DECISION DOCUMENT

Small Arms/Artillery Ranges
MUNITIONS RESPONSE SITE 2 (MRS-2)

Camp Swift FUDS
Bastrop County, Texas

FUDS Project No. K06TX030402

U.S. Army Corps of Engineers
Fort Worth District
Fort Worth, TX 76102

August 2021

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TABLE OF CONTENTS

TABLES AND FIGURES

APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

3Rs	"Recognize, Retreat, Report" Educational Program, USACE
5YR	Five Year Review
ac	acre(s)
AHPA	Archaeological and Historical Preservation Act
AIRFA	American Indian Religious Freedom Act
AMSL	above mean sea level
ARAR	applicable or relevant and appropriate requirement
ASR	Archive Search Report
BCAD	Bastrop (County) Central Appraisal District
BEG	Bureau of Economic Geology, University of Texas at Austin
bgs	below ground surface
BIP	blow/blown in place
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
C.F.R.	Code of Federal Regulations
COC	chemical of concern
COPC	contaminant of potential concern
COPEC	chemical of potential ecological concern
CR	County Road
CSM	conceptual site model
CWA	Clean Water Act
DD	Decision Document
DERP	Defense Environmental Restoration Program
DGM	digital geophysical mapping
DoD	Department of Defense
EE/CA	Engineering Estimate / Cost Analysis
EMI	electromagnetic induction
EO	Executive Order
ER	Engineer Regulation
ERA	ecological risk assessment
ESA	Endangered Species Act
ESD	Explanation of Significant Difference
FS	Feasibility Study
FUDS	Formerly Used Defense Site

FUDSMIS	Formerly Used Defense Sites Information System
HHRA	human health risk assessment
INPR	Inventory Project Report
IPaC	Information for Planning and Consultation (USFWS)
ISM	incremental sampling methodology
IVS	instrument verification strip
lf	linear feet
LUC	land use control
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
MMRP	military munitions response program
MRS	munitions response site
NAGPRA	Native American Graves Protection and Repatriation Act
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NIOSH	National Institute for Occupational Safety and Health
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OB/OD	open burn / open detonation
OSHA	Occupational Safety and Health Administration
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
ROE	right of entry
ROW	right of way
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Officer
TAC	Texas Administrative Code
TAMU	Texas Agricultural & Mechanical University

TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
THPO	Tribal Historic Preservation Officer
TOI	target of interest
TPWD	Texas Parks and Wildlife Department
TRRC	Texas Rail Road Commission
TtEC	Tetra Tech EC, Inc
TXARNG	Texas Army National Guard
U.S.	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UU/UE	unlimited use and unrestricted exposure
UXO	Unexploded Ordnance
WOTUS	Waters of the United States

EXECUTIVE SUMMARY

The U.S. Army Corps of Engineers (USACE) has prepared this Decision Document (DD) to describe the remedy selected for Munitions Response Site 2: Small Arms/Artillery Ranges (MRS-2) at Camp Swift, Bastrop County, Texas. Camp Swift is a 29,280-acre Formerly Used Defense Site (FUDS) used in WWII for Army artillery and maneuver training.

Camp Swift was declared excess to the War Assets Administration on May 5, 1947. The land was dispersed to the Texas Army National Guard (TXARNG) and private property owners from the 1940s through the 1980s. Throughout this DD, the Camp Swift FUDS property is referenced as "former Camp Swift" to clearly distinguish it from the current Camp Swift, an active installation owned and operated by the TXARNG. The TXARNG facility, though originally a portion of the historic Camp Swift, is not currently eligible for the FUDS program and is not addressed in this effort.

The MRS-2 site (FUDS Project No. K06TX030402) is composed of three non-contiguous areas used for small arms training and artillery ranges with total acreage of approximately 264.2 acres (ac). For the purposes of this document, the noncontiguous areas are designated "MRS-2 West" (approximately 221 ac), "MRS-2 East A" (approximately 20.1 ac), and "MRS-2 East B" (approximately 23.1 ac) to facilitate in-depth discussion of each area.

MRS-2 West is located approximately 3.3 miles southeast of the town of Elgin, Texas. The land use for the majority of the MRS-2 West area is rural residential and agricultural (hay and livestock production). A small portion of MRS-2 West is covered in native forest. Surrounding properties and neighboring areas have been developed in moderately dense suburban residential neighborhoods and, as such, land use in the MRS-2 West area appears to be changing to suburban residential.

MRS-2 East is composed of two non-contiguous areas (MRS-2 East A and MRS-2 East B) and is located approximately 0.6 miles west of the town of McDade, Texas. Land use in the MRS-2 East area is primarily rural residential and agricultural (hay and livestock production). While denser redevelopment does not appear to be occurring at MRS-2 East, it is within three miles of MRS-2 West and is expected to be subject to similar redevelopment pressure in the foreseeable future.

This work is performed under the Defense Environmental Restoration Program (DERP) – FUDS Program in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S. Code § 9601, *et seq.*, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations Part 300, *et seq.*, as amended. USACE acts as the lead agency on behalf of the Department of Defense (DoD) in the execution and administration of the FUDS program in accordance with CERCLA, the NCP, and the DERP statute. Support is provided by the Texas Commission on Environmental Quality (TCEQ) and the U.S. Environmental Protection Agency (USEPA).

During the history of this project, the area now designated as MRS-2 has gone through multiple, different nomenclatures. Historical documents reference the current MRS-2 area variously as Sector 1 and 2, MRS North 1 and 2, and MRS-1. Throughout the document, an attempt is made to link the results of these earlier investigations with the current designation. Historical documents containing more detail on site conditions and risk include, among others:

- An Archives Search Report (ASR)[1] and its supplement developed in 1994.

[1] (USACE, 1994a, 1994b)

- An Engineering Estimate / Cost Analysis (EE/CA) developed in 2007[2].
- A Remedial Investigation (RI) and Feasibility Study (FS) completed in 2015[3.]
- A revised Inventory Project Report (INPR)[4] completed in 2016.

During the EE/CA effort, materials designated as munitions of explosive concern (MEC) were identified in MRS-2. However, during the RI, only munitions debris (MD) was recovered. MD that could be identified included debris from 4.2-inch mortars, 60mm mortars, 2.36-inch rockets, rifle grenades, 105mm projectiles, and cannonballs. MRS-2 was sampled for the presence of munitions constituents (MCs) and MC sampling revealed no human health or ecological risk concerns from these chemicals. Given the presence of MD in the MRS-2 areas, the RI concluded that the risk of the potential presence of MEC represented an unacceptable hazard to current and future site residents, workers, and users. More detailed information concerning the MC and MEC sampling and analysis conducted at MRS-2, and the resulting risk conclusions, are presented in the RI/FS[5] for former Camp Swift FUDS property.

Based on the results of the RI and the recommendations of the FS, the MRSs at Camp Swift FUDS were delineated[6] into areas expected to have similar impacts and anticipated remedial approaches. At that time, the current MRS-2 was defined.

Remedial alternatives were identified and evaluated in the 2015[7] FS and a preferred alternative was selected and described in a Proposed Plan presented to the public in 2015 for comment.

Based on the recommendations of the FS and considering public comment, USACE has selected the following remedial alternatives for MRS-2:

- Alternative 5D: Surface and subsurface MEC removal to a planned depth of three (3.0) feet (36 inches) below ground surface (bgs) using digital electro-magnetic induction (EMI) systems in conjunction with advanced classification, where accessible and to the extent practicable; and
- Alternative 2: Implementation of Land Use Controls (LUCs).

This Selected Remedy reduces the potential MEC hazards present at MRS-2 (both MRS-2 West and MRS-2 East) by removing the identified source material (MEC), utilizing advanced classification methodology, to a depth of at least one half foot below anticipated or confirmed MEC depths in each MRS. Hazards that remain in inaccessible areas will be mitigated through the implementation of LUCs.

[2] (Parsons, 2007)
[3] (TtEC 2015a).
[4] (USACE, 2016)
[5] (TtEC, 2015a).
[6] (USACE, 2016)
[7] (TtEC 2015a).

PART 1.0: DECLARATION

1.1 Project Name & Location

1.1.1 Overview

MRS-2 is located in the north and northeast portion of the original boundary of the Camp Swift Range Complex in Bastrop County in southeast Texas. MRS-2 is project number K06TX030402 in the Formerly Used Defense Sites Management Information System (FUDSMIS).

1.2 Statement of Basis & Purpose

This DD presents the Selected Remedy for MRS-2 - Small Arms/Artillery Ranges at the Camp Swift Range Complex in Bastrop County, Texas. Investigations by USACE documented the presence of mortars, rockets, projectiles, rife grenades, and cannonballs (MEC) associated with historic training activities by the US Army in WWII. The potential presence of MEC at MRS-2 creates an unacceptable risk of injury to residents and users at the site. The Selected Remedy is a cost-effective approach to remove MEC hazards from MRS-2 and minimize risk to current and future site users.

The Selected Remedy was chosen in accordance with CERCLA, 42 U.S. Code § 9601, et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations Part 300, *et seq*. as amended. The DD follows the requirements set forth in Engineer Regulation (ER) 200-3-1, *Formerly Used Defense Site Program Policy* (USACE 2004a) and is consistent with the United States Environmental Protection Agency (USEPA) guidance provided in *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents*, EPA 540-R-98-031 (USEPA 1999). This Decision is based on the Administrative Record file for this site. The TCEQ has formally concurred with the findings and recommendations of the RI/FS reports and the Proposed Plan. TCEQ's concurrence on the Selected Remedy for this MRS and this Decision Document is attached as appendix E.

1.3 Assessment of Site

An ASR and a subsequent supplement were developed in 1994 for the former Camp Swift property. In these documents, the area including the current MRS-2 West area was identified as being used for small arms training and as forming portions of multiple artillery ranges. The area including the current MRS-2 East area was identified as a possible artillery range, possible portions of rifle and carbine transition ranges, a field combat range, a tank destroyer moving target range, and a rocket and grenade launcher range. The ASR documented no history of MEC located in the area.

During the history of this project, the site has gone through multiple nomenclatures for each investigated area in the course of each investigation. Generally, these re-designations represented an increase of focus on better-defined investigational areas as greater data was obtained. Table 1 below briefly summarizes this naming evolution.

Table 1: History of Nomenclature for the MRS-2 Sites Across Historic Site Documents

This DD (2021)	Revised INPR (2016)	FS (2015) and Proposed Plan (2015)	RI (2012)	EE/CA (2007)
MRS-2 West	MRS-2	MRS-1	MRS North 1	Sector 1
MRS-2 East (A and B)	MRS-2	MRS-1	MRS North 2	Sector 2

An EE/CA was developed in 2002. Approximately 48 pieces of munitions debris MD were reported found in "Sector 1" of the EE/CA investigational areas (which contained the area currently designated as MRS-2 West). These included MD related to 4.2-inch mortars, 2.36-inch rockets, 105-millimeter (mm) projectiles, 60mm mortars, and rifle grenades. "Sector 2" of the EE/CA included the area currently designated as MRS-2 East. It was not investigated during the EE/CA but the EE/CA noted that the presence of 57mm projectiles was possible based on site history.

An RI/FS was initiated for former Camp Swift in 2012. For the purposes of the investigation effort, the RI revised the location nomenclature of the investigational areas from those used in the EE/CA. An area designated as "MRS North 1" was delineated from the EE/CA "Sector 1" and an area designated as "MRS North 2" was delineated from the EE/CA "Sector 2." For the purposes of the subsequent FS, those portions of MRS North 1 and MRS North 2 that were found to potentially contain MEC or MD were combined and renamed "MRS 1."

For the MRS North 1 area (including the current MRS-2 West), the RI documented the recovery of MD in 23 locations. The MD found in MRS North 1 was indicative of the use of 4.2-inch mortars, 60mm mortars, 2.36-inch rockets, rifle grenades, and 105mm projectiles. Other MD fragments were unidentifiable. MRS North 1 was concluded to be a former impact or buffer area associated to a historical firing range that was previously located on property that is now a portion of the current TXARNG Camp Swift. MD was found to a depth of eight inches bgs. Though MEC was not found during the RI in the investigational areas in MRS North 1, the RI concluded that MEC, if present, was estimated to have a maximum ground penetration depth of 24 inches bgs.

For the MRS North 2 area (including the current MRS-2 East), the RI documented the recovery of MD in 3 locations. The MD found in MRS North 2 was indicative of the use of rockets and cannonballs. As with MRS North 1, MRS North 2 was concluded to be a former impact or buffer area associated to a historical firing range that was previously located on property that is now a portion of the current TXARNG Camp Swift. MD was found to a depth of 24 inches below ground surface (bgs). Though MEC was not found during the RI in the investigational areas in MRS North 2, the RI concluded that MEC, if present, was estimated to have a maximum ground penetration depth of 24 inches bgs.

Given the presence of MD in the MRS North 1 and MRS North 2, the RI concluded that the risk of the potential presence of MEC represented an unacceptable hazard to current and future site residents, workers, and users.

Munitions constituents (MC) sampling was performed in areas in which MD and MEC were identified during the RI intrusive investigation and from the previous EE/CA study. Background samples were also taken in areas where MD or MEC was not encountered during the RI and EE/CA investigations. A total of 10 incremental sampling methodology (ISM) samples were taken in triplicate.

Screening level Human Health Risk Assessments (HHRAs) and Ecological Risk Assessments (ERAs) were performed for all areas for which MC soil sampling data were collected (including MRS North, comprising areas including the current MRS-2 West and MRS-2 East). No significant risks to human health or ecological receptors were identified for any of these areas based on the absence of detection of any explosives compounds and the low levels of metals detections in the soil that were either lower than the applicable risk-based screening thresholds and/or were consistent with the background levels of the Camp Swift Range Complex MRS. As such, no contaminants of potential concern (COPC) or chemicals of potential ecological concern (COPECs) were identified and no risks to human or ecological health are expected from MCs. More detailed information concerning the MC sampling and analysis conducted at

MRS-2, and the resulting risk conclusions, are presented in the RI/FS[8] for former Camp Swift FUDS property.

Using the results of the RI, a FS was completed in 2015 to develop and assess remedial alternatives to address the risk posed by MEC at MRS North 1 and MRS North 2. For the purposes of the Feasibility Study, these areas were redefined and the areas subject to this DD were designated "MRS-1" ("MRS-1" would subsequently be designated as "MRS-2" in the Proposed Plan).

1.4 Description of the Selected Remedy

Based on the assessment of the alternatives outlined in the FS, preferred alternatives, Alternative 5D and Alternative 2, were selected and described in a Proposed Plan presented to the public in 2015 for comment. After considering public comments and input from other stakeholders, USACE selected the following remedial alternative for MRS-1 (subsequently designated as MRS-2, East and West):

- Alternative 5D: Surface and subsurface MEC removal to a depth of three (3.0) feet bgs using digital EMI systems in conjunction with advanced classification, where accessible and to the extent practicable; and
- Alternative 2: Implementation of Land Use Controls (LUCs).

As noted, the FS proposed multiple target soil depths for materials removal, in various Alternatives, for planning and estimating purposes. However, USACE policy requires that if an item is identified and expected to be MEC, it is removed regardless of depth. Since the use of advanced classification technologies may be used to distinguish MEC from other cultural metallic scrap, identified items expected to be MEC will be removed regardless of the proposed depth.

It is noted that the 3.0 feet (36 inches) bgs used for planning purposes is at least 11 inches greater than MEC or MD has been previously identified in MRS-2. This was selected consistent with the potential for future residential development of the area and the performance of construction activities that may disturb soils greater than 24 inches in depth. Following implementation of the removal remedy, the risk reduction actually achieved by the remedial action will be evaluated based on the geophysical data collected and the nature and number of targets of interest (TOIs) and MEC removed. If the risk has been reduced such that a risk designation of Unlimited Use/ Unrestricted Exposure (UU/UE) is met, no further actions (LUCs) will be performed.

It is currently expected that not all areas will be accessible to personnel and/or equipment to locate MEC and UU/UE will not be achieved. As such, Alternative 2 – Land Use Controls, is proposed to reduce the risk of exposure to residual MEC that remain in the site. Since regulation of land (zoning and deed restrictions) use has not been legislatively delegated to Bastrop County, LUCs are limited to public outreach and educational programs (ex. brochures, community meetings, publication of a website), though signs may also be employed with property owner agreement. The objectives of the public outreach and educational programs will be to provide community information and educate the public on the hazards associated with MEC and responses to follow when MEC is encountered. Additionally, 5YRs will be required for areas judged not to achieve UU/UE to reassess the continuing protectiveness and effectiveness of the LUC initiatives.

The estimated total cost of this remedy (both Alternatives 2 and 5D), as documented in the 2015 FS and Proposed Plan, was $4,009,748. However, the FS estimate included only five years of ongoing maintenance and review costs. MEC left in place is expected to require LUCs until the risks are no longer

[8] (TtEC, 2015a).

present. As such, in this document, the maintenance and review period has been increased to 30 years and the costs have been escalated to 2020 values using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator. The resulting estimated cost of this remedy in 2020, escalated for inflation is approximately $4,825,957 (Alternative 2 - $ 633,958 and Alternative 5D - $4,191,999).

The Selected Remedy for MRS-2, Alternative 5D and Alternative 2, removes existing MEC hazards, thus minimizing or eliminating the risk of injury to site users, and implements LUCs to reduce risk posed by remaining MEC, if any. This remedy satisfies the CERCLA (as amended) statutory preference for treatment as a principal element of the remedy (i.e., it reduces volume of hazardous substances as a principal element through treatment).

Major components of this remedy include:

- Obtaining Rights of Entry (ROEs) from private landowner(s) in the MRS-2 boundaries.
- Performing pre-remediation biological and cultural resource surveys, as necessary.
- Preliminarily assessing the ground surface and removing surficial MEC items (if present).
- Trimming vegetation to allow access to geophysical equipment and work crews.
- Land surveying to support the division of MRS-2 into two-dimensional grids for the performance of field activities.
- Placement of data quality control (QC) and quality assurance (QA) items ("seeds") and instrument verification strips for subsequent identification by digital geophysical mapping equipment.
- Performance of digital geophysical mapping with advanced sensors, analysis of geophysical data and classification of geophysical anomalies.
- Removing (by hand excavation) anomalies that could be subsurface MEC and those whose nature cannot be determined as well as the subsequent detonation of MEC if found (in-place or in another area in consolidated detonations).
- Disposing properly of all MD.
- Restoring site conditions following MEC removal activities.
- Implementing LUCs in the form of signs (where allowed by property owners) and other educational awareness initiatives (ex. brochures, community meetings, publication of a website).
- Documenting the results of the Removal Action including an assessment of the completeness of site clearance activities.

1.5 Statutory Determinations

It has been determined that the Selected Remedy is protective of human health and the environment, can be accomplished in compliance with Federal and State applicable or relevant and appropriate requirements (ARARs) that are relevant to the remedial action, is cost-effective, and utilizes permanent solutions to the maximum extent practicable.

Section 121(d) of CERCLA [42 U.S.C. § 9621(d)] states that CERCLA remedial actions must comply with, or have a waiver for, any ARARs, which include regulations, standards, criteria, or limitations promulgated under federal environmental, or more stringent state environmental or state facility siting laws. Requirements expected to be ARARs for this remedial action include:

- The Endangered Species Act (ESA) of 1973;
- The Resource Conservation and Recovery Act (RCRA) of 1976 disposal requirements (40 CFR 264 Subpart X);
- Clean Water Act (CWA) of 1972;
- Multiple federal cultural resource ARARs including, but not limited to:

  - National Historic Preservation Act (NHPA) of 1966 (as amended) and its implementing regulations (36 CFR Part 800);
  - Native American Graves Protection and Repatriation Act (NAGPRA) of 1990; and
  - Archaeological and Historical Preservation Act (AHPA) of 1979.
- Texas State Threatened and Endangered Species ARARs (Texas Administrative Code (TAC) 65.175, 65.176, and 69.8).

ARARs are discussed in greater detail in Section 2.10, "Federal and State ARARs."

Because this remedy may result in hazardous substances, pollutants, or contaminants, in the form of MEC, remaining in some areas of the site above levels that allow for UU/UE, as defined by USEPA, it is currently expected that five year reviews (5YRs) will be required going forward. The purpose of 5YR is to assess whether the remedy remains protective of human health and the environment. The post-remedy assessment and documentation will delineate those areas that are determined to have not attained UU/UE. The areas not attaining UU/UE will be subject to 5YR assessments.

1.6 Record of Decision (ROD, also, "Decision Document") Data Certification Checklist

The following information is included or otherwise addressed in in Part 2.0, Decision Summary, of this DD:

- A brief description of site characteristics including climate, ecology, archaeology, physical geography, and geology (Section 2.1)
- Current and reasonably anticipated future land use assumptions for the site (Section 2.1);
- A summary of the characterization of MEC hazards at MRS-2 (Section 2.2 Section 2.4);
- Expected ARARs (Section 2.9);
- Key factors that led to the selection of a combination of removal and land use controls (public education) for MRS-2 (Section 2.11);
- How source materials constituting principal threats, if present, will be addressed (Section 2.11.3).
- Estimated costs and time to implement the selected remedy (Section 2.12).

As MC and MEC present at the site have no demonstrated impact on groundwater at the site, current groundwater uses are anticipated to continue. Additional information can be found in the Administrative Record file for this site. More detailed information concerning the MC sampling and analysis conducted at MRS-2, and the resulting risk conclusions, are presented in the RI/FS[9] for former Camp Swift FUDS property.

[9] (TtEC, 2015a).

1.7 Authorizing Signatures

This DD presents the selected response action at MRS-2, former Camp Swift, Bastrop County, Texas. USACE is the lead agency under DERP at the Camp Swift FUDS property and has developed this DD in accordance with CERCLA, as amended, and the NCP.

This Decision Document will be incorporated into the Administrative Record file for Camp Swift FUDS, which is available for public viewing at Bastrop Public Library (1100 Church Street, Bastrop, Texas 78602).

The Selected Remedy is surface and subsurface MEC removal and LUCs. This remedy has a total cost estimate of $4,825,957 (Alternative 2 - $633,958 and Alternative 5D - $4,191,999), is approved by the undersigned, pursuant to Memorandum, CEMP-CED (200-1a), August 10, 2019, subject*: Redelegation of Assignment of Mission Execution Functions Associated with Department of Defense Lead Agent Responsibilities for the Formerly Used Defense Sites Program*, and to Engineer Regulation 200-3-1, Formerly Used Defense Sites (*FUDS) Program Policy* (2004), and Memorandum CEMP (1200C PERM) February 9, 2017, subject: *Interim Guidance Document (IGD) for the Formerly Used Defense Sites (FUDS) Decision Document (DD) Staffing and Approval.*

SMITH.THOMAS.PATRICK.1020138439
Digitally signed by SMITH.THOMAS.PATRICK.1020138439
Date: 2021.08.16 17:13:30 -05'00'

THOMAS P. SMITH, P.E. DATE
Director, Programs Directorate

PART 2.0: DECISION SUMMARY

2.1 Site Name, Location, and Characteristics

- Name: Munitions Response Site 2: Small Arms/Artillery Ranges (MRS-2) (Figure 1)
- FUDS Number: K06TX030402
- Location: Bastrop County, Texas; generally bounded to the north by Federal Highway 290, to the east by State Highway 21, and to the west by State Highway 95

2.1.1 Camp Swift

The former Camp Swift is a FUDS property used by the U.S. Army during WWII. In 1942, the U.S. Government acquired 52,191 acres of land to build Camp Swift and used the Camp for infantry, artillery, and maneuver training. Following the end of the War, Camp Swift was declared excess to the War Assets Administration in May, 1947. The land was dispersed to the TXARNG and private property owners from the 1940s through the 1980s. FUDS Military Munitions Response Sites (MMRP) sites are those on which elements of the Department of War/Department of Defense previously conducted military operations that resulted in munitions being left behind on properties subsequently transferred to owners outside of the DoD. The Camp Swift FUDS property includes a historic range complex comprised of overlapping small arms ranges, grenade courts, a mortar range, artillery impact areas, training maneuver areas, and a demolition area. The portion of the original Camp transferred to TXARNG is not included in the Camp Swift FUDS property. Today this FUDS property has 17 MRSs comprising 30,538 acres.

The DOD has designated USACE as the lead agency for FUDS CERCLA actions. Support agencies for the former Camp Swift site include the TCEQ and USEPA.

2.1.1.1 Topography and Physiography

The general topography within the former Camp Swift area is moderately dissected rolling, hilly uplands, and flat lowlands. Slopes are gentle, ranging from about three to eight percent. The topographic relief is 150 feet, ranging from 400 feet above mean sea level (AMSL) to 550 feet AMSL.

The former Camp Swift lies within the Gulf Coastal Plains physiographic province[10] and in the Blackland Prairies subprovince. The Gulf Coastal Plain is generally a gently undulating plain characterized by uplands of low relief and broad river valleys[11].

2.1.1.2. Soil Types

Two main soil associations occur within the boundaries of the former Camp Swift: the Patilo-Demona-Silstid association and the Axtell-Tabor association. A third soil association, the Crockett-Wilson, is present in a small area along the eastern boundary of the former camp[12]. Specifically, the MRS-2 areas are underlain by the Patilo-Demona-Silstid association. This soil association is characterized by gently sloping to strongly sloping soil types occurring on uplands that have a sandy surface layer and moderately permeable lower layers. Soil layers in this association are generally more than 30 inches deep[13]. Data maintained by the National Resources Conservation Service[14] (NRCS) states that most soils in the MRS-2 areas are greater than 80 inches deep though some areas within the MRS-2 sites demonstrate bedrock at 43 to 60 inches bgs.

[10] (BEG, 1996)
[11] (Parsons, 2007)
[12] (USDA, 1979)
[13] (Parsons, 2007)
[14] (NRCS, Online)

2.1.1.3. Geology and Hydrogeology

The following geologic formations, in order from youngest to oldest, outcrop in the former Camp Swift area: Weches Greensand, Queen City Sand, Reklaw Formation, Carrizo Sand, and the Wilcox Group. Specifically, MRS-2 is underlain by the Wilcox Group. The Wilcox Group consists of fine to coarse sand with lesser amounts of clay, sandy clay, sandstone, and silty shale with a few lenses of limestone and lignite. The Wilcox Group, which is the most important water-bearing unit in the county, furnishes all the water used by the cities of Bastrop and Elgin[15]. In the area where the Wilcox outcrops, water levels can be less than 50 feet below ground surface (bgs). There are no tidal variations in water levels; however, water levels may drop seasonally due to irrigation drawdown. The existence of perched water tables is unknown.

2.1.1.4. Climate

The former Camp Swift area has a subtropical climate consisting of humid, tropical influences during the summer and dry, continental influences during the rest of the year. The mean annual temperature is approximately 68 degrees Fahrenheit (ºF). January is the coldest month, with an average temperature of 60ºF, and August is the warmest month with an average temperature of 85ºF. Precipitation averages 32 inches per year in the area. Snowfall is rare. The frost penetration depth is 4 inches bgs in the former Camp Swift area. In most winders, the surface layer of the soil freezes only to a depth of an inch or so and seldom stays frozen more than 2 or 3 days[16]. The average fall freeze date in Bastrop County occurs November 16th, with the last frost date occurring approximately March 9th, on average. The average growing season in approximately 268 days[17].

2.1.1.5. Vegetation

According to United States Geological Survey (USGS) maps maintained by the United States Environmental Protection Agency (USEPA)[18], both MRS-2 areas (West and East) lie within the East Central Texas Plains – Southern Post Oak Savannah (33b) ecoregion. Generally, the Southern Post Oak Savannah ecoregion has more woods and forests (where natural vegetation is permitted) than adjacent prairie regions and consists of mostly hardwoods compared to the pines of the ecoregions to the east. Historically a post oak savannah existed over the entire ecoregion. Current land cover is a mix of post oak woods, improved pasture, and rangeland. A thick understory of yaupon and eastern red cedar occurs in some parts of the ecoregion. The vegetation at the former Camp Swift area is extremely dense and impenetrable on foot in some areas.[19]

Texas Parks and Wildlife Department (TPWD) further characterizes this ecoregion into subunits with the area including MRS-2 being described as "Live Oak Motte and Woodland[20]."

2.1.1.6. Wildlife

The project area lies within the Texas Biotic Province[21], which is described as an ecotene between the forests of eastern Texas and the grasslands of the west. An ecotene is an "edge" where two distinctly different habitats blend together. Mammals of the Texas Biotic Province include the Virginia opossum, eastern mole, fox squirrel, Louisiana pocket gopher, fulvous harvest mouse, white-footed mouse, hispid cotton rat, eastern cottontail, and swamp rabbit[22]. Eighteen State or Federal threatened and endangered or candidate species potentially occur in the former Camp Swift area. The larger former Camp Swift area

[15] (Parsons, 2007)
[16] (Parsons, 2007)
[17] (TAMU, Online)
[18] (USGS, 2004).
[19] (Parsons, 2007)
[20] (TPWD, undated, "East-Central Texas Plains Post Oak Savanna and Woodland").
[21] (Blair, 1950; as cited by Parsons, 2007)
[22] (Parsons, 2007)

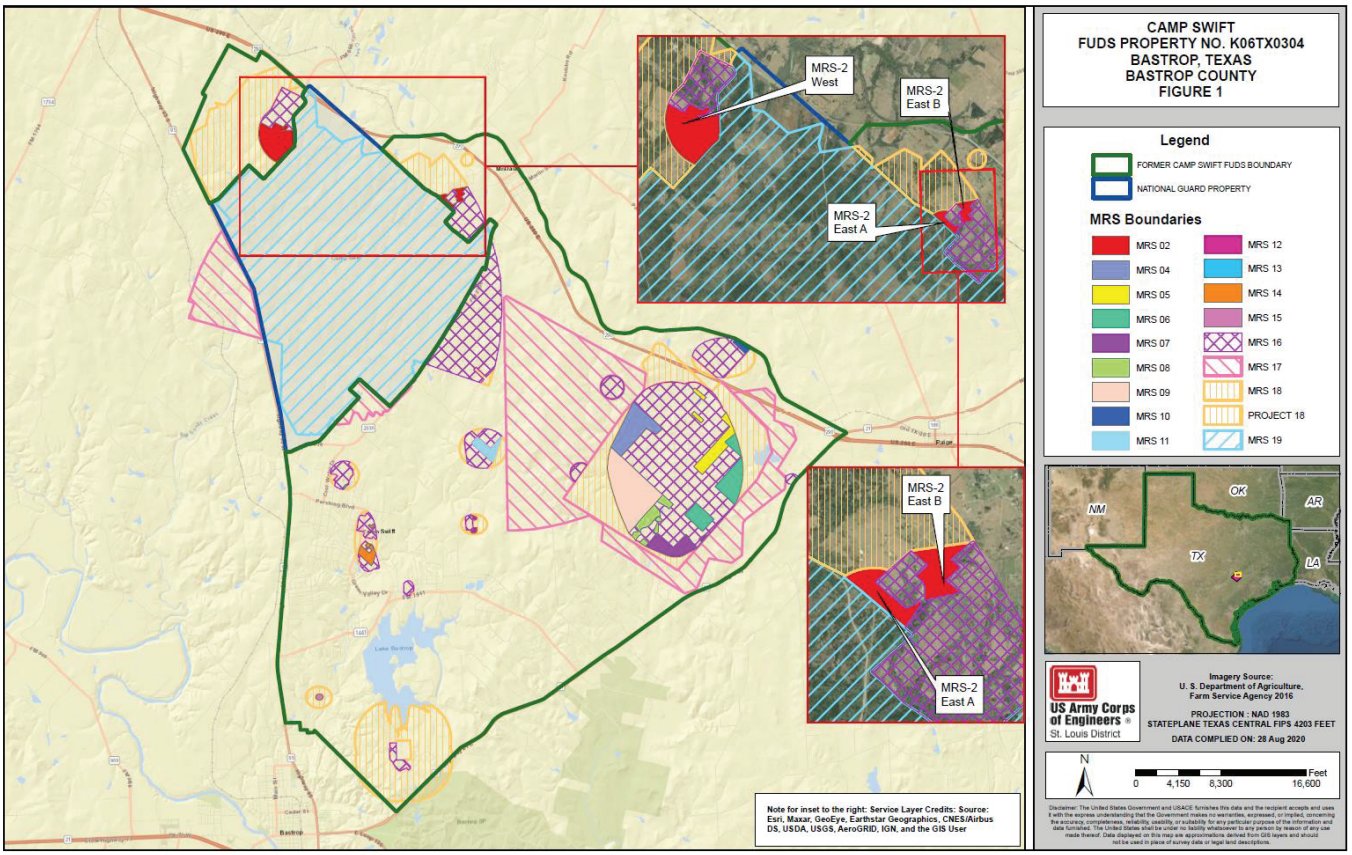
contains land that has been designated as critical habitat for the Houston toad; however, this critical habitat is not present within the boundaries of MRS-2. For more information on protected species, see Section 2.4 Site Risks and Exposure Pathways.

Further site characteristics are summarized in the Conceptual Site Model (CSM, Figure 14) within the RI/FS. The CSM provides the basis for developing the risk assessment and response action for the site.

2.1.2 MRS-2

MRS-2 is located in the north and northeast portion of the original boundary of the former Camp Swift FUDS property in Bastrop County in southeast Texas (Figure 1). MRS-2 is composed of three non-contiguous areas used for small arms training and multiple artillery ranges with total acreage of approximately 264.2 acres (ac). In this document, the noncontiguous areas are designated "MRS-2 West" (approximately 221 ac), "MRS-2 East A" (approximately 20.1 ac), and "MRS-2 East B" (approximately 23.1 ac) to facilitate in-depth discussion of each separate area. All portions of the MRS-2 sites are accessible from public roads.

1


MRS-2 West
MRS-2 East B
MRS-2 East A
MRS-2 East B
MRS-2 East A
Note for inset to the right: Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User
CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 1
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS Boundaries
MRS 02
MRS 04
MRS 05
MRS 06
MRS 07
MRS 08
MRS 09
MRS 10
MRS 11
MRS 12
MRS 13
MRS 14
MRS 15
MRS 16
MRS 17
MRS 18
PROJECT 18
MRS 19
NM
OK
AR
TX
LA
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 28 Aug 2020
N
0
4,150
8,300
16,600
Feet

2.1.3 MRS-2 West

MRS-2 West is located approximately 3.3 miles southeast of the town of Elgin, Texas and lies between US Highway 290 (to the north) and Texas Highway 95 (to the south) (Figure 2). Generally, the land is level to gently sloped toward surface drainage features. The current TXARNG Camp Swift abuts MRS-2 West to the south, across Scott Falls Road.

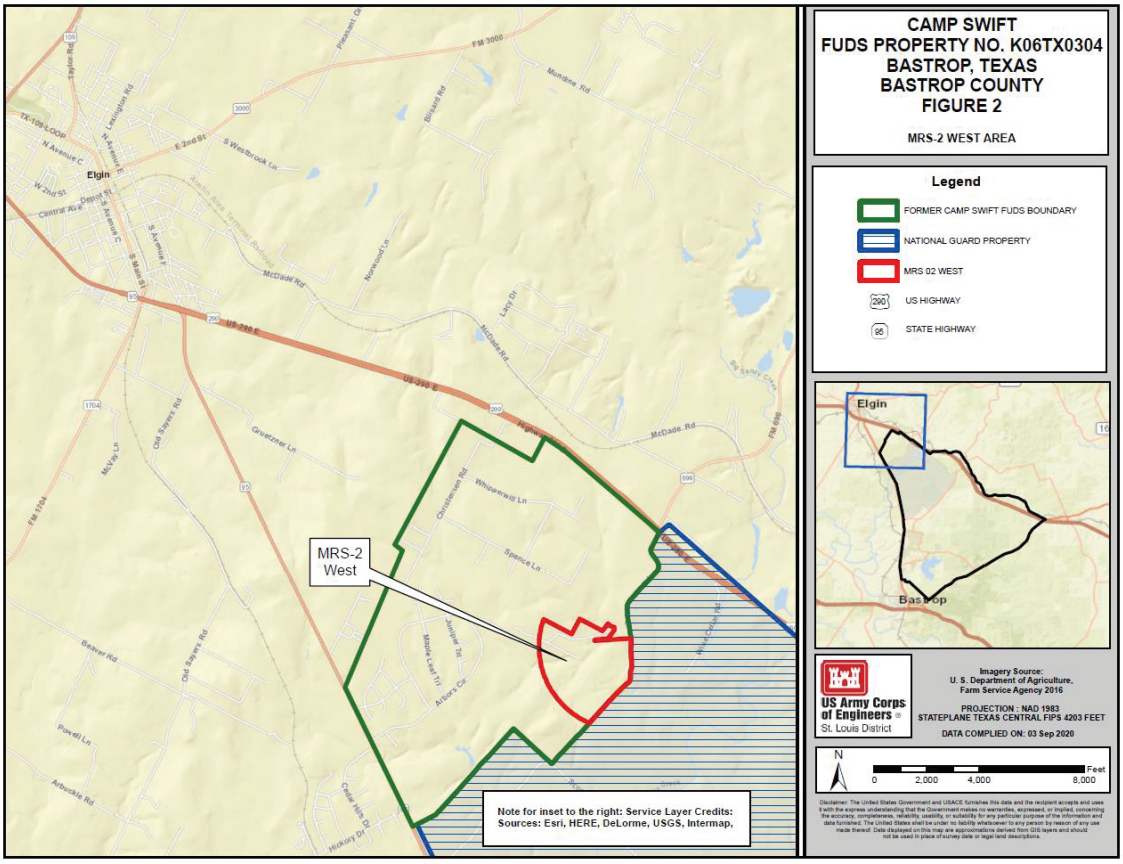
The majority of land use within MRS-2 West area is currently rural residential and agricultural (hay and livestock production). Per the Bastrop (County) Central Appraisal District (BCAD)[23], eight property parcels are wholly, or partially, located within the boundaries of MRS-2 West (Figure 3). Several residences appear to be located in MRS-2 West and may indicate the co-occurrence of underground utilities (sanitary sewer/septic lines, potable water lines or wells, electrical and digital lines) within the boundary of MRS-2 West. Portions of MRS-2 West are covered in forest (approximately 40.6 ac). Properties to the northwest, and immediately north, of MRS-2 West have recently been re-developed in moderately dense suburban residential neighborhoods. As such, a near-future land use change at MRS-2 West from rural residential/agricultural to moderately dense suburban residential appears reasonably possible.

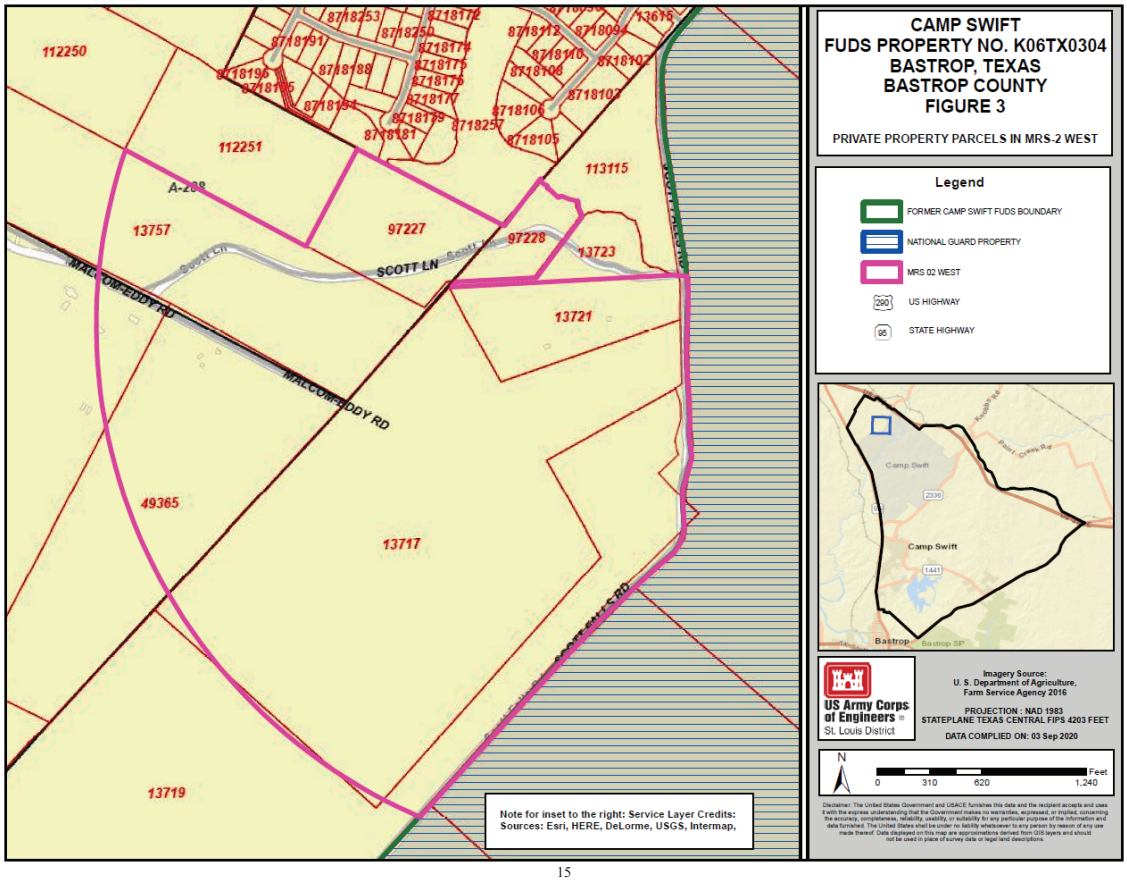
According to information maintained online by the Railroad Commission of Texas (TRRC)[24] as of the date of this Document, one natural gas transmission line trends southwest-northeast through the site. Additionally, the TRRC information states that one oil or gas "dry hole" well is located in close proximity to the southwest boundary of MRS-2 West (Figure 4).

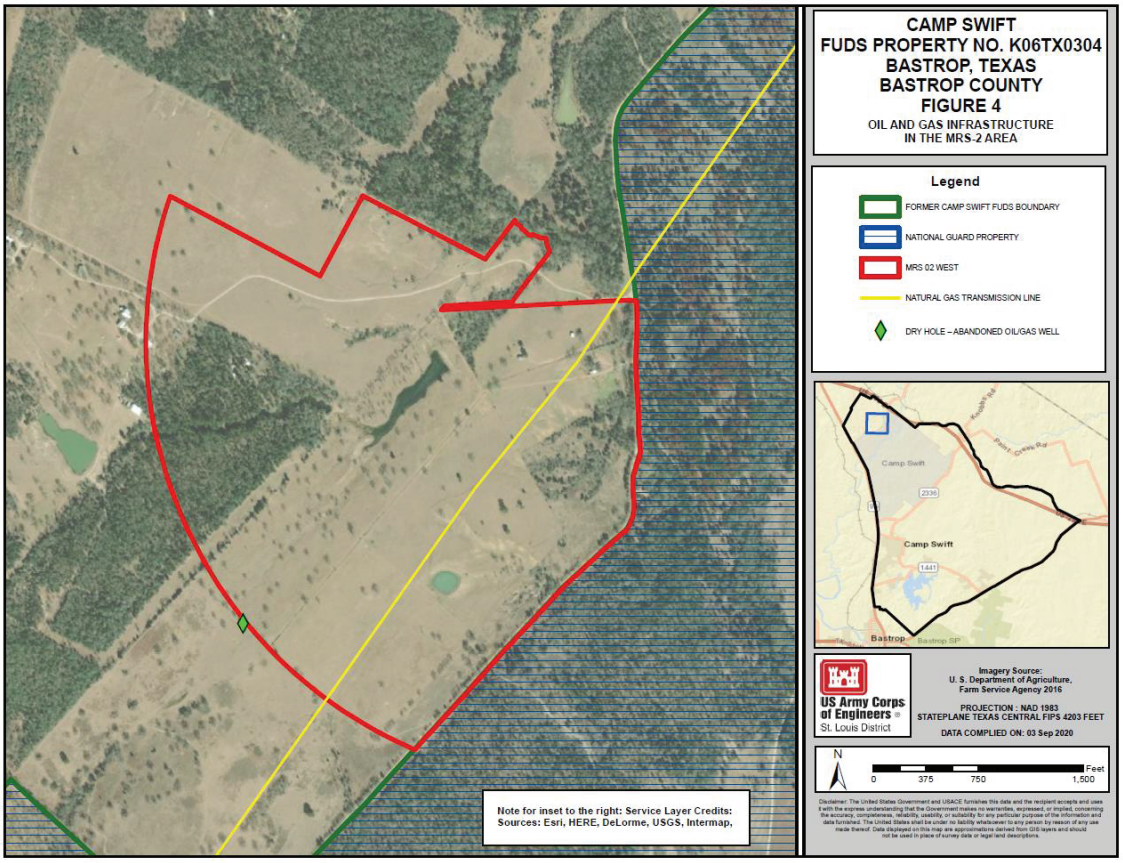
An unnamed tributary to Big Sandy Creek courses west to east through the northern part of MRS-2 West and northwest to southeast along its northeastern and eastern boundary. Another smaller, unnamed tributary appears to have headwaters inside of the southern portion of MRS-2 West and drains easterly toward Big Sandy Creek (Figure 5). Larger drainages within the site have been designated on United States Geological Survey (USGS) topographic maps as intermittent streams[25]. Smaller dendritic drainage features are present in the eastern portion of this area but are not categorized as intermittent streams on USGS topographic maps. As of November 2019, three surface water bodies are present in MRS-2 West. Two appear to be associated with the creation of dams (i.e. stock tanks) on the northerly drainage and one appears to be a stock tank associated with the southern drainage. Based on aerial photographs maintained in the public domain, it appears all three stock tanks were constructed between the 1980s and 2005. The total area of the stock tanks is approximately 2.46 ac. The tributaries and one of the ponds are included in the United States, Department of Interior, Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI)[26] map for the area with designations of Riverine (R2SBC) and Freshwater Forested/Shrub Wetland (PFO1C), respectively (Figure 6).

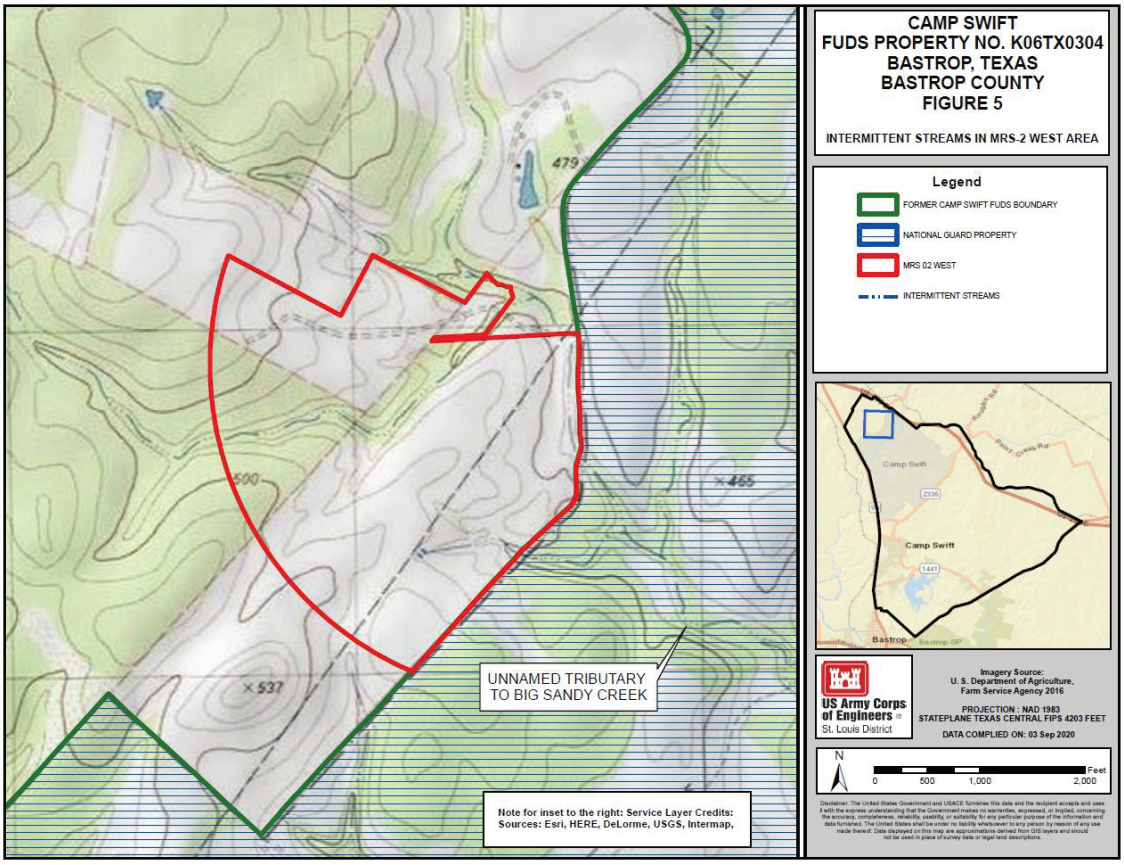
Based on information maintained in the Texas Historical Commission (THC) Archaeological Sites Atlas[27], MRS-2 West contains one known archeological site within its boundary. However, the entirety of MRS-2 West has not been covered in a cultural survey. The one known site is relatively large, and, as such, it is expected that there is a high potential for additional, unidentified, archaeological sites to be present in MRS-2 West. According to the THC Historic Sites Atlas[28], no recorded historical sites are located within the boundary of MRS-2 West.

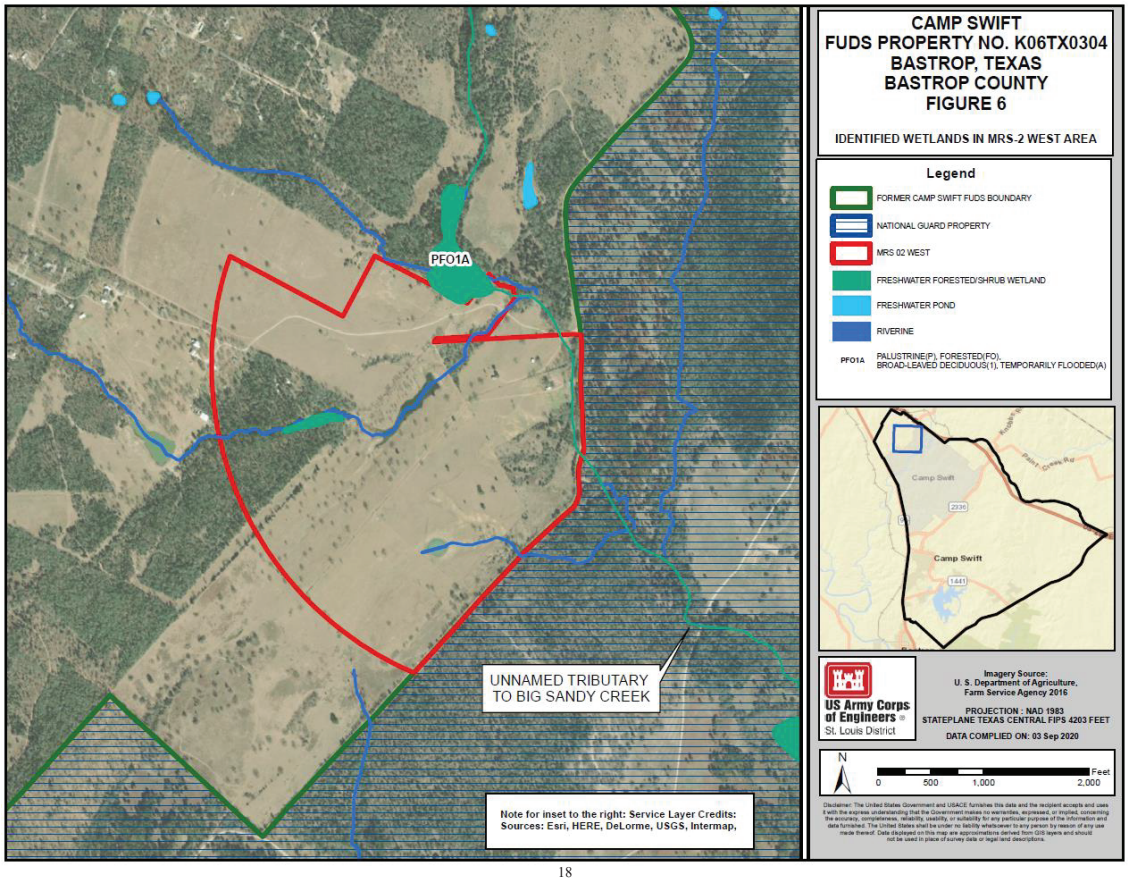
[23] (BCAD, Online)
[24] (TRRC, Online).
[25] (USGS, 2016).
[26] (USFWS, NWI, Online).
[27] (THC, Online).
[28] (THC, Online).


CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 2
MRS-2 WEST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
US HIGHWAY
STATE HIGHWAY
MRS-2 West
Elgin
Bastrop
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
2,000
4,000
8,000
Feet
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,


CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 3
PRIVATE PROPERTY PARCELS IN MRS-2 WEST
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
US HIGHWAY
STATE HIGHWAY
SCOTT LN
MALCOM-EDDY RD
112250
112251
113115
13757
97227
97228
13723
13721
49365
13717
13719
Camp Swift
Bastrop
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
310
620
1,240
Feet
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,


CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 4
OIL AND GAS INFRASTRUCTURE
IN THE MRS-2 AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
NATURAL GAS TRANSMISSION LINE
DRY HOLE – ABANDONED OIL/GAS WELL
Camp Swift
Bastrop
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
375
750
1,500
Feet
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,


CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 5
INTERMITTENT STREAMS IN MRS-2 WEST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
INTERMITTENT STREAMS
479
500
465
537
UNNAMED TRIBUTARY
TO BIG SANDY CREEK
Camp Swift
Bastrop
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
500
1,000
2,000
Feet
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,


PFO1A
UNNAMED TRIBUTARY
TO BIG SANDY CREEK
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,
CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 6
IDENTIFIED WETLANDS IN MRS-2 WEST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
FRESHWATER FORESTED/SHRUB WETLAND
FRESHWATER POND
RIVERINE
PFO1A
PALUSTRINE(P), FORESTED(FO),
BROAD-LEAVED DECIDUOUS(1), TEMPORARILY FLOODED(A)
Camp Swift
2336
Camp Swift
1441
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
500
1,000
2,000
Feet

2.1.4 MRS-2 East

MRS-2 East is composed of two non-contiguous areas (MRS-2 East A and MRS-2 East B) and is located approximately 0.6 miles west of the town of McDade, Texas. Both lie at, or near, the terminus of County Road (CR) 323 (also known as McAcres Drive) (Figure 7). The elevation at the MRS-2 West site ranges from approximately 485 ft AMSL to 515 ft AMSL. Generally, the land is level to gently sloped toward surface drainage features. The current TXARNG Camp Swift directly abuts MRS-2 East B to the southwest.

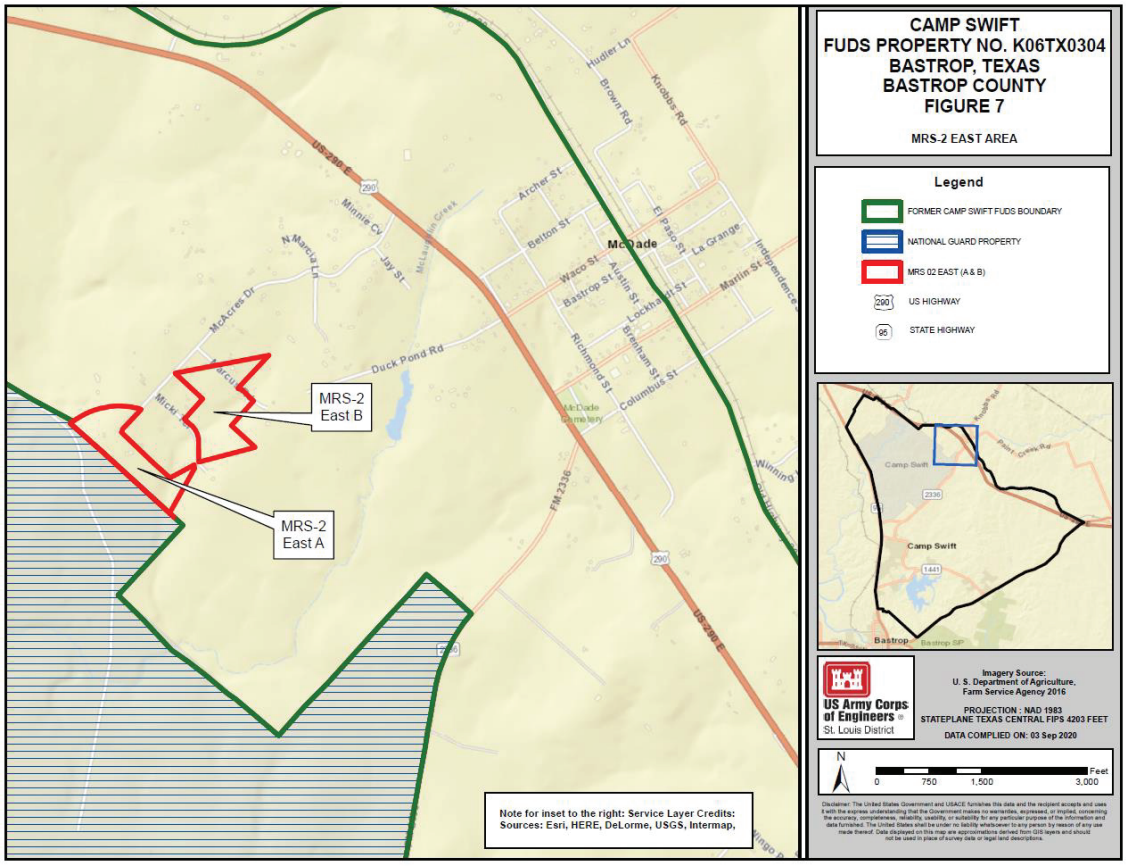
Land use in the MRS-2 East area is primarily rural residential and agricultural (hay and livestock production). Per the BCAD[29], eight property parcels are wholly, or partially, located within the boundaries of MRS-2 East (Figure 8). At least seven structures have been constructed on MRS-2 East A as of January 2018 and may include two residences. The presence of residences may indicate the co-occurrence of underground utilities (sanitary sewer/septic lines, potable water lines or wells, electrical and digital lines) within the boundary of MRS-2 East A. At least four structures have been constructed on MRS-2 East B and may include one residence. As with the other areas of MRS-2, the presence of residences may indicate the co-occurrence of underground utilities within the boundary of MRS-2 East B.

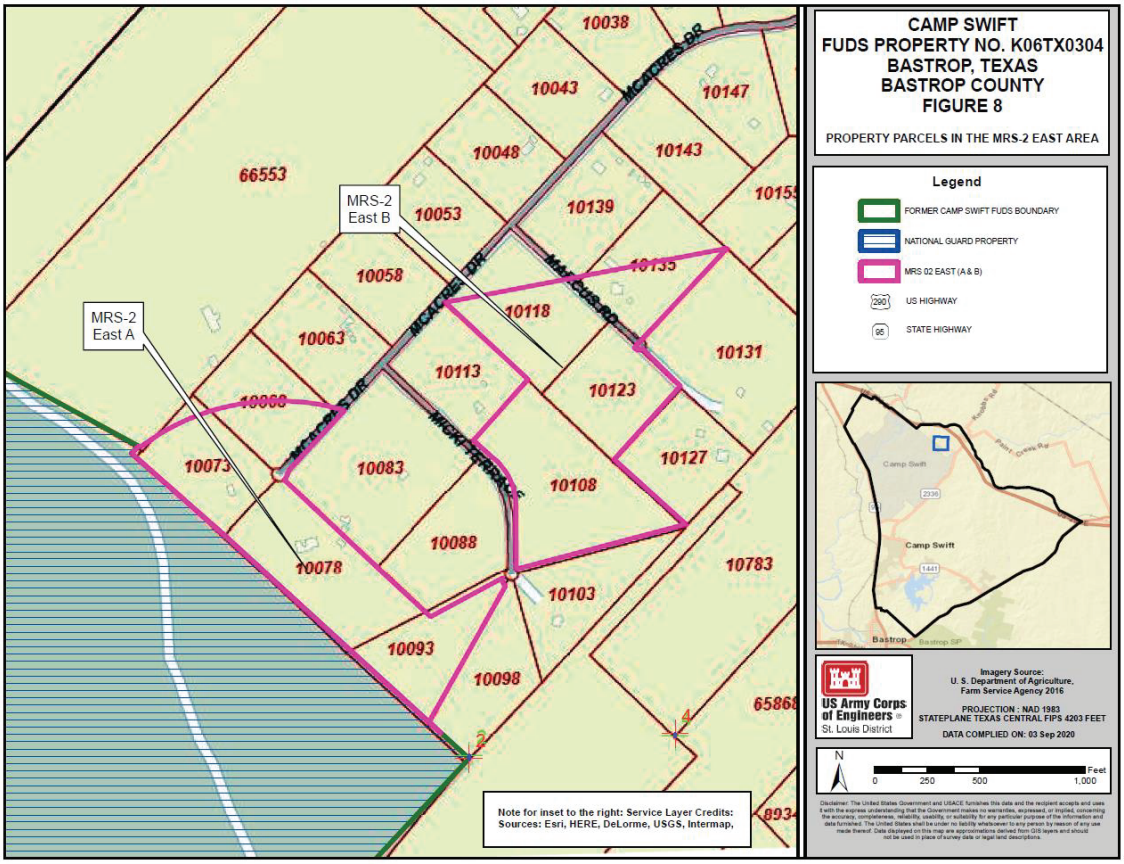
While denser redevelopment does not appear to be occurring at MRS-2 East as of the date of the most recent public aerial photographs, this portion is located within three miles of MRS-2 West and is expected to be subject to similar redevelopment pressure currently, or in the foreseeable future. As such, a land use change at MRS-2 East from rural residential/agricultural to moderately dense suburban residential appears reasonably possible. According to information maintained by the TRRC[30], one natural gas transmission line trends north-south through MRS-2 East A (Figure 9).

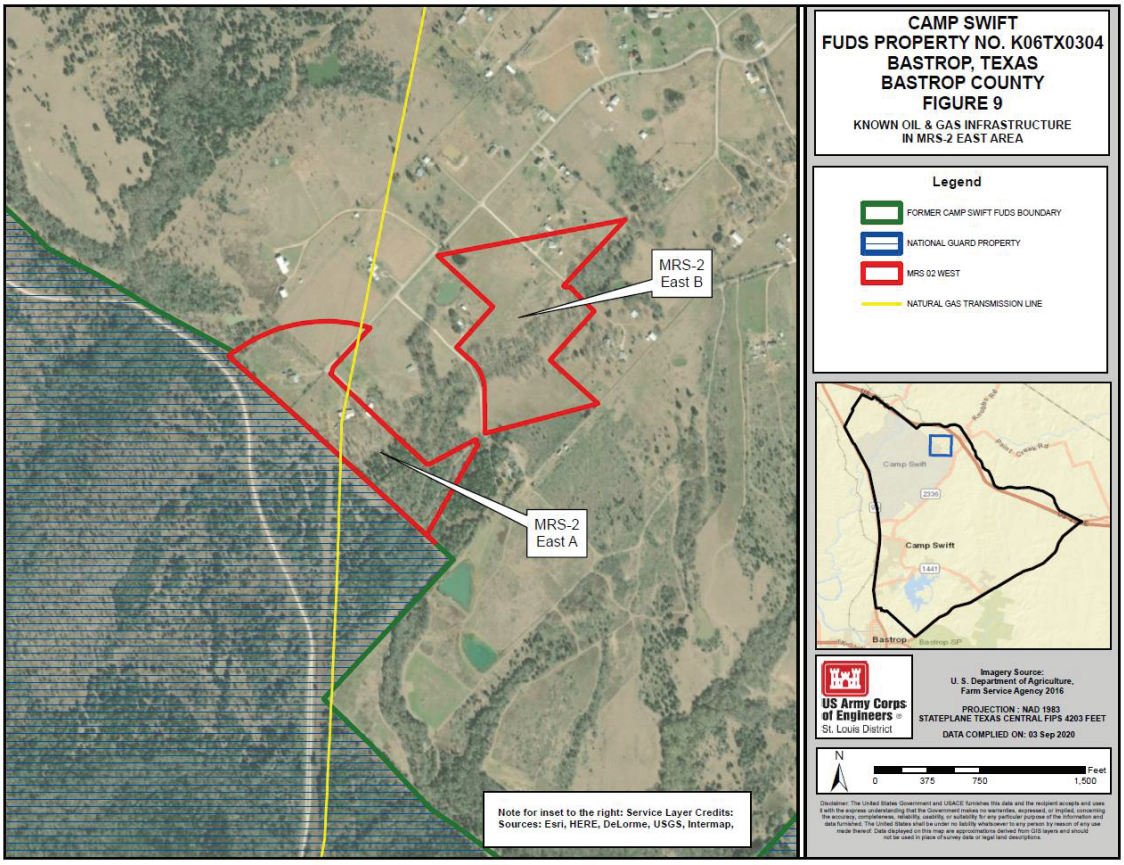
A drainage feature, indicated by USGS[31] to be an intermittent stream, bisects MRS-2 East B from northeast to southwest and trends south through the southeast portion of MRS-2 East A (Figure 10). This intermittent stream drains into McLaughlin Creek south of MRS-2 East. As of January 2018, one surface water body was present in MRS-2 East B. The feature appears to be an excavated pond or stock tank. This pond is approximately 0.15 ac in size. Another stock tank appears to have been constructed immediately outside of the western boundary of MRS-2 East B. Both appear to collect water at the head of a branch of the unnamed tributary and were constructed some time prior to 1989. As of January 2018, no surface water bodies were noted in MRS-2 East A. The tributary and the pond just outside of the MRS-2 East B boundary are included in the USFWS NWI map for the area (Figure 11).

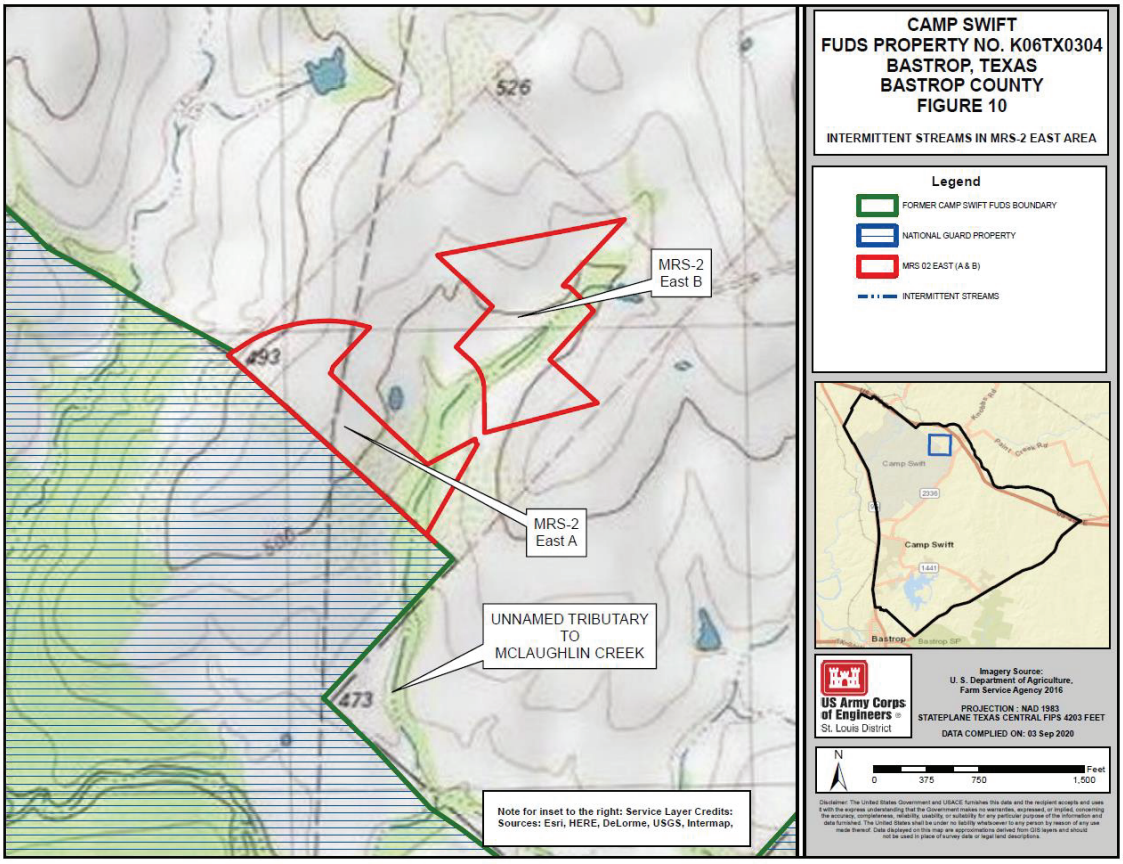
According to information maintained in the THC Archaeological Sites Atlas[32], MRS-2 East has no previously recorded archaeological sites within the MRS boundary and no previous surveys have been performed for these two areas (MRS-2 East A and MRS-2 East B). According to the THC Historic Sites Atlas[33], no recorded historical sites are located within the boundaries of MRS-2 East.

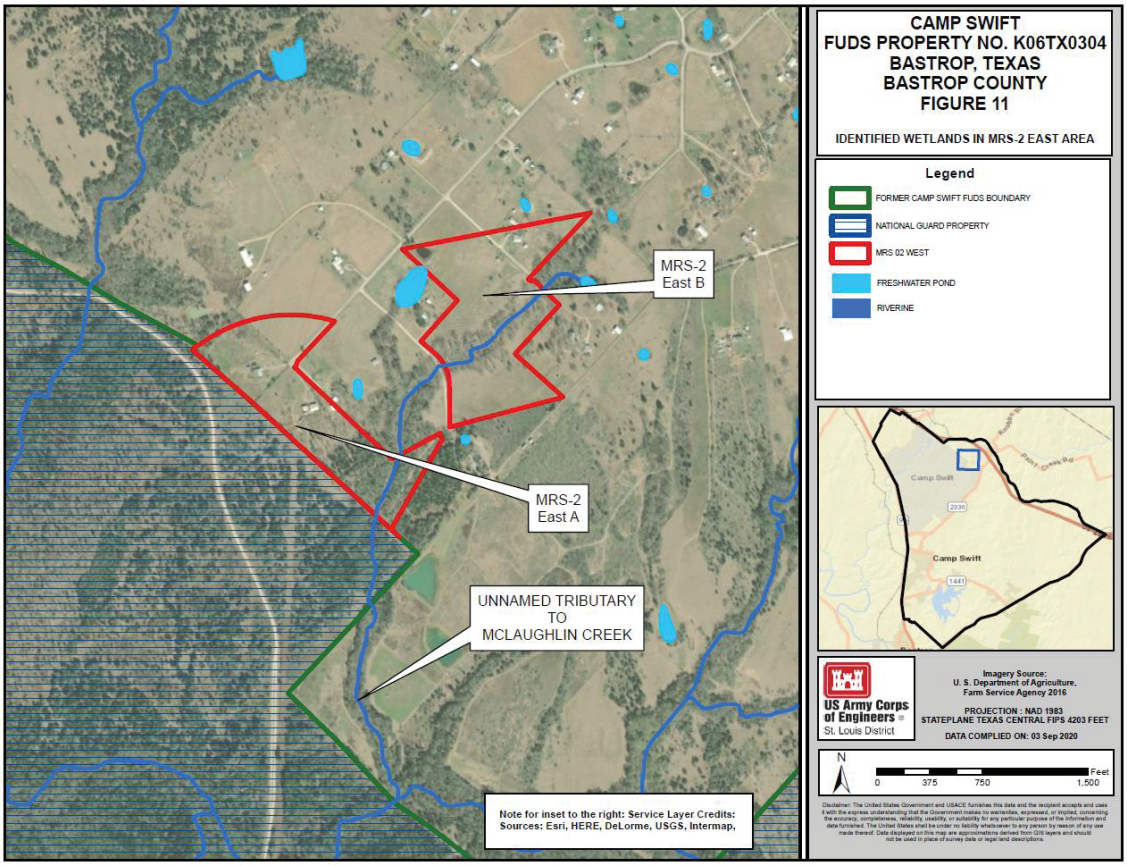
[29] (BCAD, Online).
[30] (TRRC, Online).
[31] (USGS, 2016).
[32] (THC, Online).
[33] (THC, Online).


CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 7
MRS-2 EAST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 EAST (A & B)
US HIGHWAY
STATE HIGHWAY
MRS-2 East B
MRS-2 East A
McDade
Camp Swift
Bastrop
US Army Corps of Engineers
St. Louis District
Imagery Source: U. S. Department of Agriculture, Farm Service Agency 2016
PROJECTION : NAD 1983 STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0 750 1,500 3,000 Feet
Note for inset to the right: Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap,


MRS-2
East B
MRS-2
East A
10038
10043
10147
10048
10143
66553
10053
10139
10058
10135
10118
10063
10131
10113
10123
10088
10073
10083
10127
10108
10088
10078
10783
10103
10093
10098
65868
Note for inset to the right: Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap,
CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 8
PROPERTY PARCELS IN THE MRS-2 EAST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 EAST (A& B)
US HIGHWAY
STATE HIGHWAY
Camp Swift
Bastrop
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
250
500
1,000
Feet


MRS-2
East B
MRS-2
East A
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,
CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 9
KNOWN OIL & GAS INFRASTRUCTURE
IN MRS-2 EAST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
NATURAL GAS TRANSMISSION LINE
Camp Swift
Bastrop
US Army Corps
of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
375
750
1,500
Feet


526
493
505
473
MRS-2
East B
MRS-2
East A
UNNAMED TRIBUTARY
TO
MCLAUGHLIN CREEK
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,
CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 10
INTERMITTENT STREAMS IN MRS-2 EAST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 EAST (A & B)
INTERMITTENT STREAMS
Camp Swift
Bastrop
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
375
750
1,500
Feet


MRS-2
East B
MRS-2
East A
UNNAMED TRIBUTARY
TO
MCLAUGHLIN CREEK
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,
CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 11
IDENTIFIED WETLANDS IN MRS-2 EAST AREA
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
FRESHWATER POND
RIVERINE
Camp Swift
2336
Camp Swift
1441
US Army Corps
of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 03 Sep 2020
N
0
375
750
1,500
Feet

2.2 Site History and Enforcement Activities

An ASR and a supplement were developed in 1994[34] for the former Camp Swift area. In these documents, the area, including the current MRS-2 West area, was identified as being used for small arms training and forming portions of multiple artillery ranges. The area including the current MRS-2 East area was identified as a possible artillery range, possible portions of rifle and carbine transition ranges, a field combat range, a tank destroyer moving target range, and a rocket and grenade launcher range. The ASR documented no history of MEC located in the area.

During the history of this project, the site has gone through multiple nomenclatures for each investigated area in the course of each investigation. Generally, these re-designations represented an increase of focus on better-defined investigational areas as greater data was obtained.

Based on the results of the 2012 RI and the recommendations of the 2015 FS, the MRSs at the Camp Swift FUDS property were delineated[35] into areas expected to have similar impacts and anticipated remedial approaches. At that time, the current MRS-2 was defined.

Table 1 below briefly summarizes this naming evolution.

Table 1: History of Nomenclature for the MRS-2 Sites Across Historic Site Documents

This DD (2021)	Revised INPR (2016)	FS (2015) and Proposed Plan (2015)	RI (2012)	EE/CA (2007)
MRS-2 West	MRS-2	MRS-1	MRS North 1	Sector 1
MRS-2 East (A and B)	MRS-2	MRS-1	MRS North 2	Sector 2

An EE/CA was developed in 2007[36]. The MEC/MD discovered in the MRS-2 West portion of the EE/CA are summarized in Table 2 below. "Sector 2" of the EE/CA included the area currently designated as MRS-2 East. It was not investigated during the EE/CA but the EE/CA noted that the presence of 57mm projectiles was possible based on site history.

Table 2: Targets Found in the Current MRS-2 Area During the 2002 EE/CA

MRS-2 AREA	TARGET ID	DESIGNATION	TYPE	DEPTH (inches)
MRS-2 West	0	MD	Unidentifiable Frag.	3
MRS-2 West	1	MD	Unidentifiable Frag.	3
MRS-2 West	2	MD	Unidentifiable Frag.	3
MRS-2 West	10	MD	Unidentifiable Frag.	3
MRS-2 West	34	MD	Unidentifiable Frag.	3
MRS-2 West	50	MD	Unidentifiable Frag.	3
MRS-2 West	661	MD	Rocket	25
MRS-2 West	689	MD	Unidentifiable Frag.	12
MRS-2 West	3839	MD	Anti-tank Mine	11
MRS-2 West	3911	MD	Unidentifiable Frag.	11
MRS-2 West	4005	MD	Anti-tank Mine	13
MRS-2 West	4876	MD	Rocket	25
MRS-2 West	5336	MEC	Anti-tank Mine	11
MRS-2 West	5465	MD	Rocket	24
MRS-2 West	5607	MEC	Anti-tank Mine	13

[34] (USACE, 1994).
[35] (USACE, 2016)
[36] (Parsons, 2007)

MRS-2 West	5648	MD	Unidentifiable Frag.	18
MRS-2 East A	NA			
MRS-2 East B	NA			

MD: munitions debris
MEC: munitions or explosives of concern
Frag.: fragments
NA: Not applicable – the areas now designated as "MRS-2 East A" and "MRS-2 East B" were part of "Sector 2" of the EE/CA. Sector 2 was not investigated during the EE/CA but the EE/CA noted that the presence of 57mm projectiles was possible based on site history.

An RI was initiated for former Camp Swift in 2012[37]. The RI sampling strategy at MRS-2 was designed to map the horizontal and vertical extent of MEC and MD contamination in soils at the site, and to determine if any previously unknown munitions could be present. Digital geophysical mapping (DGM) was performed to provide a permanent record of geo-located measurements and form objective criteria for identifying geophysical anomalies.

The RI concluded that both MRS North 1 and MRS North 2 were likely former impact or buffer areas associated to a historical firing range that was historically located on property that is now a portion of the current TXARNG Camp Swift. No MEC was recovered in the area currently defined as MRS-2. MD recovered is summarized in Table 3 below and RI results are mapped in Figures 12 and 13. Though MEC was not found during the RI, the RI concluded that MEC, if present, was estimated to have a maximum ground penetration depth of 24 inches bgs.

Table 3: Targets Found in the Current MRS-2 Area During the 2012 RI

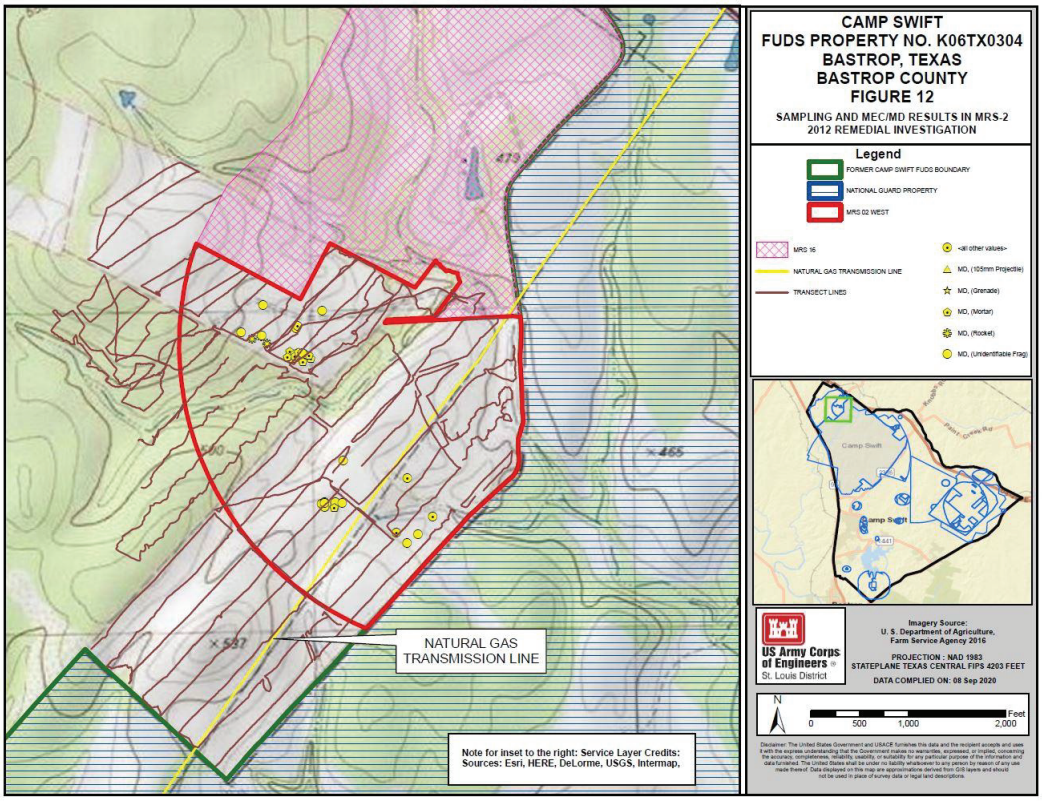
MRS-2 AREA	TARGET ID	DESIGNATION	TYPE	DEPTH (inches)
MRS-2 West	MRSN1-01_0001	MD	Unidentifiable Frag.	8
MRS-2 West	MRSN1-01_0002	MD	Unidentifiable Frag.	4
MRS-2 West	MRSN1-01_0003	MD	4.2 inch Mortar	2
MRS-2 West	MRSN1-01_0004	MD	Unidentifiable Frag.	3
MRS-2 West	MRSN1-01_0005	MD	4.2 inch Mortar	2
MRS-2 West	MRSN1-01_0006	MD	Unidentifiable Frag.	3
MRS-2 West	MRSN1-01_0014	MD	Unidentifiable Frag.	4
MRS-2 West	MRSN1-01_0015	MD	4.2 inch Mortar	3
MRS-2 West	MRSN1-01_0016	MD	Unidentifiable Frag.	5
MRS-2 West	MRSN1-01_0018	MD	Unidentifiable Frag.	6
MRS-2 West	MRSN1-01_0019	MD	Unidentifiable Frag.	3
MRS-2 West	MRSN1-02_0001	MD	4.2 inch Mortar	7
MRS-2 West	MRSN1-02_0002	MD	4.2 inch Mortar	8
MRS-2 West	MRSN1-02_0003	MD	4.2 inch Mortar	6
MRS-2 West	MRSN1-02_0005	MD	4.2 inch Mortar	8
MRS-2 West	MRSN1-02_0006	MD	4.2 inch Mortar	4
MRS-2 West	MRSN1-02_0008	MD	4.2 inch Mortar	6
MRS-2 West	MRSN1-02_0009	MD	4.2 inch Mortar	4
MRS-2 West	MRSN1-02_0010	MD	4.2 inch Mortar	3
MRS-2 West	MRSN1-02_0012	MD	4.2 inch Mortar	3
MRS-2 West	MRSN1-02_0013	MD	4.2 inch Mortar	6
MRS-2 West	MRSN1-02_0014	MD	4.2 inch Mortar	6
MRS-2 West	MRSN1-02_0015	MD	4.2 inch Mortar	8
MRS-2 East A	mrsn2_h1_0027	MD	2.36 inch Rocket	10
MRS-2 East A	mrsn2_m2_0004	MD	2.36 inch Rocket	24
MRS-2 East A	mrsn2_m2_0016	MD	Cannonball	18
MRS-2 East B	NA			

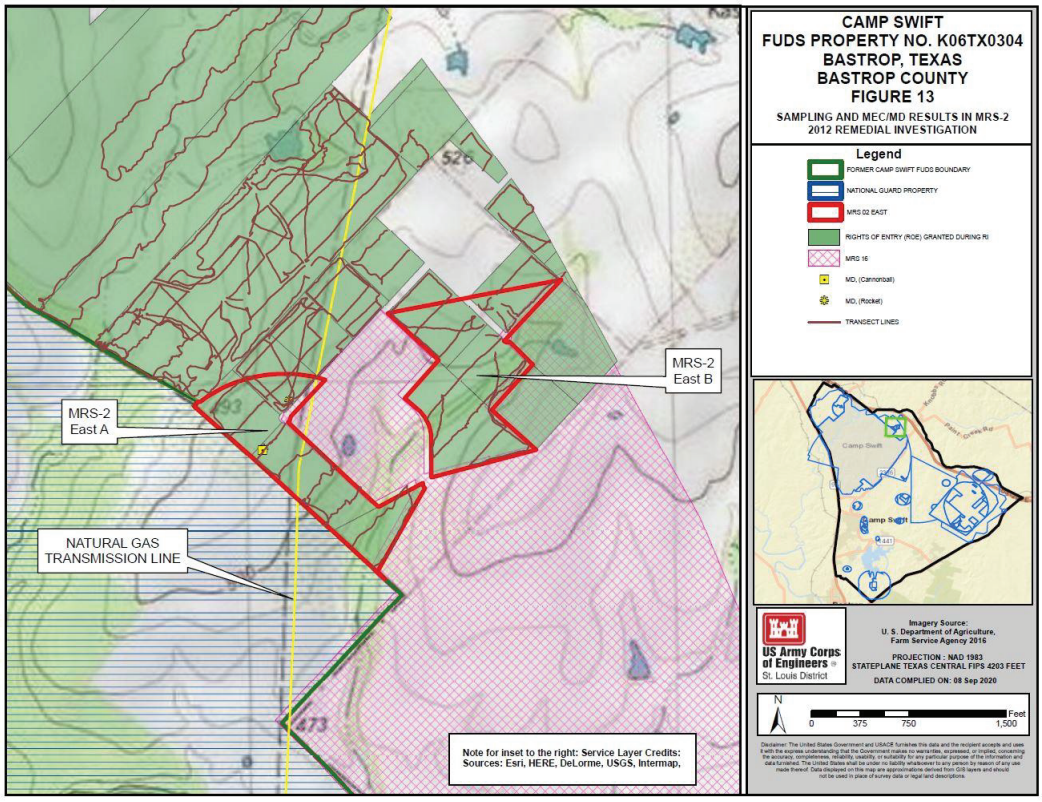
[37] (TtEC, 2015a).

MRS-2 AREA	TARGET ID	DESIGNATION	TYPE	DEPTH (inches)
MD: munitions debris **Frag.:** fragments **NA:** Not applicable – no MD or MEC identified				

MC sampling and analysis were performed to determine the presence or absence of MC contamination at locations within Camp Swift where MEC or MD was found. The MC sampling program implemented a biased sampling approach that was focused on, or was triggered by, the discovery of MEC items that were corroded or breached or had exposed explosive filler. Clusters of MD also triggered need for MC sampling. The DGM investigation results were used to guide and focus this program in specific areas (e.g., target and impact areas). Only soil was sampled, and all samples were analyzed for explosives and targeted metals associated with the munitions used at the range (aluminum, antimony, arsenic, barium, chromium, cobalt, copper, lead, manganese, mercury, molybdenum, nickel, vanadium, and zinc). No explosives compounds were detected, and the maximum detected concentrations of all the metals that were analyzed were less than the calculated site-specific background threshold value (BTV) (i.e., the UTL 95%-95%) concentration for that metal and/or its published Texas-Specific Mean Background concentration (TCEQ, 2013). As such, based on the information collected in the RI, there is no unacceptable risk to human or ecological receptors from MC at the site (See Section 2.4 in this document and the Remedial Investigation[38] for further information). More detailed information concerning the MC sampling and analysis conducted at MRS-2, and the resulting risk conclusions, are presented in the RI/FS[39] for former Camp Swift FUDS property.

[38] (TtEC, 2015a).
[39] (TtEC, 2015a).


CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 12
SAMPLING AND MEC/MD RESULTS IN MRS-2
2012 REMEDIAL INVESTIGATION
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 WEST
MRS 16
NATURAL GAS TRANSMISSION LINE
TRANSECT LINES
<all other values>
MD, (105mm Projectile)
MD, (Grenade)
MD, (Mortar)
MD, (Rocket)
MD, (Unidentifiable Frag)
NATURAL GAS TRANSMISSION LINE
Note for inset to the right: Service Layer Credits: Sources: Esri, HERE, DeLorme, USGS, Intermap,
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 08 Sep 2020
N
0
500
1,000
2,000
Feet


MRS-2
East A
MRS-2
East B
NATURAL GAS
TRANSMISSION LINE
Note for inset to the right: Service Layer Credits:
Sources: Esri, HERE, DeLorme, USGS, Intermap,
CAMP SWIFT
FUDS PROPERTY NO. K06TX0304
BASTROP, TEXAS
BASTROP COUNTY
FIGURE 13
SAMPLING AND MEC/MD RESULTS IN MRS-2
2012 REMEDIAL INVESTIGATION
Legend
FORMER CAMP SWIFT FUDS BOUNDARY
NATIONAL GUARD PROPERTY
MRS 02 EAST
RIGHTS OF ENTRY (ROE) GRANTED DURING RI
MRS 16
MD, (Cannonball)
MD, (Rocket)
TRANSECT LINES
US Army Corps of Engineers
St. Louis District
Imagery Source:
U. S. Department of Agriculture,
Farm Service Agency 2016
PROJECTION : NAD 1983
STATEPLANE TEXAS CENTRAL FIPS 4203 FEET
DATA COMPLIED ON: 08 Sep 2020
N
0
375
750
1,500
Feet

Given the presence of MD in the MRS-2 areas, the RI concluded that the risk of the potential presence of MEC represented an unacceptable hazard to current and future site residents, workers, and users.

Using these results, an FS[40] was completed in 2015 to develop and assess remedial alternatives to address the risk posed by MEC at MRS-2 (referenced as MRS North 1 and MRS North 2, and subsequently "MRS 1" in the FS).

2.3 Community Participation

The following activities were conducted to disseminate information to the community in the vicinity of the former Camp Swift FUDS property:

- An Administrative Record file was established at Bastrop County Library, which contains past investigation reports and the RI/FS for Camp Swift FUDS property.
- A newspaper announcement was published on October 11, 2015 in the *Austin American Statesman* newspaper to solicit public comment on the Proposed Plans for Camp Swift FUDS MRSs (Appendix A). The public comment period was open from October 16 to November 16, 2015. No public comments were received.
- A public meeting was held at the Lost Pines Scout Reservation (Lindsay Lodge 785 FM 1441, Bastrop, TX 78602) on October 29, 2015. The agenda for the public meeting was to present the summarized results of the RI, describe the alternatives considered, and to present the alternative preferred by USACE and TCEQ. Attendees included representatives of the USACE, USACE's contractor, and the TCEQ. No members of the general public attended.
- The meeting was transcribed by a court recorder, and a copy of the transcript is included in the Meeting Summary, which is part of the Administrative Record at the Bastrop County Library. The transcript is also attached to this document as Appendix B.

2.4 Site Risks and Exposure Pathways

As previously noted, the CSM (Figure 14), developed in the RI/FS provides the basis for developing the risk assessment and response action for the site.

MEC and MD representative of 4.2-inch mortars, 60mm mortars, 2.36-inch rockets, rifle grenades, 105mm projectiles, and cannonballs has been identified in MRS-2. The maximum depth of MD identified in MRS-2 West during the RI was 8 inches bgs. However, due partially to data collected during the EE/CA, the RI concluded that MEC, if present, was estimated to have a maximum ground penetration depth of approximately 24 inches bgs. In MRS-2 East, the maximum depth that MD was identified was 25 inches bgs. The horizontal extent of MD found during the RI, specifically in MRS-2 West and MRS-2 East, is presented in Figures 12 and 13, respectively. The nature and vertical extent of MEC and MD is summarized in Tables 2 and 3 above.

It is considered possible that natural or anthropogenic processes can transport MEC within MRS-2. Though rare, reported frost depth for Bastrop County is up to 5 inches. While the maximum depth of MD discovered was deeper than 5 inches bgs, it is considered unlikely that all MD and MEC, if present, is located at the maximum depth. As such, the potential for frost heave as a mechanism to force MEC, if present, to the surface is reasonably possible. Further, repeated cultivation by heavy equipment over cleared areas for the purpose of hay production or pasture management may uncover shallow MEC and redistribute it across the site.

[40] (TtEC, 2015a).

The potential for natural or anthropogenic processes to transport MEC outside of MRS-2 West is considered unlikely. Surface drainages do not appear to have the capacity for the volume of flow necessary to wash MEC out of the site and human use of the MRS-2 West area is expected to be limited and periodic. Similarly, the potential for natural processes to transport MEC outside of MRS-2 East is expected to be unlikely, again, due to the limited volume of flow in the drainage features. However, as MRS-2 East may be slightly more densely habited and maintained, it is considered possible that human activities (pick up and redistribution) may result in MEC, if present, moving off site.

Site users engaged in site activities on the surface or in the subsurface (residential maintenance, agricultural cultivation, construction, utility work, building fences and similar activities, and well drilling) may encounter MEC. This presents a complete exposure pathway in the CSM (Figure 14). The potential exists for these users to be injured by this exposure.

As noted, during the RI, soil sampling was conducted to determine if chemicals sourced from MCs were present at concentrations sufficient to pose an unacceptable risk to human health or the environment. The results of the sample analyses were compared to preliminary screening value that were based on former Camp Swift site-specific background soil concentrations and selected applicable human health and ecological screening values. MC measured at concentrations greater than the preliminary screening values would be considered a chemical of potential concern (COPC). Based on the results of the RI, MCs were not identified above preliminary screening values and, as such, no COPCs were identified for MRS-2. The RI concluded that MCs do not present a risk to site users or the environment, either in soil or in groundwater. More detailed information concerning the MC sampling and analysis conducted at MRS-2, and the resulting risk conclusions, are presented in the RI/FS[41] for former Camp Swift FUDS property. Based on the information collected in the RI, there is no unacceptable risk to human or ecological receptors from MC at the site.

While ecological receptors are not considered in evaluating MEC hazards, their presence must be considered in planning remedial actions at the site. There are no portions of recorded Critical Habitats within, or adjacent to, the boundaries of MRS-2 West or MRS-2 East. According to information maintained by the USFWS's [42] Information for Planning and Consultation (IPaC) database, and the TPWD Rare, Threatened, and Endangered Species of Texas by County[43], as of the date of this document, the following endangered, threatened, or candidate species have some potential to occur within the MRS-2 area:

Table 4: Threatened and Endangered Species Potentially Occurring in the Camp Swift FUDS Area

Common Name	Scientific Name	Status[44]	Habitat Requirements	Expected Potential to Occur in MRS-2
Interior Least Tern	*Sterna antillarum*	Federal – E State – E	Sand beaches, flats, lagoons, islands, sand and gravel bars within braided streams	Unlikely – potential migrant
Piping Plover	*Charadrius melodus*	Federal – T State – T	Beaches, sandflats, and dunes along the Gulf Coast	Unlikely – potential migrant
Red Knot	*Calidris canutus rufa*	Federal – T State – T	Coastal shores and bays; rarely inland mudflats	Unlikely – potential migrant
Whooping Crane	*Grus americana*	Federal – E State – E	Ponds, marshes, flooded grain fields	Unlikely – potential migrant
Houston Toad	*Bufo houstonensis*	Federal – E State – E	Forests with ephemeral pools, ponds, sandy soil	Possible

[41] (TtEC, 2015a).
[42] (USFWS. IPaC, Online).
[43] (TPWD, Online)
[44] E: Endangered, T: Threatened, C: Candidate, NL: Not Listed

Common Name	Scientific Name	Status[44]	Habitat Requirements	Expected Potential to Occur in MRS-2
Texas Fatmucket	*Lampsillis bracteata*	Federal – C State – T	Streams of slow to moderate current in sand, mud, and gravel substrates among large cobble, boulders, bedrock ledges, bedrock fractures, tree roots and vegetation.	Unlikely[45]
Texas Fawnsfoot	*Truncilla macrodon*	Federal – C State – T	Large rivers and medium-sized streams in protected near sore areas and the head of riffles. Typically, in substrates of mixed sand and gravel as well as soft sediments.	Unlikely[46]
Navasota Ladies-tresses	*Spiranthes parksii*	Federal – E State – E	Openings in post oak woodlands in sandy loams along upland drainages or intermittent streams	Possible
Black Rail	*Laterallus jamaicensis*	Federal – NL State – T	Salt, brackish, and freshwater marshes, pond borders, wet meadows, grassy swamps; nests in or along edge of marsh	Possible if appropriate surface water and vegetative features are present
Reddish Egret	*Egretta rufescens*	Federal – NL State – T	Brackish marshes and shallow salt ponds and tidal flats	Unlikely – potential migrant
Swallow-tailed Kite	*Elanoides forficatus*	Federal – NL State – T	Lowland forested regions, especially swampy areas, ranging into open woodland; marshes along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge	Possible
White-faced Ibis	*Plegadis chihi*	Federal – NL State – T	Freshwater marshes, sloughs, irrigated rice fields; currently found in near-coastal rookeries	Unlikely – potential migrant
Wood Stork	*Mycteria Americana*	Federal – NL State – T	Large tracts of bald cypress or red mangrove; forages prairie ponds, flooded pastures or ditches or other shallow standing water; may be associated with forested wetlands	Unlikely – potential migrant
Zone-tailed Hawk	*Buteo albonotatus*	Federal – NL State – T	Arid open country including open deciduous or pine-oak woodland; often near watercourses and wooded canyons and tree-lined rivers along middle-slopes of desert mountains; nests in various habitats and sites	Possible
Blue Sucker	*Cycleptus elongatus*	Federal – NL State – T	Inhabit rapids, riffles, runs and pools with moderate to fast current with bottoms of exposed bedrock sometimes in combination with hard clay, sand, gravel, and boulders. Current distribution in Texas includes the Red River downstream of Lake Texoma, Sabine and Neches rivers, and Colorado River downstream of Austin, Texas. May occur in other river systems	Possible if site drainages/streams are of sufficient volume.
False Spike Mussel	*Fusconaia mitchelli*	Federal – NL State – T	Small streams to medium-size rivers in riffles and runs with flowing water. Often in substrates of sand, gravel, and cobble.	Possible if site drainages/streams are of sufficient volume.

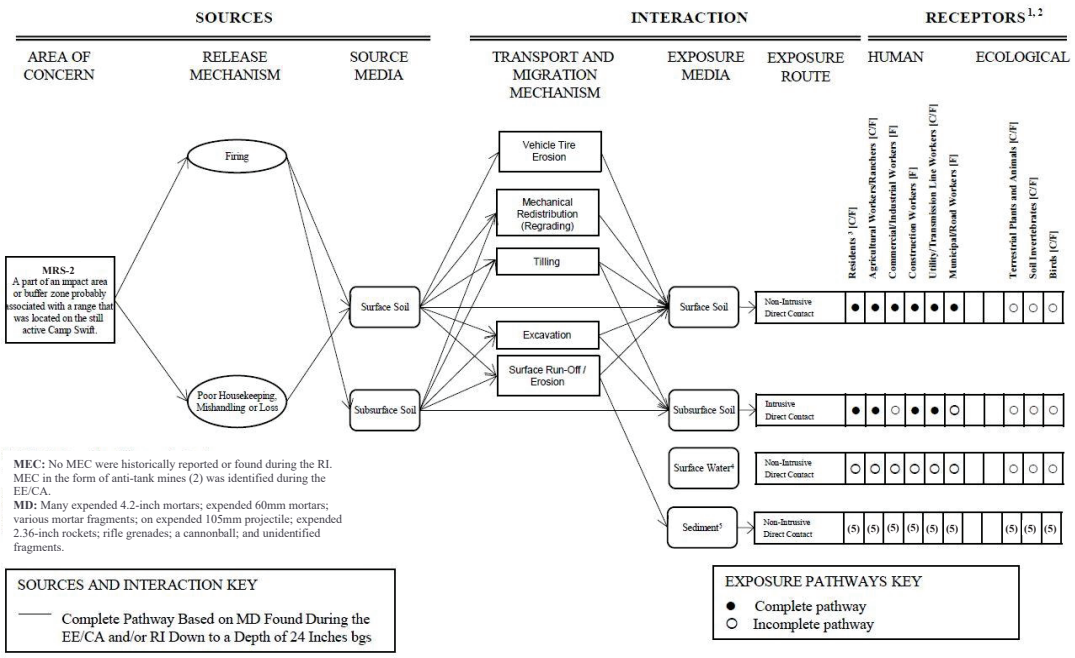
[45] Texas Parks & Wildlife Rare, Threatened, and Endangered Species of Texas website does not record instances of this species in Bastrop County.
[46] Texas Parks & Wildlife Rare, Threatened, and Endangered Species of Texas website does not record instances of this species in Bastrop County.

Common Name	Scientific Name	Status[44]	Habitat Requirements	Expected Potential to Occur in MRS-2
Texas Pimpleback	*Cyclonaias petrina*	Federal – NL State – T	Medium-size streams to large rivers in riffles and runs. Often in substrates of sand, gravel, and cobble including mud-silt or gravel-filled bedrock fractures.	Possible if site drainages/streams are of sufficient volume.
Texas Horned Lizard	*Phrynosoma cornutum*	Federal – NL State – T	Open terrestrial habitats with sparse vegetation, including grass, prairie, cactus, scattered brush/scrubby trees; soil texture from sandy to rocky	Possible

Vegetation trimming, excavations and demolitions, and site access activities are preliminarily identified as activities that may pose risk or impact to the Houston Toad, Navasota Ladies-tresses, and Texas Horned Lizard. Precautionary and mitigation efforts, identified in conjunction with USFWS and TPWD during the remedial design and following the performance of biological surveys, may be necessary for the protection of the Houston Toad, Navasota Ladies-tresses, Texas Horned Lizard, and, potentially, other protected species. Mitigating or protective actions will be documented in an Environmental Protection Plan for the remedial work.

1

Figure 14: Conceptual Site Model for Munitions and Explosives of Concern (MEC) For MRS-2, Camp Swift FUDS, Bastrop, TX



NOTES:

(1) C = Current Receptor; F = Potential Future Receptor

(2) Pathways indicated as "Complete" are complete because MD indicative of HE munitions was found during the EE/CA and/or the RI and the area is accessible to the public.

(3) One apparently occupied structure is in MRS North 1.

(4) Includes four very small ponds and associated intermittent streams.

(5) Intermittent stream sediments are treated as surficial soil.

2.5 Current and Potential Future Site and Resource Uses

As previously noted, current land use in the vicinity of MRS-2 is small scale cattle ranching, light agriculture (hay production) and scattered rural residential properties and thus is only lightly populated. However, new, denser residential neighborhoods have been constructed in the area, and in particular, to both the north (approximately 2,000 linear feet (lf)) and west (130 lf) of MRS-2 West. No suburban development was noted in the area of MRS-2 East as of January 2018. It is considered reasonably possible that both the MRS-2 West and MRS-2 East areas are currently experiencing, or will experience in the foreseeable future, redevelopment pressure to convert to suburban housing developments.

2.6 Remedial Action Objectives (RAOs)

Remediation goals identified in the Feasibility Study and Proposed Plan for the Camp Swift MRSs are:

1. Ensure protectiveness of site workers and the public during the response action operations.
2. Ensure overall protectiveness of the public after completion of the response action by minimizing the potential for site users and the public to be exposed to MEC.
3. Comply with ARARs.

With these goals in mind, the RAO developed specifically for MRS-2 in the Feasibility Study (for "MRS 1") was as follows:

- **"*MRS 1****: Many expended 4.2-inch mortars, expended 60mm mortars, various mortar fragments, one expended 105mm projectile, expended 2.36-inch rockets, rifle grenades, a cannonball, and unspecified fragments) have been confirmed to a depth of 24 inches. This MRS is currently used for residential and agricultural purposes. The RAO is to perform a clearance activity to remove MEC to a depth of at least 24 inches such that UU/UE can be obtained and in order to reduce the probability of human interaction during residential development and/or agricultural activities that could exceed 24 inches*." (TtEC, 2015a)

Given the potential for residential redevelopment of the Camp Swift MRSs, and the associated potential for the construction of buried or lower-elevation infrastructure (sanitary sewer lines, water mains, fire hydrant lines, road beds, etc.) the Feasibility Study included options with both 24-inch and 36-inch planned remediation depths. Both depths were expected to meet the RAO by removing MEC "to a depth of at least 24 inches" and by reducing "the probability of human interaction during residential development."

The RAO was summarized in the Proposed Plan (for all MRSs) as:

- "*Perform clearance to remove presence of MEC to depth of 24 inches*." (USACE, 2015).

Previous field data collected at other sites using the technology proposed indicates that the types of MEC anticipated (2.36 inch rockets, 4.2 inch mortars, and anti-tank mines) can be detected at the maximum depths at which they are anticipated to occur in MRS-2 with each of the subsurface detection technologies proposed in the various Alternatives.

Current and potential future land uses were considered in development of the RAO. Achievement of the RAO will reduce the risk to site users by removing MEC from the site and raising awareness of the actions to take should they encounter MEC in areas inaccessible to the selected MEC removal activities.

2.7 Description of Alternatives

In the FS, a range of general response actions were identified, evaluated, and screened to develop a list of possible remedial alternatives for the Camp Swift FUDS MRSs. These general response actions were (a) no action, (b) risk and hazard management (e.g., public awareness, signage, *etc.*), and (c) source removal.

Technological options for these general response actions were evaluated using screening criteria that included effectiveness, implementability, and cost. Methods deemed viable were combined into possible remedial alternatives for MRS-2. As required by CERCLA, a No Action alternative was included in the assessment. The intent of No Action is to provide baseline to which other alternatives can be compared. A detailed description of the alternative development process for former Camp Swift is provided in the RI/FS.

The FS identified eleven remedial alternatives appropriate for the 17 MRSs at Camp Swift FUDS. Seven of these were deemed feasible for MRS-2 and were carried forward for analysis:

- Alternative 1 – No Action;
- Alternative 2 – LUCs;
- Alternative 3 – Surface Removal with LUCs;
- Alternative 4C – Subsurface Removal to 2 Feet Using Digital EMI Systems with LUCs;
- Alternative 4D – Subsurface Removal to 3 Feet Using Digital EMI Systems (without LUCs);
- Alternative 5C – Subsurface Removal to 2 Feet Using Digital EMI Systems in Conjunction with Advanced Classification with LUCs; and
- Alternative 5D – Subsurface Removal to 3 Feet Using Digital EMI Systems in Conjunction with Advanced Classification (without LUCs).

In all Alternatives 3 through 5D, some amount of MEC removal is proposed. In all these Alternatives, it is considered possible that limited areas may be inaccessible or impracticable in which to perform MEC removal. Examples of areas which may be concluded, based on field conditions, to be inaccessible include areas under paved county and private hard-surface roads, under permanent structures (such as residences, trailer homes, barns, garages, greenhouses, etc.), in, or under, natural or created surface water bodies, under property contents that property owners may be unwilling to move, in areas where property owners are unwilling to allow vegetation clearance, in areas where private family cemeteries are claimed (if any), or in areas where property owners reject work for any other reason. Additionally, geophysical surveys and removals will not be performed on any levee, bridge or culvert abutments or areas covered in bank stabilization materials (ex. rip rap), if any. Similarly, areas along subsurface utility or transmissions lines and their rights of way (ROWs) may not be surveyed depending on the nature and location (ex. depth) of the utility/transmission line and other information provided by the utility/transmission provider/operator during the remedial design. Depending on the technology proposed, other characteristics may confound the selected remedial approach rendering it impracticable. These include, but are not limited to, dense or mature tree/canopy cover, areas of steep terrain, areas of soft or saturated soils, areas of soils of certain geochemical composition or depth, etc. In these areas, other technologies may be proposed during the remedial design.

2.7.1 Remedy Components

Components of each proposed remedy alternative are described below.

2.7.2 Alternative 1: No Action

The No Action alternative has no components and only provides a baseline to which other alternatives are compared to determine the relative degree of protectiveness offered by each. The risk of exposure to MEC at the site will remain. There is no financial cost associated with this Alternative.

2.7.3 Alternative 2: Implementation of Land Use Controls (LUCs)

Alternative 2 is the implementation of LUCs to discourage interaction with MEC by site users. An educational awareness program would be conducted which would focus on providing information on the areas containing the MEC hazards and the appropriate response if MEC is encountered. The measures will include periodic educational public meetings on the 3R's Explosives Safety Education Program and periodic educational fact sheets that have the goal of modifying behavior to reduce the risk of exposure and reduce the impact if exposure occurs. Fact sheets and educational materials would be distributed through the community and to landowners and residents on parcels in areas identified as having MEC hazards as a result of the RI. Additionally, a website containing relevant project documents and MEC educational and safety information, such as the 3R's Explosives Safety Education Program, would be maintained. Installation of signs on individual properties will also be considered as a public education measure, if individual landowners express an interest.

Alternative 2 Considerations

- Under this Alternative, munitions, if present, will remain on the surface and in the subsurface in MRS-2.
- While LUCs have been shown to be an effective means of reducing risk at MMRP sites, they ultimately depend on the audience to heed the information provided and respond in the appropriate manner. This cannot always be ensured.
- Current land uses can continue following implementation of this remedy. Future subsurface work under current land uses (e.g., fencing, grading, tilling, well digging) should, as a best practice, include consultation with an unexploded ordnance (UXO) contractor to ensure workers are not exposed to MEC. This also applies to changes in land uses that include construction activities, such as residential development. USACE will not be expected to have control over property owners' compliance with this practice.
- USACE expects that Alternative 2 can be designed and implemented within one year of finalization of this DD.
- The FS estimated the cost of Alternative 2 for MRS-2 (then "MRS-1"), in 2015, to be $139,448[47]. For this DD, these costs were escalated to current costs using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator[48]. Additionally, the original FS estimate included costs for a period of five years. Since the LUC activities described here are expected to be required as long as a MEC hazard is judged to remain, an assumption of 30 years is used for cost estimating purposes here. In total, the current cost of 30 years of the implementation of this Alternative is estimated to be $633,958 (undiscounted, based on costs as estimated in the FS). See Appendix C for more details of this calculation.

2.7.4 Alternative 3: Surface Removal of MEC with Implementation of Land Use Controls

Alternative 3 includes removing MEC from all accessible surface areas at MRS-2 with LUCs to address the risk posed by MEC that may remain in the subsurface. The activities involved in this Alternative include the following:

- Biological and cultural resource surveys will be performed, as determined necessary.
- To the extent allowed by the property owner, vegetation on the site will be trimmed to maximize accessibility of the site to removal activities.
- A systematic survey will be conducted using metal detectors to identify and remove MEC items breaking the ground surface from accessible areas of MRS-2.

[47] (Appendix K to Ttech, 2015)
[48] https://www.bls.gov/data/inflation_calculator.htm

- Recovered MEC items will either be detonated in place (i.e. "blown-in-place" (BIP)) or, if safe to move, will be relocated to an area in which multiple MEC items are consolidated for simultaneous detonation ("consolidated shot").
- All munitions debris remaining from demolition shots and MD or scrap metal found during excavation work will be disposed off-site at an authorized disposal facility.
- The removal, detonation, staging and support areas will be restored as agreed with the property owner.
- Following the surface removals, LUCs will be required to address risks due to MEC that may remain below the ground surface. LUCs will be implemented as described in Alternative 2.

Alternative 3 Considerations

- This Alternative requires ROEs to be granted by the landowner(s) for its execution.
- Under this Alternative, munitions, if present, will remain in the subsurface in MRS-2 and in any areas inaccessible to surface removal.
- Current land uses can continue following implementation of this remedy. Future subsurface work under current land uses (e.g., fencing, grading, tilling, well digging) should, as a best practice, include consultation with an unexploded ordnance (UXO) contractor to ensure workers are not exposed to MEC. This also applies to changes in land uses that include construction activities, such as residential development. USACE will not be expected to have control over property owners' compliance with this practice.
- While LUCs have been shown to be an effective means of reducing risk at MMRP sites, they ultimately depend on the audience to heed the information provided and respond in the appropriate manner. This cannot always be ensured.
- Alternative 3 is expected to have the potential to impact protected biological and cultural resources. Collaboration with Federal, State, and Tribal resource stewards is anticipated to be necessary. Depending on these results, additional planning is necessary and mitigation activities or avoidance in some areas may be required. These will be determined during the remedial design.
- USACE expects Alternative 3 can be designed and implemented within two years of finalization of this DD.
- The FS estimated the cost of Alternative 3 for MRS-2 (then "MRS-1"), in 2015, to be $1,306,381[49]. For this DD, these costs were escalated to current costs using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator[50]. Additionally, the original FS estimate included costs for a period of five years. Since the LUC activities described here are expected to be required as long as a MEC hazard is judged to remain, an assumption of 30 years is used for cost estimating purposes here. In total, the current cost of 30 years of the implementation of this Alternative is estimated to be $1,739,114 (undiscounted, based on costs as estimated in the FS). See Appendix C for more details of this calculation.

2.7.5 Alternative 4C/4D: Surface and Subsurface Removal of MEC Using Digital EMI Systems with, and without, the Implementation of Land Use Controls

Alternatives 4C and 4D include the surface and subsurface removal of MEC from all accessible areas of MRS-2. Digital EMI systems, where accessible and to the extent practicable, to accomplish subsurface removals. Where not practicable, other technologies may be employed. This Alternative requires ROEs

[49] (Appendix K to Ttech, 2015)
[50] https://www.bls.gov/data/inflation_calculator.htm

from landowner(s) for its execution. These two alternatives involve the same activities and differ only in the planned removal depth and the implementation of LUCs:

Table 5: Depth and Scope Differences between Alternatives 4C and 4D.

Alternative	Planned Depth of Removal	LUCs Planned
Alternative 4C	2.0 feet (24 inches) bgs	Yes
Alternative 4D	3.0 feet (36 inches) bgs	No

While the RAO was developed to include the removal of MEC to at least 24 inches, alternatives specifying the target removal to 36 inches were included to further reduce the probability of human interaction during residential development and/or agricultural activities that could exceed 24 inches (ex. construction of buried infrastructure including sewer, water, and gas mains, road beds, etc.) and support a designation of UU/UE where such remediation is possible (accessible areas). It is noted that the removal depths considered for these Alternatives were used for planning and costing purposes only. In the event an anomaly remains unresolved after excavating to the removal depth, relevant field data will be considered and a decision will be made whether to continue the excavation until the anomaly is resolved.

The activities involved in both of these Alternatives include the following:

- Biological and cultural resource surveys will be performed, as determined necessary.
- To the extent allowed by the property owner, vegetation trimming and surface MEC removal will be executed as described in Alternative 3.
- Where accessible and practicable, digital geophysical mapping (DGM) will be conducted using EMI systems.
- Digital geophysical data will be analyzed to identify anomalies that are considered to be indicative of buried MEC.
- Anomalies identified as potential MEC will be excavated to assess the nature of the identified anomalies. In the event an anomaly remains unresolved after excavating to the removal depth (2.0 feet in Alternative 4C, 3.0 feet in Alternative 4D), relevant field data will be considered and a decision will be made whether to continue the excavation until the anomaly is resolved.
- Subsurface removal efficacy will be considered achieved when, within the detection limit of the equipment, there are no items detected or classified within the planned depth interval of 5 to 7 times (5x – 7x) the observed instrument background noise.
- All recovered MEC will be destroyed by blowing in place or, if it is safe to move, in a consolidated shot at MRS-2. No public roads will be crossed while transporting MEC.
- All metal debris remaining from demolition shots and MD or scrap metal found during anomaly excavation work will be disposed off-site at an authorized disposal facility.
- The removal, detonation, staging and support areas will be restored as agreed with the property owner.
- Based on the results of the removal, the site will be assessed for its ability to achieve a risk designation of UU/UE. For planning purposes, Alternative 4C assumes LUCs will be necessary but Alternative 4D does not.

<u>Alternative 4C/4D Considerations</u>

- These Alternatives require ROEs to be granted by the property owner(s) for their execution.
- Under this Alternative, there is an expected potential for residual munitions to remain in the subsurface and in the surface where access to removal work is not available or below the planned removal depth.
- The technical approach being utilized in Alternatives 4C/4D generally cannot distinguish between potential MD, MEC, or cultural scrap. As a result, the planned excavation depth for all observed

instrument anomalies will be the specified depth for each Alternative; 2.0 feet and 3.0 feet for Alternatives 4C and 4D, respectively.

- Current land uses can continue following implementation of this remedy. The risk posed from MEC to future subsurface work under current land uses (e.g., fencing, grading, tilling, well digging) or under future land use (e.g. residential development) would be expected to be significantly reduced.
- While LUCs have been shown to be an effective means of reducing risk at MMRP sites, they ultimately depend on the audience to heed the information provided and respond in the appropriate manner. This cannot always be ensured.
- Alternatives 4C/4D are expected to have the potential to impact protected biological and cultural resources. Collaboration with Federal, State, and Tribal resource stewards is anticipated to be necessary. Depending on these results, additional planning, and mitigation activities or avoidance in some areas may be required. These will be determined during the remedial design.
- USACE expects that the field activities in Alternatives 4C/4D can be designed and implemented within three years of finalization of this DD.
- The FS estimated the cost of Alternative 4C (with LUCs) for MRS-2 in 2015, to be $5,875,396[51]. For this DD, these costs were escalated to current costs using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator[52]. Additionally, the original FS estimate included costs for a period of five years. Since the LUC activities described here are expected to be required as long as a MEC hazard is judged to remain, an assumption of 30 years is used for cost estimating purposes here. The cost estimates for management, institutional controls, and 5YRs were expanded to a 30-year timeframe. In total, the current cost of 30 years of the implementation of Alternative 4C is estimated to be $6,786,350 (undiscounted, based on costs as estimated in the FS). See Appendix C for more details of this calculation.
- The FS estimated the cost of Alternative 4D (without LUCs) for MRS-2 (then "MRS-1"), in 2015, to be $7,834,857[53]. These costs were escalated to current costs using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator. The current estimated cost for the implementation of Alternative 4D is estimated to be $8,648,611 (undiscounted, based on costs as estimated in the FS). See Appendix C for more details of this calculation.

2.7.6 Alternatives 5C/5D – Surface and Subsurface Removal of MEC using Digital EMI in Conjunction with Advanced Classification with, and without, the Implementation of Land Use Controls

Both Alternatives 5C and 5D include the surface and subsurface removal of all accessible areas of MRS-2 but propose an additional technology to that proposed in Alternatives 4C/4D.

Advanced classification technologies and methodologies will be used in both Alternatives 5C and 5D, where accessible and to the extent practicable, to accomplish the subsurface removals. Where not practicable, other technologies may be employed. Advanced classification technology uses electromagnetic data collected to predict whether an identified anomaly represents a MEC item or a non-MEC-related cultural item (ex. hand tools, horseshoes, barbed wire remnants, etc.) and offers the potential of reducing the number of excavations needed to recover MEC from the site. Since the greatest cost of cleaning up munitions sites is from needlessly excavating targets that pose no explosive risk (ex. scrap metal, lost tools, chains, etc.), advanced classification techniques can be a more cost-effective remediation method. As previously noted, this ability to distinguish MEC from MD or cultural scrap can be used to

[51] (Appendix K to Ttech, 2015)
[52] https://www.bls.gov/data/inflation_calculator.htm
[53] (Appendix K to Ttech, 2015)

inform decisions to excavate beyond the planned excavation depth. Finally, these techniques also provide more information about the anomalies left in the ground, thereby increasing confidence in the remedy.

Like Alternatives 4C/4D, Alternatives 5C/5D differ in their planned/estimated removal depth and in the implementation of LUCs.

Table 6: Depth and Scope Differences between Alternatives 5C and 5D.

Alternative	Planned Depth of Removal	LUCs Planned
Alternative 5C	2.0 feet (24 inches) bgs	Yes
Alternative 5D	3.0 feet (36 inches) bgs	No

Given the ability of advanced classification to distinguish between MD, MEC, and cultural scrap, detected items expected to be MEC will be removed regardless of depth, in accordance with USACE policy.

The activities involved in these Alternatives include the following:

- Biological and cultural resource surveys will be performed, as determined necessary.
- As allowed by the property owner, vegetation trimming and surface MEC removal will be executed as described in Alternative 3.
- Where accessible and practicable, geophysical mapping will be conducted across the site using digital EMI and advanced classification systems and the data analyzed to identify anomalies that suggest MEC items are present. Such anomalies will be designated as "Targets of Interest" (TOIs).
- TOIs will be excavated and resolved. Anomalies that can be predicted to be caused by the presence of cultural scrap, called non-TOIs, will generally not be excavated.
- Anomalies for which the data cannot clearly predict a risk character (uncertain provenance) will additionally be labeled as TOIs and will be excavated.
- In the event a TOI remains unresolved after excavating to the planned removal depth (2.0 feet bgs in Alternative 5C, 3.0 feet bgs in Alternative 5D), excavation will continue until the target is resolved.
- A limited number of non-TOIs will also be excavated for QC/QA purposes.
- Subsurface removal efficacy will be considered achieved when, within the detection limit of the equipment, there are no items detected or classified within the planned depth interval of 5 to 7 times (5x – 7x) the observed instrument background noise.
- All recovered MEC will be destroyed by blowing in place or, if it is safe to move, in a consolidated shot at MRS-2.
- All metal debris remaining from demolition shots and MD or scrap metal found during anomaly excavation work will be disposed off-site at an authorized disposal facility.
- The removal, detonation, staging and support areas will be restored as agreed with the property owner.
- Based on the final results of the removal process, the site will be assessed for its ability to achieve a risk designation of UU/UE. For planning purposes, Alternative 5C assumes LUCs will be necessary but Alternative 5D does not.

<u>Alternative 5C/5D Considerations</u>

- These Alternatives require ROEs to be granted by the landowner(s) for their execution.
- Under these Alternatives, there is an expected potential for residual munitions to remain in the subsurface and in the surface in inaccessible areas.

- Current land uses can continue following implementation of this remedy. The risk posed from MEC to future subsurface work under current land uses (e.g., fencing, grading, tilling, well digging) or under future land use (e.g. residential development) would be expected to be significantly reduced.
- While LUCs have been shown to be an effective means of reducing risk at MMRP sites, they ultimately depend on the audience to heed the information provided and respond in the appropriate manner. This cannot always be ensured.
- Alternatives 5C/5D are expected to have the potential to impact protected biological and cultural resources. Collaboration with Federal, State, and Tribal resource stewards is anticipated to be necessary. Depending on these results, additional planning is necessary and mitigation activities or avoidance in some areas may be required. These will be determined during the remedial design.
- USACE expects that the field activities in Alternatives 5C/5D can be designed and implemented within three years of finalization of this DD.
- The FS estimated the cost of Alternative 5C (with LUCs) for MRS-2, in 2015, to be $3,456,200[54]. For this DD, these costs were escalated to current costs using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator[55]. Additionally, the original FS estimate included costs for a period of five years. Since the LUC activities described here are expected to be required as long as a MEC hazard is judged to remain, an assumption of 30 years is used for cost estimating purposes here. In total, the current cost of 30 years of the implementation of this Alternative is estimated to be $4,097,279 (undiscounted, based on costs as estimated in the FS). See Appendix C for more details of this calculation.
- The FS estimated the cost of Alternative 5D (without LUCs), in 2015, to be $3,870,300[56]. These costs, inflated to the date of this document using the Bureau of Labor Statistics' Consumer Price Index Inflation Calculator were estimated to be $4,191,999 (undiscounted, based on costs as estimated in the FS). See Appendix C for more details of this calculation.

2.8 Common Elements and Distinguishing Features of Each Alternative

Alternative 1 has no common elements with any other alternatives. Its distinguishing feature is no action will be taken and MEC hazards will remain at the site.

Alternatives 2, 3, 4C, and 5C all have a LUC component. This is expected to be necessary because each of these Alternatives may leave MEC at the site. Alternative 2 has two distinguishing features:

1. No removals will occur in the implementation of this remedy;
2. Vegetation removal/trimming is not anticipated. The reduction of habitat disturbance may present less risk to biological resources than that in Alternatives 3, 4C/4D, and 5C/5D.

Alternative 3 is distinguished as the only removal Alternative to not include removal in the subsurface. Only surface removal is proposed.

Alternatives 3, 4C/4D, and 5C/5D all require USACE or its representatives to access private property and all will require the granting of ROEs by property owners. Alternative 2 may require ROEs if signage is permitted by property owners.

Alternatives 3, 4C/4D, and 5C/5D all are expected to potentially disturb protected biological or cultural resources. Alternative 3 may have less disturbance to cultural resources as only surface removals will be

[54] (Ttech, 2015. App. K)
[55] https://www.bls.gov/data/inflation_calculator.htm
[56] (Ttech, 2015. App. K)

performed and less (or no) disturbance of subsurficial soils is anticipated. Alternatives 5C and 5D may result in less disturbance to cultural resources than the Alternatives 4C and 4D as less excavations are anticipated.

As previously discussed, Alternatives 4C/4D and 5C/5D are similar with the exceptions of the type of technologies proposed for the performance of subsurface removals; the planned depth of excavation; and whether LUCs were proposed in the Alternative in the Proposed Plan. The technologies proposed in both the 4C/4D and 5C/5D Alternatives are expected to be able to detect the relevant MEC identified to their expected maximum depths based on occurrences documented in the EE/CA and RI.

Table 7: Duration and Cost Estimates for Each Alternative

Alternative	Time for Design and Execution	Period of Operation and Maintenance (O&M)	Cost Estimate [1,2] (U.S. $)
Alternative 1	None	None	$0
Alternative 2	1 year	> 30 years	$633,958
Alternative 3	2 years	> 30 years	$1,739,114
Alternative 4C	3 years	> 30 years	$6,786,350
Alternative 4D	3 years	None	$8,648,611
Alternative 5C	3 years	> 30 years	$4,097,279
Alternative 5D	3 years	None	$4,191,999

1. Includes 30 years of O&M for LUCs and 5YRs where O&M costs are proposed. LUCs and 5YRs are expected to continue as long as hazards from residual MEC are expected remain.
2. Costs are escalated to July 2020 values from the Feb. 2015 values proposed in the FS and are presented undiscounted.

2.9 Federal and State ARARs

As mandated by the National Environmental Policy Act (NEPA) of 1970, generally, work performed by the United States must be accomplished in accordance with the provisions of many ecological, environmental, and cultural resource protection Acts, Regulations, Orders, and Policies. Implementation of these regulations at sites remediated under CERCLA differs from implementation elsewhere, in that the requirements of these Acts, Regulations, Orders, and Policies are incorporated as Applicable or Relevant and Appropriate Requirements (ARARs) into the Superfund process.

CERCLA section 121(d), NCP, and USEPA guidance require, and provide a framework for, the development of site-specific ARARs that pertain to the particular contamination, location characteristics, and activities addressed by the response action. Although the CERCLA process sets acceptable risk-based goals for cleanups, it does not impose specific restrictions on the various activities (such as treatment, storage, and disposal of waste) that may occur during a response. The USEPA instead relies on other federal and state environmental laws and regulations to inform response activities through the ARARs selection process[57]. At FUDS sites, the USACE has been delegated as the authority to select and implement remedies under CERCLA. CERCLA sections 121(d)(2) and (d)(4) establish a process for how federal and state environmental laws should apply to on-site CERCLA response actions (i.e., the ARARs process)[58]. Pursuant to the NCP, "applicable requirements" means those promulgated cleanup standards, standards of control, and other substantive requirements, criteria, or limitations that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance

[57] Pursuant to CERCLA section 121(d) (*Degree of cleanup*), any remedial action selected by the USEPA must meet two threshold requirements. The remedy: (1) must attain a degree of cleanup which, at a minimum, assures protection of human health and the environment and (2) shall require a level or standard of control, at the completion of the action, which at least attains (or justifies a waiver of) all ARARs with respect to any hazardous substance, pollutant or contaminant that will remain onsite. 42 U.S.C. § 9261(d)(1); *see also* 40 C.F.R. §§ 300.430(f)(5)(ii)(A); 300.430(f)(5)(ii)(A)—(b). Further, the NCP requires remedies to attain (or waive) ARARs during the course of a remedial action. 40 C.F.R. § 300.435(b)(2).
[58] National Oil and Hazardous Substances Pollution Contingency Plan, 55 Fed. Reg. 8666, 8742 (Mar. 8, 1980).

found at a CERCLA site[59]. "Relevant and appropriate" means those promulgated cleanup standards, standards of control, and other substantive requirements, criteria, or limitations that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site, address problems or situations sufficiently similar to those encountered that their use is well suited to the particular site.

The following laws and regulations are considered potential ARARs for this project. Other potential ARARs may be considered if new or expanded site information becomes available during the remedial design process.

2.9.1 The Endangered Species Act (ESA) of 1973, as Amended and Texas Administrative Code (TAC) (TAC 65.171 – 65.177 and 69.1 – 69.9)

2.9.1.1 The ESA

The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the USFWS and the National Marine Fisheries Service (NMFS). The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife.

Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. The law (50 CFR Part 17) requires federal agencies, in coordination with the USFWS and/or the NMFS, to ensure that the actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law also prohibits any action that causes a "take" of any listed species of endangered fish or wildlife. USFWS defines "take" as actions that harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect endangered species or any attempt to engage in such actions.

2.9.1.2 Texas Rare, Threatened, and Endangered Species Protection Regulations (TAC 65.171 – 65.177)

For a State law to qualify as an ARAR, the state standard must be (1) promulgated, (2) more stringent than federal standards, (3) legally applicable or relevant and appropriate, and (4) timely identified with respect to a particular site[60].

The Texas legislature has authorized regulations pertaining to the management, regulation, and protection of native animals listed as state threatened or endangered. Under these, no person may capture, trap, take, or kill, or attempt to capture, trap, take, or kill those species listed as threatened or endangered by the State of Texas unless a valid permit is acquired[61]. Notwithstanding these requirements, CERCLA section 121(e) provides that "[n]*o Federal, state, or local permit shall be required for the portion of any removal or remedial action conducted entirely onsite, where such remedial action is selected and carried out in compliance with this section*." [62] This exemption applies to all administrative requirements, whether or not they are actually referred to as "permits."[63] Accordingly, only the substantive requirements of State biological resource preservation ARARs must be met at sites remediated under CERCLA. As specified in

[59] 40 C.F.R. § 300.5.
[60] 40 C.F.R. § 300.400(g)(4)
[61] 42 U.S.C. § 9621(e)(1).
[62] (USEPA, 1988. *Compliance with Other Laws Manual Part I: Interim Final*, § 1.2.2.1; [hereinafter USEPA, 1988])
[63] *Id.* (including "approval of, or consultation with administrative bodies, consultation, issuance of permits, documentation, reporting, recordkeeping, and enforcement").

USEPA guidance, substantive requirements "are those requirements that pertain directly to actions or conditions in the environment." Conversely, administrative or procedural requirements "are those mechanisms that facilitate the implementation of the substantive requirements of a statute or regulation."[64]

Generally, those species listed by the USFWS as Federally Threatened or Endangered also appear as State-listed species. However, in Bastrop County, the State has 10 additional listed (Threatened) species. Given that the Texas protections for these biological resources are (1) promulgated, (2) more stringent than federal standards, (3) relevant and appropriate since they are reported to occur in Bastrop County, and (4) timely identified, the substantive portions of Texas' protections for these species are considered to be ARARs for the site.

Texas Administrative Code (TAC) 65.171 (General Provisions) states "No person may (1) take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed by the [Texas Parks and Wildlife Department] as endangered; or (2) take, possess, propagate, transport, export, sell or offer for sale, or ship any species of fish or wildlife listed in this subchapter as threatened…."

2.9.1.3 Compliance with State and Federal Wildlife ARARs at MRS-2

At MRS-2, vegetation trimming, excavations and demolitions, and site access activities are preliminarily identified as activities that may pose risk or impact to at least three Federal or State Threatened or Endangered species: the Houston Toad, Navasota Ladies-tresses, and Texas Horned Lizard. Others that may be potentially impacted may be identified during the remedial design planning or biological survey processes. These ARARs apply to Alternatives 3, 4C/4D, and 5C/5D, and to Alternative 2 if signs are installed as part of LUCs.

While no State permits will be solicited, USACE will communicate with USFWS and TPWD to implement "reasonable and prudent measures" to minimize jeopardy to, and "take" of, these species and destruction or adverse modification of habitat, as required by the ESA and State ARARs. Work plans in all Alternatives 3 through 5D will be developed to describe work requirements to meet this ARAR.

2.9.2 The Resource Conservation and Recovery Act (RCRA) of 1976, as Amended

An action-specific ARAR under RCRA Subpart X (40 CFR Part 264, Subpart X) is applicable if consolidated demolition is performed by open burn/open detonation (OB/OD) or disposal within a blast chamber or if a single location is selected for demolition of all MEC items found (consolidated shot). RCRA Subpart X requires that certain location, performance, and operating standards are met in these instances which are protective of human health and the environment. USACE will meet the RCRA performance standards for this alternative. This ARAR is expected to apply to Alternatives 3, 4C/4D, and 5C/5D if MEC is disposed via blow-in-place or consolidated shot. Work plans in all Alternatives will be developed to describe work requirements to meet this ARAR.

2.9.3 Federal Chemical-Specific ARARs

There are no environmental laws, regulations, or orders that specifically require the removal of MEC to given chemical-specific regulatory levels.

As previously discussed, based on the results of the RI, there are no COPCs related to MCs at the site and thus the chemical-specific laws and regulations (CERCLA, RCRA, etc.) related to MCs that might otherwise be applicable are not considered ARARs for the MRS-2 site.

[64] (USFWS, 2011, Appendix D)

2.9.4 State Chemical-Specific ARARs

Given there were no identified risks to soils, groundwater, or surface water from MCs identified for the MRS-2 site, no chemical-specific or waste-specific State ARARs were identified for the proposed actions beyond those already contemplated by RCRA Subpart X.

2.9.5 Cultural Resource Protection ARARs

2.9.5.1. The National Historic Preservation Act (NHPA) of 1966, as Amended

Section 106 (36 CFR Part 800) of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (or a party designated to act for the Council) a reasonable opportunity to comment on such undertakings. The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties, commencing at the early stages of project planning. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize, or mitigate any adverse effects on historic properties.

CERCLA response actions taken by USACE at the Camp Swift MRS-2 FUDS are a Federal undertaking within the meaning of Section 106 of the NHPA[65]. These undertakings, collectively or individually, have the potential to affect historic/archaeologic properties[66]. Per the NHPA, in each state, the State Historic Preservation Officer (SHPO) is authorized to administer the NHPA. In Texas, in accordance with TAC Chapter 442, Section 442.005, the executive director of the Texas Historical Commission (THC) is designated as the SHPO. In this role, the SHPO advises and assists federal and state agencies and local governments in carrying out their historic preservation responsibilities. In general, in consultation with the SHPO and Tribal Historic Preservation Officers (THPOs), the federal agency must apply the criteria of adverse effects to historic properties within the area of potential affects (APE). If an adverse effect is found, the federal agency must consult further to resolve the adverse effect.

However, as previously noted under the ESA, CERCLA specifically exempts environmental responses from administrative requirements of all other ARARs, whether or not they are actually referred to as "permits."[67] Accordingly, only the substantive requirements of cultural resource preservation ARARs must be met at sites remediated under CERCLA including the identification of historic properties and attempts to avoid, minimize, or mitigate any adverse effects on such properties. Coordination with SHPO and THPOs is expected to support USACE in identifying historic properties and potential adverse effects and developing ways to avoid, minimize, or mitigate any adverse effects.

2.9.5.2 The Archaeological Resources Protection Act (ARPA) of 1979 (43 CFR Subtitle A, Part 7)

The Archaeological Resources Protection Act of 1979 (ARPA), is a Federal law passed in 1979 and amended in 1988. It governs the excavation of archaeological sites on Federal and Indian lands in the United States, and the removal and disposition of archaeological collections from those sites. The Act aims to secure, for the present and future benefit of the American people, the protection of archaeological resources and sites on Federal and tribal lands. These resources are considered an irreplaceable part of the nation's heritage.

The following ARPA requirements are considered substantive for CERCLA sites in which there are located known, or discovered, archaeological resources:

[65] 54 U.S.C. § 300-320.
[66] Within the meaning of 54 U.S.C 300320 and regulations set forth at 36 C.F.R. Part 800.
[67] (USEPA, 1988)

- "No person may excavate, remove, damage, or otherwise alter or deface, or attempt to excavate, remove, damage, or otherwise alter or deface any archaeological resource unless such activity meets the substantive requirements that would be included in a permit issued under section 470cc. – 16 USC 470ee(a)"; and

- "Information about nature and location of archaeological resources must be protected from public release - 16 USC 470hh(b)."

2.9.5.3 The Native American Graves Protection and Repatriation Act (NAGPRA) of 1990

The Native American Graves Protection and Repatriation Act describes the rights of Native American lineal descendants, Indian tribes, and Native Hawaiian organizations with respect to the treatment, repatriation, and disposition of Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony, referred to collectively in the statute as cultural items, with which they can show a relationship of lineal descent or cultural affiliation. A major purpose of the statute is to provide greater protection for Native American burial sites and more careful control over the removal of Native American human remains, funerary objects, sacred objects, and items of cultural patrimony. Excavation or removal of any such items also must be done under procedures required by the ARPA. Other provisions of NAGPRA stipulates that illegal trafficking in human remains and cultural items may result in criminal penalties.

The following NAGPRA requirements are considered substantive and may be applicable or relevant to the site should Native American objects be discovered during the course of the remedial action:

- "If inadvertent discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony occurs, the Agency must stop the activity in the area of the inadvertent discovery and make a reasonable effort to protect the human remains, funerary objects, sacred objects, or objects of cultural patrimony discovered inadvertently." - 43 CFR 10.4(c)
- "If the human remains, funerary objects, sacred objects, or objects of cultural patrimony must be excavated or removed, such excavation or removal must meet the substantive requirements of 43 CFR 10.3. – 43 CFR 10.4(d)(v)."
- "Disposition of any excavated or removed human remains, funerary objects, sacred objects, or objects of cultural patrimony shall be in accordance with 43 CFR 10.6 and 10.7. - 43 CFR 10.4(d)(vi)."

2.9.5.4 Cultural Resources in MRS-2

As previously noted, USACE has identified the presence of one known and recorded archaeological site within the MRS-2 West boundary. However, the entirety of MRS-2 West has not been covered in a cultural survey. The one known site is relatively large, and, as such, it is expected that there is a high potential for additional, unidentified, archaeological sites to be present in MRS-2 West. MRS-2 East has no previously recorded archaeological sites within the MRS boundary and no previous surveys have been performed for these two areas (MRS-2 East A and MRS-2 East B). As such, the potential for unidentified archaeological sites to be present in MRS-2 East is unknown. No historical sites have been recorded in either MRS-2 West or MRS-2 East. Structures of certain criteria, particularly over an age of 45 years, if present, may be considered historical resources.

Alternatives 3, 4C/4D, and 5C/5D all involve the disturbance of soil and the potential risk to cultural resources, particularly archaeological resources. In each of these Alternatives, during remedial design, the potential for the presence of historic resources will be assessed and a Cultural Resources Management Plan will be developed to address the substantive requirements of these ARARs. As such, it is expected that Alternatives 2, 3, 4C, 4D, 5C, and 5D can be accomplished in accordance with these ARARs.

2.9.6 The Clean Water Act (CWA) of 1972, as Amended

According to information provided by USGS and the USFWS National Wetlands Inventory Map, mapped surface drainages and wetlands occur within both MRS-2 West and MRS-2 East.

The CWA establishes the basic structure for regulating discharges of pollutants into the Waters of the United States (WOTUS) and regulating quality standards for surface waters.

A primary purpose of the Clean Water Act (CWA), also known as the Federal Water Pollution Control Act, is to restore and maintain the quality of surface waters. Pursuant to 40 CFR 230.10(b), no discharge of dredged or fill material shall be allowed if the discharge:

- Causes or contributes to violations of any applicable State water quality standards;
- Violates any applicable toxic effluent standard or discharge prohibition under CWA Section 307 (Toxic and Pre-treatment Effluent Standards)
- Jeopardizes endangered or threatened species or their habitat designated as critical habitat under the Endangered Species Act; or
- Violates requirements to protect any marine sanctuary designated under Title III of the Marine Protection, Research, and Sanctuaries Act of 1972.

The guidelines also prohibit the discharge of dredged or fill material that will cause or contribute to significant degradation of the waters of the U.S. (40 CFR 230.10(c)).

Generally the CWA regulations that are most likely to be ARARs for Superfund actions are the requirements for (1) surface-water quality; (2) direct discharges to surface waters; (3) indirect discharges to publicly-owned treatment works (POTWs); or (4) discharges of dredge-and-fill materials into surface waters (including wetlands). Pollutants are regulated under the CWA according to their category:

- Toxic pollutants: priority pollutants identified by the USEPA (CWA Section 307(a)(1));
- Conventional pollutants: including total suspended solids (TSS), biochemical oxygen demand, fecal coliform, oil and grease, and pH (CWA Section 304(a)(4)); and
- Nonconventional pollutants: any pollutant not identified as conventional or toxic (40 CFR Section 122.21(i)(2)).

The discharge of pollutants under the CWA is regulated by permits through the National Pollutant Discharge Elimination System (NPDES). NPDES requires permits for direct discharges to surface waters (including creeks, rivers, etc.). The permits contain limits based upon either effluent (discharge) standards, or, if they are more stringent, ambient (overall water quality) standards. NPDES permits are issued, monitored, and enforced by USEPA, or by a State agency authorized by EPA to administer an equivalent State program (ex. TCEQ).

As previously noted, an on-site discharge from a CERCLA site to surface waters must meet the substantive NPDES requirements but need not obtain an NPDES permit nor comply with the administrative requirements of the permitting process. To meet the substantive requirements, during the site remedial design, the potential for the accidental discharge of pollutants (ex. gasoline/lubricants/oils from site equipment) or sediment from disturbed soils (sourced from grading, excavations, or erosion in work areas), must be evaluated. Best management practices (BMPs) may be used to limit or eliminate the potential for discharge of pollutants into waters of the U.S. Plans for BMPs, if considered necessary, will be developed during the remedial design.

It is not anticipated that the MRS-2 area is serviced by drainages for publicly-owned treatment works; however, if present and subject to discharges from the site, the CWA also requires that discharges by nondomestic users into POTWs must meet pre-treatment standards. Any discharge from a CERCLA site to a POTW is considered an off-site activity. It is, therefore, subject to both the substantive and

administrative requirements of the national pretreatment program, and to all applicable State and local pretreatment regulations. The presence or absence of drainage collection systems will be evaluated during the remedial design.

Alternatives 3, 4C/4D, and 5C/5D all involve the disturbance of soil and the potential for work, directly, in areas designated as wetlands. In each of these Alternatives, work plans will be developed to address the substantive requirements of these ARARs.

2.9.7 Other Texas State ARARs

Beyond those discussed above, no other State ARARs have been identified.

2.10 Expected Outcomes of Each Alternative

No socioeconomic, community revitalization impacts are expected as a result of implementing any of the alternatives. No environmental or ecological benefits are expected as a result of implementing any of the alternatives. The RI documented no CPOCs at the site, thus there are no expected impacts (i.e. reduction of CPOCs, if present) on groundwater quality or use.

This evaluation considers the possibility that field teams will be unable to collect geophysical data in limited portions of the site. Areas which may be excluded include areas under paved county and private roads, under permanent structures (such as homes, trailer homes, barns, greenhouses, etc.), in or under natural or created surface water bodies, under property contents that property owners may be unwilling to move, in areas where property owners are unwilling to allow vegetation clearance, in areas where private family cemeteries are claimed (if any), or in areas where property owners reject work for any other reason. Additionally, geophysical surveys and removals will not be performed on any levee, bridge or culvert abutments or areas covered in bank stabilization materials (ex. rip rap), if any. Similarly, areas along subsurface utility or transmissions lines and their ROWs may not be surveyed depending on the nature and location (ex. depth, construction, contents) of the utility/transmission line and other information provided by the utility/transmission provider/operator during the remedial design. Depending on the technology proposed, other characteristics may confound the selected remedial approach rendering it impracticable. These include, but are not limited to, dense or mature tree/canopy cover, areas of steep terrain, areas of soft or saturated soils, areas of soils of certain geochemical composition or depth, etc. In these areas, other technologies may be proposed during the remedial design.

2.10.1 Alternative 1 – No Action / Baseline Comparison

Site users and possible future residents will continue to be exposed to MEC risks. No impacts will occur to protected biological, ecological, or cultural resources.

2.10.2 Alternative 2 – Implementation of LUCs

Under LUCs, the threat to public health from MEC exposure will be reduced to the extent that the controls are effective in limiting potential exposures and the risky behavior of individuals. Any activities at the site on the surface or in the subsurface will continue to present a threat of exposure of MEC to the site users or workers. Minimal or no impacts to protected biological, ecological, or cultural resources will occur.

Alternative 2, alone, does not achieve the MRS-2 specific RAO. This alternative is not retained for further evaluation at former Camp Swift MRS-2 as a stand-alone remedy. However, it is retained for consideration in conjunction with Alternatives 4D and 5D.

2.10.3 Alternative 3 – Surface Removal of MEC with the Implementation of LUCs

This Alternative will significantly reduce the risk of direct contact with MEC located on the surface. Any activities at the site in the subsurface will continue to present a threat of exposure of MEC to the site users or workers. LUCs will be implemented as described in Alternative 2 to address the hazard from MEC that may remain in the subsurface and residual MEC in the surface. Impacts to protected biological, ecological, or cultural resources could occur.

Alternative 3 does not achieve the MRS-2 specific RAO.

2.10.4 Alternatives 4C/4D – Surface and Subsurface Removal of MEC Using EMI with the Implementation of Land Use Controls

Alternatives 4C and 4D propose the utilization of EMI systems technology, where accessible and to the extent practicable, to significantly reduce the risk of direct contact with MEC located on the surface and in the subsurface. LUCs will be implemented, as described in Alternative 2, with Alternative 4C to address the residual hazard from MEC that may remain in the subsurface. LUCs are not proposed in Alternative 4D. Impacts to protected biological, ecological, or cultural resources could occur.

Alternatives 4C and 4D both achieve the MRS-specific RAO.

2.10.5 Alternatives 5C/5D – Surface and Subsurface Removal of MEC Using Advanced Geophysical Classification (AGC) with LUCs

Alternatives 5C and 5D propose the utilization of EMI systems technology in conjunction with advanced classification, where accessible and to the extent practicable, to significantly reduce the risk of direct contact with MEC located on the surface and in the subsurface. LUCs will be implemented, as described in Alternative 2, with Alternative 5C to address the residual hazard from MEC that may remain in the subsurface. LUCs are not proposed in Alternative 5D. Impacts to protected biological, ecological, or cultural resources could occur.

Alternatives 5C and 5D both achieve the MRS-specific RAO.

2.11 Summary of Comparative Analysis of Alternatives

2.11.1 Evaluation Method

A detailed analysis was completed for the remedial alternatives developed to address MEC hazards at MRS-2. The analysis evaluated and compared the remedial action alternatives against the baseline condition (no action) and each other to select the preferred alternative to address site risks. A detailed account of this analysis is provided in the RI/FS report for the Camp Swift FUDS property. A summary of this process is provided here.

The detailed analysis evaluated each remedial alternative against nine CERCLA-mandated criteria. These nine criteria are split into three groups:

Table 8: Nine CERCLA-Mandated Evaluation Criteria

Criteria Category	Considerations	Criteria
Threshold Criteria	An alternative must meet the requirements of each of these criteria in order to be considered for further evaluation	Overall Protectiveness of Human Health and the Environment determines whether an alternative adequately protects human health and the environment from unacceptable risks posed by MEC in both the short- and long-term.
		Compliance with ARARs evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified.

Criteria Category	Considerations	Criteria
Primary Balancing Criteria	Primary balancing criteria are used to weigh major trade-offs among alternatives.	Long-Term Effectiveness and Performance considers the ability of an alternative to maintain protection of human health and the environment over time.
		Reduction of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of principal contaminants, their ability to move in the environment, and the amount of contamination present.
		Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
		Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
		Cost includes estimated capitol and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over times in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
Modifying Criteria	These are considered after the public and stakeholders have had the opportunity to comment on the Proposed Plan. In the final balancing of trade-offs between alternatives upon which the final remedy selection is based, modifying criteria and primary balancing criteria are equally important.	State/Support Agency Acceptance considers whether the State agrees with the analyses and recommendations, as described in the RI/FS and Proposed Plan.
		Community Acceptance considers whether the local community agrees with the analyses and preferred alternative. Comments received on the Proposed Plan are an important indicator of community acceptance.

2.11.2 Evaluation Conclusions and Summary

Each of the seven Alternatives (1, 2, 3, 4C/4D, and 5C/5D) were evaluated against the nine CERCLA criteria (Table 8 above). The following sections summarize the evaluation of each Alternative and identifies the most practicable solution for reducing the potential MEC exposure hazard at MRS-2. Table 9 summarizes the discussions in this Section.

Table 9: Summary of Analyses of Remedial Alternatives for Small Arms/Artillery Ranges Munitions Response Site 2 (MRS-2), Camp Swift FUDS

		THRESHOLD CRITERIA		BALANCING CRITERIA					MODIFYING CRITERIA		
Alt No.	**Description**	**Overall Protection of Human Health and the Environment**	**Compliance with ARARs**	**Long-Term Effectiveness and Permanence (1)**	**Reduction of Risk through Treatment**	**Short-Term Effectiveness**	**Implementability**	**Cost (2) (30-Year)**	**State / Support Agency Acceptance**	**Community Acceptance**	**Conclusion**
1	No Further Action Alternative	**Not protective.** No source reduction and thus no reduction of future risk.	None applicable.	**Not effective.** Does not temporarily, or permanently, reduce risk. **Results in no change to baseline Hazard Level for MRS-2.**	**No reduction** of MEC risk through treatment (removal).	No additional short-term risks to the area or receptors. Can be implemented immediately.	Highly implementable due to no actions required.	$0	**Not accepted by the State of Texas.**	No community preference (rejection or acceptance) noted.	**Not selected.** This Alternative does not meet the threshold criteria (is not protective), does not meet the RAO, and does not have the acceptance of the State of Texas.
2	Land Use Controls (LUCs) (public education options)	Protective. Public awareness can reduce interaction with MEC, thus reducing risk. Degree of risk reduction depends upon audience receiving communications and adherence to 3R tenets. No source reduction.	None applicable.	Effective. Not permanent. Long-term effectiveness is dependent upon the audience not becoming inured or accustomed to the communication such that it is no longer heeded (signs, public education) No reduction of MEC source. Ongoing LUCs to be performed in perpetuity. **Results in no change to baseline Hazard Level for MRS-2.**	**No reduction** of MEC risk through treatment (removal).	No additional short-term risks to the area or receptors. Can be implemented within one year	Very easily implementable.	$633,958	**Not accepted by the State of Texas as a sole remedy.**	No community preference (rejection or acceptance) noted.	**Selected in conjunction with another alternative.** Alone, this Alternative does not meet the RAO and does not have the acceptance of the State of Texas. However, this remedy is proposed to be employed to supplement another selected alternative (see Alternative 5D below).
2	Land Use Controls (signage options)	Protective. Public awareness can reduce interaction with MEC, thus reducing risk. Degree of risk reduction depends upon audience receiving communications and adherence to 3R tenets No source reduction.	Activities may temporarily disturb small portions of soil and habitats. ARARs identified would be applicable. **ARARs are considered achievable** with the development of appropriate workplans.			Some short-term risks to project workers installing sign. Can be implemented within one year.	Easily implementable where ROEs are not required. On private property, implementation will depend upon the provision of ROEs to USACE.				
3	Surface Removal of MEC with LUCs.	Protective. MEC risks in the surface will be greatly reduced. No reduction of risk will be achieved in the subsurface. The degree of additional risk reduction through LUCs will be as that noted in Alternative 2.	Activities will temporarily disturb soils and habitats. ARARs identified would be applicable. **ARARs are considered achievable** with the development of appropriate workplans.	Effective and permanent. Reduces MRS-2 Hazard Level from 3 to 4. Hazard Level "4" is the lowest achievable hazard level.	Greatly reduced MEC risk in surficial soils through treatment (removal). **No reduction** of MEC in deeper soils.	Some short-term risks to project workers, and ecological, biological, or archaeological resources. Can be implemented within two years.	Implementability will depend upon the provision of ROEs to USACE as well as the accessibility of the site to project workers.	$1,739,114	**Not accepted by the State of Texas.**	No community preference (rejection or acceptance) noted.	**Not selected.** This Alternative does not meet the RAO and does not have the acceptance of the State of Texas. This Alternative only partially reduces risk and potentially allows MEC to remain in the subsurface where it may be encountered by the public in the future.
4C	Surface Removal and Subsurface Removal of MEC (to 2.0 feet bgs) Using EMI with LUCs	Protective. MEC risks in the surface and subsurface will be greatly reduced. The degree of additional risk reduction through LUCs will be as that noted in Alternative 2.	Activities will temporarily disturb soils and habitats. ARARs identified would be applicable. **ARARs are considered achievable** with the development of appropriate workplans.	Effective and permanent. Reduces MRS-2 Hazard Level from 3 to 4. Hazard Level "4" is the lowest achievable hazard level.	Greatly reduced MEC risk in surficial and subsurficial soils through treatment (removal).	Some short-term risks to project workers, and greater risk to ecological, biological, or archaeological resources. Can be implemented within three years.	Implementability will depend upon the provision of ROEs to USACE as well as the accessibility of the site to project workers.	$6,786,350	Accepted by the State of Texas	No community preference (rejection or acceptance) noted.	**Not selected.** The planned depth of this Alternative meets, but does not exceed, the greatest depth of detection of MEC at MRS-2. The reduction of MEC risk is not as great as that offered in Alternative 4D or 5D.

Alt No.	Description	THRESHOLD CRITERIA		BALANCING CRITERIA					MODIFYING CRITERIA		Conclusion
		Overall Protection of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence (1)	Reduction of Risk through Treatment	Short-Term Effectiveness	Implementability	Cost (2) (30-Year)	State / Support Agency Acceptance	Community Acceptance	
4D	Surface Removal and Subsurface Removal of MEC (to 3.0 feet bgs) Using EMI (no LUCs)	Protective. MEC risks in the surface and subsurface will be greatly reduced.	Activities will temporarily disturb soils and habitats. ARARs identified would be applicable. **ARARs are considered achievable** with the development of appropriate workplans.	Effective and permanent. Reduces MRS-2 Hazard Level from 3 to 4. Hazard Level "4" is the lowest achievable hazard level.	Greatest reduced MEC risk in surficial and subsurficial soils through treatment (removal).	Some short-term risks to project workers, and greatest risk to ecological, biological, or archaeological resources. Can be implemented within three years.	Implementability will depend upon the provision of ROEs to USACE as well as the accessibility of the site to project workers.	$8,648,611	Accepted by the State of Texas	No community preference (rejection or acceptance) noted.	**Not selected** Alternative is expected to provide the greatest permanent reduction of risk but at a cost significantly greater than an expected equal MEC risk reduction offered by Alternative 5D.
5C	Surface Removal and Subsurface Removal of MEC (to 2.0 feet bgs) Using EMI and AGC with LUCs	Protective. MEC risks in the surface and subsurface will be greatly reduced.	Activities will temporarily disturb soils and habitats. ARARs identified would be applicable. **ARARs are considered achievable** with the development of appropriate workplans.	Effective and permanent. Reduces MRS-2 Hazard Level from 3 to 4. Hazard Level "4" is the lowest achievable hazard level.	Greatly reduced MEC risk in surficial and subsurficial soils through treatment (removal).	Some short-term risks to project workers, and greater risk to ecological, biological, or archaeological resources. Can be implemented within three years.	Implementability will depend upon the provision of ROEs to USACE as well as the accessibility of the site to project workers.	$4,097,279	Accepted by the State of Texas	No community preference (rejection or acceptance) noted.	**Not selected** The planned depth of this Alternative meets, but does not exceed, the greatest depth of detection of MEC at MRS-2. The reduction of MEC risk is not as great as that in Alternative 4D or 5D.
5D	Surface Removal and Subsurface Removal of MEC (to 3.0 feet bgs) Using EMI and AGC (no LUCs)	Protective. MEC risks in the surface and subsurface will be greatly reduced.	Activities will temporarily disturb soils and habitats. ARARs identified would be applicable. **ARARs are considered achievable** with the development of appropriate workplans.	Effective and permanent. Reduces MRS-2 Hazard Level from 3 to 4. Hazard Level "4" is the lowest achievable hazard level.	Greatest reduced MEC risk in surficial and subsurficial soils through treatment (removal).	Some short-term risks to project workers, and greater risk to ecological, biological, or archaeological resources. Can be implemented within three years.	Implementability will depend upon the provision of ROEs to USACE as well as the accessibility of the site to project workers.	$4,191,999	Accepted by the State of Texas	No community preference (rejection or acceptance) noted.	**Selected** Alternative 5D is expected to provide the greatest permanent reduction of MEC risk for the best cost. It is accepted by the State. Implementability is dependent upon property owners. Alternative 2 is additionally selected to address remaining risk from residual MEC, if any, posed due to lack of ROEs, inaccessibility, or lack of equipment detection.

Notes:

(1) Hazard Levels shown are discussed in further detail in the 2015 Feasibility Study (Ttech, 2015) and its Appendix G-2.

(2) Costs are presented undiscounted. See Appendix C for estimate details.

2.11.2.1 Threshold Criteria 1: Overall Protectiveness of Human Health and the Environment
Overall protection of human health and the environment addresses whether an alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative 1 provides no source reduction or reduction of future risk and is not protective of human health and the environment.

Alternative 2 provides no source reduction but mitigates risk by educating users and the public about the risk of MEC exposure at the site via LUCs. Alternative 2 does not achieve the MRS-2 specific RAO.

Alternative 3 includes source removal for MEC on the ground surface and leaves MEC in the subsurface. Since MEC will remain in the subsurface LUCs are needed to address risk to users engaged in ground disturbance activities. Alternative 3 does not achieve the MRS-2 specific RAO.

Alternatives 4C/D and 5C/D all include source reduction on the surface and in the subsurface. These alternatives can be implemented at the site, though certain areas may be inaccessible to remedial processes. Since MEC may remain in these inaccessible areas LUCs are needed to address risk to users engaged in ground disturbance activities. Alternatives 4C/4D and 5C/5D achieve the RAO as all propose the removal of MEC to at least 2.0 feet bgs.

2.11.2.2. Threshold Criteria 2: Compliance with ARARs
Alternative 1 is a no-action alternative, no ARARs are applicable to Alternative 1.

Alternatives 2, 3, 4C/4D and 5C/5D are all expected to develop and implement relevant work plans in accordance with all identified ARARs, as discussed in Section 2.9. Some work areas may be excepted from removals due to ecological, biological, or cultural resource concerns.

2.11.2.3 Primary Balancing Criteria 1: Long-term Effectiveness and Permanence
Long-term effectiveness and permanence refer to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up levels have been met. This criterion includes the consideration of residual risk that will remain on site following remediation and the adequacy and reliability of controls.

Alternative 1 is the continuation of the baseline condition and is not protective and not effective in either the short- or long-term.

Alternative 2 may be effective initially but its effectiveness may lessen over time as the target population becomes inured to the repeated warnings or desensitized to the presence of signs. Efficacy, either initially or in the long-term, will be partially dependent on public perception, sentiment, and cooperation. Additionally, efficacy is expected to be difficult to quantify and monitor.

Alternative 3 is effective in permanently reducing the risk from MEC at the surface, where accessible. Risk from subsurface MEC is expected to remain and is proposed to be addressed with LUCs. As noted above, the efficacy of the LUC portion of the remedy may lessen over time as the target population becomes inured to the repeated warnings or desensitized to the presence of signs.

Alternatives 4C/4D and 5C/5D include surface and subsurface source removal, where accessible. Source removal is an effective and permanent means to reduce risk. Risk from surface and subsurface MEC may

remain in inaccessible areas and will be addressed with LUCs. As with the other Alternatives, the efficacy of the LUC portion of the remedy may lessen over time. The risk may be more effectively reduced in options 4D and 5D as these address a deeper planned remediation depth (36 inches) over that proposed in Alternatives 4C and 5C.

2.11.2.4 Primary Balancing Criteria 2: Reduction of Contaminants through Treatment
Reduction of toxicity, mobility, or volume of contaminants through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy. At this site, MEC is the contaminant of interest.

Alternatives 1 and 2 do not propose the removal, and therefore reduction, of MEC from MRS-2.

Alternative 3 will remove MEC from the ground surface, but MEC is expected to remain in the subsurface and in any inaccessible areas.

Alternatives 4C/4D and 5C/5D will remove surface and subsurface MEC from all accessible areas of the site. MEC may remain in inaccessible areas of the site.

2.11.2.5 Primary Balancing Criteria 3: Short-term Effectiveness
Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and implementation of the remedy until cleanup levels are achieved.

Alternative 1
Alternative 1 proposes no actions and, as such, there are no short-term effects to workers. There are no additional short-term effects to the community, and the environment related to this alternative beyond those already posed by the site.

Alternative 2
With regard to workers, the short-term effectiveness of the 3Rs portion of Alternative 2 is expected to be high as there is no physical exposure to the site by those developing and implementing the educational program. If signage is included as part of the LUCs site workers will be exposed to general construction and surface/subsurface MEC exposure risks. Environmental impacts during the implementation of this Alternative would be expected to be limited to just those posed during the installation of post holes for signs, if allowed. Soil disturbance impacts would be expected to be exceptionally insignificant. The short-term effectiveness of the educational program to the community is not considered measurable.

Alternative 3
In the short-term, Alternative 3 poses risks to site workers engaged in surface MEC removal activities as well as workers installing signage LUCs; though the risk of surface MEC to workers installing these LUCs would be anticipated to be lower than those in Alternative 2, as MEC removal activities would be completed prior to LUC installation. However, subsurface MEC would remain a risk to workers if signs were installed.

This Alternative would require the temporary (i.e. daily) relocation of property owners or residents from properties during surface removal and disposal operations. Using this practice, risks to other site users during the implementation of the removal remedy are expected to be minimal. Following removal activities, the effectiveness of this alternative, on the surface, would be immediate and permanent.

This Alternative requires that vegetation be trimmed or cut to allow access to workers and equipment. As previously discussed, the site area experiences a subtropical, humid climate, an average annual rainfall of 36.82 inches, and a growing season of approximately 270 days in length. As such, vegetation is expected to quickly recover after site work is complete. However, vegetation cutting, piling, collection, and disposal activities may cause risks of take to the Houston toad, if present as may activities related to access, staging, excavation, and detonation. While this Alternative does not propose to disturb the deeper subsurface, they may create risk to shallow archaeological resources through MEC removal activities as well as in access and staging areas.

The general population may experience temporary traffic delays and disturbances along public and private roads while work was occurring. Residents or site users on neighboring or nearby properties may experience additional noise from site detonations.

Alternatives 4C/4D and 5C/5D

In the short-term, Alternatives 4C/4D and 5C/5D pose risks to site workers engaged in surface and subsurface MEC removal activities as well as workers installing LUCs (in the case of Alternatives 4C and 5C). The short-term risks to site workers in these Alternatives are expected to be greater/more extended than in length than those of Alternative 3 consistent with the increased time involved in removal activities. The risk to workers installing LUCs (ex. signs) would be anticipated to be lower than that in Alternatives 1 through 3 as surface and subsurface removal activities would be completed prior to LUC installation.

These Alternatives would require the temporary (i.e. daily) relocation of property owners or residents from properties during surface removal and disposal operations. Using this practice, risks to other site users during the implementation of the removal remedy are expected to be minimal. Following removal activities, the effectiveness of these alternatives, on the surface and in the subsurface, would be immediate and permanent.

As with Alternative 3, vegetation cutting will be required in Alternatives 4C/4D and 5C/5D to allow access to workers and equipment. As noted above, vegetation is expected to quickly recover after site work is complete but vegetation cutting, piling, collection, and disposal activities may create risk of take to the Houston toad, if present. As these Alternatives are proposed to disturb the subsurface, they may pose risk to archaeological resources.

Since Alternatives 5C/5D distinguish anomalies as those likely to be munitions and those likely to not be munitions, these Alternatives have the potential to reduce the number of excavations required, over those that will be required in Alternatives 4C/4D. This results in both less risk to site workers as well as less potential impact to biological and archaeological resources.

In all four of these Alternatives, the general population may experience temporary traffic delays and disturbances during work along public and private roads. Residents or site users on neighboring or nearby properties may experience additional noise from site detonations. Alternatives 5C/5D may demonstrate a reduction in these impacts, over Alternatives 4C/4D due to the fewer number of excavations anticipated.

2.11.2.6 Primary Balancing Criteria 4: Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and implementation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Alternative 1 is the existing baseline condition against which the other alternatives are assessed. Alternative 1 has the greatest implementability as it is the continuation of the current state.

Alternative 2 may be comprised of two components: educational programs and signs. The educational program is easily implementable. There are potentially minor to moderate constraints to implementing the 3Rs program at MRS-2 if soil-disturbing activities (sign) are required. Those may include, but are not limited to, securing ROEs from private landowners, coordinating with public ROWs holders, and excavation planning related to the location of known archaeological sites and the potential for unknown archaeological sites.

Alternatives 3, 4C/4D, and 5C/5D, in general, are implementable and removal activities could be complete within three years. However, all five of these alternatives require the property owner to both grant ROEs and allow vegetation trimming. Additionally, coordination would be required with public ROWs holders along public roads for access and work in these areas. For any areas for which the remedy is not implementable related to these issues, MEC may remain and present an on-going risk. Access and technology considerations will be examined in greater detail during the design and planning of the remedial action.

Alternatives 4C/4D and 5C/5D rely on electromagnetic technologies to locate potential MEC in the subsurface. Based on the MEC historically identified at MRS-2, the instruments proposed in Alternatives 4C/4D and 5C/5D are all expected to be able to reliably detect MEC, if present, at the maximum MEC depths expected at the site.

2.11.2.7 Primary Balancing Criteria 5: Cost

Current cost estimates, based on those in the FS, escalated to July 2020, and extrapolated to 30 years (where O&M costs are proposed) are listed in Table 10.

Table 10: Alternative Cost Estimates

Alternative	Cost Estimate (U.S. $, 2020)
Alternative 1	$0
Alternative 2	$633,958
Alternative 3	$1,739,114
Alternative 4C	$6,786,350
Alternative 4D	$8,648,611
Alternative 5C	$4,097,279
Alternative 5D	$4,191,999

The costs estimated for Alternatives 5C/5D are less than those for 4C/4D because it is expected that the advanced classification technology utilized in Alternatives 5C/5D will reduce the number of unnecessary excavations during subsurface MEC removal operations at the site.

2.11.2.9 Modifying Criteria 1: State and Support Agency Acceptance

In comments received from the State of Texas, TCEQ stated that their position that Alternative 1 does not reduce the risks to human health or the environment and that USACE will have limited ability to influence public behavior with the LUCs proposed in Alternative 2. TCEQ believes that Alternative 3 will leave MEC hazards in the subsurface while relying on public education LUCs to reduce risk. As such, in the opinion of TCEQ, the risks at the site are not adequately reduced and Alternatives 1 through 3 are not acceptable to the State of Texas.

In the opinion of the TCEQ, Alternatives 4C/4D and 5C/5D remove MEC hazards from most of the site. Alternatives 4C and 5C additionally propose LUCs to mitigate residual risk from MEC that may be present below the planned excavation limit. These Alternatives are deemed acceptable to TCEQ.

No response was received from USEPA.

2.11.2.10 Modifying Criteria 2: Community Acceptance
No public comments were received on the Proposed Plan during the 30-day public comment period or at the public meeting. As such, no public opposition to this project is known or expected.

2.11.3 Principal Threat Wastes
There are no principal threat wastes at MRS-2.

2.11.4 Conclusion
Alternative 1 does not meet the threshold criteria (Overall Protectiveness) and is not an acceptable alternative for selection. This alternative is not retained for further evaluation.

Alternative 2 does not achieve the MRS-2 specific RAO nor does it have the concurrence of the TCEQ. This alternative is not retained for further evaluation.

Alternatives 3 provides an effective and permanent remedy for surface soils. Alternative 3 is of a lower cost than Alternatives 4C/4D and 5C/5D and can be readily implemented and can be completed within two years, in accordance with ARARs. However, Alternative 3 does not achieve the MRS-2 specific RAO and does not have the concurrence of the TCEQ. This alternative is not retained for further evaluation.

Alternatives 4C/4D and 5C/5D all achieve the MRS-2 specific RAO. These Alternatives provide an effective and permanent remedy for surface and subsurface soils, can be readily implemented (subject to property-owner agreement), and can be completed within three years. All of these alternatives can be completed in accordance with ARARs and all have the concurrence of the TCEQ. Alternatives 5C/5D are expected to have the potential to be less costly than Alternatives 4C/4D while resulting in a similar reduction in exposure risk.

2.12 Selected Remedy
The selected remedy for MRS-2 is a combination of:

- Alternative 2 – Land Use Controls and
- Alternative 5D – Surface and Subsurface Removal of MEC, to a depth of 3.0 feet, using Advanced Geophysical Classification (AGC).

The Selected Remedy was chosen in accordance with CERCLA, 42 U.S. Code § 9601, et seq., as amended by SARA, and, to the extent practicable, the NCP, 40 Code of Federal Regulations, Part 300, *et seq.*, as amended.

2.12.1 Rationale
Alternative 5D was selected because it is expected to remove, reliably and permanently, the greatest amount of MEC hazards from MRS-2 in the most cost-effective manner. Further, the greater depth of removal is considered to be most responsive to potential exposures during future residential development of the area including during the construction of infrastructure that would be expected to occur during residential redevelopment (ex. installation of subsurface sewer, water, fire, and gas mains; electrical and data lines, road beds, etc.).

However, based on the size of MRS-2 (approximately 264.2 acres) and the presence of multiple homes, buildings, surface water features, roads, utilities/transmission lines and, potentially, other features, it is currently expected that the potential for some areas to be inaccessible to surface and subsurface removals is significant. As such, it is considered unlikely that the performance of this Alternative will achieve an UU/UE risk designation over the entire site.

As such, Alternative 2, the implementation of LUCs, was additionally selected to address any residual risk presented by MEC that may remain in areas not subject to removals.

2.12.2 Remedy Components

- Negotiate the ROE agreements between the property owners and USACE documenting both parties' rights and responsibilities during implementation of the remedy.
- Coordinate with local stakeholders regarding the planned work in public ROWs, if any.
- With input from all stakeholders including the public, private landowners, local public officials, and wildlife and cultural resource stewards (Federal, State, and Tribal), draft work plans describing actions to be taken to implement the remedy. The work plan will use the current AGC-QAPP[68] template as required by FUDS policy.
- Coordinate schedules with the property owners and other stakeholders and mobilize support equipment to the site, such as office and storage trailers, electrical hookup or a generator, a magazine for storage of donor charges, waste storage, and sanitary facilities.
- Perform biological and archaeological surveys, as determined necessary and described by the work plans.
- Present public meetings at intervals described, or provide public communication as otherwise specified, in the work plans to update the public on the progress of the remedial action and facilitate public feedback.
- Engage land surveyors to survey and divide the site into grids per the work plans developed to facilitate field activity management.
- Coordinate with property owners or residents for the temporary removal or relocation of contents and, potentially, livestock.
- Trim vegetation to maximize accessibility. Typically, this includes cutting ground cover and shrubs to a height of 6 to 10 inches tall and cutting down smaller trees (defined as 4-inch trunk diameter at 4 feet above ground). Property owners may limit the amount and location of vegetation trimming.
- Temporarily relocate on-site residents or site users during survey and removal activities.
- Conduct a systematic survey of the site using metal detectors to identify and remove MEC items on the ground surface or partially buried (breaking the surface of the ground) in each grid.
- Where the use of EMI systems, in conjunction with advanced classification, is accessible and practicable, instrument verification strips (IVSs) will be installed.
- Data QC/QA objects ("seeds") will be placed in the planned removal area to allow quantitation of the accuracy and effectiveness of the DGM/AGC survey.
- EMI systems surveys, in conjunction with advanced classification, will be performed to the extent practicable.
- Resulting survey data will be processed and analyzed to identify anomalies in the subsurface. Anomalies judged to potentially be caused by buried munitions (MEC) will be designated as Targets of Interest (TOI). Anomalies with an uncertain provenance (nature) will also be identified as TOIs. Anomalies caused by scrap will be designated as non-TOIs.
    - All TOIs will be placed on a dig list for excavation and investigation.
    - Some non-TOIs will also be placed on the dig list for verification and validation.

[68] Advanced Geophysical Classification – Quality Assurance Project Plan

  - Each TOI location will be revisited and excavated until they recover the source of the anomaly, per USACE policy for MEC
  - TOIs subsequently identified as Seeds will be recorded.
- After the anomaly is removed, the excavation will be swept with a geophysical sensor to ensure no additional anomalies are present below the excavation.
- Where EMI or AGC systems cannot access, or are otherwise impracticable, other detection technologies will be considered and employed.
- All recovered MEC will be destroyed by blowing in place or, if it is safe to move, in a consolidated detonation within MRS-2. No public roads will be used in the transport of MEC.
- All metal remaining from demolitions shots and MD/scrap metal found during site removal work will be demilitarized, if necessary, and placed into sealed containers. These will be transported off site to a licensed metals recycling facility.
- All excavation holes will be backfilled and the soil compressed so that tripping hazards are not created. Vegetation restoration (seeding, sodding, or other planting) will be performed on private properties per agreements with property owners.
- Signs, as approved by property owners, may be implemented on private properties.
- Educational LUCs will be planned and implemented and will include the development of a public website, the development and distribution of educational print materials, and public meetings. LUCs will be identified during remedial design in a LUC Implementation Plan (LUCIP).
- A report (or reports) will be drafted following the completion of the remedy and maintained in the administrative record for public viewing. Reports will include the final designation and documentation of all areas determined to be inaccessible or for which removals were not accomplished for other reasons (ex. property owner denial, etc.)
- Signs (if any), and other long-term LUCs will be maintained by USACE or by its designated representatives as long as risk is considered to remain at the site.

2.12.3 Cost Estimate for the Selected Remedy

The cost estimate summary in Table 11 is based on the best available information regarding the scope of the selected remedy. The total estimated cost for the selected remedy is approximately $4,825,957 (Alternative 2 - $633,958 and Alternative 5D - $4,191,999). This estimate is based on the assumptions developed in the Feasibility Study and costs have been escalated to current year. This cost estimate may change as a result of new information. Major changes, if any, will be documented in a memorandum in the Administrative Record file, an Explanation of Significant Differences (ESD), or a Decision Document amendment. This is considered to be an 'order-of-magnitude' cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

Table 11: Alternative 2 and Alternative 5D Cost Estimate Buildup

Alternative 2 Activities:	**Cost Estimate (U.S. $, 2020)**
Management (30 years)	$95,089
Implementation of Land Use Controls (LUCs, 30 years)	$417,154
Five-Year Reviews (6 occurrences)	$121,714
Subtotal	***$633,958***
Alternative 5D Activities:	
Management	$89,384
Explosive Safety Submission	$48,272
Surface Removal Plans	$39,609
Surface Removal	$1,467,983
Subsurface Removal to 3.0 feet bgs	$2,503,898
Final Report	$42,854
Subtotal	***$4,191,999***
Total – Alternative 2 and Alternative 5D	***$4,825,957***

2.13 Expected Outcomes of the Selected Remedy

If allowed by property owners, implementing the selected remedy at MRS-2 will significantly, and permanently, reduce, or eliminate, explosive hazard risks to current and future site users. Two remedial outcomes are considered possible.

- Acceptable End State 1: A physical search for MEC is performed over all areas (no inaccessible areas are encountered) and no MEC is discovered deeper than the reliable detection depth range of the equipment used, then the site will be anticipated to reach a UU/UE risk designation. In this case no further LUCs would be implemented.
- Acceptable End State 2: If a physical search for MEC is performed over all accessible areas, but the horizontal MEC distribution indicates MEC may exist under inaccessible areas or, the vertical MEC distribution indicates MEC may exist beneath the reliable detection depth range of the equipment used, then the site (or portions of the site) will not be expected to reach a UU/UE risk designation. For such areas, LUCs would be implemented.

Temporary habitat impacts and increased risk of take of protected species or disturbance of cultural resources are possible during the implementation of the mobilization/demobilization, staging, vegetation cutting, or MEC removal activities. Work plans will be developed, in conjunction with the appropriate stakeholders, to eliminate, minimize, or mitigate potential impacts to protected species and cultural resources. No environmental or ecological benefits (such as restoration of sensitive ecosystems, protection of endangered species, protection of wildlife resources, or wetlands restoration) are anticipated as a result of implementing the selected remedy.

Temporary impacts to residents and the local community may be encountered during the implementation of the removal portions of the remedy and are expected to include increased noise, increased traffic, temporary traffic disruptions, and temporary relocations.

There are no socioeconomic or community revitalization impacts anticipated as a result of implementing the selected remedy.

2.14 Statutory Determinations

The selected remedy for the MRS-2 is protective of human health and the environment and satisfies the statutory requirements of CERCLA § 121(b).

The selected remedy is cost-effective and utilizes permanent solutions and alternative treatment technologies to the extent practicable. The Army will comply with applicable ARARs in implementing the remedy.

2.15 Documentation of Significant Changes

There are no changes in the technology or procedures proposed to Alternative 5D as presented in the Proposed Plan. Estimated costs for all Alternatives were updated to 2020 costs and extrapolated to a thirty-year maintenance period.

PART 3.0: RESPONSIVENESS SUMMARY

3.1 Stakeholder Comments and Lead Agency Responses

3.1.1. Regulatory Concurrence and Comment

The RI/FS Report for Camp Swift FUDS, and the Proposed Plan for Camp Swift FUDS MRS-2 were submitted to TCEQ and USEPA for review and comment. TCEQ formally concurred with the findings and recommendations in the RI/FS and the Proposed Plan[69]. The comments provided by TCEQ and the resolved responses are provided in Appendix U of the RI/FS Report. No comments were received from USEPA.

3.1.2 Public Comment

As discussed in Section 2.3, USACE also made the Proposed Plans for the Camp Swift FUDS MRSs available for public comment between October 16 and November 16, 2015. This public comment period was announced through a notice placed in the *Austin American Statesman* newspaper and a public meeting was held on October 29, 2015. No members of the public attended the October 29, 2015 public meeting. There were no written questions submitted by the public during the comment period. As such, this DD contains no responses to public comments.

3.1.3 Decision Document Availability

After this DD is executed (signed), USACE shall publish a notice of the availability of the DD in the *Austin American Statesman* and make the DD available for public inspection and copying at the Bastrop Public Library (1100 Church St, Bastrop, TX 78602) prior to beginning the remedial action.

3.2 Technical and Legal Issues

There were no significant technical or legal issues raised in the process of developing this DD.

[69] TCEQ 2013a and 2013b

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APPENDIX A

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Austin American-Statesman
statesman.com | austin360.com

PUBLIC SERVICE ANNOUNCEMENT

The U.S. Army Corps of Engineers invites you to review and comment on the Proposed Plan associated with the Remedial Investigation and Feasibility Study at the Former Camp Swift Formerly Used Defense Site in Bastrop County, Texas. The Former Camp Swift was founded in 1942 and the areas investigated consisted of a range complex comprising overlapping small arms ranges, grenade courts, a mortar range, artillery impact areas, training maneuver areas, and a demolition area. The U.S. Army Corps of Engineers has recently completed a study of the Former Camp Swiftconcerning potential military munitions and alternatives for further action.

Copies of the Remedial Investigation/ Feasibility Study and Proposed Plan are available for public review in the Bastrop Public Library 1100 Church St, Bastrop, TX 78602. Comments on the Proposed Plan will be accepted beginning, October 16 – November 16, 2015.

Written comments may be submitted by mail, postmarked no later than November 16, 2015 at the following address: ATTN: Mr. Steve Martin US Army Corps of Engineers, CESWF-PEC-TE 819 Taylor Street, Suite 3A12 Fort Worth, Texas 76012. Public comments received during this period will be considered in the final decision-making process for Former Camp Swift.

The U.S. Army Corps of Engineers will hold a public meeting to explain the Proposed Plan. Oral and written comments will be accepted at the meeting. The meeting will be held at the Lost Pines Scout Reservation: Lindsay Lodge 785 FM 1441, Bastrop, TX 78602. The meeting will occur on 29 Oct 2015 between 6:00 p.m. and 8:00 p.m.

For more information, please contact the Steve Martin of the U.S. Army Corps of Engineers, Ft. Worth District, at Steven.G.Martin@usace.army.mil.

#485074 10-11/2015

STATE OF TEXAS
COUNTY OF TRAVIS

Before me, the undersigned authority, a Notary Public in and for the County of Travis, State of Texas, on this day personally appeared Alejandro Cado. Advertising Agent of the Austin American-Statesman, a daily newspaper published in said County and State that is generally circulated in Bastrop, Bell, Blanco, Brazos, Burleson, Burnet, Caldwell, Colorado, Comal, Coryell, Fayette, Gillespie, Gonzales, Guadalupe, Hays, Kerr, Lampasas, Lee, Llano, Milam, Nueces, San Saba, Travis, Washington and Williamson Counties, who being duly sworn by me, states that the attached advertisement was published at the lowest published rate for Classified advertising in said newspaper on the following date(s), to wit:TETRA TECH,,First date of Publication 10/11/2015,Last date of Publication 10/11/2015,Web and print times Published 2, Legal Notices, 1 X 51, and that the attached is a true copy of said advertisement.

CAMP SWIFT
Ad ID: 922709
Ad Cost: 741.54

SWORN AND SUBSCRIBED TO BEFORE ME, on 10/14/2015

Notary Public

ROSIE ANN STEPHENS
Notary Public, State of Texas
My Commission Expires
September 26, 2016

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APPENDIX B

ORIGINAL

****

CERTIFICATE OF PUBLIC MEETING

RE: PROPOSED PLAN FOR PROPERTIES ASSOCIATED WITH CAMP SWIFT RANGE COMPLEX, BASTROP COUNTY, TEXAS

****

USACE Fort Worth District

US Army Engineering and Support Center, Huntsville

Bastrop, Texas

October 29, 2015

Job No. 04-69647

I, JAMES M. PLAIR, a Certified Shorthand Reporter in and for the State of Texas, do hereby certify that a PUBLIC MEETING was scheduled for Thursday, October 29, 2015, at 6:00 p.m. at the LOST PINES SCOUT RESERVATION, 785 FM 1441, Bastrop, Texas 78602.

On October 29, 2015, I was present at the LOST PINES SCOUT RESERVATION, at the hour of 5:15 p.m. and did so remain there until the hour of 7:15 p.m.

During the time between 5:15 p.m. and 7:15 p.m., the PUBLIC MEETING was not held, at which time the following record was adduced:

MR. BELEW: My name is Roland Belew and I'm the Contract Manager out of Huntsville, and we did have a public meeting scheduled for tonight. However, unfortunately, no one showed up. So we -- For the record, we want to state who all is present from the Government, and also, if you would, state the -- the Texas regulator's name. Bob, go ahead.

MR. SELFRIDGE: Bob Selfridge, Chief Geophysicist, U.S. Army Engineering Support Center, Huntsville.

MR. ROBERTS: Ian Roberts, Project Manager, Tetra Tech.

MR. DOLLAR: Mark Dollar, Munitions Response Program Manager with Tetra Tech.

07:06 MR. EDMONDSON: Clay Edmondson, Munitions Response Project Manager with Tetra Tech.

07:07 MR. MARTIN: Thank you. I'm Steve Martin, Engineer, Corps of Engineers, Fort Worth District. And the lady who just left was Maureen Hatfield from the State of Texas, and the abbreviation is TCEQ.

07:07 MR. BELEW: And we did wait an hour for people to show up, a little more than an hour, and no one has showed up. So we are going to shut everything down and leave. Thank you.

(Record concluded)

I, JAMES PLAIR, Certified Shorthand Reporter in and for the State of Texas, hereby certify that that the proceedings were taken in shorthand by me, later reduced to typewriting under my direction, and the preceding pages represent a true and accurate transcription of the proceedings.

I further certify that I am neither attorney nor counsel for, related to, nor employed by any of the parties to the action in which this proceeding was taken. Further, I am not a relative or employee of any party in this cause, nor do I have a financial interest in the outcome of this action.

SUBSCRIBED AND SWORN TO UNDER MY HAND on this the 12th day of November, 2015.

James M. Plair

JAMES M. PLAIR, CSR
Texas CSR 4409
Expiration: 12/31/2015
CONTINENTAL COURT REPORTERS, INC.
Firm Registration No. 61
5300 Memorial Drive, Suite 250
Houston, Texas 77007
713.522.5080 Phone
713.522.0440 Fax

APPENDIX C

APPENDIX C: Cost Estimates

Alternative 2 – 30-Year Cost Estimate Calculation

Activity[1]	Cost as Proposed in 2015 FS	Cost Escalated to July 2020	Divided into Annual/Periodic Cost (as appropriate)	Notes/Comments
Management	$14,357	$15,848[2]	$3,170	Originally included 5 years of costs.
Institutional Controls (ICs)	$62,984	$69,526	$13,905	Originally included 5 years of costs. Assumed 2 public meetings, generation of brochures, and establishment of a website.
Five-Year Review	$18,377	$20,286		Originally included only one 5YR.
TOTAL	**$95,718**	**$105,660**		2015 Total originally included costs for the development of an Explosives Safety Submission. This cost is considered unnecessary for ICs. Additionally, the cost for an ESS is included in Alternative 5D.

Activity	30-Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Management	**$95,089**	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ICs	**$417,154**	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Five-Year Review	**$121,714**	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$633,958**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

Activity	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Management	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ICs	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Five-Year Review	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

[1] Activities and costs as proposed in the 2015 RI/FS (Ttech, 2015). See the 2015 RI/FS for further details and cost assumptions.
[2] Costs are rounded in this document to the nearest whole U.S. dollar. Some columns may not foot due to rounding.

Alternative 3 – 30-Year Cost Estimate Calculation

Activity[3]	Cost as Proposed in 2015 FS	Cost Escalated to July 2020	Divided into Annual/Periodic Cost (as appropriate)	Notes/Comments
Management	$41,340	$45,634[4]	$4,563	Originally included 5 years of costs. Current estimate assumes 80% of management costs were assumed to be related to construction. 80% was divided by two years of construction; Management O&M costs (annual) in the estimate below were based on those proposed for Alternative 2
Explosive Safety Submission (ESS)	$43,730	$48,272		
Institutional Controls (ICs)	$62,984	$69,526	$13,905	Originally included 5 years of costs. Assumed 2 public meetings, generation of brochures, and establishment of a website. Total costs were divided by 5 years to derive annual cost.
Surface Removal Plans	$35,882	$39,609		
Surface Removal	$1,050,203	$1,159,281	$579,641	Costs split across two years.
Surface Removal Final Report	$38,822	$42,854		
Five-Year Review	$18,377	20,286		Originally included only one 5YR.
TOTAL	**$1,291,338**	**$1,425,461**		

Activity	30-Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Management[5] - construction	**$36,507**	$18,253	$18,253	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Management – O&M	**$88,760**	$0	$0	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ESS	**$48,272**	$48,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ICs	**$417,154**	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Surface Removal Plans	**$39,609**	$39,609	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surface Removal	**$1,159,281**	$579,641	$579,641	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surface Removal Final Report	**$42,854**	$0	$42,854	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Five-Year Review	**$121,714**	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$1,954,141**	**$699,680**	**$654,653**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

Activity	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Management – O&M	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ICs	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Five-Year Review	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

[3] Activities and costs as proposed in the 2015 RI/FS (Ttech, 2015). See the 2015 RI/FS for further details and cost assumptions.
[4] Costs are rounded in this document to the nearest whole U.S. dollar. Some columns may not foot due to rounding.
[5] 80% of management costs were split across two years of construction; Management – O&M costs were estimated using those of Alternative 2

Alternative 4C – 30-Year Cost Estimate Calculation

Activity[6]	Cost as Proposed in 2015 FS	Cost Escalated to July 2020	Divided into Annual/Periodic Cost (as appropriate)	Notes/Comments
Management	$120,607	$133,134[7]	$39,940	Originally included 5 years of costs. Current estimate assumes 90% of management costs were related to construction. 90% was divided by three years of construction; Management O&M costs (annual) in the estimate below were based on those proposed for Alternative 2
Explosive Safety Submission (ESS)	$43,730	$48,272		
Institutional Controls (ICs)	$62,984	$69,526	$13,905	Originally included 5 years of costs. Assumed 2 public meetings, generation of brochures, and establishment of a website. Total costs were divided by 5 years to derive annual cost.
Removal Plans	$35,882	$39,609		
Surface Removal	$1,329,859	$1,467,983	$733,991	Costs split across two years.
Subsurface Removal to Two Feet	$4,225,135	$4,663,971	$2,331,986	Costs split across two years
Removal Final Report	$38,822	$42,854		
Five-Year Review	$18,377	$20,286		Originally included only one 5YR.
TOTAL	**$5,875,396**	**$6,485,634**		

Activity	30-Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Management[8] - construction	**$119,820**	$39,940	$39,940	$39,940	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Management – O&M	**$85,580**	$0	$0	$0	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ESS	**$48,272**	$48,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ICs	**$417,154**	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Removal Plans	**$39,609**	$39,609	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surface Removal	**$1,467,983**	$733,991	$733,991	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subsurface Removal to Two Feet	**$4,663,971**	$0	$2,221,986	$2,221,986	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Report	**$42,854**	$0	$0	$42,854	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Five-Year Review	**$121,714**	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$7,006,958**	**$875,717**	**$3,119,822**	**$2,428,685**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

Activity	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Management – O&M	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ICs	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Five-Year Review	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

[6] Activities and costs as proposed in the 2015 RI/FS (Ttech, 2015). See the 2015 RI/FS for further details and cost assumptions.
[7] Costs are rounded in this document to the nearest whole U.S. dollar. Some columns may not foot due to rounding.
[8] 90% of management costs were split across three years of construction; Management – O&M costs were estimated using those of Alternative 2

Alternative 4D – 30-Year Cost Estimate Calculation

Activity[9]	Cost as Proposed in 2015 FS	Cost Escalated to July 2020	Divided into Annual/Periodic Cost (as appropriate)	Notes/Comments
Management	$170,149	$187,821[10]	$62,607	For construction time (approx. 3 years) only; no ICs or Five Year Reviews estimated.
Explosive Safety Submission (ESS)	$43,730	$48,272		
Removal Plans	$35,882	$39,609		
Surface Removal	$1,329,859	$1,467,983	$733,991	Costs split across two years.
Subsurface Removal to Three Feet	$6,216,415	$6,862,072	$3,431,036	Costs split across two years
Final Report	$38,822	$42,854		
TOTAL	**$7,834,857**	**$8,648,611**		

Activity	30-Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Management[11] - construction	**$187,821**	$62,607	$62,607	$62,607	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Management – O&M (**NONE**)[12]	**$0**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ESS	**$48,272**	$48,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ICs (**NONE**)	**$0**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Removal Plans	**$39,609**	$39,609	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surface Removal	**$1,467,983**	$733,991	$733,991	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subsurface Removal to Three Feet	**$6,862,072**	$0	$3,431,036	$3,431,036	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Report	**$42,854**	$0	$0	$42,854	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Five-Year Review (**NONE**)	**$0**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL	**$8,648,611**	**$884,479**	**$4,227,635**	**$3,536,497**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Activity	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Management – O&M	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ICs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Five-Year Review	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

[9] Activities and costs as proposed in the 2015 RI/FS (Ttech, 2015). See the 2015 RI/FS for further details and cost assumptions.
[10] Costs are rounded in this document to the nearest whole U.S. dollar. Some columns may not foot due to rounding.
[11] 90% of management costs were split across three years of construction; Management – O&M costs were estimated using those of Alternative 2
[12] Institutional Controls, ongoing management for institutional controls, and Five Year Reviews are not proposed for this Alternative and costs are not included.

Alternative 5C – 30-Year Cost Estimate Calculation

Activity[13]	Cost as Proposed in 2015 FS	Cost Escalated to July 2020	Divided into Annual/Periodic Cost (as appropriate)	Notes/Comments
Management	$71,065	$78,446[14]	$23,534	Originally included 5 years of costs. Current estimate assumes 90% of management costs were related to construction. 90% was divided by three years of construction; Management O&M costs (annual) in the estimate below were based on those proposed for Alternative 2
Explosive Safety Submission (ESS)	$43,730	$48,272		
Institutional Controls (ICs)	$62,984	$69,526	$13,905	Originally included 5 years of costs. Assumed 2 public meetings, generation of brochures, and establishment of a website. Total costs were divided by 5 years to derive annual cost.
Removal Plans	$35,882	$39,609		
Surface Removal	$1,329,859	$1,467,983	$733,991	Costs split across two years.
Subsurface Removal to Two Feet	$1,828,714	$2,018,650	$1,009,325	Costs split across two years
Removal Final Report	$38,822	$42,854		
Five-Year Review	$18,377	$20,286		Originally included only one 5YR.
TOTAL	**$5,875,396**	**$6,485,634**		

Activity	30-Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Management[15] - construction		$23,534	$23,534	$23,534	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Management – O&M	**$85,580**	$0	$0	$0	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ESS	**$48,272**	$48,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ICs	**$417,154**	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Removal Plans	**$39,609**	$39,609	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surface Removal	**$1,467,983**	$733,991	$733,991	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subsurface Removal to Two Feet	**$2,018,650**	$0	$1,009,325	$1,009,325	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Report	**$42,854**	$0	$0	$42,854	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Five-Year Review	**$121,714**	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$4,312,417**	**$859,311**	**$1,780,755**	**$1,089,618**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

Activity	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Management – O&M	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170	$3,170
ICs	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905	$13,905
Five-Year Review	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286	$0	$0	$0	$0	$20,286
TOTAL	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**	**$17,075**	**$17,075**	**$17,075**	**$17,075**	**$37,360**

[13] Activities and costs as proposed in the 2015 RI/FS (Ttech, 2015). See the 2015 RI/FS for further details and cost assumptions.
[14] Costs are rounded in this document to the nearest whole U.S. dollar. Some columns may not foot due to rounding.
[15] 90% of management costs were split across three years of construction; Management – O&M costs were estimated using those of Alternative 2

Alternative 5D – 30-Year Cost Estimate Calculation

Activity[16]	Cost as Proposed in 2015 FS	Cost Escalated to July 2020	Divided into Annual/Periodic Cost (as appropriate)	Notes/Comments
Management	$80,974	$89,384[17]	$29,795	For construction time (approx. 3 years) only; no ICs or Five Year Reviews estimated.
Explosive Safety Submission (ESS)	$43,730	$48,272		
Removal Plans	$35,882	$39,609		
Surface Removal	$1,329,859	$1,467,983	$733,991	Costs split across two years.
Subsurface Removal to Three Feet	$2,268,304	$2,503,898	$1,251,949	Costs split across two years
Final Report	$38,822	$42,854		
TOTAL	**$3,797,571**	**$4,191,999**		

Activity	30-Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Management[18] - construction	**$89,384**	$29,795	$29,795	$29,795	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Management – O&M (**NONE**)[19]	**$0**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ESS	**$48,272**	$48,272	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ICs (**NONE**)	**$0**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Removal Plans	**$39,609**	$39,609	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Surface Removal	**$1,467,983**	$733,991	$733,991	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subsurface Removal to Three Feet	**$2,503,898**	$0	$1,251,949	$1,251,949	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Final Report	**$42,854**	$0	$0	$42,854	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Five-Year Review (**NONE**)	**$0**	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL	**$4,191,999**	**$851,667**	**$2,015,735**	**$1,324,598**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Activity	Year 16	Year 17	Year 18	Year 19	Year 20	Year 21	Year 22	Year 23	Year 24	Year 25	Year 26	Year 27	Year 28	Year 29	Year 30
Management – O&M	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ICs	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Five-Year Review	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

[16] Activities and costs as proposed in the 2015 RI/FS (Ttech, 2015). See the 2015 RI/FS for further details and cost assumptions.
[17] Costs are rounded in this document to the nearest whole U.S. dollar. Some columns may not foot due to rounding.
[18] 90% of management costs were split across three years of construction; Management – O&M costs were estimated using those of Alternative 2
[19] Institutional Controls, ongoing management for institutional controls, and Five Year Reviews are not proposed for this Alternative and costs are not included.

APPENDIX D

United States Department of the Interior

FISH AND WILDLIFE SERVICE
10711 Burnet Road, Suite 200
Austin, Texas 78758
512 490-0057
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William Fickel, Jr.
Chief, Planning, Environmental, and Regulatory Division
U.S. Army Corps of Engineers
P.O. Box 17300
Fort Worth, Texas 76102-0300

Consultation No. 21450-2011-F-0105

Dear Mr. Fickel:

This transmits our final biological opinion for the proposed remediation of ordnance and explosives at the former Camp Swift, Bastrop County, Texas, in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

We appreciate the assistance provided by your staff. If you have any questions as remediation efforts proceed, please contact Patrick Connor at (512) 490-0057, extension 227.

Sincerely,

Adam Zerrenner
Field Supervisor

cc: Lynn Crane, USACE, Fort Worth, TX, PER-DI
Bobby Shelton, USACE, Fort Worth, TX, PER-E
Hollie Hunter, USACE, Fort Worth, TX,
Gary Mowad, USFWS, Austin, TX

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion based on our review of the proposed remediation of ordnance and explosives at former Camp Swift, Bastrop County, Texas, and its effects on the Houston toad and its critical habitat. The Houston toad (*Bufo houstonensis*) was listed as endangered pursuant to the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act). The U.S. Army Corps of Engineers (USACE) requested re-initiation of formal consultation in a November 1, 2010 letter, pursuant to section 7(a)(2) of the Act. The Service does not anticipate impacts to any other listed species from the proposed activities.

This biological opinion is based on information in: (1) the original formal consultation, (2) the re-initiation request, (3) research by Texas Parks and Wildlife Department, Texas State University - San Marcos, Texas A&M University, and other sources of information. A complete administrative record of this consultation is on file at this office.

List of Acronyms and Abbreviations

Act	Endangered Species Act of 1973
ASR	Archives Search Report
BA	Biological Assessment
BO	Biological Opinion
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
DERP	Defense Environmental Restoration Program
EE/CA	Engineering Evaluation/Cost Analysis
ERDC	Engineering Research and Development Center
ESA	Endangered Species Act
FS	Feasibility Study
GPS	Global Positioning System
HCP	Habitat Conservation Plan
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
OE	Ordnance and Explosives
RI/FS	Remedial Investigation / Feasibility Study
SHA	Safe Harbor Agreement
TARNG	Texas Army National Guard
TEC	Topographic Engineering Center
USACE	United States Army Corps of Engineers
Service	United States Fish and Wildlife Service
UXO	Unexploded Ordnance

Consultation History

October 25, 2000 Parsons Engineering Science, Inc. (Parsons), consultant for USACE, requested information regarding the potential for the project to impact federally listed threatened and endangered species. The Service responded with a November 6, 2000, letter outlining our concerns with regard to potential impacts on the Houston toad and its designated critical habitat.

November 8-9, 2000 Service biologists attended a Technical Project Planning Meeting with representatives from various Federal and State agencies and local organizations. The USACE explained the purposes of the project, and solicited comments from the various interested parties. The work plan for the Engineering Evaluation and Cost Analysis (EE/CA) was received by the Service March 15, 2001.

May 2, 2001 Service biologists met with representatives from the USACE and Parsons to further discuss potential impacts to the Houston toad. The Service outlined our concerns with respect to potential impacts to the toads and recommended the USACE formally consult with our office prior to conducting any activities which may adversely affect the Houston toad or its designated critical habitat.

October 3, 2001 USACE designated Parsons as their non-federal representative in letter to the Service. The Service received a Biological Assessment Report on the Former Camp Swift EE/CA and a request for formal consultation from Parsons on October 15, 2001. The Service acknowledged initiation of formal consultation in a November 14, 2001, letter.

January 22, 2002 The Service provided USACE with final biological opinion.

September 22, 2003 USACE provided the Service with updated EE/CA report, which describes the anomalies, ordnance scrap items, and UXO found in 2002.

November 1, 2010 USACE notified the Service of plans to implement a new phase in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) investigation at former Camp Swift and requests re-initiation of formal consultation. USACE provided the Service with a description of the Remedial Investigation / Feasibility Study (RI/FS) and planned activities.

February 16, 2011	The Service provides USACE with a draft biological opinion for former Camp Swift UXO remediation.
March 10, 2011	USACE provides the Service with its comments on the draft biological opinion.

BIOLOGICAL OPINION

I. Description of Proposed Action

Action Area

The former Camp Swift ordnance and explosive remediation project encompasses 41,170 acres in Bastrop County, Texas (Figure 1). No effects to Houston toads or Houston toad habitat outside of the former Camp Swift are expected. No activities are planned for the area occupied by Texas Army National Guard.

Background

For more specific information on previous planning for remediation efforts, please refer to the *Work Plan for Engineering Evaluation and Cost Analysis Camp Swift, February 2001*, and *Engineering Evaluation and Cost Analysis Report Camp Swift, September 2003*. For more specific information on the proposed remediation, please see USACE's re-initiation request, November, 2010.

In March of 1942, the U.S. Government acquired 52,191 acres in Bastrop County for establishment of a U.S. Army Camp for training infantry during World War II. In 1947, after five years of use, the camp was declared excess to the War Assets Administration. Although some unexploded ordnance (UXO) clearance was conducted prior to closing the former Camp, several UXO items have been found since closure.

Former Camp Swift is located about 36 miles east of Austin, in Bastrop County, Texas. The site is bordered to the north by U.S. Highway 290, to the east by State Highway 21, and to the west by State Highway 95. Texas Army National Guard (TARNG) currently occupies about 11,700 acres that were part of the original Camp Swift. However, TARNG's area is not eligible for Defense Environmental Restoration Program funding and is not part of the proposed investigation and consultation.

Field activities for the remediation consist of four phases. Field activities associated with each phase are also detailed in the re-initiation request. The remediation will begin in May, 2011 and span a period of fifteen years.

Phase 1. A geophysical survey of up to 88 acres (out of a total of 41,170 acres) will be conducted in the former Camp area. Multiple teams of two people each will hand carry geophysical survey instruments and global positioning system (GPS) equipment on transects and grids designed for the area of the parcel of interest. A geophysicist will then analyze the data and identify anomalies for further investigation and identification. The location of these anomalies will be marked in the field with a pin flag.

Phase 2. Intrusive Sampling: UXO specialists will hand-dig and expose anomalies at each flagged location. The area disturbed for a single anomaly will be about 2 feet by 2 feet in area, and up to 4 feet deep. However, the area disturbed for certain sites may reach about 4 feet by 4 feet, with a maximum depth of 4 feet. The purpose of the intrusive sampling is to excavate a small proportion of the anomalies detected in the geophysical survey to determine the types of materials associated with each anomaly. The applicant plans to investigate 30 anomalies per acre, using a meandering path method, and will avoid environmentally sensitive areas such as wetlands and deep sands, which may provide habitat for Houston toads. In addition, no trees will be cut and vegetation clearing will be limited to use of a machete and clearing of limbs that are less than one inch in diameter.

An estimated 2,640 excavations are planned within the 41,170 acres of former Camp Swift. In order to minimize any long-term affects to the habitat, each excavation will be backfilled and replanted or reseeded as necessary. Of the total 88 acres in the current remediation effort, USACE expects intrusive sampling to directly impact about 1 (one) acre of potential Houston toad habitat.

About half of that sampling effort is expected to be performed in designated critical habitat for the Houston toad. The amount of area to be impacted is based on the assumption that the Corps will have right-of-entry to all lands within the former Camp Swift.

Phase 3. Detonations: During the intrusive sampling phase, any items found to be UXO will be detonated in place. Based on information gathered at other remediation sites, a project area the size of the former Camp Swift would be expected to have fewer than fifteen anomalies actually requiring detonation. Where a detonation needs to be conducted, sand bags, and tamping will be used to control and minimize the impact of the detonation. The resulting impact crater will be about two feet in diameter and two feet deep. Shock waves transmitted through the earth are expected to occur up to a distance of 25 feet from the center of the blast.

Phase 4. Soil and water (surface and groundwater) samples will be made and analyzed for munitions constituents.

Conservation Measures

USACE and its contractors propose to maximize use of existing roads and trails for vehicle movement in order to minimize off-road impacts of equipment.

To address project impacts to the Houston toad, USACE proposes to fund the permanent protection of Houston toad habitat through the Griffith League Ranch Conservation Bank. This money would be used to preserve and conserve one acre of Houston toad habitat in perpetuity to support recovery of the Houston toad. The area proposed for protection will exceed the area of Houston toad habitat directly affected by remediation efforts.

Status of the Species and Critical Habitat

Houston toad

Species Description and Life History

In October 1970, the Houston toad was federally listed as an endangered species (35 FR 16047). Critical habitat was designated in 1978 (43 FR 4022 - 4026), in subsets of Bastrop and Burleson counties. The critical habitat in Burleson County is a small area surrounding Lake Woodrow while the land designated in Bastrop County covers about 98,000 acres in the central portion of the county north of the Colorado River.

Houston toads are generally brown and speckled, although individual coloration can vary. The Houston toad's underside is usually pale with small, dark spots. Males have dark throats, which appear bluish when distended. Adult Houston toads are 2 to 3.5 inches (5 to 9 centimeters) long and, like all toads, are covered with raised patches of skin that resemble warts (Brown 1971). Although Houston toads are similar in appearance to the closely related Gulf Coast toad (*B. valliceps*) and Woodhouse's toad (*B. woodhouseii*), these species can be discerned by physical and genetic characteristics (Brown 1971, Hillis et al. 1984). Mitochondrial DNA sequence analysis indicates that the Houston toad is a unique evolutionary unit separate from the other species (Forstner and Dixon 2000).

The life expectancy of the Houston toad is at least three years, but may be longer (Price 1993). Males reach sexual maturity at about one year of age, but females require one to two years to achieve reproductive maturity (Quinn 1981, Quinn and Mengden 1984). In mark-recapture surveys of Houston toads in Bastrop County, observed sex ratios of males to females have been highly skewed in favor of males ranging from 3:1 to 10:1 (Dixon et al. 1990, Forstner 2002a, 2002b, 2003, 2006). The Houston toad is an explosive breeder, appearing in large numbers at breeding ponds where the males call to attract females over a period of a few nights throughout the breeding season, beginning as early as January 18 (Hillis et al. 1984, Dixon et al. 1990).

Houston toads typically breed from late January through June (Kennedy 1962, Hillis et al. 1984). Reported egg-laying dates in the field range from February 18 to June 26 (Kennedy 1962, Dixon 1982, Hillis et al. 1984). Breeding is believed to be triggered in part by rainfall and warm night time temperatures (Kennedy 1962). Other factors may also play a role in the timing of chorusing activity. For example, Price (1992) found that Houston toads do not generally call during 7 to 10 days prior to a full moon. However, all cues that may stimulate Houston toad breeding activity are not known.

This species tends to concentrate their reproductive efforts into producing large numbers of eggs, but each egg has less than one percent probability of survival (Seal 1994). Eggs are laid in strings in the water and hatch into tadpoles that metamorphose into juvenile toadlets approximately 60 days after egg deposition (Hillis et al. 1984). After metamorphosis, juvenile Houston toads move into the surrounding terrestrial habitats where they grow and develop into adults (Forstner 2003).

Historic and Current Distribution

The Houston toad is endemic to east central Texas (Dixon 2000). Since the 1980s, the known range of the Houston toad included nine Texas counties (Hillis et al. 1984, Yantis 1989, 1990, 1991, 1992). These included Austin, Bastrop, Burleson, Colorado, Lavaca, Lee, Leon, Milam, and Robertson counties. However, rangewide audio surveys conducted from 2006 to 2009 have resulted in the detection of the species in only seven counties (McHenry and Forstner 2009). There is a high correlation between the occurrence of the Houston toad and outcrops of the Eocene Epoch Sparta Sand, Weches, Queen City Sand, Recklaw, and Carrizo Sand formations (Yantis 1991, Seal 1994, Forstner 2003). The Carrizo Sand and Reklaw formations give rise to deep sandy soils, such as the Patilo-Demona-Silstid and Axtell-Tabor soils that are often found in toad habitat (Dixon et al. 1990, Forstner 2003).

Reasons for Decline and Threats to Survival

Small, sedentary species with restricted distributions, specialized habitat niches, and narrow climatic tolerances are especially sensitive to changes in habitat conditions (deMaynadier and Hunter 1998, Welsh 1990). The distribution of the Houston toad appears to be restricted naturally as the result of specific habitat requirements for breeding and development. These natural restrictions make them particularly vulnerable to the negative effects of human-induced changes that result in habitat loss, degradation, and fragmentation (Hillis et al. 1984). Habitat disturbance also encourages the establishment and proliferation of red-imported fire ants (*Solenopsis invicta*) (fire ants). Fire ants are known to prey on newly-metamorphosed toadlets (Freed and Neitman 1988, Forstner 2002a) as well as the invertebrate community that is believed to be an important part of the food base for the Houston toad (Bragg 1960) and for most toad species within the genus *Bufo* (Clarke 1974). Paved roads with traffic and other forms of urban development can prevent or hinder amphibian dispersal and increase mortality (Van Gelder

1973, Reh and Seitz 1990, Soulé et al. 1992, Fahrig et al. 1995, Yanes et al. 1995, Findlay and Houlahan 1997, Gibbs 1998, Vos and Chardon 1998, Knutson et al. 1999).

Other forms of habitat loss or disturbance include expanding urbanization, conversion of woodlands to agricultural use, logging, mineral production, alteration of watershed drainages, wetland degradation or destruction, and other processes that contribute to loss of suitable breeding, feeding, or sheltering habitat (Brown 1971, Seal 1994). Population viability analyses for the Houston toad indicate that risk of extinction increases with reduced migration and dispersal, survivorship, reproductive success, and sustained reduction of available habitat. Maintaining several relatively large populations of equal sizes that are interconnected so as to allow dispersal and re-colonization can enhance population survival (Seal 1994).

Rangewide Survival and Recovery Needs

The Houston toad has experienced considerable population declines (Forstner 2006; McHenry and Forstner 2009) and the juvenile survival rate of this species in the wild has been shown to be approximately 0.03 percent (Forstner 2006). A population viability analysis by Hatfield et al. (2004) indicates this level of survival may result in a probability of extinction at or greater than 60 percent within the next 10 years (Forstner 2006). To prevent extinction, the Service recommends three, interconnected Houston toad populations that include a combined total of 1,000 adult female Houston toads be identified and/or established. Ensuring these populations are connected through corridors of suitable migrating habitat will allow for dispersal and re-colonization to enhance population size and genetic diversity (Service 2009).

The Service's Spotlight Species Action Plan for the Houston toad recommends: (1) determining priority areas to protect or restore particular habitat based on the potential of each area to provide desired benefits to the species and (2) establishing habitat objectives that directly relate to achieving the Houston toad population targets mentioned above (Service 2009). Pursuing ways of protecting existing Houston toad habitat or habitat that could be restored to support Houston toads through fee simple purchases, conservation easements, or other means in designated areas were also suggested (Service 2009).

The Service is partnering with other non-government organizations as well as Federal and State agencies to engage private landowners in Houston toad conservation through outreach efforts that provide information on land management, financial incentives (Service 2009). Landowner cooperation is critical to implementing habitat management and restoration efforts throughout the Houston toad's range. Headstarting and/or captive propagation to augment existing or establish new Houston toad populations in designated priority areas will also likely play a role in the recovery of this species (Service 2009).

Critical Habitat

Critical habitat includes areas essential to the conservation of a threatened or endangered species and that may require special management considerations or protection. Although not described when critical habitat was designated, essential habitat requirements (primary constituent elements) for the Houston toad include seasonally-flooded breeding ponds, deep sandy soil, and forests or woodlands. The Service designated critical habitat for the Houston toad in 1978 (43 FR 4022), which includes about 98,000 acres in the central portion of Bastrop County, and about 2,000 acres surrounding Lake Woodrow in Burleson County. Little was known about the habitat requirements of the Houston toad at the time of designation and the area designated as critical habitat in Burleson County is no longer occupied.

Analysis of the species/critical habitat likely to be affected

Bastrop County harbors the largest known population of Houston toads. Within this population, two separate populations occur: one north of Highway 290 to the Lee County line and one south of Highway 290 to the Colorado River. The remaining habitat between Highway 290 and the Colorado River is further fragmented into four habitat blocks: (1) south of Highway 71, (2) north of Highway 21, (3) in and around Bastrop State Park, and (4) in and around the University of Texas Science Park and Buescher State Park. The proposed project activities will occur entirely within the potential habitat block (2) located north of Highway 21 and south of Highway 290. The primary estimated effect of the remediation is the disturbance to one acre of Houston toad habitat in an action area (41,170 acres). The proposed action is not likely to result in any discernable adverse effects to the Houston toad population due to the small areal extent of habitat that will be disturbed.

About half of the proposed remediation efforts (surveys, excavations, and detonations) will be located in Bastrop County unit of designated critical habitat for the Houston toad. However, USACE estimates that less than 0.5 acre of critical habitat will disturbed by remediation efforts (excavations and detonations). The 0.5-acre critical habitat disturbed as a result of the remediation is less than 0.002 percent of the critical habitat in the action area (20,531 acres, which excludes Lake Bastrop). The effects to Houston toad habitat are expected to be temporary as areas excavated will be graded and revegetated.

III. Environmental Baseline

The Service considers the action area to be the 41,170 acres contained within former Camp Swift, Bastrop County, Texas. This area includes Lake Bastrop (nominally 906 acres), which with the exception of its littoral zone (shoreline areas), is not Houston toad habitat.

Safe Harbor Agreements

As of February, 2011, the Service has issued three section 10(a)(1)(A) permits for the Houston toad associated with Safe Harbor Agreements (SHA) in Bastrop County, including:

- Jim Small Safe Harbor Agreement (TE-120475-0). A 12-year permit for creation, restoration, and enhancement of Houston toad habitat on a 836 acre ranch, in which the Service estimated that "...the level of take of Houston toad anticipated will be no more than 50 individuals and 785.5 acres from these activities during the life of the permit."

- Robert K. Long Safe Harbor Agreement (TE-074530-0). A 12-year permit for implementing conservation measures to improve Houston toad habitat on 540 acres, within five management areas, in which the Service estimated a " ....minor amount of incidental take of individual toads could occur as result of implementation of some of the conservation measures, such as understory thinning and prescribed fire. In addition, as a result of the creation and enhancement of habitat, it may be reasonably foreseeable that there will be an increased risk of death or injury to individual toads as a result of normal ranching practices."

- Boy Scouts / Lower Colorado River Authority Lost Pines Safe Harbor Agreement (TE-151746-0). A 15-year permit on 541 acres for the development of a Boy Scout camp and conservation activities to improve the quality of Houston toad habitat. The Service estimated that there would be a minor amount of incidental take during understory thinning and prescribed burn activities, and an increased risk of death to toads as a result of normal camp activities, including camp expansion.

Habitat Conservation Plans

As of May, 2008, the Service had issued 236 section 10(a)(1)(B) incidental take permits for the Houston toad associated with habitat conservation plans. These include:

- Griffith League Ranch, Boy Scouts of America (TE-065406-0), a 50-year permit for the development and operation of a High Adventure Boy Scout Camp on the 4,848-Acre Griffith League Ranch.

- Bastrop Utilities Habitat Conservation Plan (TE-078366-0), a 30-year permit covering construction and maintenance on up to 142,526 acres within central, eastern, and northern Bastrop County (106,953 acres) and western Lee County (35,573 acres), Texas.

- Revised 46 Subdivision Habitat Conservation Plan (TE-025965-1 and TE-025997-l), which allowed for issuance of up to 9,220 section 10(a)(1)(B) permits, each for a term of five years. The total area covered by the HCP was 13,163 acres, of which about 6,554 acres were already developed. The Service estimated" ... any Houston toad on a maximum of 4,610 acres of previously disturbed Houston toad habitat (based on 0.5 acre lots multiplied by 9,220 lots) will be taken in the form of harm, harassment, injury, and/or death." This HCP was incorporated into the Lost Pines Regional HCP.

- Lost Pines Regional Habitat Conservation Plan (TE-113500-0), a 30-year permit for variety of developments within the 124,000-acre plan area, a subset of Bastrop County. Each development requires retention of native vegetation, preservation of wetlands, treatment to control fire-ants, and restrictions on herbicides and pesticide use.

IV. Effects of the Action

Project activities will have short-term adverse affects on the Houston toad and its critical habitat. Adverse effects include impacts from pedestrian and vehicular travel through occupied habitat, excavations, and negative impacts from detonations, should any be required. Any toads estivating in areas to be excavated may be injured or killed by shovels during the digging. In addition, toads present within 25 feet of a UXO to be detonated may be harmed or killed by shockwaves traveling through the sand. Impacts to long term survival and recovery of the toad are not anticipated, however, as very few toads are expected to be injured or killed. The effect of detonations on Houston toads will depend on at least two factors: (1) proximity to occupied breeding habitat (a body of water supporting reproductively mature adults, egg strands, and larval Houston toads), and (2) timing (whether remediation detonations occur in the breeding season).

Not all of the action area contains suitable – potential habitat. For example, farm land that is plowed or tilled is not likely to support Houston toads. No long-term adverse impacts to potential or critical habitat is expected because vegetation removal will be limited to small limbs and all areas impacted by digging or detonation will be backfilled and replanted or reseeded as necessary.

Potential benefits of the proposed action include removal of UXO from occupied toad habitat, although the probability that ordnance would explode while toads are nearby is remote. The USACE proposes to mitigate impacts to the Houston toad by contribute to the conservation of Houston toad habitat in perpetuity through the Griffith League Conservation Bank, which is in the action area. Payment to the Conservation Bank may also protect critical habitat as the southern part of Griffith League Ranch is within designated critical habitat.

V. Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

The following examination of activities and trends in the action area documents a probable overall increase in suburban development that results in fragmentation, degradation, and loss of significant habitat areas that remain in Bastrop County.

Urbanization

Austin area growth and development, such as Austin Bergstrom Airport, have contributed to increased development in Bastrop County. The Capital Area Planning Council has ranked Bastrop County as the second-fastest growing county in the 22 county Capital Area Planning Council region (CAPCO 1998).

The increasing population in Bastrop County will continue to pose a threat to the Houston toad through loss of habitat for urbanization, increased roads and traffic, increased infrastructure, and loss of potential breeding sites. In order to help conserve the Houston toad, Bastrop County developed a regional habitat conservation plan to ensure the continued survival of the Houston toad while allowing for development.

Agricultural and Forestry Activities

Some forestry practices, specifically clear cutting, result in the destruction of woodland habitat. However, depending on the extent and location of the clearing, an area that has been clear-cut could eventually provide a habitat benefit to the toad as the woodland becomes reestablished, particularly if it is surrounded by other woodlands inhabited by the toad. Agricultural production contributes to the loss of habitat and the species through the conversion of woodlands to pasture or cropland, as well as through the use of pesticides and alteration or destruction of watershed drainages and wetlands important for Houston toad breeding and reproduction. Conversion of habitat to other cover types may introduce competition by providing habitat for other species of toads, including Woodhouse's toad and the Gulf Coast toad. Conversion of habitat also encourages the establishment and proliferation of red-imported fire ants, which prefer open, sunny areas where soils have been disturbed from clearing of woody vegetation.

VI. Conclusion

After reviewing the current status of the Houston toad, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the Service's biological opinion that the remediation efforts for ordnance and explosives at former Camp Swift, as proposed, is not likely to jeopardize the continued existence of the Houston toad or adversely modify or destroy its critical habitat.

INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or

sheltering. Incidental take is any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of Section 7 (b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in 7(o)(2) to apply. The USACE has a continuing duty to regulate the activity covered by this incidental take statement. If the USACE: (1) fails to require contractors to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the contractor must report the progress of the proposed action and its impacts on species to the Services as specified in the incidental take statement [50 CFR section402.14(i)(3].

Amount or Extent of Take Anticipated

The Service anticipates incidental take of the Houston toad will be difficult to detect for the following reasons: small body size; challenges of finding a dead or impaired specimen in soil or leaf litter; and removal of dead toads by predators. The Service anticipates incidental take of all toads within one acre of Houston toad habitat disturbed by remediation efforts. The incidental take of toads is expected to be in the form of harassment, harm, and death through impacts associated with excavations and detonations.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the Houston toad:

1. During surveys, minimize off-road vehicular traffic to avoid compacting soils potentially occupied by Houston toads; and during excavation and detonations, implement practices that avoid injuring or killing Houston toads.

2. Implement practices that will minimize impacts to the vegetation community, fragmentation of toad habitat, and loss of any potential breeding sites.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, project personnel must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary.

The following terms and conditions are necessary to implement Reasonable and Prudent Measure number 1:

I. If a Houston toad is observed on the project site during excavation and detonation activities, note the location and avoid excavation or detonations within 50 feet of the toad's location.

A. Avoid vehicular or pedestrian traffic through or near any standing water that may harbor Houston toad tadpoles.

B. Avoid the excavation of any anomalies that may require the use of heavy equipment if the equipment would need to cross deep sands potentially harboring hibernating or estivating toads.

C. Upon locating a dead, injured, or sick Houston toad, or any other endangered or threatened species, contact the U.S. Fish and Wildlife Service's Law Enforcement Office in Austin area at (512) 863-5972 for care and disposition instructions. Extreme care should be taken in handling sick or injured individuals to ensure effective and proper treatment. Care should also be taken in handling dead specimens to preserve biological material in the best possible state for later analysis of cause of death. In conjunction with the care of sick or injured endangered/threatened species, or preservation of biological materials from a dead specimen, the applicants and their associated contractor/subcontractor have the responsibility to ensure that scientific evidence intrinsic to the specimen is not unnecessarily disturbed.

II. The following terms and conditions are necessary to implement Reasonable and Prudent Measure number 2:

A. Avoid disturbance of any ephemeral or temporary ponds that form on-site during the toad's breeding season (January through June).

B. Avoid driving or parking vehicles and storing equipment and supplies off of established roadways within potential Houston toad habitat.

C. Soil compaction should be avoided. Avoid storing equipment and supplies in an woodland areas.

Conservation Recommendations

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends implementing the following action:

1) Surveys for Houston toads during breeding season should be conducted in each year of the project. Details on the location and habitat associations of any Houston toad sightings should be included in reports to the Service as soon as feasible.
2) Support Houston toad habitat conservation efforts to maintain habitat suitability and connectivity, as detailed in the recovery plan *et seq.*

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Reinitiation Notice

This concludes formal consultation on the action outlined in the request. This biological opinion addresses the remediation of ordnance and explosives at former Camp Swift through December 31, 2026. As provided in 50 CFR section 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have any questions regarding this document, please contact Patrick Connor at (512) 490-0057, extension 227.

Sincerely,

Adam Zerrenner
Field Supervisor

cc: Lynn Crane, CESWF-PER-DI
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Yantis, J.H. 1991. Houston toad distribution and habitat status. Performance report, Job No. 76. Texas Parks and Wildlife Department. Austin, Texas.

Yantis, J.H. 1992. Houston toad distribution and habitat status. Performance report, Job No. 78. Texas Parks and Wildlife Department. Austin, Texas.

Figure 1. Former Camp Swift remediation project and action area.

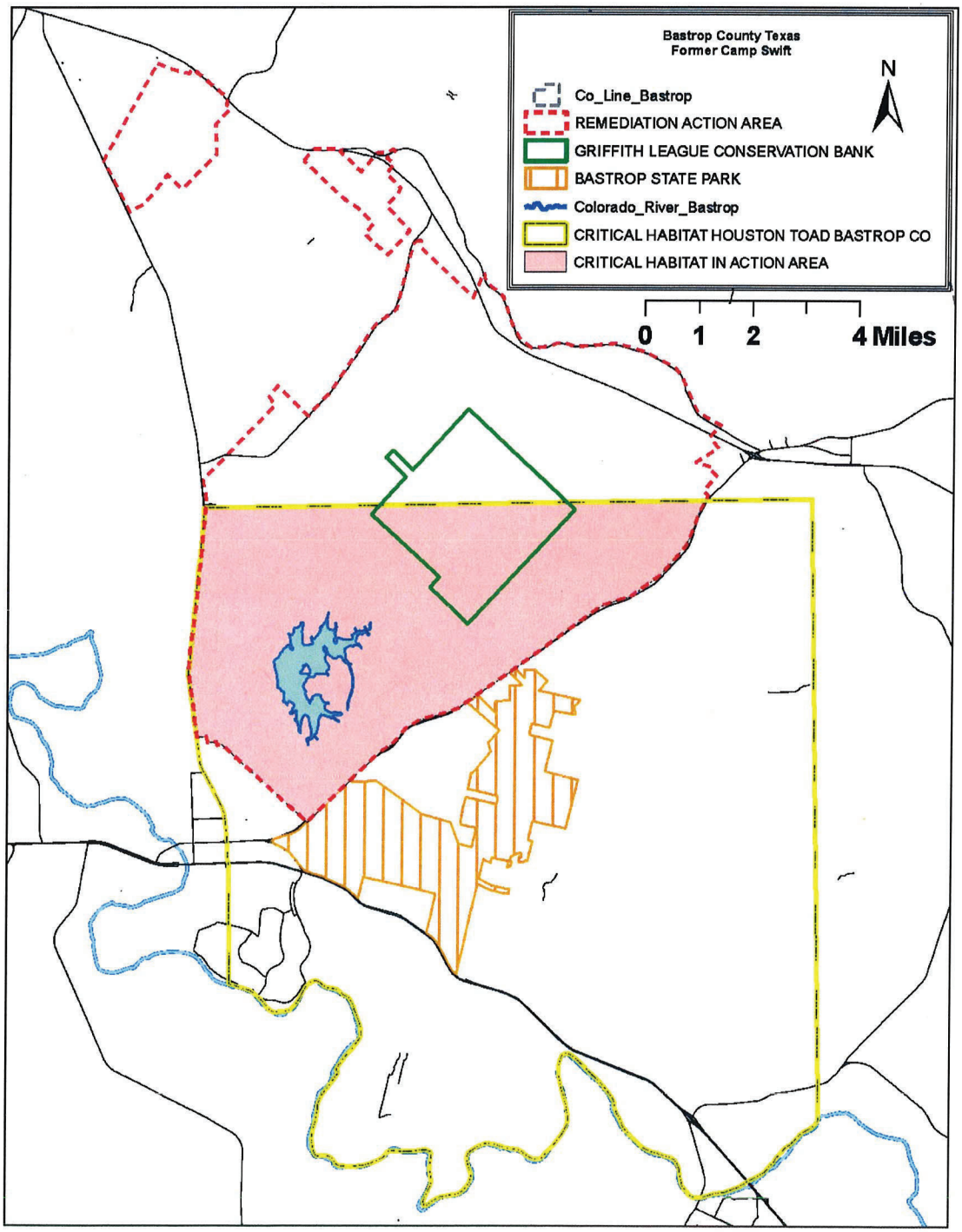
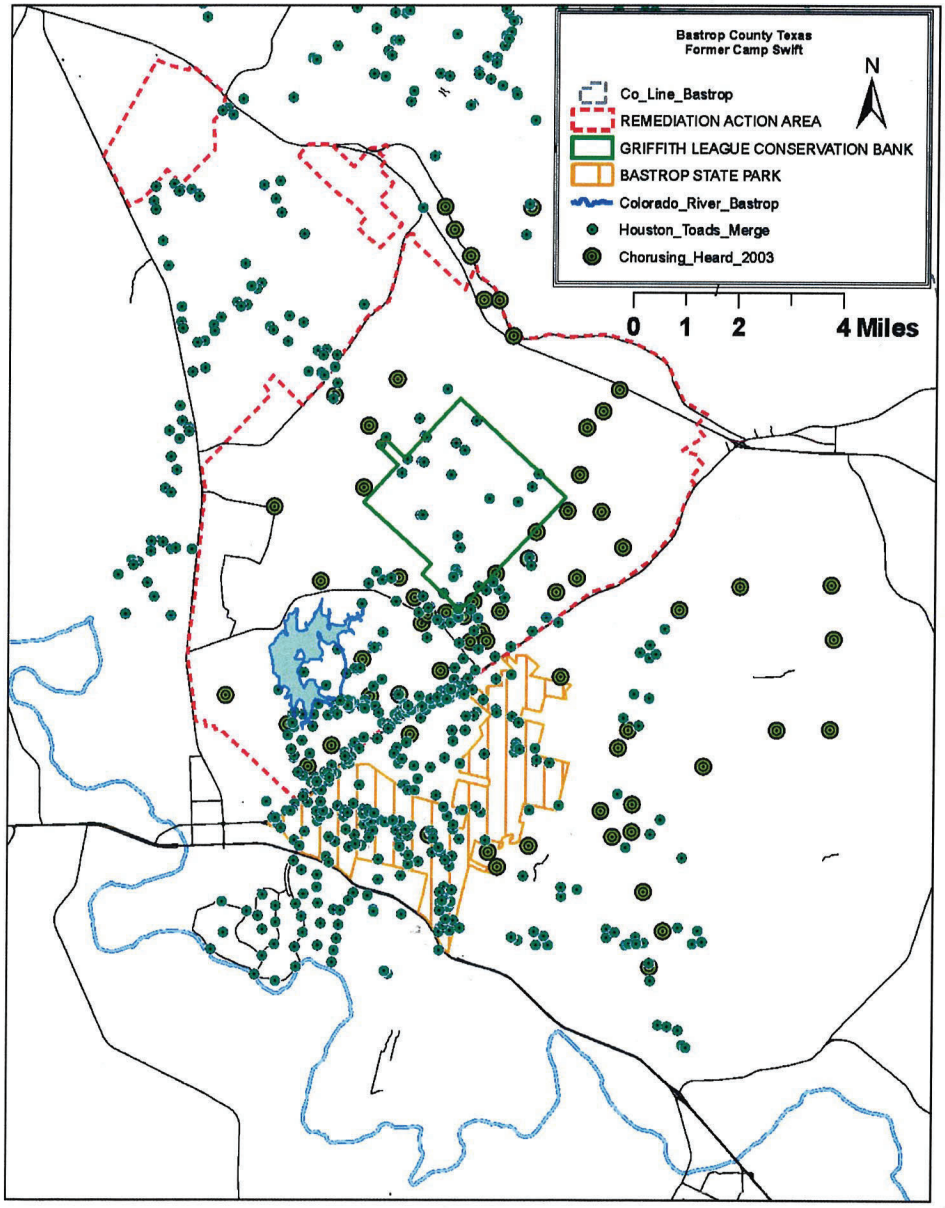


Figure 2. Houston toads seen and heard in and near the action area and Griffith League Ranch, Bastrop County.



APPENDIX E

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

June 23, 2021

Electronic Transmittal

Mr. Steven G. Martin, P.E.
Environmental Engineer
Department of the Army, US Army Corps of Engineers
CESWF-PEC-TE
P.O. Box 17300
Fort Worth, Texas 76102 -0300

Re: Approval with Comment
Response to TCEQ May 13, 2021 Comment letter and Draft-Final Decision Document (DD), Munitions Response Site (MRS) 2: Small Arms/Artillery Ranges, Former Camp Swift, Bastrop County, dated May 28, 2021; Former Camp Swift, FUDS MMRP sites, Bastrop, Texas
TCEQ ID No. T1626; CN600918916/RN104662960

Dear Mr. Martin:

The Texas Commission on Environmental Quality (TCEQ), Remediation Division has completed review of the above referenced May 28, 2021 response to TCEQ May 13, 2021 Comment Letter on the Draft Final DD for the MRS 2 – Small Arms/Artillery Ranges received on April 6, 2021. The Remedial Investigation/Feasibility Study (RI/FS) and the Proposed Plan (PP) were approved by the TCEQ on August 22, 2018. Results of the RI/FS documents presence of munitions explosive of concern (MEC) and munitions debris (MD), consisting of 4.2-inch mortars, 60 mm mortars, 2.36-inch rockets, rile grenades, 105 mm projectiles and cannonballs. The selected remedy for this MRS consists of Alternative 5D which includes subsurface MEC removal to 3 feet using digital electro-magnetic induction (EMI) systems in conjunction with advanced classification, land use controls (LUCs), followed by 5-year review(s).

The TCEQ overall approves the DD for the MRS 2 Area with the following comment: In addition to the LUCs outlined in the DD, the TCEQ concurs that the Corps should continue to maintain an updated public information web page that is specific to Camp Swift with information on the munitions 3 Rs (e.g. Recognize, Retreat, Report); and, the landowners notification should be filed with the county deed for those areas containing MEC hazard. When it comes to property notification, ownership, transfers, health and safety a more consistent notification process involving formal institutional controls (e.g. deed notice or restrictive covenant) should be used.

Questions concerning this letter should be directed to me at (512) 239-2034. When responding by mail, please submit one paper copy and one electronic copy (on USB or

disc) of all correspondence and reports to the TCEQ Remediation Division at Mail Code MC-127. An additional copy should be submitted in electronic format to the local TCEQ Region Office. The information in the reference block should be included in all submittals. Note that the electronic and hard copies should be identical, complete copies.

Sincerely,

Maureen Hatfield, P.G., Project Manager
VCP-CA Section
Remediation Division
Texas Commission on Environmental Quality

MMH/mmh

cc: Mr. Elijah Gandee, TCEQ Waste Section Manager, Austin Regional Office, MC-R11 (email)