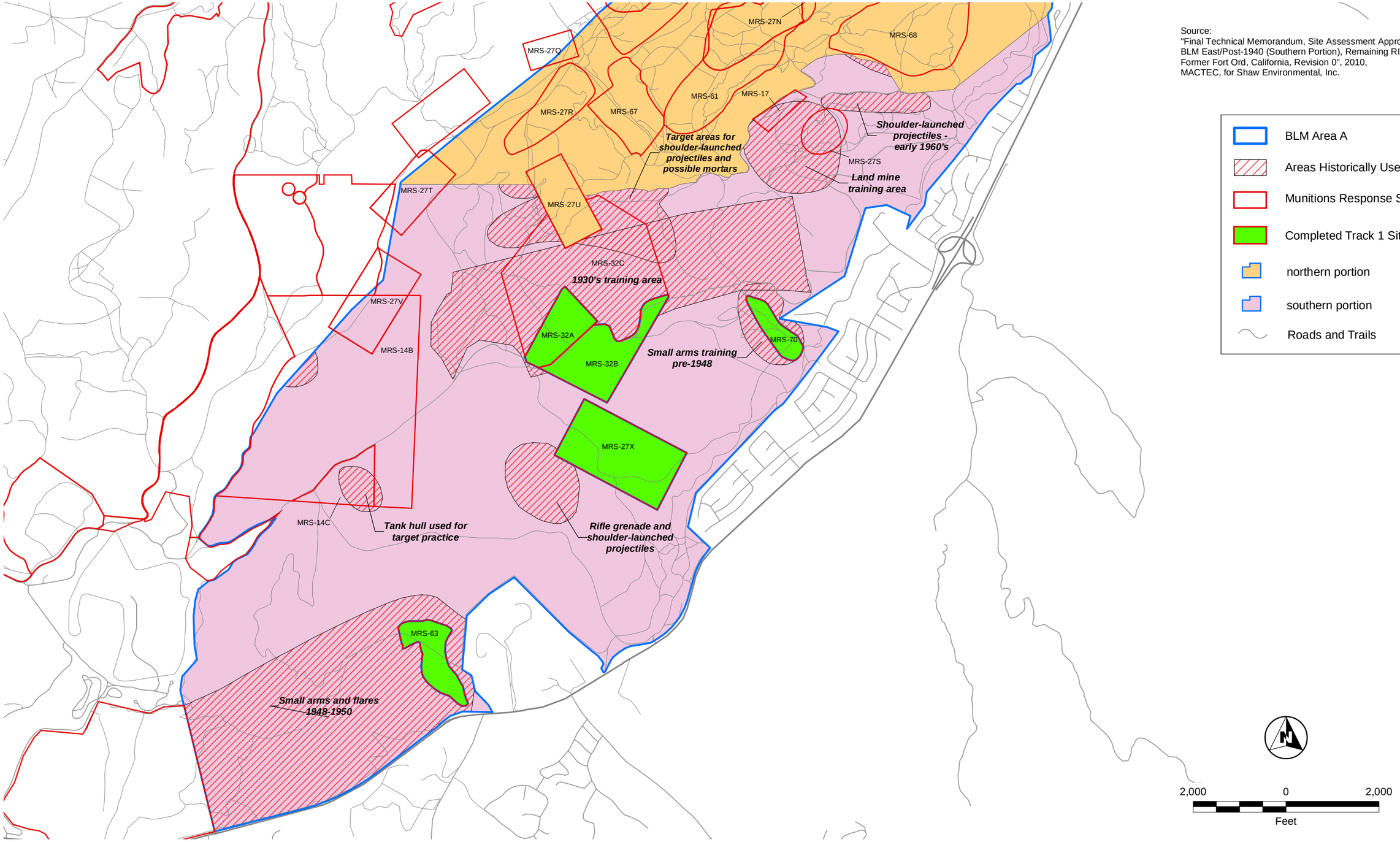

Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 11
Reported Historic Training Areas
(southern portion)

G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\S_Histor_Training_Areas.mxd 8/15/2012 [18:06 PM] AZHUK, ITSI

Source:
"Final Technical Memorandum, Site Assessment Approach,
BLM East/Post-1940 (Northern Portion), Remaining RI/FS Areas,
Former Fort Ord, California, Revision 0", 2010,
MACTEC, for Shaw Environmental, Inc.

EUCALYPTUS RD

RESERVATION RD

PILARCITOS CANYON RD

OIL WELL RD

Potential rifle grenades and Vietnam village

Potential firing area for shoulder-launched projectiles and rifle grenades

Potential target areas for shoulder-launched projectiles and rifle grenades

Potential rifle grenade and hand grenade area

Potential target areas for shoulder-launched projectiles and possible mortars

MRS-64

MRS-27W

MRS-27N

MRS-27Q

MRS-27P

MRS-27R

MRS-67

MRS-61

MRS-17

MRS-68

MRS-69

MRS-27T

MRS-27U

BLM Area A

Areas Historically Used

Munitions Response Sites

Completed Track 1 Site

northern portion

southern portion

Roads and Trails

N

1,200 0 1,200

Feet

Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 12
Reported Historic Training Areas
(northern portion)

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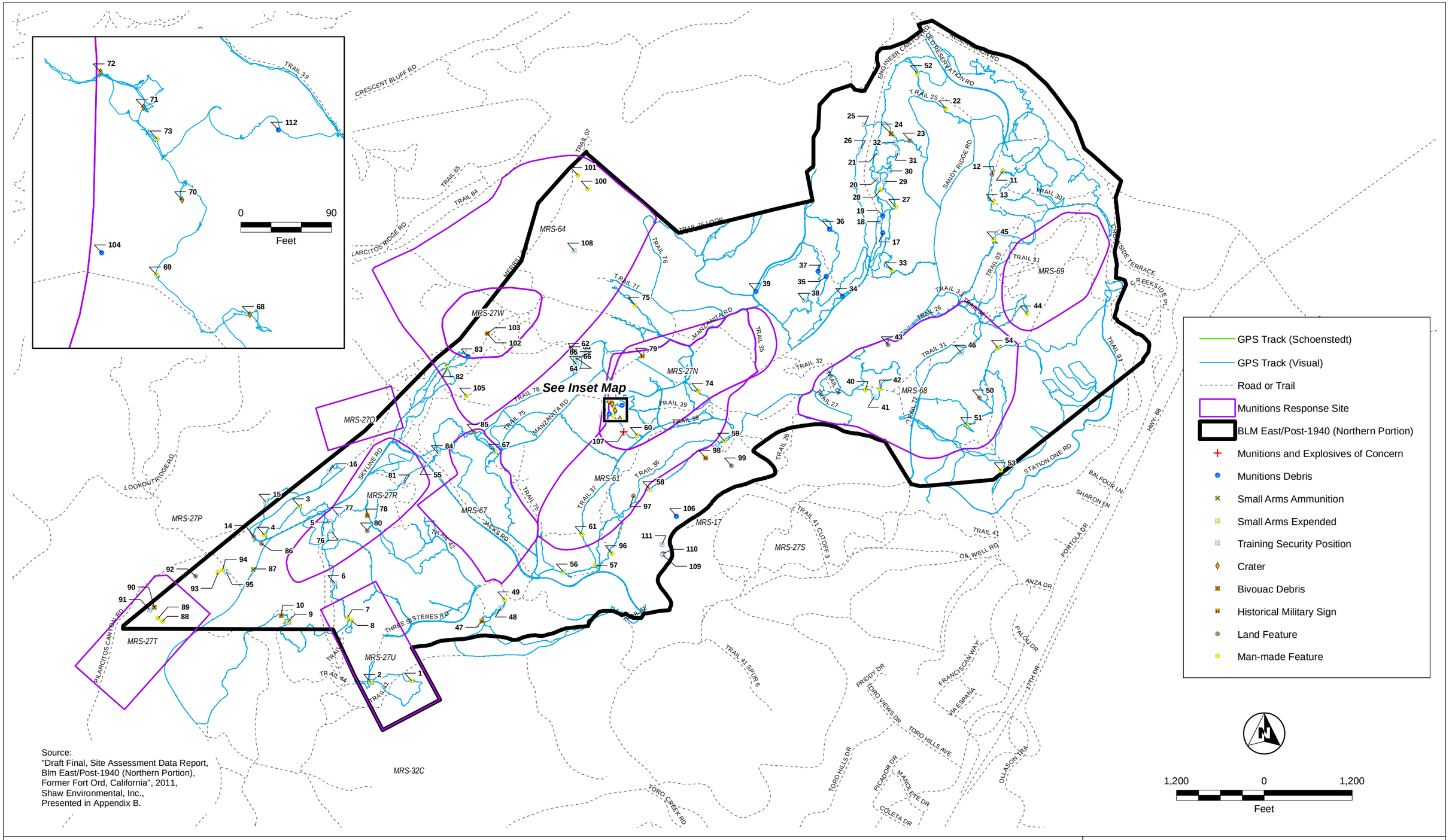
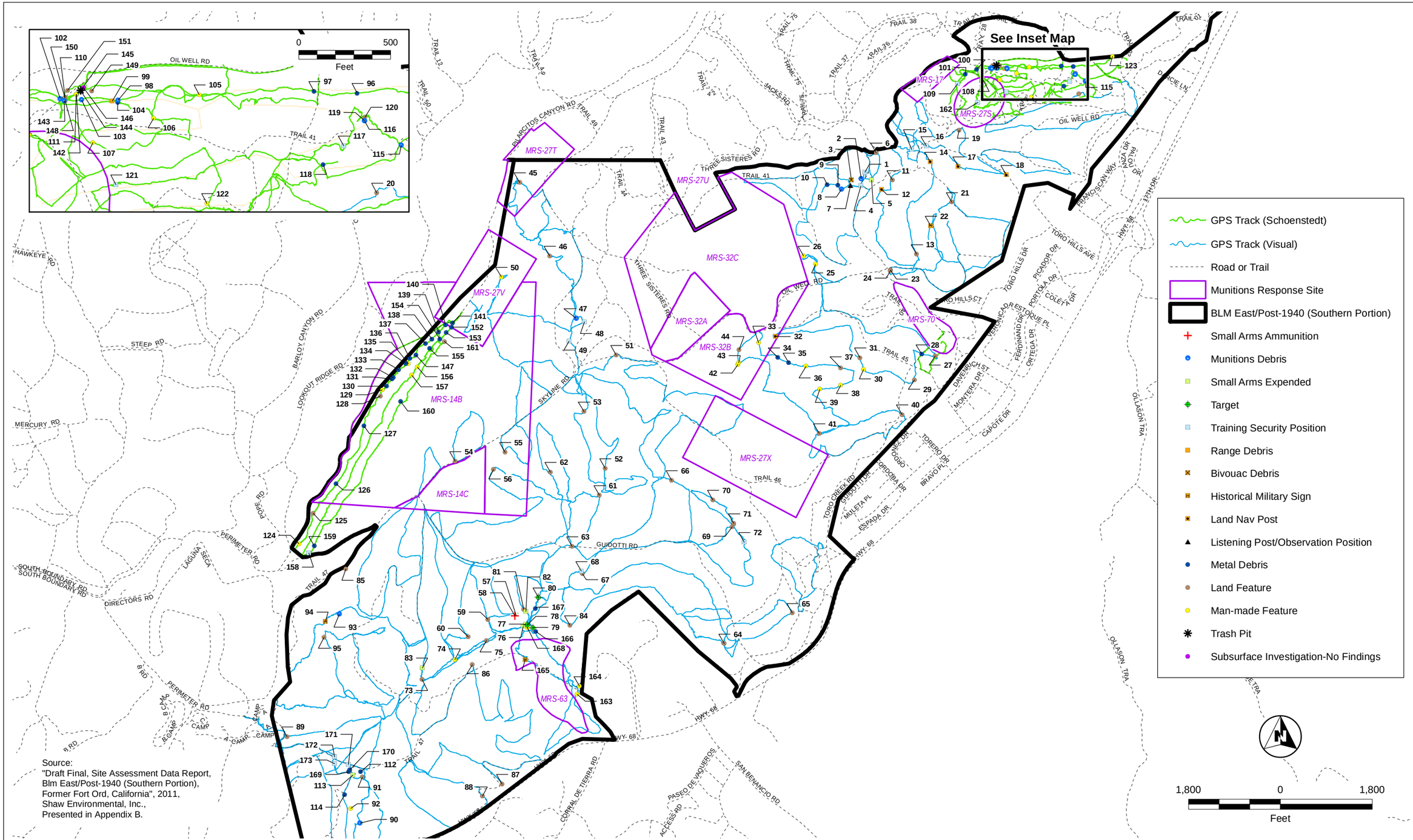


Source:
"Draft Final, Site Assessment Data Report,
Blm East/Post-1940 (Northern Portion),
Former Fort Ord, California", 2011,
Shaw Environmental, Inc.,
Presented in Appendix B.

Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 13
Site Assessment Investigation Results
(northern portion)

G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\N_Site_Assessmt_Investg.mxd 8/15/2012 [18:19 PM] AZHUK, ITSI



Source:
"Draft Final, Site Assessment Data Report, Blm East/Post-1940 (Southern Portion), Former Fort Ord, California", 2011, Shaw Environmental, Inc., Presented in Appendix B.

Track 1
Plug-In Approval Memorandum
BLM Area A
Former Fort Ord, California

FIGURE 13A
Site Assessment Investigation Results
(southern portion)

G:\ArcGIS\USACE\Fort_Ord\PROJECTS\BLM\East\Post_1940\Map_Docs\S_Site_Assessmt_Investg.mxd 8/15/2012 [18:23 PM] AZHUK, ITSI

Appendix A

Glossary

Glossary

Administrative Record
A compilation of all documents relied upon to select a remedial action pertaining to the investigation and cleanup of Fort Ord. Source: (1)

Approval Memorandum
For the purposes of No Further Action, a document submitted for regulatory agency review with supporting documentation of eligibility that will serve as a record that no further action is necessary at a site upon approval. Source: (1)

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)
A federal law that addresses the funding for and cleanup of abandoned or uncontrolled hazardous waste sites. This law also establishes criteria for the creation of decision documents such as the RI, FS, Proposed Plan, and ROD. Source: (1)

Discarded Military Munitions (DMM)
Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, 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)) Source: (2)

For the purposes of the basewide Munitions Response Program being conducted at the former Fort Ord, DMM does not include small arms ammunition .50 caliber and below. Source: (1)

Expended
The state of munitions debris in which the main charge has been expended leaving the inert carrier. Source: (1).

Feasibility Study (FS)
Feasibility study (FS) means a study undertaken by the lead agency to develop and evaluate options for remedial action. The FS emphasizes data analysis and is generally performed concurrently and in an interactive fashion with the remedial investigation (RI), using data gathered during the RI. The RI data are used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study. Source: (3).

Historical Impact Area
The impact area consists of approximately 8,000 acres in the southwestern portion of 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 to the west. Source: (1).

Magnetometer
An instrument used to detect ferromagnetic (iron-containing) objects. Total field magnetometers measuring the strength of the earth's natural magnetic field at the magnetic sensor location. Gradient magnetometers, sensitive to smaller near-surface metal objects, use two sensors to measure the difference in magnetic field strength between the two sensor locations. Vertical or horizontal gradients can be measured. Source: (5)

Military Munitions
Military munitions means 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)). Source: (2)

Military Munitions Response Program (MMRP)
DoD-established program to manage the environmental, health and safety issues presented by Munitions and Explosives of Concern (MEC). Source: (1)

Mortar
A muzzle-loading, indirect fire weapon with either a rifled or smooth bore. It usually has a shorter range than a howitzer, employs a higher angle of fire, and has a tube with a length of 10 to 20 calibers. Source: (6)

Munitions and Explosives of Concern (MEC)
Distinguishes specific categories of military munitions that may pose unique explosives safety risks, such as: UXO, as defined in 10 U.S.C. 101 (e) (5); discarded military munitions, as defined in 10 U.S.C. 2710 (e) (2); or munitions constituents (e.g., TNT, Cyclotrimethylene trinitramine [RDX]), as defined in 10 U.S.C. 2710 (e) (3), present in high enough concentrations to pose an explosive hazard. Source: (2)

For the purposes of the basewide Munitions Response Program being conducted for the former Fort Ord, MEC does not include small arms ammunition .50 caliber and below. Source: (1)

Munitions Constituents (MC)
Any materials originating from unexploded ordnance (UXO), discarded military munitions (DMM), or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions constituents (e.g., trinitrotoluene [TNT], cyclotrimethylene trinitramine [RDX]) (10 U.S.C. 2710 (e) (3)). Source: (2)

Munitions Debris
Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal. Source: (4)

Munitions Response
Response actions, including investigation, removal actions, and remedial actions to address the explosives safety, human health, or environmental risks presented by UXO, DMM, or MC, or to support a determination that no removal or remedial action is required. Source: (4)

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. Source: (4)

Munitions Response Site (MRS)
A discrete location within MRA that is known to require a munitions response. Source: (4)

Projectile
An object projected by an applied force and continuing in motion by its own inertia, as a bullet, bomb, shell, or grenade. Also applied to rockets and to guided missiles. Source: (6)

Remedial Investigation (RI)
Remedial investigation (RI) is a process undertaken by the lead agency to determine the nature and extent of the problem presented by the release. The RI emphasizes data collection and site characterization, and is generally performed concurrently and in an interactive fashion with the feasibility study. The RI includes sampling and monitoring, as necessary, and includes the gathering of sufficient information to determine the necessity for remedial action and to support the evaluation of remedial alternatives. Source: (3)

Track 0 Areas
Areas of the former Fort Ord that contain no evidence of MEC and have never been suspected of having been used for military munitions-related activities of any kind. This definition has been clarified in the *Explanation of Significant Differences, Final Record of Decision, No Action Regarding Ordnance-related Investigations (Track 0 RoD), former Fort Ord, California (March 2005)* to include areas not suspected as having been used for military munitions-related activities of any kind, but where incidental military munitions have been discovered. Source: (1)

Track 1 Sites
Sites at the former Fort Ord where military munitions were suspected to have been used, but based on the results of the Munitions Response Remedial Investigation Feasibility Study (MR RI/FS) each site falls into one of the following three categories: Category 1: There is no evidence to indicate military munitions were used at the site (i.e., suspected training did not occur); or Category 2: The site was used for training, but the military munitions items used do not pose an explosive hazard (i.e., training did not involve explosive items); or Category 3: The site was used for training with military munitions, but military munitions items that potentially remain as a result of that training do not pose an unacceptable risk based on site specific evaluations conducted in the Track 1 Military Munitions RI/FS. Field investigations identified evidence of past training involving military munitions, but training at these sites involved only the use of practice and/or pyrotechnic items that are not designed to cause injury. In the unlikely event that a live item of the type previously observed at the site is found, it is not expected that the item would function by casual contact (i.e., inadvertent and unintentional contact). Source: (1).

Track 2 Sites
Sites at the former Fort Ord where MEC items were present and MEC removal have been conducted. These areas are evaluated in area-specific RI/FSs to assess whether they are in a protective state based on their reasonably anticipated future land uses. Possible outcomes of a Track 2 RI/FS and Record of Decision (RoD) could include no further action, land use control, and /or additional MEC removal. Source: (1).

Track 3 Sites
Track 3 sites are those areas where MEC is suspected or known to exist, but investigations are not yet complete or need to be initiated, or any area identified in the future. Source: (1).

Unexploded Ordnance (UXO)
Military munitions that (a) have been primed, fuzed, armed, or otherwise prepared for action; (b) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and (C) remain unexploded either by malfunction, design, or any other cause. (10 U.S.C. 101(e)(5)(A) through (C)). Source: (2)

For the purpose of the basewide Munitions Response Program being conducted for the former Fort Ord, UXO does not include small arms ammunition .50 caliber and below. Source: (1)

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. Source: (4).

UXO Technician
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. Source: (4).

Sources:

(1) Non-standard definition developed to describe Fort Ord-specific items, conditions, procedures, principles, etc., as they apply to issues related to MEC cleanup.

(2) Federal Register/Volume 70. No. 192/Wednesday, October 5, 2005/Rules and Regulations, 32 Code of Federal Regulations (CFR) Part 179, Munitions Response Site Prioritization Protocol, Department of Defense, Final Rule. October, 2005.

(3) National Oil and Hazardous Substances Pollution Contingency Plan, Title 40, Code of Federal Regulations Part 300.

(4) DoD. 2008. DOD Manual 6055.09-M, DoD Ammunition and Explosives Safety Standards. February 29 (Administratively Reissued August 4, 2010).

(5) Survey of Munitions Response Technologies, June 2006. ITRC (Interstate Technology and Regulatory Council) with ESTCP (Environmental Security and Technology Certification Program) and SERDP (Strategic Environmental Research and Development Program).

(6) Department of Defense Environmental & Information Exchange. 1996. Unexploded Ordnance: An Overview. October.

Appendix B

Site Evaluation Checklists

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM Area A
EVALUATION CHECKLIST PART 1: LITERATURE REVIEW

TYPE OF TRAINING AND MILITARY MUNITIONS EXPECTED

	Yes	No	Inconclusive
1. ***Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades or other launched ordnance)?***			Inconclusive

Sources reviewed and comments
Based on interviews provided in the 1997 ASR, Pilarcitos Canyon (MRS-14B) was suspected of containing 7-and 8-inch naval gun projectiles that overshot the impact area; however no evidence of this training is visible on aerial photographs, or training maps. A Tank Gunnery Firing Range is present on a 1956 training map in the vicinity of MRS-32A, MRS-32B, and MRS-32C. No tank gunnery-related munitions were identified during sampling at these sites. Based on the analysis of MRS-32A and MRS-32B conducted as part Track 1 RI/FS, the range could have been used as a practice area for small arms training using the tank mounted .30 caliber and .50 caliber machine guns. Interview records also identified two areas within the southern portion of the site and three areas within the northern portion as potential target areas for shoulder-launched projectiles and rifle grenades. No MD or MEC was discovered within these areas to support this use.

References:
USAEDH, 1997 (ASR); Army, 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987.

2. ***Is there historical evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?***		No	

Sources reviewed and comments
MEC and MD discovered at the site did not include any HE or LE items. With the exception of the training identified above, the types of training identified on historical training maps do not indicate that HE or LE items would have been used for training.
References:
USAEDH, 1997; 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987; USA, 2000a.

	Yes	No	Inconclusive
3. *Is there historical evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?*	Yes		

Sources reviewed and comments
Review of training maps, historical documents, and items found at the site, indicates that training did involve use of pyrotechinc, smoke producing items, practice mines, and simulators. The items found are consistent with the types of training designated on the historical training maps. Types of training identified on historical training maps included practice anti-tank mine areas, bivouac areas, Vietnam villages, aviation training areas (helipads), and land navigation and compass courses.
References:
USAEDH, 1997; 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987; USA, 2000a.

DEVELOPMENT AND USE OF THE SURROUNDING AREA

4. *Does subsequent development or use of the area indicate that military munitions would have been used at the site?*			Inconclusive

Sources reviewed and comments
The area has not been developed. It is maintained as an open space recreational area by BLM. Use of part of the northern portion of the area as a Boy Scout Camp could indicate that training did not involve use of HE or LE. During reuse of the property as a recreational and habitat management area, very few MEC and muntions debris items have been found by BLM. Items included 2 M18 series smoke hand grenades, and expended pyrotechnic items. The types of items indicate that practice military munitions and pyrotechnic items were used at the site.
References:
USAEDH, 1997

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM Area A
EVALUATION CHECKLIST PART 1: LITERATURE REVIEW

	Yes	No	Inconclusive
5. *Does use of area surrounding the site indicate that military munitions would have been used at the site?*			Inconclusive

Sources reviewed and comments

According to historical documents and training maps, the area to the west of the northern portion of the site was used for general training and manuevers, and for bivouac. The area to the north was not part of the former Fort Ord. The area west of the southern portion of the site included MRS-62 which was used for training with small arms and flares according to the 1997 ASR. This site is a completed Track 1 site. The southern portion of the site is boardered by MRS-14A, a portion of MRS-14B, MRS-14E, and MRS-29. Review of data from removal actions and sampling at these sites, indicated that the sites were used for general manuevers and training and for bivouac. MEC and MD found within these surrounding sites included 22mm sub-caliber practice projectiles likely result of training at sub-caliber Range P-5, illumination signals and M49 series trip flares. Based on review conducted as part of the ESCA Group 3 Remedial Investigation, "MRSs-14A, -29, and -30 appear to have used for basic maneuvers with occasional impact by various projectiles. There does not appear to be a pattern of use as an impact area for MRSs-14A, -29, and -30." MRS-14A and MRS-29 are within areas purchased by the government in 1917.

References:

USAEDH, 1997; MACTEC/Shaw 2010a; MACTEC/Shaw 2010b; Former Fort Ord Military Munitions Response Program Database.

ESTABLISHMENT OF SITE BOUNDARIES

	Yes	No	Inconclusive
6. ***Is there evidence of training areas on aerial photographs that could be used to establish boundaries?***	Yes		

Sources reviewed and comments
The boundaries of the Track 1 Area are based on analysis conducted during the development of the Remaining RI/FS Areas Management Plan. The aerial photographs do show several disturbed areas that were investigated as part of the site assessment (See Reconnaissance checklist).
References:
Aerial photographs dated 1966, 1975, 1978, 1986, 1989, and 2009, MACTEC/Shaw 2010a, MACTEC/Shaw 2010b

7. ***Is there evidence of training on historical training maps that could be used to establish boundaries?***		No	

Sources reviewed and comments

The boundaries of the Track 1 Area are based on analysis conducted during the development of the Remaining RI/FS Areas Management Plan. The historical maps were used to separate the Post-1940 area from the rest of BLM East which was purchesed prior to 1940. Designated training areas are shown on available training maps. The boundaries shown on the maps could be used to establish specific training areas within the larger Track 1 area.
References:
Army, 1945; “After 1953"; 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987. MACTEC/Shaw, 2010c

8. ***Should current boundaries be revised?***		No	

Sources reviewed and comments
Based on review of the available aerial photographs and training maps there is no evidence that training with HE occurred within the site boundaries. Therefore the current boundaries represent the proposed Track 1 area.
References:
See above for questions 6 and 7.

RESULTS OF LITERATURE EVALUATION

	Yes	No	Inconclusive
Does the literature review provide sufficient evidence to warrant further investigation?		No	

Comments
The interview records, aerial photographs, and historical training maps all identified that training with practice military munitions and pyrotechnics likely occurred within both the northern and southern portions of the BLM Area A footprint.
References:
USAEDH, 1997.

References
USAEDH, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by US Army Corps of Engineers, St. Louis District.
U. S. Department of the Army (Army), 1945. Training Facilities, Fort Ord and Vicinity, California. Revised August 1945.
_____, "After 1953". *Fort Ord Map*.
_____, 1956. *Fort Ord Training Areas & Facilities*. Revised December 20.
_____, 1957. *Map of Fort Ord Training Areas & Facilities. Enclosure I to Annex "H".* Revised: 15 July 1957.
_____, 1958. *Map of Fort Ord Training Areas & Facilities. Enclosure 1 to Appendix 1 to Annex "H".* Revised: 10 January 1958.
_____, 1965. *Fort Ord, California, Aerial Mosaic, Location of Ranges*. May.
_____, 1967a. *Field Training Areas & Range Map, Appendix 2, Annex O*. April 27.
_____, 1967b. *Back Country Roads*. January.
_____, 1972. Master Plan Basic Information Maps, Reservation Map. March.
_____, 1977. *Fort Ord Reservation Plan, Master Plan, Future Development Plans*. June.

	Yes	No	Inconclusive
_____, 1980. Master Plan Basic Information, Maps Training Facilities Maps.			
_____, 1984. Training Facilities Map. June.			
_____, 1987. Ranges and Training Area Overlay Fort Ord and Vicinity. November 15.			
MACTEC/Shaw, 2010a, Final Technical Memorandum, Site Assessment Approach, BLM East/Post-1940 (Southern Portion), Remaining RI/FS Sites, Former Fort Ord, California.			
MACTEC/Shaw, 2010b, Final Technical Memorandum, Site Assessment Approach, BLM East/Post-1940 (Northern Portion), Remaining RI/FS Sites, Former Fort Ord, California.			
MACTEC/Shaw, 2010c. Final Remaining Remedial Investigation Study Areas Management Plan, Former Fort Ord, California.			

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM Area A
EVALUATION CHECKLIST PART 2: SITE WALK EVALUATION

	Yes	No	Inconclusive
1. *Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades or other launched ordnance)?*		No	

Sources reviewed and comments

Based on interviews provided in the 1997 ASR, Pilarcitos Canyon (MRS-14B) was suspected of containing 7-and 8-inch naval gun projectiles that overshot the impact area; however, no evidence of this training is visible on aerial photographs, or training maps. A Tank Gunnery Firing Range is present on a1956 training map in the vicinity of MRS-32A, MRS-32B, and MRS-32C. No tank gunnery-related munitions were identified during sampling at these sites. Based on analysis conducted as part of the MRS-32A and MRS-32B Track 1 RI/FS, the range could have been used as a practice area for small arms training using the tank mounted .30 caliber and .50 caliber machine guns. Interview records also identified two areas within the southern portion of the site and three areas within the northern portion as potential target areas for shoulder-launched projectiles and rifle grenades. No MD or MEC was discovered within these areas to support this use.

References

USAEDH, 1997; Army 1956; Fort Ord Military Munitions Response Program Data Base USACE 2011.

	Yes	No	Inconclusive
2. *Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?*		No	

Sources reviewed and comments

Review of training maps, historical documents, and MEC and MD found at the site, indicates that training did involve use of pyrotechinc, smoke producing items, practice mines, and simulators. The items found are consistent with the types of training designated on the historical training maps. Types of training identified on historical training maps included practice anti-tank mine areas, bivouac areas, Vietnam villages, aviation training areas (helipads), and land navigation and compass courses.

References

USAEDH 1997 (ASR); Fort Ord Military Munitions Response Program Database, USACE 2011

3. *Is there evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?*	Yes		

Sources reviewed and comments

Review of training maps, historical documents, and items found at the site, indicates that training did involve use of pyrotechinc, smoke producing items, practice mines, and simulators. The items found during the site walks are consistent with the types of training designated on the historical training maps. Types of training identified on historical training maps included practice anti-tank mine areas, bivouac areas, Vietnam villages, aviation training areas (helipads), and land navigation and compass courses.

References

USAEDH 1997 (ASR); Army 1957; Army 1965; Army 1956; Army, 1967a; Army, 1967b; Army 1972; Army 1977; Army 1980; Army, 1984; Army 1987

	Yes	No	Inconclusive
4. *Does subsequent development or use of the area indicate potential that military munitions would have been used at the site?*			Inconclusive

Sources reviewed and comments
The area has not been developed. It is maintained as an open space recreational area by BLM. Use of part of the northern portion of the area as a Boy Scout Camp could indicate that training did not involve use of HE or LE. During reuse of the property as a recreational and habitat management area, very few MEC and muntions debris items have been found by BLM. Items included two M18 series smoke hand grenades, and expended pyrotechnic items. The types of items indicate that practice military munitions and pyrotechnic items were used at the site.

References
USAEDH, 1997, Fort Ord Military Munitions Response Program Database, 2011

	Yes	No	Inconclusive
5. *Does use of area surrounding the site indicate that military munitions would have been used at the site?*			Inconclusive

Sources reviewed and comments

According to historical documents and training maps, the area to the west of the northern portion of the site was also used for general training and manuevers, and for bivouac. The area to the north was not part of the former Fort Ord. The area west of the southern portion of the site included MRS-62 which was used for training with small arms and flares according to the 1997 ASR. This site is a completed Track 1 site. The southern portion of the site is also boardered by MRS-14A, a portion of MRS-14B, MRS-14E, and MRS-29. Review of data from removal actions and sampling at these sites, indicated that the sites were used for general manuevers and training and for bivouac. MEC and MD found within these adjacent sites included 22mm sub-caliber practice projectiles related to sub-caliber Range P-5, illumination signals and M49 series trip flares. Based on review conducted as part of the ESCA Group 3 Remedial Investigation, "MRSs-14A, -29, and -30 appears to have used for basic maneuvers with occasional impact by various projectiles. There does not appear to be a pattern of use as an impact area for MRSs-14A, -29, and -30." MRS-14A and MRS-29 are within areas purchased by the government in 1917.

References

USAEDH, 1997; Army, 1945; “After 1953"; 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987.

	Yes	No	Inconclusive
6. *Is there evidence of training areas on aerial photographs that could be used to establish site boundaries?*		No	

Sources reviewed and comments

The boundaries of the Track 1 Area are based on analysis conducted during the development of the Remaining RI/FS Areas Management Plan. The aerial photographs do show several disturbed areas that were investigated as part of the site assessment. The site boundaries were established based on era of use and vegetation type. The aerial photographs were used to identify areas that should be investigated as part of the site assessment.

References

Aerial photographs dated 1966, 1975, and 1978, 1986., Shaw, 2011a; Shaw, 2011b; MACTEC/Shaw, 2010a; MACTEC/Shaw 2010b.

7. *Is there evidence of training on historical training maps that could be used to establish boundaries?*	Yes		

Sources reviewed and comments

The boundaries of the Track 1 Area are based on analysis conducted during the development of the Remaining RI/FS Area Management Plan. The historical maps were used to separate the Post-1940 area from the rest of BLM East which was part of the former Fort Ord prior to 1940. Designated training areas are shown on available training maps. The boundaries shown on the maps could be used to establish specific training areas within the larger Track 1 area.

References

Army, 1945; "After 1953"; 1956; 1957; 1958; 1965; 1967a; 1967b; 1972; 1977; 1980; 1984; 1987.

	Yes	No	Inconclusive
8. *Was the site walk performed within appropriate area?*	Yes		

Sources reviewed and comments
The site walks inlcuded 1995 site walks conducted by the USACE and reported in the ASR, site walks conducted as part of the Basewide Range Assessment, site walks conducted by USA Environmental at the direction of the USACE in 1999, and site walks conducted as part of the site assessment in 2010 and 2011. The site assessment walks were designed to provide information on areas not previously investigated, primarily in between designated MRSs, and in areas where review of historical aerial photographs and training maps indicated that training with military munitions might have occurred. The site walks were performed in the appropriate area to provide sufficient data for the Track 1 analysis.

References
USA, 2001; MACTEC/Shaw, 2008; Shaw, 2011a; Shaw 2011b; USAEDH 1997.

9. *Does reconnaissance (site walk) indicate MEC and/or munitions debris are present at the site?*	Yes		

Sources reviewed and comments
The types of items found during the site walks include M74A1 air burst projectile simulators (one MEC, 4 MD), ground illumination signals (MD), M48 parachute trip flares, M49 trip flare (MD), M18 smoke grenades (MD), and inert unfuzed practice antipersonnel and antitank mines (MD) and a hand grenade fuze, model unknown (MD).

References
USA, 2001, MACTEC/Shaw 2008, Shaw 2011a, Shaw 2011b, USAEDH 1997

	Yes	No	Inconclusive
10. *Were the type(s) of items found consistent with the type of training identified for the site?*	Yes		

Sources reviewed and comments
The types of items found during the site walks are consistent with general manuever, bivouac training, and practice mine training.
References
USA, 2001; MACTEC/Shaw 2008; Shaw 2011a; Shaw 2011b; USAEDH 1997

11. *Were the type(s) of items found consistent with the era(s) in which training was identified?*	Yes		

Sources reviewed and comments
The types of items were consistent with the era that training took place.

References
USA, 2001; MACTEC/Shaw, 2008; Shaw, 2011a; Shaw, 2011b; USAEDH 1997

12. *Was HE fragmentation found?*		No	

Sources reviewed and comments
No HE fragmentation were found during the site walks.

References
USA, 2001; MACTEC/Shaw 2008; Shaw 2011a; Shaw 2011b; USAEDH 1997

13. *Was HE found?*		No	

Sources reviewed and comments
No HE were found during the site walks.

References
USA, 2001; MACTEC/Shaw, 2008; Shaw, 2011a; Shaw, 2011b; USAEDH,1997

	Yes	No	Inconclusive
14. *Was LE found?*		No	

Sources reviewed and comments
No LE was found during site walks.

References
USA, 2001; MACTEC/Shaw, 2008; Shaw, 2011a; Shaw, 2011b; USAEDH, 1997

	Yes	No	Inconclusive
15. *Were pyrotechnics found?*	Yes		

Sources reviewed and comments
Pyrotechnics were found during the site walks. Pyrotechnics found during the site walks included trip flares and illumination signals

References
USA, 2001; MACTEC/Shaw, 2008; Shaw 2011a; Shaw, 2011b; USAEDH 1997

	Yes	No	Inconclusive
16. *Were smoke-producing items found?*	Yes		

Sources reviewed and comments
Smoke-producing items were found during the site walks. Smoke hand grenades (MEC and MD) and and smoke rifle grenades (MD) were found during the site walks.

References
USA, 2001; MACTEC/Shaw, 2008; Shaw, 2011a; Shaw, 2011b; USAEDH, 1997

	Yes	No	Inconclusive
17. *Were explosive items found (e.g., rocket motors with explosive components, fuzes with explosive components)?*	Yes		

Sources reviewed and comments
MD and MEC items found at the site contained energetic components (ground illumination signal, practice and smoke grenades, and simulators). These items were consistent with the types of training identified for this area.

References
USA, 2001; MACTEC/Shaw, 2008; Shaw, 2011a; Shaw, 2011b; USAEDH, 1997

18. *Do items found in the area indicate training would have included use of training items with energetic components?*	Yes		

Sources reviewed and comments
MD and MEC items found at the site contained energetic components (ground illumination signal, practice and smoke grenades, and simulators). These items were consistent with the types of training identified for this area.

References
USA, 2001; MACTEC/Shaw, 2008; Shaw, 2011a; Shaw, 2011b; USAEDH, 1997; Fort Ord Military Munitions Response Program Database, 2011

19. *Were items found in a localized area (possibly the remnants of a cleanup action)?*			Inconclusive

Sources reviewed and comments
Items found during site walks were generally scattered, with the exception of the unfuzed inert practice land mines. The land mines were likely localized due to the training and not the results of a cleanup action.

	Yes	No	Inconclusive
20. ***Is it appropriate to divide the site into sectors to focus on areas of common usage, similar topography and vegetation, and/or unique site features?***		No	

Sources reviewed and comments
There are no distinct site features that would support dividing the site.

21. ***Should site boundaries be revised?***		No	

Sources reviewed and comments
Current boundaries are based on parcel reuse boundaries and analysis proviced in the Remaining RI/FS Areas Management Plan, which do not need modification based on investigation of the site.

References
MACTEC/Shaw, 2010c

22. ***Has the field data been collected and managed in accordance with quality control standards established for the project?***	Yes		

Sources reviewed and comments
The site walk was completed according to general practices and according to the Remaining RI/FS Areas Management Plan and Technical Memoranda, and the Basewide Range Assessment Work Plan (IT), and CMS (USA) Site Specific Work Plan

References
MACTEC/Shaw, 2010; Shaw, 2011a; Shaw, 2011b; IT, 2001; CMS 1995.

Does the site walk evaluation provide sufficient evidence to warrant further investigation?		No	

Comments
The results of the site walk indicated there is no need to investigate the site further.

	Yes	No	Inconclusive

References

CMS Environmental, Inc. (CMS) 1995. Site Specific Work Plan, July.

IT, 2001. Basewide Range Assessment Work Plan.

USAEDH, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by US Army Corps of Engineers St. Louis District.

Shaw Envionmental & Infrastructure Group (Shaw), 2011a. Site Assessment Data Report, BLM East/Post-1940 (Southern Portion), Former Fort Ord, California. September.

Shaw Environmental & Infrastructure Group (Shaw), 2011b. Site Assessment Data Report, BLM East/Post -1940 (Northern Portion), Former Fort Ord, California. December.

MACTEC/Shaw, 2010b. Final Technical Memorandum, Site Assessment Approach, BLM East/Post 1940 (Northern Portion), Remaining RI/FS Sites, Former Fort Ord, California.

MACTEC/Shaw, 2010a. Final Technical Memorandum, Site Assessment Approach, BLM East/Post 1940 (Southern Portion), Remaining RI/FS Areas, Former Fort Ord, California.

MACTEC\Shaw, 2010c. Final Remaining Remedial Investigation Study Area Management Plan, Former Fort Ord, California

MACTEC/Shaw, 2012. Final Comprehensive Basewide Range Assessment Report, Former Fort Ord, California, Revision 2. January.

USA, 2001. Final Sampling & OE Removal Inland Range Contract Closure, After Action Report, Former Fort Ord, Califonia. November

U. S. Department of the Army (Army), 1945. Training Facilities, Fort Ord and Vicinity, California. Revised August 1945.

Army, “After 1953”. Fort Ord Map.

Army, 1956. Fort Ord Training Areas & Facilities. Revised December 20.

_____, 1957. Map of Fort Ord Training Areas & Facilities. Enclosure I to Annex “H”. Revised: 15 July 1957.

_____, 1958. Map of Fort Ord Training Areas & Facilities. Enclosure 1 to Appendix 1 to Annex “H”. Revised: 10 January 1958.

	Yes	No	Inconclusive

_____, 1965. Fort Ord, California, Aerial Mosaic, Location of Ranges. May.
_____, 1967a. Field Training Areas & Range Map, Appendix 2, Annex O. April 27.
_____, 1967b. Back Country Roads. January.
_____, 1972. Master Plan Basic Information Maps, Reservation Map. March.
_____, 1977. Fort Ord Reservation Plan, Master Plan, Future Development Plans. June.
_____, 1980. Master Plan Basic Information, Maps Training Facilities Maps.
_____, 1984. Training Facilities Map. June.

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM Area A
EVALUATION CHECKLIST PART 3: SAMPLING EVALUATION
MRS-14B, MRS-14C, MRS-17, and MRS-32C

	Yes	No	Inconclusive
TYPE OF TRAINING AND MILITARY MUNITIONS EXPECTED			
1. ***Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades and other launched military munitions)?***		No	

Sources reviewed and comments
Based on interviews provided in the 1997 ASR, Pilarcitos Canyon (MRS-14B and MRS-14C) was suspected of containing 7-and 8-inch naval gun projectiles that overshot the impact area; however, no evidence of this training is visible on aerial photographs, or training maps. A Tank Gunnery Firing Range is present on a 1956 training map in the vicinity of MRS-32C. No tank gunnery-related munitions were identified during sampling at this site. Based on analysis conducted as part of the MRS-32A and MRS-32B Track 1 RI/FS, the range could have been used as a practice area for small arms training using the tank-mounted .30 caliber and .50 caliber machine guns. MRS-17 was suspected as a mine and booby trap training area and for shoulder launch projectile training in the 1960s based on interview records: however, historical 1960s era training maps show land navigation in the area of MRS-17. No MEC or MD was found in any of the sampled MRSs to support use as impact areas.

References:
USAEDH, 1997; Army 1956; Fort Ord Military Munitions Response Program Data Base; USACE 2011, MACTEC, 2004

2. ***Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?***		No	

Sources reviewed and comments
MRS-14B and MRS-14C were suspected of containing 7-and 8-inch naval gun projectiles that overshot the impact area; however no evidence of this training is visible on aerial photographs or training maps. A Tank Gunnery Firing Range is present on a 1956 training map in the vicinity of MRS-32C. No tank gunnery-related munitions were identified during sampling and this site. MRS-17 was identified as a practice mine and booby trap areas and a shoulder launched projectile training area based on interviews; however, no evidence of shoulder launched projectiles were identified during sampling.

	Yes	No	Inconclusive
References: USAEDH 1997 (ASR); UXB 1995a; UXB 1995d; UXB 1995h; USA 2000a; USA 2000b., Fort Ord Military Munitions Response Program Database, USACE, 2011.			
3. *Is there evidence that training involved use of pyrotechnic and/or smoke producing items (e.g., simulators, flares, smoke grenades) but not explosives?*	Yes		

Sources reviewed and comments

Review of training maps, historical documents, and items found the sampled MRSs indicate that training did involve use of pyrotechnic, smoke producing items, and simulators at. The items found are consistent with the types of training designated on the historical training maps. Smoke hand grenades and illumination signals were found at MRS-14B. Pyrotechnic material and rifle smoke grenades were found at MRS-14C. A booby trap simulator (MD) and an illumination signal (MD) were found within MRS-17. A 81mm illumination mortar projectile was found within MRS-32C.

References:

USAEDH 1997 (ASR); UXB 1995a; UXB 1995d; UXB 1995h; USA 2000a; USA 2000b; Army 1957; Army 1965; Army 1956; Army, 1967a; Army 1967b; Army 1972; Army 1977; Army 1980; Army 1987

4. *Was sampling and/or reconnaissance performed within the appropriate area?*	Yes		

Sources reviewed and comments

Review of sampling results and historical training maps indicates that the sampling was completed within MRS boundaries. Site assessment was conducted in areas identified for training and also within general training and maneuver areas. Disturbed areas shown on aerial photographs were also identified for assessment site walks.

References:

USAEDH 1997 (ASR); UXB 1995a; UXB 1995d; UXB 1995h; USA 2000a; USA 2000b; Army 1957; Army 1965; Army 1956; Army, 1967a; Army, 1967b; Army 1972; Army 1977; Army 1980; Army 1987

	Yes	No	Inconclusive
5. ***Does sampling indicate MEC and/or munitions debris are present at the site?***	Yes		

Sources reviewed and comments
Sampling was conducted within MRS-14B, MRS-14C, MRS-17, and MRS-32C. The results of sampling identified MD in MRS-14B and MRS-17. MEC and MD were found within MRS-14C. An illumination mortar projectile was found within MRS-32C.
References:
UXB 1995a; UXB 1994d; UXB 1995h; UXB 1995b; USA 2000b; MACTEC/Shaw 2010a; MACTEC/Shaw 2010b

6. ***Were the type(s) of items found consistent with the type of training identified for the site?***	Yes		

Sources reviewed and comments

The MEC and MD found were generally consistent with the types of training identified on historical training maps and interview records. A booby trap simulator (MD) was found within MRS-17. Items associated with bivouac and general maneuvers were found within MRS-14B including M125 series illumination signals, M18 series smoke grenades, and M19 and M17 series rifle parachute ground signals. Items associated with bivouac and general maneuvers were also found within MRS-14C including M18 series smoke hand grenades, simulators, and practice hand grenade fuzes. Only one item, an illumination mortar projectile was found within MRS-32C. This item does not suggest the area was used as a tank gunnery range.
References:
UXB 1995a; UXB 1994d; UXB 1995h; UXB 1995b; USA 2000b; MACTEC/Shaw 2010a; MACTEC/Shaw 2010b; Shaw 2011a; Shaw 2011b; Fort Ord Military Munitions Response Program Database 2011

7. ***Were the type(s) of items found consistent with the era(s) in which training was identified?***	Yes		

Sources reviewed and comments
Items found were consistent with the Army ownership of the property (Post 1940 until base closure in 1994).

	Yes	No	Inconclusive

References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b

8. *Was HE fragmentation found?*		No	

Sources reviewed and comments
No HE fragmentation was found in MRS-14B, MRS-14C, MRS-17, or MRS-32C.
References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995a; UXB, 1995; UXB, 1995d; USA, 2000a; USA, 2000b.

9. *Was HE found?*		No	

Sources reviewed and comments
No HE was found at MRS-14B, MRS-14C, MRS-17, or MRS-32C.
References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995a; UXB 1995d; UXB, 1995h; USA 2000a; USA, 2000b.

10. *Were LE found?*		No	

No LE was found in MRS-14B, MRS-14C, MRS-17, or MRS-32C.
Sources reviewed and comments

References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995a; UXB, 1995d; UXB, 1995h; USA 2000a; USA 2000b.

11. *Were pyrotechnics found?*	Yes		

Sources reviewed and comments

M125 series illumination signals (MD), M17 and M19 ground rifle parachute signals (MEC and MD) were found within MRS-14B. Pyrotechnic illumination mixture (MEC) was found within MRS-14C, an M117 explosive booby trap simulator (MD) was found within MRS-17, and one 81mm M301 illumination mortar projectile (ISD) was found within MRS-32C.

	Yes	No	Inconclusive

References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995a, UXB, 1995d; UXB, 1995h; USA, 2000a; USA, 2000b.

12. *Were smoke producing items found?*	Yes		

Sources reviewed and comments

M18 Series smoke hand grenade (MEC and MD) in MRS-14B, and M22 series smoke rifle grenades (MD) were found at MRS-14C.
References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995h; UXB, 1995a.

13. *Were explosive items found (e.g. rocket motors with explosive components, fuzes with explosive components)?*	Yes		

Sources reviewed and comments
Hand grenade fuzes (one MEC and one MD) were found within MRS-14B; they have pyrotechnic delay-igniting fuzes, but are not high explosive.
References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995h

14. *Do items found in the area indicate training would have included use of training items with energetic components?*	Yes		

Sources reviewed and comments

MD and MEC items found at MRS-14B, MRS-14C, MRS-17, and MRS-32C contained energetic components (ground illumination signals ([MRS-14B and MRS-17], and smoke hand and rifle grenades [MRS-14B, and MRS-14C]). These items were consistent with the types of training identified for this area.
References:
Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995a; UXB, 1995d; UXB, 1995h; USA,2000a; USA, 2000b.

15. *Were items found in a localized area (possibly the remnants of a cleanup action)?*		No	

	Yes	No	Inconclusive

Sources reviewed and comments

MEC and MD found during sampling at MRS-14B, MRS-14C, MRS-17, and MRS-32C were not found in localized areas. Items found during the removal action at MRS-14C were found in localized areas.

References:

Fort Ord Military Munitions Response Program Database, 2011; USA 2000a; Shaw 2011a; Shaw 2011b; UXB, 2000a; UXB, 2000d, UXB, 2000h; USA, 2000a; USA, 2000b.

16. *Has the site been divided into sectors to focus on areas of common usage, similar topography and vegetation, and/other unique site features?*			Inconclusive

Sources reviewed and comments

MRS-14B, MRS-14C were originally part of a larger site that was divided into 5 areas as part of the 1997 ASR. The rationale for dividing the site into five smaller areas in not reported. MRS-32C was originally part of the Oil Well Road training area. The Oil Well Road training area was also divided into 3 areas. The rationale for dividing the site into 3 areas is not reported. The smaller MRS-14B, MRS-14C, and MRS-32C were not further subdivided during sampling operations.

References:

MACTEC/Shaw 2010a; MACTEC/Shaw 2010b

17. *Should current site boundaries be revised?*		No	

Sources reviewed and comments

Based on sampling results, the MRS boundaries would not need to be revised.

References:

Fort Ord Military Munitions Response Program Database, 2011; Shaw 2011a; Shaw 2011b; UXB, 1995a, UXB, 1995d, UXB, 1995g, USA, 2000a, USA, 2000b

	Yes	No	Inconclusive
18. *Was equipment used capable of detecting items suspected at the site at the maximum expected depth?*	Yes		

Sources reviewed and comments
Results of the ODDS study indicate that the Schonstedt Model 52Cx is capable of detecting ferrous MEC or MD items if present at this site. The potential and discovered MEC and MD are primarily non-penetrating or expected in the near surface where the Schonstedt is most effective. The Schonstedt was used for sampling at all 4 sites.
References:
Parsons, 2001

19. *Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?*	Yes		

Sources reviewed and comments
Equipment used was capable of detecting munitions with ferrous components. It would be less effective in detecting non-ferrous material (grenade fuzes); however these items would likely be found at or near the surface, therefore, the reducted detection capability for grenade fuzes, should not be significant.
References:
Parsons 2001

20. *Do the results of the ODDS indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?*	Yes		

Sources reviewed and comments

The results of the ODDS seeded test indicate that the types of items suspected or detected at the site, (hand grenade fuzes, smoke hand and rifle grenades, practice rifle grenades [suspected at MRS-17], illumination signals, practice landmines, and simulators) were, with the exception of a illumination signal and some hand grenade fuzes, detectable in the top 6 inches using a Schonstedt 52CX. The types of items expected at the site are primarily surface related items; therefore, a decrease in detection capabilities with depth is not considered significant.
References:
Parsons, 2001

	Yes	No	Inconclusive
21. ***Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?***	Yes		

Sources reviewed and comments
Results of the ODDS suggest that the equipment used should be able to detect ferrous MEC at shallow depths. Items expected at the site are generally surface items or items that would be expected to penetrate less than 6 inches or be buried in the near surface (practice landmines).
References:
Parsons, 2001

22. ***Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturer's specifications?***	Yes		

Sources reviewed and comments

During work performed by UXB the Quality Control Specialist calibrated and recorded the operational condition of the equipment on a daily basis. Equipment was calibrated at a frequency recommended by the manufacturer. Prior to geophysical searches source material was utilized to verify the accuracy of the equipment. During work performed by USA/CMS, instruments and equipment requiring maintenance and/or calibration were checked prior to the start of each workday. Batteries were replaced as needed and the instruments were checked against a known source.
References:
UXB, 1994b; USA, 2000a; USA 2000b

23. ***Based on the anticipated target density (MEC items per acre) has the minimal amount of sampling acreage been completed in accordance with the scope of work or contractor work plan?***	Yes		

Sources reviewed and comments
There is no anticipated density of items for this area; however, no target areas were identified or suspected based on historical data. Sampling was performed in accordance with the scope of work and work plans.

References:
USA 2000a; USA, 2000b; UXB, 1995a; UXB 1995b; UXB 1995d; UXB 1995h

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM Area A
EVALUATION CHECKLIST PART 3: SAMPLING EVALUATION
MRS-14B, MRS-14C, MRS-17, and MRS-32C

	Yes	No	Inconclusive
24. *Based on sampling procedure (e.g., grids, transects, and/or random walks) was a percentage of the site completed to provide 95% confidence in a MEC density estimate, and if so, provide total area investigated and the MEC density estimate.*			NA

Sources reviewed and comments

MRS-14B, MRS-14C, MRS-17, and MRS-32C were investigated through grid sampling, site assessment site walks, and 100 percent sampling at MRS-14C. Sampling and site walks resulted in the discovery of anomalies which were all investigated. About 53 acres were sampled or had removal actions completed. A MEC density was not calculated due to the varied sampling approaches.

Total Area: Approx. 53	acres
MEC Density:	Not calculated

References:
USA 2000a; USA 2000b; Shaw, 2011a; Shaw 2011b

25. *What percentage of the anomalies were intrusively investigated?*

Sources reviewed and comments
100 percent of the anomalies identified during sampling and within the western portion of MRS-14B instrument aided site walks were intrusively investigated.

References:
USA 2000a; USA 2000b; UXB 1995a; UXB 1995b; UXB 1995d; UXB, 1995h; Shaw 2011a; Shaw 2011b

Total % of anomalies investigated:	100

26. *Was the appropriate data processing scheme used for the site, how was the data processed?*			Not Applicable

Sources reviewed and comments
Data were collected using Schonstedt magnetometers. Schonstedt magnetometers are analog so no digital data was collected for processing.

References:
USA 2000a; USA 2000b; UXB 1995a; UXB 1995b; UXB 1995d; UXB, 1995h; Shaw 2011a; Shaw 2011b

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM Area A
EVALUATION CHECKLIST PART 3: SAMPLING EVALUATION
MRS-14B, MRS-14C, MRS-17, and MRS-32C

	Yes	No	Inconclusive
27. *Has the field data been collected and managed in accordance with quality control standards established for the project?*	Yes		

Sources reviewed and comments
Contractors working at the site followed work plans and quality assurance plans.
References:
USA 2000a; USA 2000b; UXB 1995a; UXB 1995b; UXB 1995d; UXB, 1995h; Shaw 2011a; Shaw 2011b

Result of Sampling Evaluation

Does the sampling evaluation provide sufficient evidence to warrant further investigation?		No	

Comments
MEC sampling activities resulted in a high degree of certainty that the area was used for general maneuvers and training, and bivouac. No evidence of training with high explosive munitions was identified. No further investigation is warranted in MRS-14B, MRS-14C, MRS-17, and MRS-32C based on the sampling results; however removal actions were performed in a portion of MRS-32C and MRS-14C.

References
Parsons, 2001. Draft Ordnance Detection and Discrimination Study (ODDS), Former Fort Ord, Monterey, California. August.
Shaw Environmental & Infrastructure Group (Shaw), 2011a. Site Assessment Data Report, BLM East/Post-1940 (Southern Portion), Former Fort Ord, California. September.
Shaw Environmental & Infrastructure Group (Shaw), 2011b. Site Assessment Data Report, BLM East/Post -1940 (Northern Portion), Former Fort Ord, California. December.
MACTEC/Shaw, 2010b. Final Technical Memorandum, Site Assessment Approach, BLM East/Post 1940 (Northern Portion), Remaining RI/FS Sites, Former Fort Ord, California.
MACTEC/Shaw, 2010a. Final Technical Memorandum, Site Assessment Approach, BLM East/Post 1940 (Southern Portion), Remaining RI/FS Areas, Former Fort Ord, California.

	Yes	No	Inconclusive

Army, 1956. Fort Ord Training Areas & Facilities. Revised December 20.
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_____, 1965. Fort Ord, California, Aerial Mosaic, Location of Ranges. May.
_____, 1967a. Field Training Areas & Range Map, Appendix 2, Annex O. April 27.
_____, 1972. Master Plan Basic Information Maps, Reservation Map. March.
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_____, 1987. Ranges and Training Area Overlay Fort Ord and Vicinity. November 15.
USAEDH, 1997. Revised Archives Search Report, Former Fort Ord, California, Monterey County, California. Prepared by US Army Corps of Engineers, St. Louis District.
USA Environmental , Inc (USA), 2000a. Final After Action Report, - 100 percent Ordnance and Explosive Removal -Site OE-14C. Former Fort Ord, California. November.
UXB, 1994b. Final Report for Ordnance and Explosive Removal Action, Fort Ord, California, Fort Ord Range Control.
UXB, 1995a, Final Report for Ordnance and Explosive Removal Action, Fort Ord, California, Site 14SE, November
UXB, 1995b, Final Report for Ordnance and Explosives Removal Action, Fort Ord, California, Combined Non-Intrusive Areas. November
UXB, 1995d, Final Report for Ordnance and Explosive Removal Action, Fort Ord, California, Site 17, November.
UXB, 1995h, Final Report for Ordnance and Explosives Removal Action, Fort Ord, California, Site 14

ATTACHMENT 1
EVALUATION OF PREVIOUS WORK: BLM Area A,
EVALUATION CHECKLIST PART 4: REMOVAL EVALUATION, MRS-32C & MRS-14C

	Yes	No	Inconclusive

TYPE OF TRAINING AND MILITARY MUNITIONS EXPECTED

1. ***Is there evidence that the site was used as an impact area (i.e., fired military munitions such as mortars, projectiles, rifle grenades and other launched military munitions)?***

	No	

Sources reviewed and comments
No impacting type munitions were identified during sampling at MRS-14C or MRS-32C, the two sites addressed in this checklist. An illumination mortar projectile was identified at MRS-32C; however, this item does not indicate would use as an impact area.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

2. ***Is there evidence that training involved use of High Explosive (HE) or Low Explosive (LE) items?***

	No	

Sources reviewed and comments
The items found within MRS-14C and MRS-32C indicate that the areas were used for general training. No HE or LE items were identified.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

3. ***Is there evidence that training involved use of pyrotechnic and/or smoke-producing items (e.g., simulators, flares, smoke grenades) but not explosives?***

Yes		

Sources reviewed and comments
Evidence of smoke-producing or pyrotechnic items was found within MRS-14C and MRS-32C. M18 series smoke hand grenades (MD and MEC), and M22 series rifle grenades, smoke (MD and MEC) were found at MRS-14C. 30 Smoke pots (MD) were found at MRS-32C; however, these items were not found as part of the removal action.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

4. *Was removal and/or reconnaissance performed within the appropriate area?*

Yes		

Sources reviewed and comments

Removal was performed within the appropriate boundaries of MRS-14C and 32C.

References
Shaw, 2011a; Shaw, 2011b; Shaw/MACTEC, 2010a; Shaw/MACTEC, 2010b

5. *Does removal indicate MEC and/or munitions debris are present at the site?*

Yes		

Sources reviewed and comments

MEC and MD were present within both MRSs. Items found in MRS-14C included simulators, smoke grenades, and hand grenade fuzes. One illumination mortar projectile was found within MRS-32C prior to the removal action. No MEC or MD was found within MRS-32C during removal action.

References
USA, 2000a; USA 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

6. *Were the type(s) of items found consistent with the type of training identified for the site?*

Yes		

Sources reviewed and comments
The items found within MRS-14C were consistent with the types of training that took place. No MEC or MD was found within the removal action at MRS-32C.

References
USA 2000a USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

7. *Were the type(s) of items found consistent with the era(s) in which training was identified?*	Yes		

Sources reviewed and comments
Items found within MRS-14C are consistent with training in the 1940s through 1994.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

8. *Was HE fragmentation found?*		No	

Sources reviewed and comments
HE fragmentation was not found in MRS-14C or MRS-32C.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

9. *Was HE found?*		No	

Sources reviewed and comments
No HE items were in either MRS.

References
USA, 2000a; USA, 2000b, Fort Ord Military Munitions Response Program Database (USACE, 2011)

10. *Were LE found?*		No	

Sources reviewed and comments
LE items were not found in either MRS.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

11. *Were pyrotechnics found?*	Yes		

Sources reviewed and comments
Pyrotechnic items were found within both MRS-14C. Items included 0.1 pounds of pyrotechnic illumination mixture (UXO) and a trip flare (MEC). No items were found during the MRS-32C removal action.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Resposne Program Database (USACE, 2011)

12. *Were smoke producing items found?*	Yes		

Sources reviewed and comments

Smoke producng items items were found was found within both MRS-14C. Items found were M18 smoke hand grenades (MD and MEC) and M22 smoke rilfe greanads (MD and MEC) were found in MRS-14C. Smoke pots were found within MRS-32C, but were not found as part of the removal action.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

13. *Were explosive items found (e.g., rocket motors with explosive components, fuzes with explosive components)?*	Yes		

Sources reviewed and comments
Two hand grenade fuzes (MEC) were found at MRS-14C.

References
USA, 2000a; Fort Ord Military Munitions Response Program Database (USACE, 2011)

14. ***Do items found in the area indicate training would have included use of training items with energetic components?***

Yes		

Sources reviewed and comments

MD and MEC items found at MRS-14C contained energetic components (ground illumination signals, practice and smoke grenades, and simulators). These items are consistent with the types of training identified for this area.

References
USA, 2000a; USA, 2000b; Fort Ord Military Munitions Response Program Database (USACE, 2011)

15. ***Were items found in a localized area (possibly the remnants of a cleanup action)?***

		Inconclusive

Sources reviewed and comments
The rocket motor simulators(DMM) found within MRS-14C were found within a burial pit. Many of the other MEC items found within MRS-14C were found grouped together. The UXO and DMM found within MRS-14C were generally localized.

References
USA, 2000a; Fort Ord Miltrary Munitions Response Program Database, 2011

16. *Has the site been divided into sectors to focus on areas of common usage, similar topography and vegetation, and/other unique site features?*	Yes		

Sources reviewed and comments

The removal action within MRS-32C was based on discovery, during sampling, of one M301 series 81mm Illumination mortar projectile. The removal action was performed in the eight grids surrounding the grid where the 81mm illumination mortar projectile was found. No additional MEC was discovered. The boundaries for the MRS-14C removal actions were based on the boundaries presented in the ASR.

References
USACE, 1997; USA, 2000b

17. *Should current site boundaries be revised?*		No	

Sources reviewed and comments
Based on the results of the removal action and review of historical documents, site walks, and sampling, the site boundaries should not be revised.

References
USA, 2000a; USA, 2000b; Shaw, 2011a

18. *Was equipment used capable of detecting items suspected at the site at the maximum expected depth?*

Yes		

Sources reviewed and comments
The types of items, mostly non-penetrating, that might be expected within MRS-32C and MRS-14C are generally detectable using the Schonstedt 52Cx based on the results of the ODDS seeded tests and field trials; however, detection of hand grenade fuzes (non-ferrous material) and detection of smaller items does decrease at depth. Although the detection capabilities for some items do decrease with depth, the instruments are able to detect multiple items within burial pits as evident by detection of two burial pits at MRS-14C. In additoin, hand grenade fuzes were dectected during removal actions at MRS-14C.

References
Parsons, 2001

19. *Was equipment used capable of detecting the types of items (e.g., non-ferrous) suspected at the site?*

Yes		

Sources reviewed and comments
Items that could be present on the site that contain mostly non-ferrous material (grenade fuzes) would likely be found at or near the surface, therefore, the reduced detection capability for these types of items should not be significant.

References
Parsons, 2001.

20. *Do the results of the ODDS indicate that items suspected at the site would have been detected by the instrument used at the time of investigation?*	Yes		

Sources reviewed and comments
The results of the ODDS seeded test indicate that the types items suspected or detected at MRS-32C and MRS-14C, (hand grenade fuzes, practice rifle grenades, practice smoke grenades, illumination signals, smoke pots, and simulators) were, with the exception of a illumination signal and some hand grenade fuzes, detectable in the top 6 inches using a Schonstedt 52CX. The types of items expected at the site are primarily surface related items; therefore, a decrease in detecion capabilities below one foot is not considered significant.

References
Parsons, 2001.

21. *Do results of the investigation indicate that suspected items could be detected with a high level of confidence at observed and expected depth ranges?*	Yes		

Sources reviewed and comments
Although not directly comparable to MRS-14C and MRS-32C, results of the ODDS suggest that the equipment used should be able to detect ferrous MEC to the depth expected at this site,

References
Parsons, 2001.

22. ***Were all the instruments used to evaluate the site maintained and calibrated in accordance with associated work plan and manufacturer's specifications?***	Yes		

Sources reviewed and comments
The After Action reports state that daily operational checks and quality control were performed during the removal actions.

References
USA, 2000a; USA, 2000b

23. ***Was the appropriate data processing scheme used for the site, how was the data processed?***			NA

Sources reviewed and comments

Digital data was not collected as part of the removal actions.

References
USA, 2000a; USA 2000b

24. ***Has the field data been collected and managed in accordance with quality control standards established for the project?***	Yes		

Sources reviewed and comments
According to the After Action Reports, all work was completed without QC deficiencies.

References
USA, 2000a; USA, 2000b

RESULTS OF REMOVAL EVALUATION

25. ***Does the removal evaluation provide sufficient evidence to warrant further investigation?***

	No	

Comments

No MEC or MD was found during the removal action in MRS-32C. Practice and pyrotechnic items were found during the removal in MRS-14C. No further investigation is warranted at MRS-14C and MRS-32C.

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References

Parsons, 2001. Draft Ordnance Detection and Discrimination Study (ODDS), Former Fort Ord, Monterey, California. August.

USA Environmental , Inc (USA), 2000a. Final After Action Report, - 100 percent Ordnance and Explosive Removal -Site OE-14C. Former Fort Ord, California. November.

USA, 2000b. Finall After Action Report, Limited OE Removal, Inland Range Contract, Former Fort Ord, California, Site OE-32C. December.

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