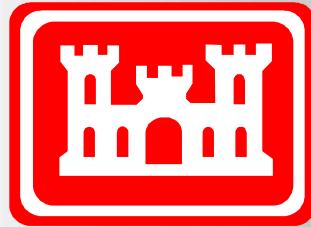


# Engineering Evaluation and Cost Analysis Report

## Camp Swift, Texas

Property Number K06TX0304



U. S. Army Corps of Engineers  
Huntsville Center  
Mandatory Center of Expertise & Design Center  
Ordnance and Explosives

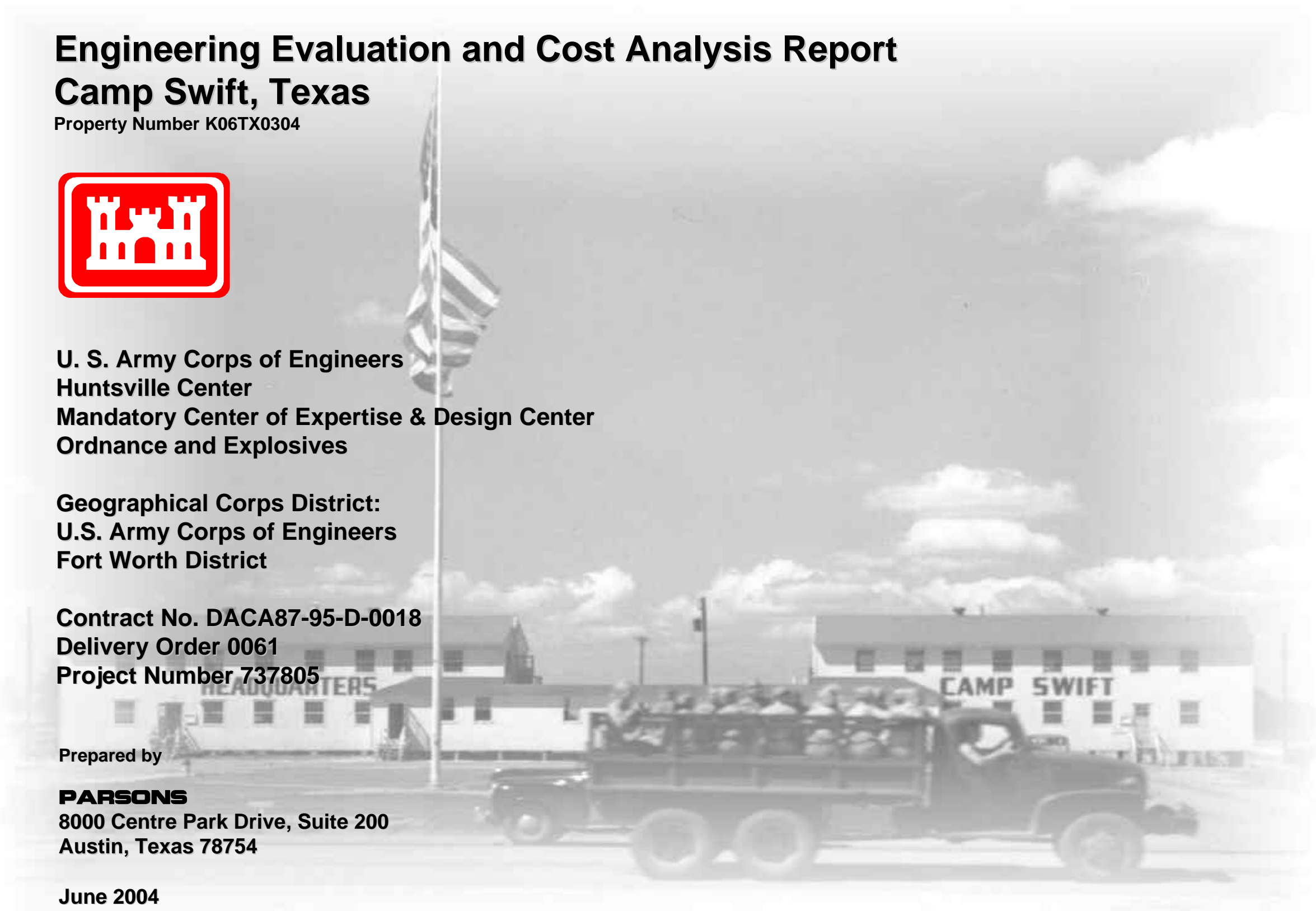
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Prepared by

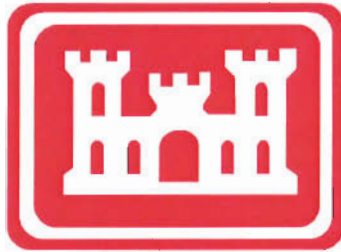
**PARSONS**  
8000 Centre Park Drive, Suite 200  
Austin, Texas 78754

June 2004  
Revised and Issued June 2007



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Don Silkebakken, P.E.



## EXECUTIVE SUMMARY

ES1 Camp Swift consists of approximately 52,191 acres and is located approximately 36 miles east of Austin, in Bastrop County, Texas. The Texas Army National Guard currently occupies 11,700 acres which were formerly part of the original Camp, and their installation is also named Camp Swift; this area is excluded from this investigation because it is not an eligible Formerly Used Defense Site. Surrounding communities include Bastrop, which is located 3 miles to the south; Elgin, which is located to the northwest; and Paige, which is situated to the east. Currently, the site consists of privately-owned residential and agricultural lands, two Boy Scouts camps, a public park, a correctional institute, and other areas.

ES2 Former Camp Swift was a U.S. Army infantry training replacement camp between 1942 and 1947. In addition to normal infantry training, artillery, tank destroyer, and engineer units carried out operations with various munitions and explosives at the camp. The camp included two impact areas (one of which is within current-day Camp Swift), an ammunition demolition area, and several training areas. In 1947 and 1948, the U.S. Army made efforts to remove remaining unexploded ordnance (UXO), but subsurface ordnance removal was not conducted. When the camp was sold to various individuals in the late 1940s, deeds to some of the properties included recommendations for surface-use only. In recent years, population has grown rapidly in the area. Many of the large properties have been subdivided and developed, and use-restrictions are no longer included on many of the property deeds. UXO has been found by landowners on several properties; none of the findings have resulted in injury or fatality.

ES3 The Engineering Evaluation/Cost Analysis (EE/CA) field investigation was conducted between February 25 and June 27, 2002. The site was divided into fourteen sectors (1, 2, 3A, 3B, 3C, 3D, 3E, 4, 5, 6, 7, 8, 9, 10, 11, and 12) for site characterization purposes, based on former camp land use information. For the EE/CA report risk evaluation, the sectors were further subdivided into 23 areas of interest (AOI) using land use designations, property ownership boundaries, and the sample locations and results of the EE/CA investigation. The total area surveyed was approximately 214 acres, comprised of meandering paths distributed throughout the site to provide representative coverage. A total of 3,124 anomalies were investigated. Thirteen UXO items and 648 ordnance scrap items were discovered. The remaining 2,476 magnetic anomalies were caused by buried utilities, other metal scrap such as barbed wire or metal tent pegs, metal-bearing rocks, and other non-ordnance items.

ES4 In addition to these items, a landowner found include an unexploded 105mm projectile in AOI 4-2. In AOI 3-4, an unexploded rifle grenade was identified in a landowner's collection of ordnance scrap found on his property. During the EE/CA fieldwork, two landowners identified expended anti-tank mines on their property (AOI 3-2 and AOI 3-3). After fieldwork was completed, a volunteer firefighter heard a detonation while fighting a grass fire in AOI 3-3, and later found an anti-tank mine in the area where a bulldozer was making a fire break. In November 2002, a Boy Scouts representative identified several mines visible on the surface in Griffith League Ranch (in AOI 4-1); the local sheriff was called to respond. An unexploded 75mm projectile was identified during the EE/CA site

visit, as well. Landowner findings are included in the investigation findings and taken into account when formulating the EE/CA AOI recommended response actions, which are explained in paragraphs ES5 through ES7.

ES5 The EE/CA findings for each of the AOIs are as follows. UXO was recovered from the impact area and buffer zone (AOIs 4-1 and 5-1), the demolition area (AOI 10), other artillery lands (AOI 6-1), and other remaining lands (AOIs 3-3 and 3-4). Ordnance scrap was recovered from all other AOIs, except AOIs 2, 3-7, 5-2, 7, and 12-2. However, AOIs 2, 3-7, and 12-2 were not investigated due to lack of right-of-entry. If right-of-entry is granted to these AOIs in the future, it is recommended that they be investigated.

ES6 Six of the thirteen UXO items recovered during the EE/CA investigation were found in AOIs 4-1, 4-2, 4-3, 5-1, and 10; and 544 of the 648 ordnance scrap items were recovered from these areas. Based on EE/CA investigation results, the highest UXO density is anticipated to be within AOIs 4-1, 4-2, 4-3, 5-1, and 10, which are located within the former impact area, impact area buffer zone, and demolition area. UXO and ordnance scrap were found in AOIs 4-1, 4-2, 4-3, and 5-1, while only ordnance scrap was found in AOI 4-3. In these AOIs, UXO has been found at depths of up to 30 inches. UXO types found in these areas include 75mm projectiles (identified during the EE/CA site visit), 105mm projectiles, 4.2-inch mortars, and anti-tank mines with energetic charges. Since these AOIs had such a high occurrence of UXO and ordnance scrap, Removal to Depth of Ordnance and Explosives (OE) with Institutional Controls is recommended for the entire area for each of these five AOIs.

ES7 The remaining seven UXO items were recovered from AOIs 3-3, 3-4, and 6-1; and 104 ordnance scrap items were recovered from AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-8, 6-1, 6-2, 9, and 12-1. These items were all recovered on the surface or at depths of 6 inches or less, and the UXO items were mostly practice anti-tank mines. The OE findings in these AOIs were not as concentrated as those in the impact area, buffer zone, and demolition area. In addition, AOIs 1, 2, 3-4, 5-3, 6-1, and 6-2 are located in areas in which firing range fans were formerly located. These areas are considered to have a greater likelihood to contain OE. Removal to Depth of OE with Institutional Controls is recommended as the OE response alternative for 500-ft radius areas around past OE findings in AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-2. In addition, Removal to Depth of OE with Institutional Controls is also recommended for the land within these AOIs that was formerly part of a firing range. In addition, because heavy vegetation precluded investigation in much of AOI 3-1, pre-construction removal actions are recommended in camping areas at the Boy Scouts Griffith Ranch. Planning for these camping areas is currently underway, and the number of acres they will include is currently unknown. Because a bottle associated with a mustard gas test kit was found on the ground surface in AOI 9, geophysical survey and surface sweep of the entire area is recommended prior to any further intrusive investigations in the area.

ES8 Institutional control components are recommended to help inform visitors and residents of UXO hazards and keep them from encountering UXO, and they include

signage; notification by certified letter to current landowners and area agencies involved in property transfer, during permitting, and by tax bill; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an internet Website, and establishment of an Ad Hoc committee.

ES9 Due to the impending construction of an elementary school in AOI 3-8, a time-critical removal action (TCRA) was completed for the school property (approximately 21 acres) during May and June 2003. During the EE/CA, ordnance scrap related to 2.36-inch practice rockets was identified in this area, which was part of the Wake Island tank destroyer training area. The TCRA investigated 303 subsurface anomalies, 14 of which were found to be inert ordnance scrap items. All of the ordnance scrap items were 2.36-inch rockets. The total weight of the items was 40 pounds.

ES10 A total of approximately 7,000 acres are located within the areas recommended for response action. Costs to conduct removal to depth in AOIs 4-1, 4-2, 4-3, 5-1, and 10, and the portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 located within a 500-foot radius of OE findings and within former firing ranges are estimated at \$57,811,699. The initial cost to implement institutional controls is estimated at \$88,500, with annual costs of \$3,000. The total cost, excluding annual institutional controls cost, is therefore estimated at \$57,900,199.

ES11 Because removal action has been recommended for a large number of acres, the site has been divided into fourteen physically practical and manageable operable units. A prioritization system has been recommended to identify the order in which removal actions should be accomplished. The prioritization is based on factors related to current demographics, historic camp use information, and OE findings. Areas with the highest population density, those that are located in former impact/buffer areas and the demolition area, and those that have the highest number of most sensitive and severe OE pose the greatest risk of an OE incident. Unpopulated areas that are outside of former training areas and have the lowest number of less sensitive and less severe OE pose the least risk.

ES12 The U.S. Army Corps of Engineers (Fort Worth District) will maintain its responsibilities for the residual risk that remains once the recommended OE response actions have been implemented by performing recurring reviews. The purpose of recurring reviews is to determine if a response action continues to minimize explosives safety risks and continues to be protective of human health, safety, and the environment. During the recurring review process, updates will also be made to the prioritization model to address changes in land use, population, and OE findings. Recurring reviews will be conducted every 5 years, starting 5 years after the response action is initiated.

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## ACRONYMS AND ABBREVIATIONS

AOI	Area of Interest
AP	Armor-piercing
APC	Armor-piercing, capped
APT	Armor-piercing tracer
AR	Army Regulation
ARAR	Applicable or Relevant and Appropriate Requirement
ASR	Archives Search Report
AT	Anti-tank
BD/DR	Building Demolition/Debris Removal
BEG	Bureau of Economic Geology
BFCI	Bastrop Federal Correctional Institute
bgs	Below ground surface
BIP	Blow-in-place
BSA	Boy Scouts of America
CDP	Census designated place
CEHNC	U.S. Army Corps of Engineers, Huntsville Center
CERCLA	Comprehensive Environmental Removal, Compensation, and Liability Act
CESWF	U.S. Army Corps of Engineers, Fort Worth District
CFR	Code of Federal Regulations
C.I.H.	Certified Industrial Hygienist
CWM	Chemical Warfare Materiel
CX	Center of Expertise
DA	Department of the Army
DDESB	Department of Defense Explosives Safety Board
DERP	Defense Environmental Restoration Program
DID	Data Item Description
DL	Delisted
DoD	Department of Defense
DOT	Department of Transportation
DQO	Daily Quality Objective
E	Listed Endangered
EDC	Economic Development Corporation
EE/CA	Engineering Evaluation/Cost Analysis
EM	Engineer Manual

E.O.	Executive Order
EOD	Explosive ordnance disposal
EODT	EOD Technology, Inc.
EP	Engineer Pamphlet
ERDC	Engineering Research and Development Center
ESS	Explosives safety submission
ETJ	Extraterritorial jurisdiction
F	Fahrenheit
FM	Farm-to-Market Road
FUDS	Formerly Used Defense Site
GIS	Geographic information system
GPS	Global Positioning System
GSA	General Services Administration
H.C.	Hexachloroethane
HE	High explosive
HEAT	High explosive anti-tank
IA	Institutional Analysis
IC	Institutional Control
ID	Identification
IGD	Interim Guidance Document
INPR	Inventory Project Report
IPD	In-place disposal crater
ISD	Independent School District
I.V.	Intravenous
LCRA	Lower Colorado River Authority
MDL	Method Detection Limit
mg/kg	Milligram per kilogram
MKT	Missouri, Kansas, and Texas
mm	Millimeter
MPM	Most probable munition
MSD	Minimum separation distance
MSL	Mean sea level
N/A	Not available
NAD	North American Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	Not detected

NDAI	No DoD Action Indicated
NRHP	National Register of Historic Places
nT	nanoTesla
NTCRA	Non-Time Critical Removal Action
OE	Ordnance and explosives
OERIA	Ordnance and Explosives Risk Impact Analysis
OU	Operable Unit
P	Proposed
PaE	Patilo-Demona-Silstid Association Soils
PCL	Protective Concentration Limit
P.E.	Professional Engineer
P.G.	Professional Geologist
PM	Project Manager
POW	Prisoner of war
ppm	Parts per million
PsB	Axtell-Tabor Association Soils
QA	Quality assurance
QC	Quality control
RAC	Risk assessment code
RCRA	Resource Conservation and Recovery Act
RDX	Royal Defense Explosive (chemical name cyclo-1,3,5-trimethylene-2,4,6-trinitramine, or cyclonite)
RL	Reporting Limit
ROE	Right-of-entry
SAL	State Archaeological Landmark
SARA	Superfund Amendments and Reauthorization Act
SHPO	State Historic Preservation Officer
SOW	Statement of Work
SUXOS	Senior UXO Supervisor
T	Listed Threatened
TAC	Texas Administrative Code
TARL	Texas Archaeological Research Laboratory
TARNG	Texas Army National Guard
TBC	To be considered criteria
TCEQ	Texas Commission on Environmental Quality
TCRA	Time Critical Removal Action
TDMD	Time Domain Electromagnetic Metal Detector

TEC	Topographic Engineering Center
THC	Texas Historical Commission
TM	Technical Manual
TNRIS	Texas Natural Resources Information System
TNRCC	Texas Natural Resource Conservation Commission
TNT	Trinitrotoluene
TPP	Technical project planning
TPWD	Texas Parks and Wildlife Department
TWDB	Texas Water Development Board
UND	Undisturbed soil
URL	Uniform Resource Locator
U.S.	United States
USA	USA Environmental, Inc.
USACE	United States Army Corps of Engineers
USADACS	United States Army Defense Ammunition Center and School
USAESCH	U.S. Army Engineering and Support Center, Huntsville
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
UST	Underground storage tank
UT	University of Texas
UTMDA	University of Texas MD Anderson Cancer Center
UXO	Unexploded ordnance
UXOSO	UXO Safety Officer
VIC	Visually-identifiable historic detonation crater
WAA	War Assets Administration
WhP	White phosphorous
WP	Work Plan



## CHAPTER 1 INTRODUCTION

### 1.1 BACKGROUND

1.1.1 In 1942, the U.S. Government acquired 52,191 acres in Bastrop County, Texas for a U.S. Army infantry replacement training camp. The location of the former Camp Swift is shown in Figure 1.1. In addition to the normal infantry training, artillery, tank destroyer, and engineer units carried out operations with various munitions and explosives at the camp. A detailed description of the site and its historical use is presented in Chapter 2 of this report. The property was declared excess to the War Assets Administration (WAA) on May 5, 1947.

1.1.2 In 1947 and 1948, the U.S. Army made efforts to remove remaining unexploded ordnance (UXO). Certificates of surface removal of ordnance were issued, but subsurface removal was not conducted. Following the declaration of excess and surface removal, over 35,000 acres of the camp were sold to various individuals, and the deeds to some of the new owners contained a recommendation that activities be limited to surface uses only. At that time, the majority of land was used for agricultural purposes.

1.1.3 In recent years, population has grown rapidly in the area. Many of the large properties that were formerly within the camp have been subdivided and developed, and limited use-recommendations are no longer included on many of the property deeds. UXO has been found on several properties; however, none of the findings have resulted in injury or fatality.

1.1.4 An ordnance risk assessment was conducted by the United States Army Corps of Engineers (USACE, 1991), in accordance with MIL-STD-882B and Army Regulation (AR) 385-10, for the former camp. This risk assessment was based on documented evidence consisting of records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, field observations, interviews, and measurements. The output is a risk assessment code (RAC) score used to prioritize actions at a site. The RAC score for former Camp Swift was a "2" on a scale of 1 to 5, with 1 being the highest risk score. A RAC score of 2 indicates that further action should be taken.

1.1.5 This Engineering Evaluation/Cost Analysis (EE/CA) report presents a characterization of the type, location, and distribution of ordnance and explosives (OE) and UXO present at the former Camp Swift U.S. Army training camp. In addition, an assessment of safety risk to the public from residual OE as well as an evaluation of feasible OE removal actions was conducted.

### 1.2 PROJECT AUTHORIZATION

Parsons received Contract No. DACA87-95-D-0018, Delivery Order No. 0061, from the U.S. Army Engineering and Support Center, Huntsville (USAESCH) to conduct an

EE/CA at approximately 40,491 acres of the former Camp Swift, Bastrop, Texas. This EE/CA addresses all of the former Camp, except for the 11,700 acres currently being used by Texas Army National Guard (TARNG), which is not eligible for Formerly Used Defense Sites (FUDS) funding. This EE/CA has been performed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 104 and 121; Executive Order (E.O.) 12580; and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). All activities involving work in areas potentially containing UXO hazards were conducted in accordance with USAESCH, U.S. Army Corps of Engineers (USACE), Department of the Army (DA), and Department of Defense (DoD) requirements regarding personnel, equipment, and procedures.

### **1.3 PURPOSE AND SCOPE**

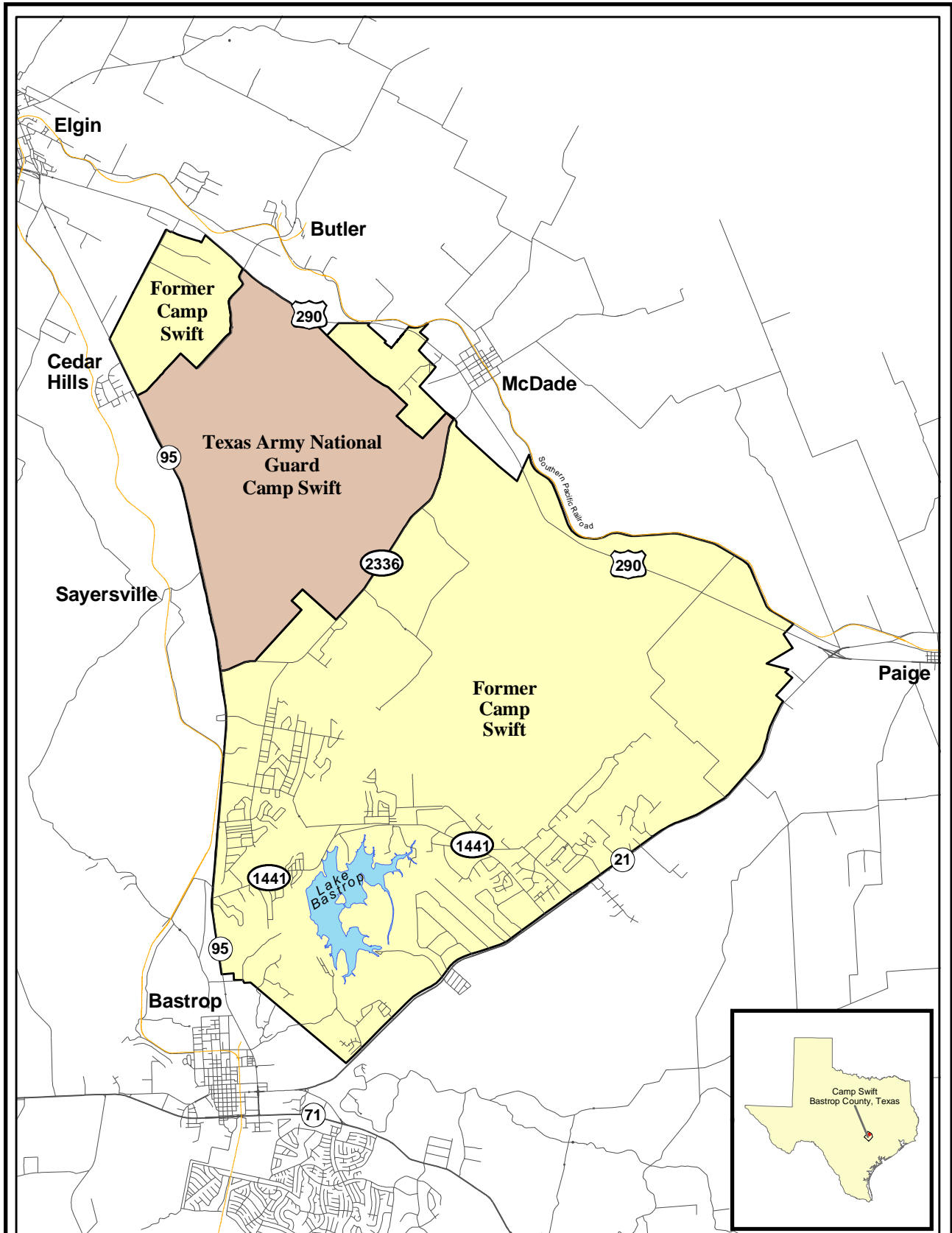
The purpose of this EE/CA at the former Camp Swift is to characterize OE nature, location, and concentration; provide a description of the OE-related problems affecting human use of the site; identify and analyze reasonable risk management alternatives; and provide a convenient record of the process for use in final decision-making. The scope of work conducted to achieve the objectives of this EE/CA included a review of existing documents, site visit, collection of geophysical data to identify potential OE, subsurface investigation of anomalies, and preparation of this report as detailed in the Statement of Work (SOW [Appendix A]).

### **1.4 PROJECT TEAM**

The technical project team consisted of USACE Fort Worth District (CESWF), USAESCH, Parsons, and USA Environmental, Inc. (USA). The roles of these team members are described below and depicted in Figure 1.2. In addition to USACE and its contractors, a Technical Project Planning (TPP) team was established prior to beginning work at the site. TPP team members and activities are described in Chapter 3 of this report.


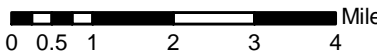
#### **1.4.1 U.S. Army Corps of Engineers, Fort Worth District**

CESWF is the life-cycle project manager (PM) and funding agency for this project. CESWF's responsibilities include review of project plans and documents, obtaining right-of-entry (ROE) agreements to properties in the investigation areas, working with the news media and the public, and coordinating with State and local regulatory agencies on issues pertaining to protection of ecological and cultural resources.



**Legend**

- Texas Army National Guard Boundary
- Former Camp Swift Boundary
- Roads
- Railroad

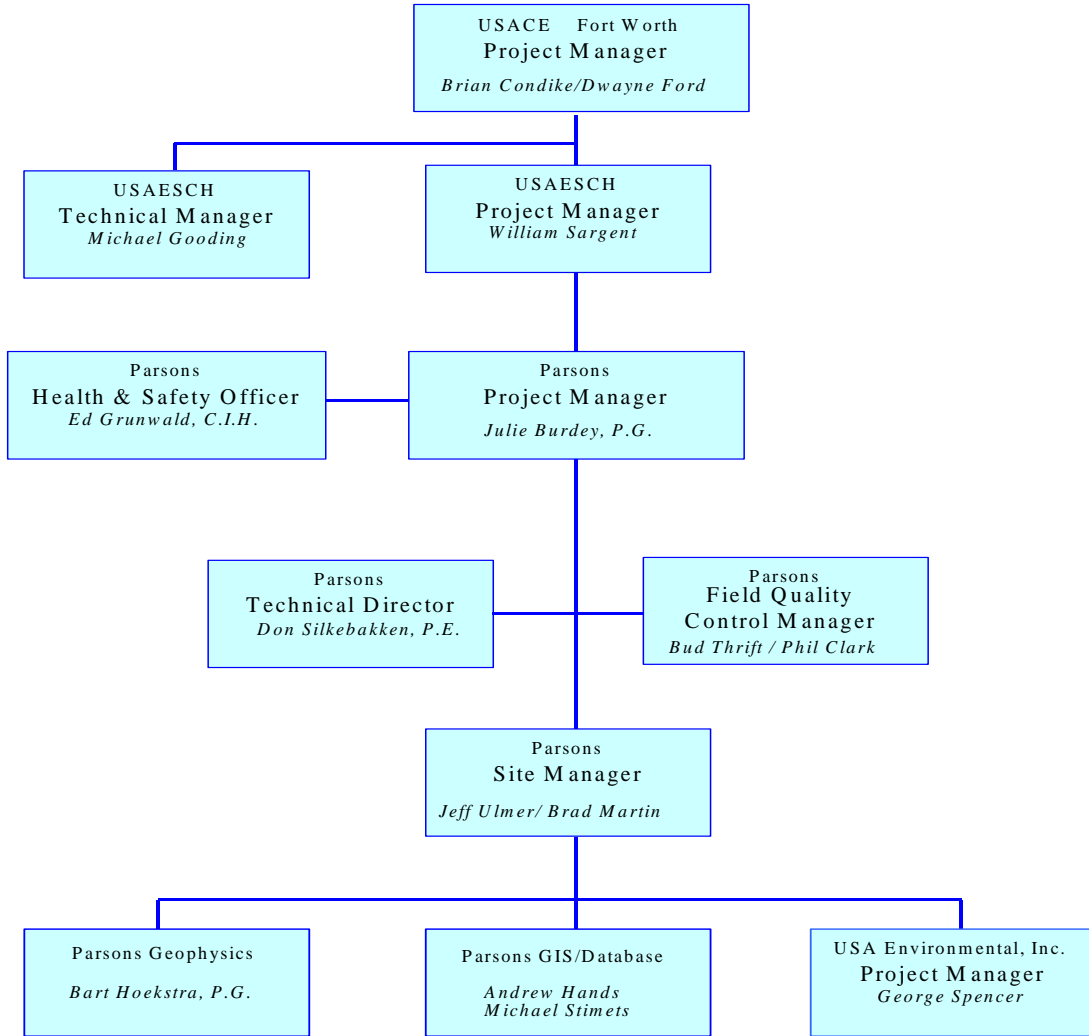
0 0.5 1 2 3 4 Miles

Map Units: NAD 1983 Texas Central State Plane (Feet)

Figure 1.1  
Location Map  
Camp Swift, Texas

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: KG	SCALE: 1:150,000	PROJECT NUMBER: 727905	
CHECKED BY: EN	DATE: April, 2003	PAGE NUMBER:	
SUBMITTED BY: JB	FILE: J:\737805\GIS\ECAD\OverviewMap.mxd		

Figure 1.2 Organization Structure for Camp Swift EE/CA



C.I.H. = Certified Industrial Hygienist

P.E. = Professional Engineer

GIS = Geographical Information System

P.G. = Professional Geologist

#### **1.4.2 U.S. Army Engineering and Support Center, Huntsville**

USAESCH is the lead technical agency for this project. USAESCH responsibilities include procurement of architect/engineer services, direction of the EE/CA contractor, review and coordination of project plans and documents, and working with the news media and the public. USAESCH also provides technical expertise for OE activities. As the technical project manager, USAESCH is responsible for directing the EE/CA contractor and controlling the budget and schedule.

#### **1.4.3 Parsons**

Parsons is the prime contractor to USAESCH and provides overall engineering support and services for the EE/CA. Parsons is responsible for performance of the activities detailed in the SOW (Appendix A), and for schedule and budget control. Parsons provided overall engineering support and services for this project.

#### **1.4.4 USA Environmental, Inc.**

USA is the UXO subcontractor to Parsons. USA provided qualified UXO personnel needed to conduct the field investigation. USA conducted intrusive investigations of anomalies identified and reacquired by Parsons. USA was also responsible for all OE operations, including handling, detonating, and storage and disposal of OE and ordnance scrap.

### **1.5 PROJECT OBJECTIVES**

1.5.1 The primary objective of this task order is for Parsons to prepare an EE/CA report (this document) containing the following elements:

- Characterization of OE nature, location, and concentration.
- A description of the OE-related problems affecting human use of the site.
- Identification and analysis of reasonable risk management alternatives.
- A convenient record of the process for use in final decision-making.

1.5.2 To complete this primary objective, project tasks included:

- Technical Project Planning;
- Geophysical Prove-Out;
- Geophysical Survey;
- Site Investigation and Sampling;
- Anomaly Selection and Reacquisition;
- Intrusive Investigations;
- Historical and Archaeological Survey;
- Flora and Fauna Survey; and
- Institutional Analysis.

## 1.6 REPORT ORGANIZATION

1.6.1 This report has been prepared in accordance with Data Item Description (DID) OE-010. Report chapters are listed in Table 1.1.

**Table 1.1 EE/CA Report Organization**

<b>Chapter</b>	<b>Chapter Title</b>
1	Introduction
2	Site Description
3	Site Characterization
4	Risk Evaluation
5	Institutional Analysis
6	Identification of Response Action Objectives
7	Identification and Analysis of Response Action Alternatives
8	Comparative Analysis of Response Action Alternatives
9	Recommended Response Action Alternative
10	Recurring Review Plan
11	References

1.6.2 Appendices include the project SOW, the Biological Opinion from the U.S. Fish and Wildlife Service (USFWS), the Archaeological Survey Report, a summary of anomaly findings, Institutional Analysis (IA), and responses to regulatory and public comments on the draft final EE/CA Report.



## CHAPTER 2 SITE DESCRIPTION

### 2.1 LOCATION

2.1.1 The former Camp Swift consisted of 52,191 acres located approximately 36 miles east of Austin, in Bastrop County, Texas. Texas Army National Guard (TARNG) Camp Swift currently occupies 11,700 acres which were formerly part of the former Camp Swift. The former Camp Swift is bordered to the east by State Highway 21 and to the west by State Highway 95 (Figure 1.1). Federal Highway 290 forms much of the north boundary of the former Camp Swift, but approximately 1,660 acres are located to the north of the highway. Surrounding communities include Bastrop, which is located 3 miles to the south; Elgin, which is located to the northwest; Paige, which is situated to the east; McDade, which is located to the northeast; and Sayersville, which is located to the west. The former Camp Swift includes Lake Bastrop.

2.1.2 For the purposes of the EE/CA field investigation, the former Camp Swift was divided into twelve sectors based on the land use descriptions presented in the Camp Swift Archives Search Report (ASR, [USACE, 1994a]). The sector descriptions, excluding the 11,700 acres currently occupied by TARNG, are presented in Table 2.1.

**Table 2.1 Former Camp Swift Sectors**

	Sector Name	Sector Acreage	% of Area
1	Firing Ranges	2,321	6%
2	Remaining Lands	1,031	3%
3	Remaining Lands	27,937	69%
4	Artillery Range Impact Area	2,515	6%
5	Artillery Range Buffer Zone	2,720	7%
6	Other Artillery Lands	2,827	7%
7	Ammunition Storage Area	20	0.05%
8	Booby Trap Training Area	13	0.03%
9	Gas Area	20	0.05%
10	Munitions Demolition Area	69	0.2%
11	Hospital Area	627	2%
12	Fortified Area	419	1%
	<b>Total</b>	<b>40,519</b>	

Note: The acreages presented in the above table were determined from Geographic Information System (GIS) data and show a 28-acre difference from the acreage presented in the Camp Swift ASR (USACE, 1994a). This is caused by slight inconsistencies between the Camp Swift ASR figures and the GIS data.

## **2.2 PHYSICAL DESCRIPTION**

### **2.2.1 Topography and Physiography**

2.2.1.1 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 mean sea level (MSL) to 550 feet MSL. A topographic map is provided in Figure 2.1.

2.2.1.2 The former Camp Swift lies within the Gulf Coastal Plains physiographic province (Bureau of Economic Geology [BEG], 1996). The Gulf Coastal Plains include three subprovinces, named the Coastal Prairies, the Interior Coastal Plains, and the Blackland Prairies. The former Camp Swift is located 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. The plain includes sedimentary rocks of both marine and continental origin. The rock units range in age from Late Cretaceous to Cenozoic and form the upper portion of the depositional sequence in the Gulf of Mexico Basin. Regionally, the rocks dip to the southeast.

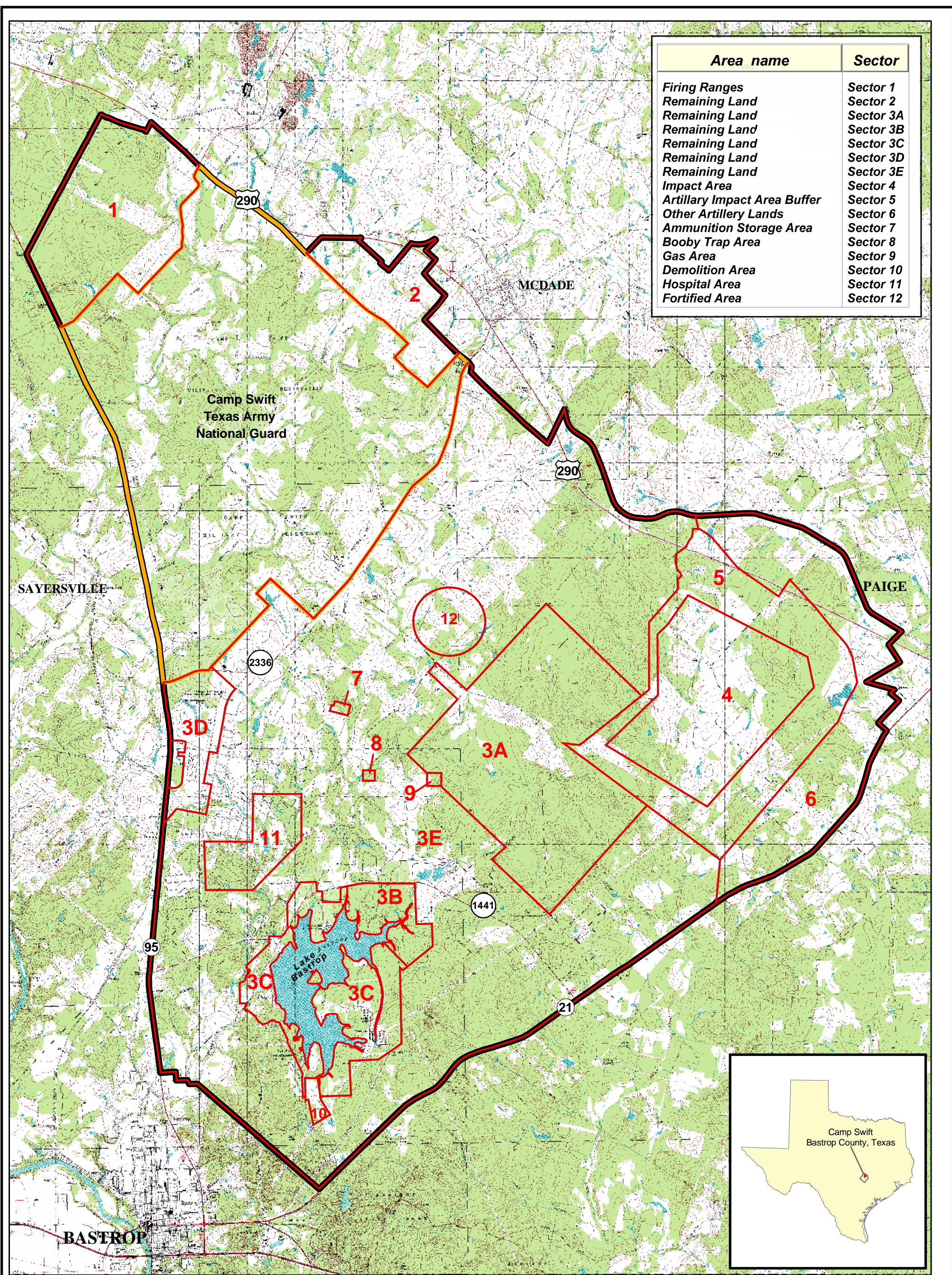
### **2.2.2 Soil Types**

Two main soil associations occur within the boundaries of the former Camp Swift: the Patilo-Demona-Silstid association and the Axtell-Tabor association (United States Department of Agriculture [USDA], 1979). A soil association is a landscape that has a distinctive soil pattern in defined proportions. The Patilo-Demona-Silstid 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. The Axtell-Tabor association is characterized by nearly level to strongly sloping soil types occurring on stream terraces and uplands that have a loamy surface layer and lower layers with very low permeability. Soil layers in both associations are generally more than 30 inches deep. A third soil association, the Crockett-Wilson, is present in a small area along the eastern boundary of the former camp. A more detailed description of the soil associations is presented in the EE/CA Work Plan (Parsons, 2001a). A soil type map of the former Camp Swift area is shown in Figure 2.2.

### **2.2.3 Geology and Hydrogeology**


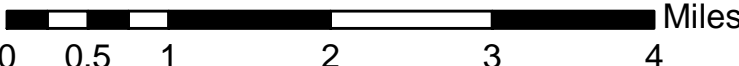
2.2.3.1 The following geologic formations, in order from youngest to oldest, outcrop in the former Camp Swift: Weches Greensand, Queen City Sand, Reklaw Formation, Carrizo Sand, and the Wilcox Group. The Wilcox Group, Carrizo Sand, and Reklaw Formation are the predominant formations at the former Camp Swift. 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 Carrizo Sand consists chiefly of fine to coarse, loose sand and some thin beds of sandstone and clay. The upper part of the Reklaw Formation consists primarily of clay and a few thin beds of sandstone, and the lower part consists primarily of glauconitic sand and silt.





Area name	Sector
Firing Ranges	Sector 1
Remaining Land	Sector 2
Remaining Land	Sector 3A
Remaining Land	Sector 3B
Remaining Land	Sector 3C
Remaining Land	Sector 3D
Remaining Land	Sector 3E
Impact Area	Sector 4
Artillery Impact Area Buffer	Sector 5
Other Artillery Lands	Sector 6
Ammunition Storage Area	Sector 7
Booby Trap Area	Sector 8
Gas Area	Sector 9
Demolition Area	Sector 10
Hospital Area	Sector 11
Fortified Area	Sector 12

Legend	
	Sector Boundary
	Texas Army National Guard Boundary
	Former Camp Swift Boundary

  
  
 Source: USGS 1:24,000 Topographic Maps  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

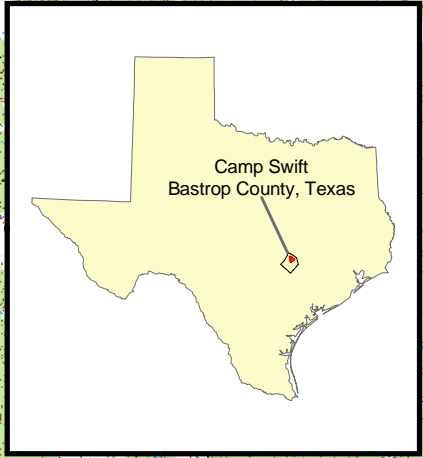


Figure 2.1  
Topographic Map,  
Camp Swift, Texas

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: KG	SCALE: 1:75,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: April, 2003	PAGE NUMBER:	
SUBMITTED BY: JB	FILE: j:\737805\GIS\EECA\Fig2_1.mxd		



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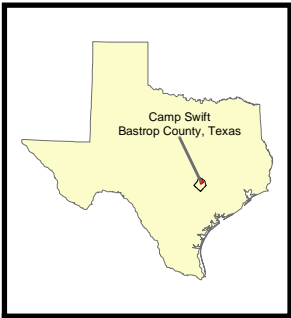
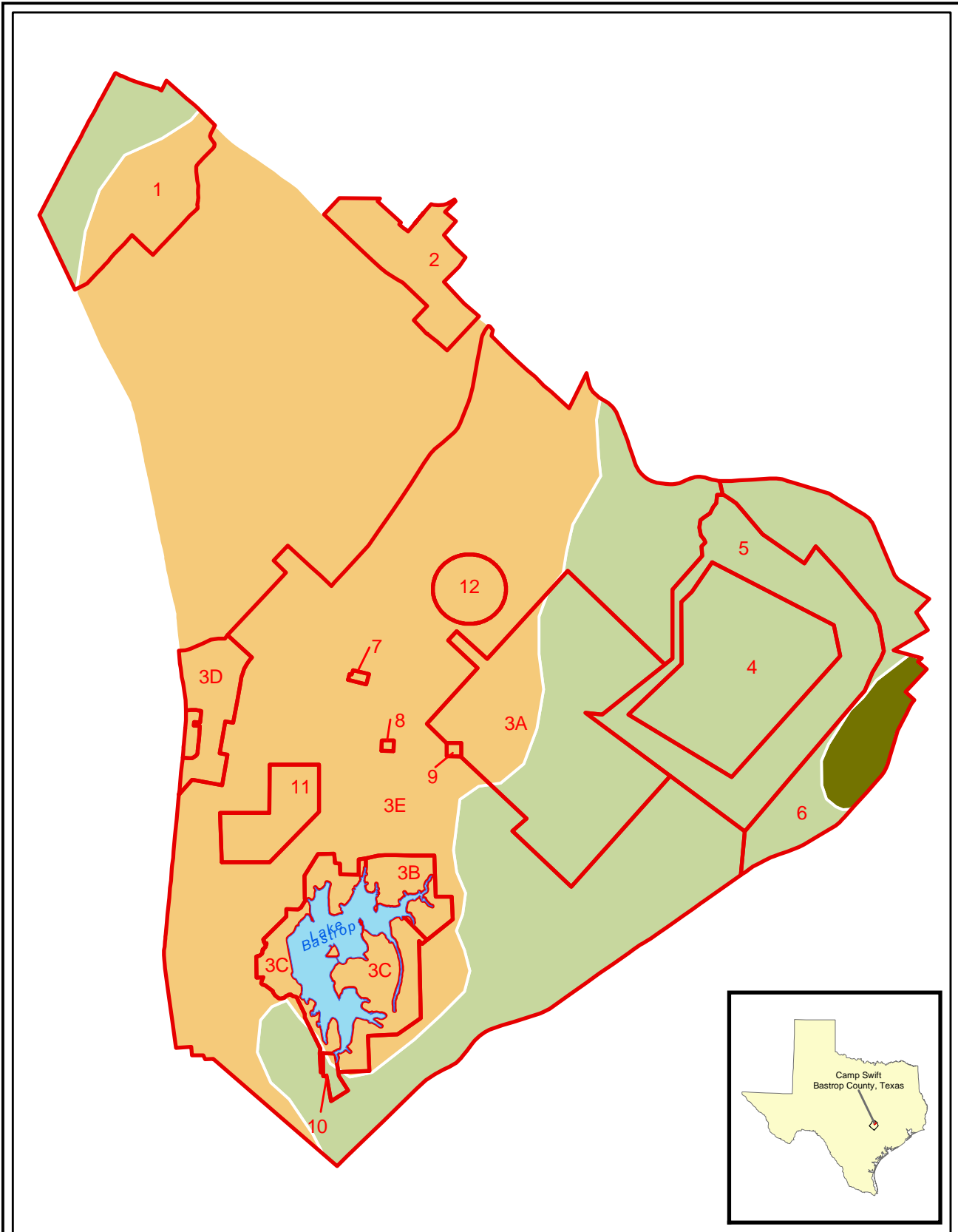



Figure 2.2  
Soils Map,  
Camp Swift, Texas

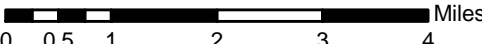
**Legend**

12 Sector Boundary

**Soil Associations**

- Crockett-Wilson
- Axtell-Tabor
- Patilo-Demona-Silstid





Miles

Source: Soils: Soil Survey of Texas, Bastrop County, Texas  
Map Units: NAD 1983 Texas Central State Plane (Feet)

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
CAMP SWIFT, TEXAS		CAMP SWIFT, TEXAS	
DRAWN BY: ARH	SCALE: 1:115,000	PROJECT NUMBER: 737805	
CHECKED BY: KG	DATE: October, 2002	DRAWN BY: JB	FILE: j377805/GIS/EECA/fig2_2.mxd

2.2.3.2 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. The Carrizo Sand yields small to large quantities of fresh water, which is low in dissolved solids but has a high iron content. The Reklaw Formation yields small to moderate quantities of fresh to slightly saline water to a few wells, but is rarely tapped (Texas Water Development Board [TWDB], 1981). A geologic map of the former Camp Swift area is provided in Figure 2.3.

## 2.2.4 Vegetation

2.2.4.1 As described in Subchapter 2.2.1, the former Camp Swift area is located within the Blackland Prairie physiographic subprovince. Little bluestem is the dominant native vegetation in this province. Big bluestem, Indiangrass, switchgrass, hairy grama, sideoats grama, tall dropseed, silver bluestem, and Texas wintergrass represent other important grasses in the vegetational region. Wooded areas along riparian strips in the Blackland Prairies include such species as black willow, oak, pecan, osage orange, elm, and eastern cottonwood. Woody invasive species that are commonly found in the area include post oak, blackjack oak, and cedar elm in the north, with honey mesquite being a common invader in the southern portion of the region. The vegetation at the former Camp Swift is extremely dense and impenetrable on foot in some areas. A more detailed vegetation description is presented in the EE/CA Work Plan (Parsons, 2001a).

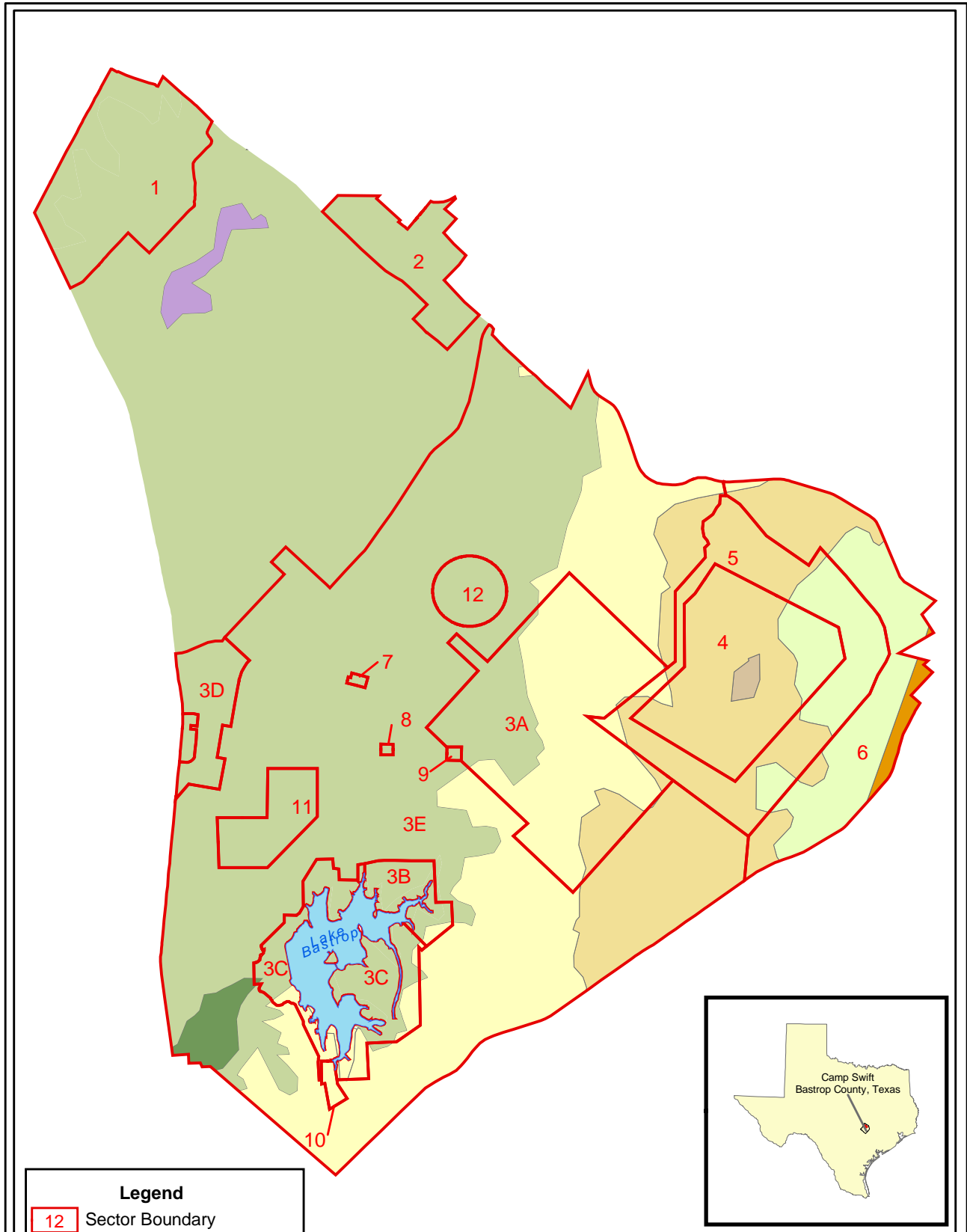
2.2.4.2 According to the Soil Survey of Bastrop County, Texas (USDA, 1979), there are three general vegetational areas in the county: pasture and hayland, woodland, and range. Most farms in Bastrop County have some improved pasture and hayland. These pastures are made up of different kinds of grasses, but common or improved bermudagrass is the dominant perennial grass in most pastures (USDA, 1979). The eastern apex of the former Camp Swift consists primarily of open pastureland.

2.2.4.3 An area known as the “Lost Pines” is located in Bastrop County and partially within the former Camp Swift. The loblolly pine woodland is isolated from the main body of East Texas Pines by approximately 100 miles of rolling, post oak woodlands. Other tree species that occur in the county include juniper cedar, pecan, water and willow oak, post oak, blackjack oak, cottonwood, sycamore, and slash pine. Needleleaf forest types grow most frequently on the hills, and broadleaf types generally predominate on the bottoms along the rivers and creeks (USDA, 1979).

2.2.4.4 Finally, rangeland includes about half the land in Bastrop County. This area produces native vegetation, including little bluestem, Indiangrass, purpletop, beaked panicum, and uniola associated with post oak, blackjack oak, pine, elm, cedar, and shrubs.

## 2.2.5 Wildlife

2.2.5.1 The project area lies within the Texas Biotic Province (Blair, 1950), which is described as an ecotene between the forests of eastern Texas and the grasslands of the west.



**Legend**

12 Sector Boundary

**Geology**

- Carrizo Sand
- Fluvialite Terrace Deposits
- Fluvialite Tile Deposits
- Laredo Formation
- Reklaw Formation
- Wilcox Group
- Young Quaternary Deposits
- Weches Formation, Queen City Sand, El Pico Clay

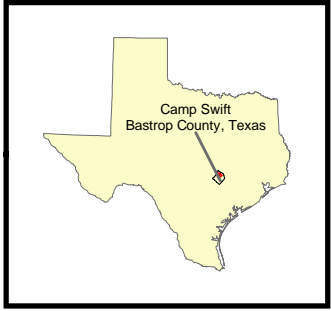


Figure 2.3  
Geologic Map,  
Camp Swift, Texas

Source: Geology: UT Bureau of Economic Geology Geological Atlas of Texas  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
CAMP SWIFT, TEXAS			
DATE	1:114,996	PROJECT NUMBER	737805
BY	October, 2002	DATE	
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An ecotone 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. A more detailed wildlife description is presented in the EE/CA Work Plan (Parsons, 2001a).

2.2.5.2 Several threatened and endangered species potentially occur in the project area, which is shown in Figure 1.1. A list of these species is provided in Table 2.2. The former Camp Swift area contains land that has been designated as critical habitat for the Houston toad. The area within former Camp Swift that has been identified as critical habitat is shown in Figure 2.4. The bald eagle and whooping crane may also potentially use the area during migration periods.

**Table 2.2 Threatened & Endangered Species Potentially Occurring in Bastrop County**

Common Name	Scientific Name	Status	Habitat Requirements	Potential to Occur at former Camp Swift
Houston toad	<i>Bufo houstonensis</i>	Federal - E State - E	Ephemeral pools, ponds, sandy soil	Possible
American peregrine falcon	<i>Falco peregrinus anatum</i>	Federal - DL State - E	Potential migrant, nests in west Texas	Unlikely
Arctic peregrine falcon	<i>Falco peregrinus tundrius</i>	Federal - DL State - T	Tall trees or cliffs near coast, rivers or large lakes	Unlikely
Bald eagle	<i>Haliaeetus leucocephalus</i>	Federal - PDL State - T	Tall trees near large lakes	Unlikely - potential migrant
Mountain plover	<i>Charadrius montanus</i>	Federal - PT	Winter resident, shortgrass plains and plowed fields	Unlikely
Whooping crane	<i>Grus americana</i>	Federal - E State - E	Herbaceous wetlands	Unlikely - potential migrant

E - listed endangered  
T - listed threatened

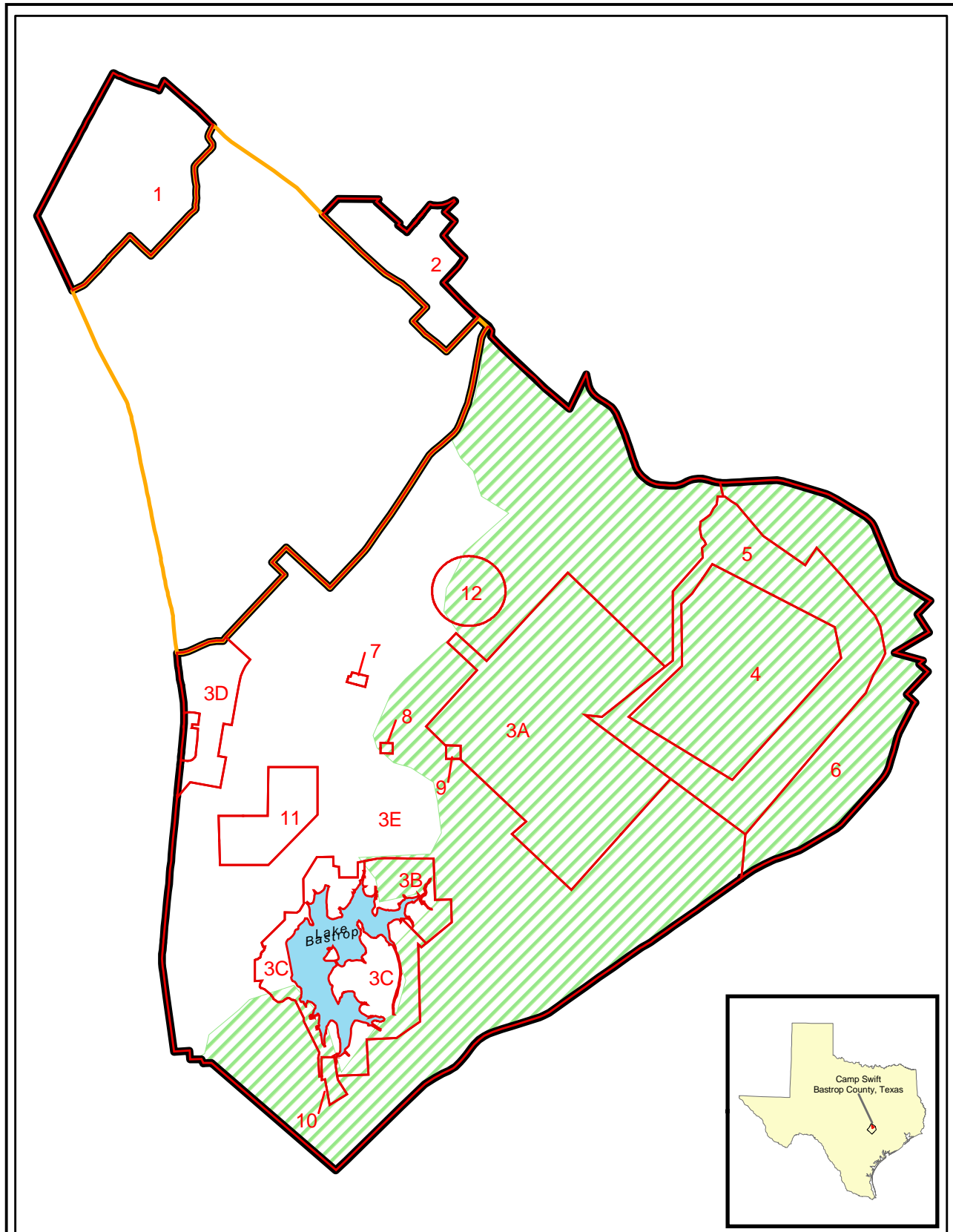
DL - delisted  
P - proposed

Due to USFWS concerns regarding potential impacts to the Houston toad and its critical habitat from activities associated with the EE/CA, USACE requested formal section 7 consultation with the USFWS under the Endangered Species Act, as amended (16 United States Code [U.S.C.] 1531 *et seq.*). Section 7 consultation is the mechanism by which Federal agencies, such as USACE, ensure the actions they fund or authorize do not jeopardize the existence of any listed species. A Biological Assessment (Parsons, 2001b) which described potential impacts from the investigation to the Houston toad and other threatened and endangered species and their habitat was submitted to USFWS.

2.2.5.4 On January 22, 2002, the USFWS returned its Biological Opinion (USFWS, 2002). This document, which is included as Appendix B, presented the USFWS terms and conditions for fieldwork procedures so that impact to the Houston Toad and its habitat would be mitigated. These terms included:


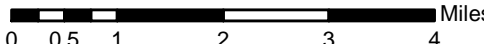
- Avoiding vehicular and pedestrian traffic through or near any standing water;





**Legend**

- 12 Sector Boundary
- Houston Toad Critical Habitat
- Texas Army National Guard Boundary
- Former Camp Swift Boundary

  
  
 Source: Houston Toad Habitat: U.S. Fish and Wildlife Service  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

**Figure 2.4**  
Houston Toad Critical Habitat within Camp Swift

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: KG			PROJECT NUMBER: 737805
CHECKED BY: EN	SCALE: 1:115,000	DATE: November, 2002	
APPROVED BY: JB	FILE NAME: I:\737805\GIS\SECA\Figure_Toad.mxd		

- Avoiding excavation of anomalies that require the use of heavy equipment;
- Contacting USFWS if any dead, injured, or sick Houston toads or other endangered or threatened species are located;
- Avoiding disturbance of ponds;
- Avoiding driving or parking vehicles off of established roadways; and
- Avoiding soil compaction.

In addition, a donation of approximately \$4,700 was made to the Houston Toad Conservation Fund administered by the National Fish and Wildlife Foundation to help fund habitat preservation/conservation to aid in recovery of the Houston toad. No Houston toads were observed by any of the field personnel during the EE/CA field investigation.

## **2.2.6 Climate**

The former Camp Swift area has a subtropical climate consisting of humid, tropical influences during the summer and dry, continental influences the rest of the year. The mean annual temperature is approximately 68° Fahrenheit (F). January is the coldest month, with an average temperature of 60°F, and August is the warmest month with an average temperature of 85°F. Precipitation averages 32 inches per year in the area. April, May, and September have the highest average precipitation and January through March and July have the lowest average precipitation. Thunderstorms have a frequency of about 52 per year and occur primarily in April through September. Snowfall is rare. The frost penetration depth is 4 inches below ground surface (bgs) in the former Camp Swift area (USACE, 1998a). In most winters, 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.

## **2.3 HISTORY**

### **2.3.1 General**

2.3.1.1 During July 1940, the Military Affairs Committee began interviewing interested individuals in the Austin, Texas area for the possible construction of a military reservation. On January 2, 1941, the Army vocalized its intent to build a military reservation near Bastrop, in Bastrop County, Texas. By July 29, 1941, engineering surveys were being conducted for the future Camp Swift and by January 19, 1942, contracts were authorized. Camp Swift was named for Major General Eben Swift, a veteran of World War I and campaigns in Mexico and Texas. Camp Swift's major function was advanced divisional training.

2.3.1.2 In March of 1942, the U.S. Government acquired 52,191 acres in Bastrop County. Although Camp Swift was not formally activated until July 8, 1942 (USACE, 1994a), construction began in March 1942, and it began functioning officially in May 1942. Camp Swift was composed of a cantonment area, which was located roughly midway along the western edge of the camp, and training and maneuver areas. The cantonment area included most of the developed parts of the camp. Figure 2.5 shows the master plan of the camp in 1944-1945.

2.3.1.3 The members of the first unit, the 95th Infantry Division, arrived at Camp Swift on July 15, 1942. In February 1943, the 97th Infantry Division was activated. The following list shows divisions and regiments stationed at Camp Swift during its history:

- 2<sup>nd</sup> Infantry Division
- 2<sup>nd</sup> Air Base Security Training Group
- 5<sup>th</sup> Headquarters Special Troops of Third Army
- 10<sup>th</sup> Mountain Division
- 85<sup>th</sup> Infantry Regiment
- 86<sup>th</sup> Infantry Regiment
- 87<sup>th</sup> Infantry Regiment
- 95<sup>th</sup> Infantry Division
- 97<sup>th</sup> Infantry Division
- 102<sup>nd</sup> Infantry Division
- 116<sup>th</sup> Tank Destroyer Battalion
- 120<sup>th</sup> Tank Destroyer Battalion
- 126<sup>th</sup> Engineer Battalion
- 576<sup>th</sup> Anti-Tank Battery
- 604<sup>th</sup> Field Artillery Battalion
- 605<sup>th</sup> Field Artillery Battalion
- 616<sup>th</sup> Field Artillery Battalion

2.3.1.4 The Army used the site as an infantry replacement training camp and constructed 2,750 buildings including barracks, warehouses, support buildings, training facilities and areas, and recreational facilities. Camp Swift had its own 750-bed hospital, churches, fire department, swimming pools, theaters, power and communication distribution systems, water mains, sewer lines, and wastewater treatment plant. Camp Swift also had structures and facilities for the 6,400 horses and mules of the 10<sup>th</sup> Mountain Division, including stables, corrals, hay sheds, a blacksmith shop, and a veterinary infirmary. An Army nurse training program was also housed at Camp Swift. Upon completion, capacity was estimated at 40,000 officers and men; however, at one time during the height of training, 44,000 occupied the camp.

2.3.1.5 An area known as “Wake Island” accommodated two Tank Destroyer groups of about 2,000 troops and their tracked vehicles. In addition, a prisoner of war (POW) detention facility was built in 1943. Approximately 4,800 German POWs mainly captured in North Africa from Rommel's Afrika Corps and at Normandy during the invasion of Europe were held at Camp Swift. The POW camp continued until 1946 when the last of its inmates were shipped back to Germany.

### **2.3.2 Ordnance Activities**

Information regarding ordnance activities at the former Camp Swift was obtained from the following sources:

- Archives Search Report (USACE, 1994a);
- Supplement to Archives Search Report (USACE, 1994b);
- 1944-1945 Master Plan (U.S. Army, 1945), included as Figure 2.5;
- 1946 Master Plan (U.S. Army, 1946), included as Figure 2.6; and
- Geographic Information System (GIS)-Based Historical Photographic Analysis (Engineering Research and Development Center [ERDC], 2000).

#### **2.3.2.1 Conventional Munitions**

Master plans (Figures 2.5 and 2.6) of the former Camp Swift show two large artillery impact areas surrounded by numerous ranges, an ammunition storage area, a gas training area, a booby trap area, a demolition area, maneuver areas, and a fortified area. The ASR indicates that ordnance used at the former Camp Swift included rockets, grenades, artillery rounds, mortars, small arms munitions, mines, simulators, and dynamite. OE that may be encountered at the former Camp Swift includes:

- 2.36” rockets (high explosive [HE] and white phosphorous [WhP]),
- 3.5” rockets (high explosive anti-tank [HEAT] and WhP),
- 4.2” mortars,
- Rifle grenades (anti-tank [AT], HEAT, and practice),
- Hand grenades (MK II),
- 75 millimeter (mm) artillery rounds (HE, WhP, and smoke),
- 105mm artillery rounds (HE),
- 155mm projectiles,
- 60mm and 81mm mortars (HE and WhP),
- 37mm projectiles,
- Booby trap simulators,
- Practice anti-personnel mines,
- Anti-tank mines (HE and practice), and
- Dynamite.



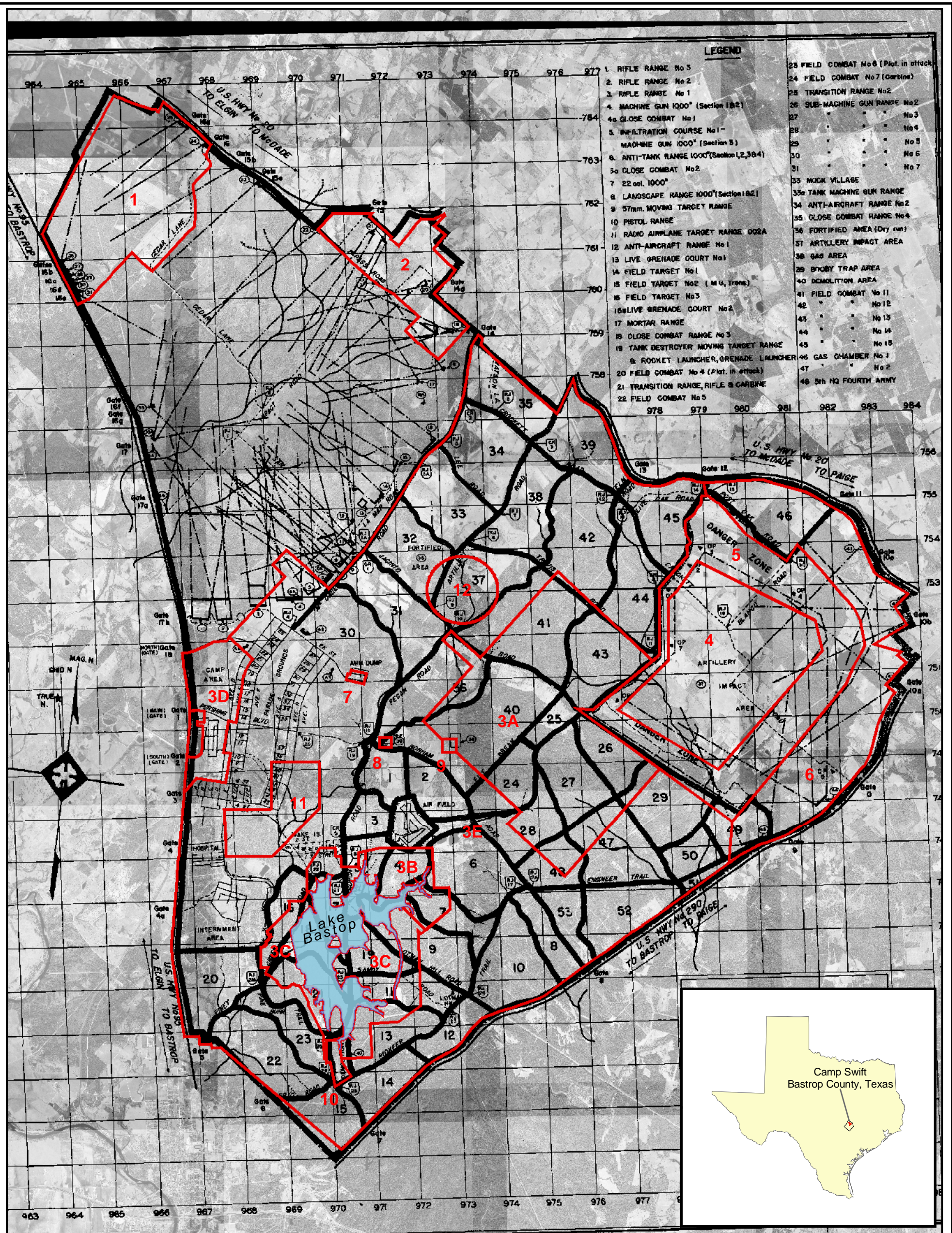
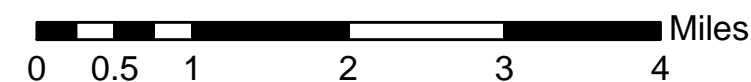


Figure 2.5  
1944-1945 Master Plan,  
Camp Swift, Texas

**Legend**

12 Sector Boundary



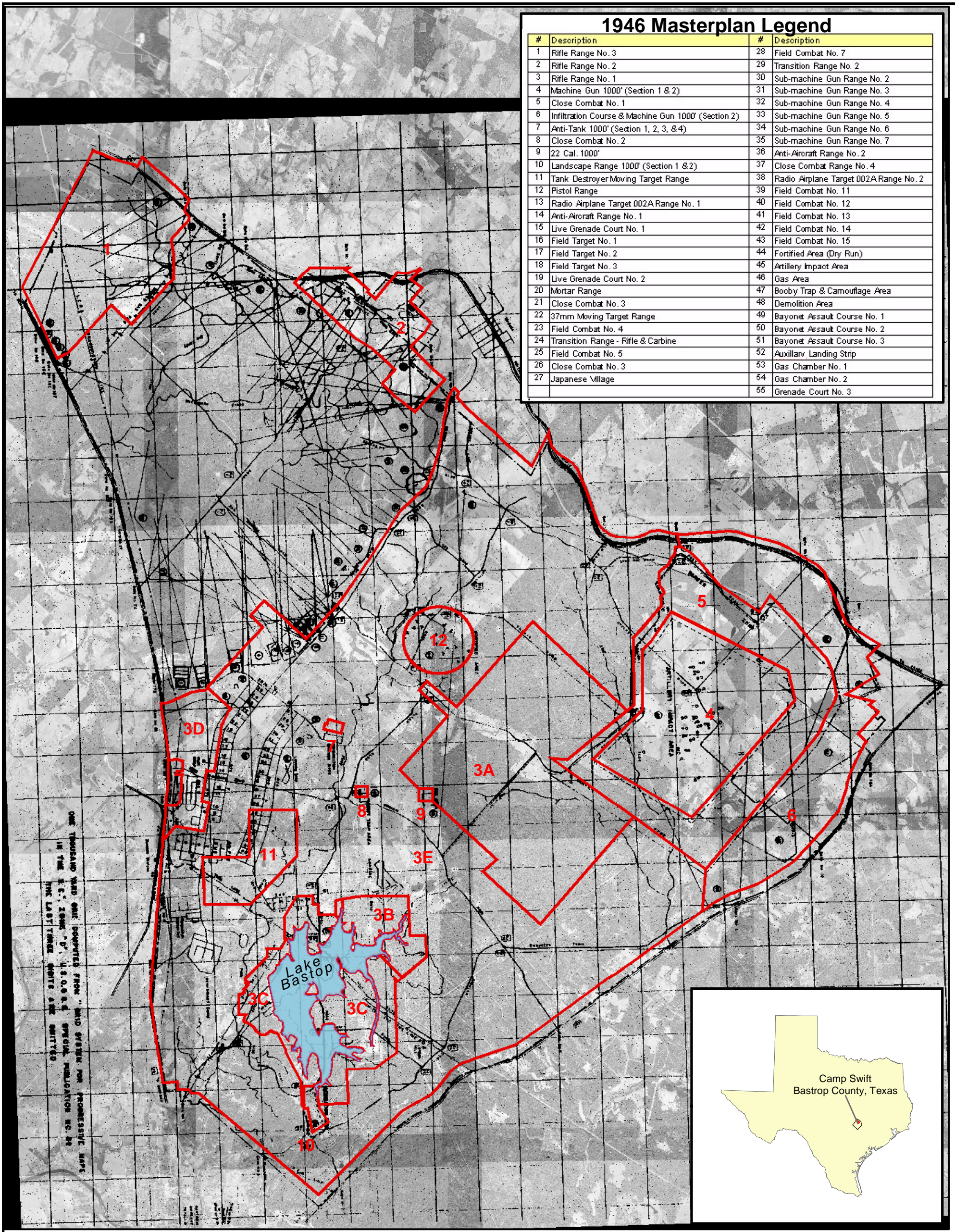
Source: US Army 1944 - 1945 Master Plan scan. Figure quality limited by original Aerial Photography: TNRIS Aerial Photography. Date: 1995-1997  
Map Units: NAD 1983 Texas Central State Plane (Feet)

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
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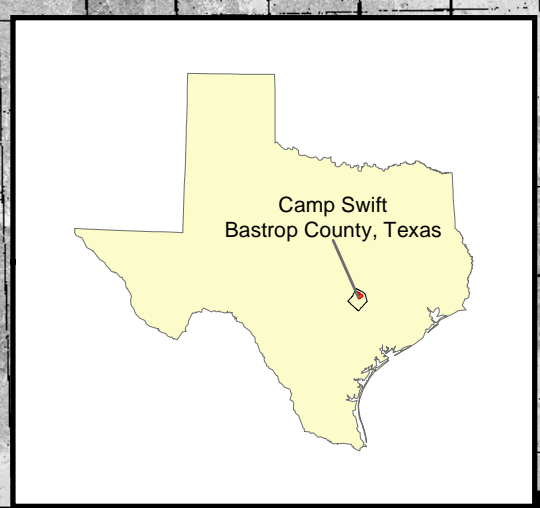




### 1946 Masterplan Legend

#	Description	#	Description
1	Rifle Range No. 3	28	Field Combat No. 7
2	Rifle Range No. 2	29	Transition Range No. 2
3	Rifle Range No. 1	30	Sub-machine Gun Range No. 2
4	Machine Gun 1000' (Section 1 & 2)	31	Sub-machine Gun Range No. 3
5	Close Combat No. 1	32	Sub-machine Gun Range No. 4
6	Infiltration Course & Machine Gun 1000' (Section 2)	33	Sub-machine Gun Range No. 5
7	Anti-Tank 1000' (Section 1, 2, 3, & 4)	34	Sub-machine Gun Range No. 6
8	Close Combat No. 2	35	Sub-machine Gun Range No. 7
9	22 Cal. 1000'	36	Anti-Aircraft Range No. 2
10	Landscape Range 1000' (Section 1 & 2)	37	Close Combat Range No. 4
11	Tank Destroyer Moving Target Range	38	Radio Airplane Target 002A Range No. 2
12	Pistol Range	39	Field Combat No. 11
13	Radio Airplane Target 002A Range No. 1	40	Field Combat No. 12
14	Anti-Aircraft Range No. 1	41	Field Combat No. 13
15	Live Grenade Court No. 1	42	Field Combat No. 14
16	Field Target No. 1	43	Field Combat No. 15
17	Field Target No. 2	44	Fortified Area (Dry Run)
18	Field Target No. 3	45	Artillery Impact Area
19	Live Grenade Court No. 2	46	Gas Area
20	Mortar Range	47	Booby Trap & Camouflage Area
21	Close Combat No. 3	48	Demolition Area
22	37mm Moving Target Range	49	Bayonet Assault Course No. 1
23	Field Combat No. 4	50	Bayonet Assault Course No. 2
24	Transition Range - Rifle & Carbine	51	Bayonet Assault Course No. 3
25	Field Combat No. 5	52	Auxiliary Landing Strip
26	Close Combat No. 3	53	Gas Chamber No. 1
27	Japanese Village	54	Gas Chamber No. 2
		55	Grenade Court No. 3

ONE THOUSAND FEET GULF DEPARTURE FROM "WIND STREAM FOR PROGRESSIVE MAPS  
 IN THE S.E. CORNER OF U.S.G.P. ORIGINAL PUBLICATION NO. 48  
 THE LAST THREE DIGITS ARE OMITTED



**Figure 2.6**  
**1946 Master Plan,**  
**Camp Swift, Texas**

### Legend

Sector  
Boundary

Source: US Army 1946 Masterplan scan. Figure quality limited by original  
 Aerial Photography: TNRIS. Date: 1995 - 1997  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

<b>PARSONS</b>		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
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DRAWN BY: KG	SCALE: 1:78,000	PROJECT NUMBER: 737805	
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### **2.3.2.2 Chemical Warfare Material**

2.3.2.2.1 During the ASR investigation (USACE, 1994a), the OE/UXO Assessment Team could find no evidence of chemical group A (highly toxic) agents being within the confines of the former Camp Swift; although possible usage and/or storage of chemical warfare materiel (CWM) was noted in the document. Furthermore, the Assessment Team could not locate any information, either through interviews or historical documentation, indicating any previous discoveries of any chemical munitions OE. The Assessment Team could not verify the locations of structures in the “Gas Area” shown on the 1946 Camp Swift map.

2.3.2.2.2 The ASR Supplement (USACE, 1994b) reports that Camp Swift conducted chemical warfare training in three areas: gas chamber #1, gas chamber #2, and the gas area. However, no documents were found describing the actual training conducted or materials used in these areas. The gas area comprises a tract of about 15 acres that could have been used for the storage of CWM (USACE, 1994b). Chemical warfare troops that were stationed at Camp Swift during World War II included six chemical mortar battalions, a chemical depot company, and a chemical decontamination company.

### **2.3.3 Camp Swift Closure, Decontamination, and Land Transfer**

2.3.3.1 Camp Swift was largely vacated in 1946. On January 31, 1947, Camp Swift was declared surplus to the needs of the War Department. A statement dated March 17, 1947, issued by the Headquarters Fourth Army, Fort Sam Houston, reports that the cantonment area of Camp Swift was cleared of all explosive powders, live ammunition, acid and corrosive materials, and toxic substances (U.S Army, 1947a).

2.3.3.2 On May 5, 1947, the property encompassing Camp Swift was declared excess to the WAA. This declaration caused 374 acres to be deeded to the State of Texas Department of Health, and the Federal Farmers Mortgage Corporation assumed responsibility of an additional 83 acres.

2.3.3.3 Additional ordnance removal activities were completed later in 1947. Between May 20 and July 1, 1947, “decontamination” of the target range impact areas of Camp Swift was conducted. During this removal activity, 979 high explosive rounds were detonated, 4,506 inert and practice rounds were removed, and 42 tons of scrap metal were recovered. This information was provided in the Final Report of Decontamination of Target Range Impact Area, Camp Swift (U.S. Army, 1947b), and addressed activities on 9,173 acres in the artillery impact area (east side of former Camp Swift) and the small impact area (north side of former Camp Swift, within present-day TARNG Camp Swift). Table 2.3 provides details regarding the number and types of high explosive, inert, and practice rounds removed.

**Table 2.3 Ordnance Removed from Former Camp Swift in 1947**

High Explosive Rounds		Inert or Practice Rounds	
Type	Number Detonated	Type	Number Removed
Grenade, hand, incendiary	5	Grenade, hand, practice	10
Grenade, hand, fragmentation	4	Grenade, hand, dummy	27
Grenade, hand, practice (w/charge)	4	Grenade, rifle, practice	144
Grenade, hand, HC-smoke	2	Rocket, 2.36-inch, practice	1,414
Grenade, rifle, HEAT	30	37mm, APT (expended)	251
Rocket, 2.36-inch, HEAT	123	57mm, APT (expended)	1,044
Rocket, 2.36-inch, practice (w/propellant)	2	Case, 75mm, shrapnel	4
Shell, 37mm, sub-caliber	7	75mm, APT (expended)	50
Shell, 37mm, HE, M63	24	76mm, APC (expended)	1,315
Shell, 75mm, HE	286	Case, 105mm HC-Smoke	103
Shell, 75mm APC	14	Mines, AP	2
Shell, 75mm, WhP smoke	1	Mines, land, AT, practice	134
Shell, 76mm, APC	334	Cases, flare, trip	4
Shell, 105mm, HE	56	Case, mortar, 4.2-inch	4
Shell, 105mm, HC-smoke	5	<b>Total</b>	<b>4,506</b>
Shell, 155mm, HE	8		
Fuze, land mine, AT practice	2		
Mortar, 60mm, HE	40		
Mortar, 60mm, illumination	6		
Mortar, 81mm, HE	5		
Mortar, 81mm, HE, Heavy	2		
Mortar, 81mm, WhP smoke	7		
Mortar, 4.2-inch, HE	22		
<b>Total</b>	<b>979</b>		

APT: Armor-piercing tracer  
H.C.: Hexachloroethane  
AT: Anti-tank  
HE: High explosive

AP: Armor-piercing  
APC: Armor-piercing, capped  
HEAT: High explosive anti-tank  
WhP: White phosphorous

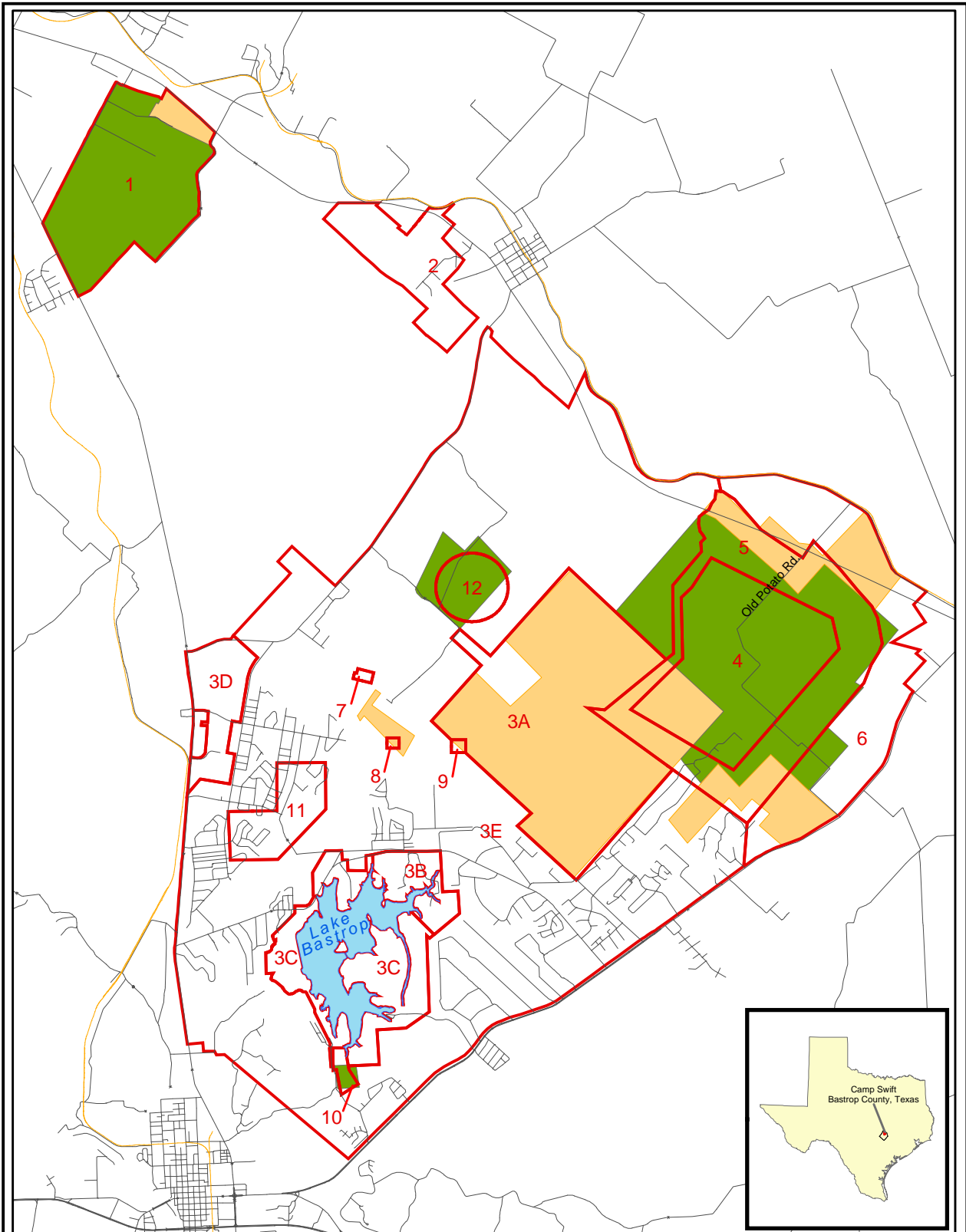
2.3.3.4 The decontamination report (U.S. Army, 1947b) described difficulties in completing the ordnance removal due to “excessive vegetation and under-growth.” It also noted that “maps prepared by Camp Swift Personnel, prior to its being closed, were inadequate for the purposes of ascertaining the bounds of contamination of the range area.” Spot checks were made in the range area, and it was noted that “a great many fewer acres were found to be contaminated in the artillery impact area and seven hundred acres additional were found to be badly contaminated with duds in the small impact area, located in the Northeast corner of the reservation” (U.S. Army, 1947b).

2.3.3.5 Subsequently, on July 3, 1947, a certificate of decontamination (U.S. Army, 1947c) was issued stating all tracts of land had been physically searched and all high explosives were removed. The certificate states all tracts of land should be disposed of and be used for any purpose. However, it further explains that the clearance does not apply for subsurface usage.

2.3.3.6 According to the ASR Supplement (USACE, 1994b), the Department of the Army states, in a letter pertaining to the 1947 certificate, that there are dangers with drilling, digging, or plowing the land, therefore, restrictions would be placed on it. The letter states that “since it was considered impractical to attempt to remove buried duds on the former Camp Swift Target Range, no effort was made and, consequently, a certificate of decontamination covering areas below the ground surface could not be accomplished.”

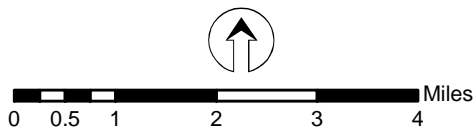
2.3.3.7 The Certificate of Clearance dated December 17, 1948, states that 121 tracts (approximately 7,150 acres) of the former Camp Swift were recommended for surface use only (U.S. Army, 1948). It further states that portions of 26 other tracts (approximately 6,480 acres) were recommended for surface use only. The parcels of land that the 1948 certificate indicated were recommended for surface use only are shown on Figure 2.7; however, landowner research of the deeds indicates that not all property deeds from the government associated with these 147 tracts include this recommendation. The 1948 certificate also indicated that county and military roads maintained during the operation of the former Camp Swift were recommended as safe for further maintenance and use, but that the portion of Potato Road located within the area recommended for surface use only should be “maintained with caution as artillery was fired on both sides of said road.”

2.3.3.8 In 1949 and the early 1950s, various private landowners purchased a total of 35,633 acres and the General Services Administration (GSA) terminated a lease covering 98 acres. The deeds for many tracts included the warning: “...the property hereinafter described was formerly used in part as a training and maneuvering area for combat troops and portions of such property was subjected to contamination by the introduction of unexploded and dangerous bombs, shells, rockets, mines, and charges either upon or below the surface.... The Corps of Engineers, War Department has caused the property to be inspected and has decontaminated the same to the degree reasonably necessary ... and has made certain recommendations pertaining to the use to which the land could be devoted” (USACE, 1994b).



**Legend**

- 12 Sector Boundary
- Tract Recommended for Surface Use Only
- Portion of Tract Recommended for Surface Use Only
- Roads
- Railroads



Source: Supplement to ASR (USACE, 1994b)  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

**Figure 2.7**  
 Real Estate Tracts Recommended for Surface Use at Camp Closure, 1948

<b>PARSONS</b>		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY ARH	CAMP SWIFT, TEXAS		
DRAWN BY KIG	SCALE 1:120,000	PROJECT NUMBER 737805	
CHECKED BY EN	DATE August, 2003	MAP NUMBER	
DATE PLOTTED JB	\\11737805\GIS\BCECA\real\0308tracts.mxd		

2.3.3.9 In the early 1950s, there was an initiative to relocate a military installation within the former Camp Swift area. In 1952, the U.S. Army reacquired 17,300 acres (held in inactive status for mobilization purposes with a portion being used by the TARNG for training purposes) by withdrawing 16,002 acres from surplus and obtaining 1,298 acres which had been previously disposed of through direct purchase and condemnation. By the early 1960s, this initiative was abandoned, and in 1962, 5,522 acres were declared excess by the GSA and were licensed by the Army to the State of Texas for training of the TARNG. Another 78 acres were declared excess to the GSA in 1982. A chronology of the land transfers is provided in Table 2.4.

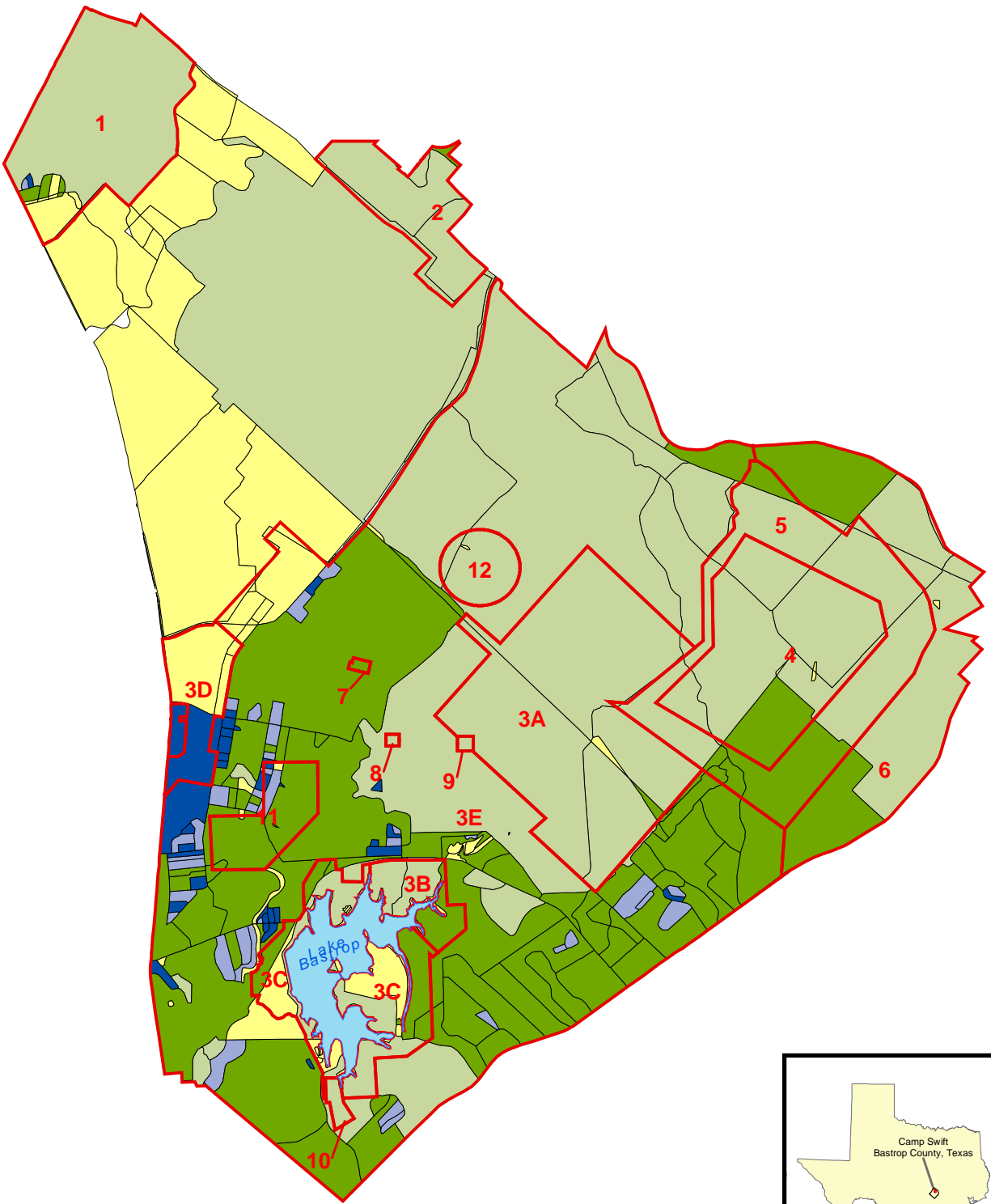
**Table 2.4 Chronology of Land Transfers following Camp Swift Closure**

Year	Action	Change in Camp Acreage	Total Camp Acreage
1942	U.S. Army acquires land for Camp Swift (98.5 of the total acres were leased).	+52,191.26	52,191.26
1947	Camp Swift property declared excess to the WAA. A total of 373.99 acres deeded to the State of Texas Department of Health.	-373.99	51,818.27
1947	Federal Farmers Mortgage Corporation assumed accountability of 83 acres.	-83.0	51,734.27
N/A	Lease of 98.5 acres was terminated.	-98.5	51,635.77
1951-1952	Various private landowners purchase land.	-35,633.52	16,002.25
1952	U.S. Army purchases additional 1,298 acres of previously disposed land for mobilization purposes and for TARNG training purposes.	+1,298.75	17,301.00
1962	Property declared excess by GSA.	-5,522.70	11,778.30
1982	Additional property declared excess by GSA.	-78.15	11,700.15 (current Camp Swift TARNG facility)

N/A = Not available

## 2.4 DEMOGRAPHIC PROFILE

2.4.1 The southern portion of the former Camp Swift is approximately three miles north of the city of Bastrop, Bastrop County, Texas. In the year 2000, the city of Bastrop had a population of 5,340 and Bastrop County had a population of 57,733 (Bastrop Economic Development Corporation, 2002). The northern portion of the former Camp Swift is approximately five miles south of the city of Elgin, which had a population of 5,700 in the year 2000. The bulk of the population of the county resides outside the city limits of Bastrop and Elgin. Population density (U.S. Census Bureau, 2000) within the former Camp Swift area is shown in Figure 2.8.



**Legend**

12 Sector Boundary

**Population Density**  
(people/square mile)

- 0
- 1 - 100
- 101 - 500
- 501 - 1000
- > 1000

**Figure 2.8**  
**Population Density**  
**Camp Swift, Texas**

Source: 2000 US Census Bureau and 2000 TIGER Block Group Dataset  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

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		October, 2002	UNSURE
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2.4.2 Population growth in Bastrop County and the Circle D-KC Estates Census Designated Place (CDP), which is situated within the former Camp Swift boundary, is summarized in Table 2.5. The Bastrop County population increased by 50% between 1990 and 2000. In the Circle D-KC Estates CDP, population increased by 76% in the same period. As of 2001, Bastrop County was the eighth fastest growing county in Texas and the thirtieth fastest growing county in the United States (Bastrop Economic Development Corporation, 2002).

**Table 2.5 Population and Employment Statistics, Bastrop County**

Year	Circle D-KC Estates CDP	Bastrop County	
	Population	Population	Employment
1990	2,681	38,263	17,634
1991	N/A	38,869	17,895
1992	N/A	40,036	18,813
1993	N/A	41,381	19,834
1994	N/A	43,433	21,391
1995	N/A	45,810	22,593
1996	N/A	48,739	23,872
1997	N/A	51,058	24,808
1998	N/A	53,066	26,114
1999	N/A	55,682	27,460
2000	4,731	57,733	28,728
2001	N/A	62,059	28,759

2.4.3 Bastrop County serves largely as a bedroom community for those working in Austin. Bastrop County's proximity to Austin allows the county to take advantage of the city's workforce and services. U.S. Highway 290 and State Highway 71 provide two major connections from Austin to Houston, requiring most ground transport between the two cities to pass through Bastrop County. In addition, since the Austin airport's move in 1999 to the current Austin-Bergstrom location, Bastrop County now has easier and faster access to air transportation.

2.4.4 While employment in Bastrop County is growing, almost two-thirds of the county's employees work outside the county. Bastrop County's largest industries are listed in Table 2.6. The largest employer is the Bastrop Independent School District (ISD), employing nearly 1,000 people. Bastrop County also houses a federal penitentiary, the Bastrop Federal Correctional Institute (BFCI), which employs nearly 300 individuals. The University of Texas' M.D. Anderson Cancer Center (UTMDA) has a cancer research facility, which employs approximately 300 individuals. The University also has a veterinary services facility which conducts medical research on animals.

**Table 2.6 Bastrop County Top Industries (2000)**

<b>Industry</b>	<b>Employees</b>
Agriculture, forestry, fishing, hunting, & mining	728
Construction	3,555
Manufacturing	3,123
Wholesale Trades	688
Retail Trades	2,788
Transportation, warehousing, & utilities	1,545
Information	418
Finance, insurance, real estate, rental, & leasing	1,525
Professional, scientific, management, administrative & waste management	2,081
Education, health & social services	4,707
Arts, entertainment, recreation accommodation, & food service	1,379
Public administration	2,496
Other services	1,506

## 2.5 CURRENT AND FUTURE SITE USE

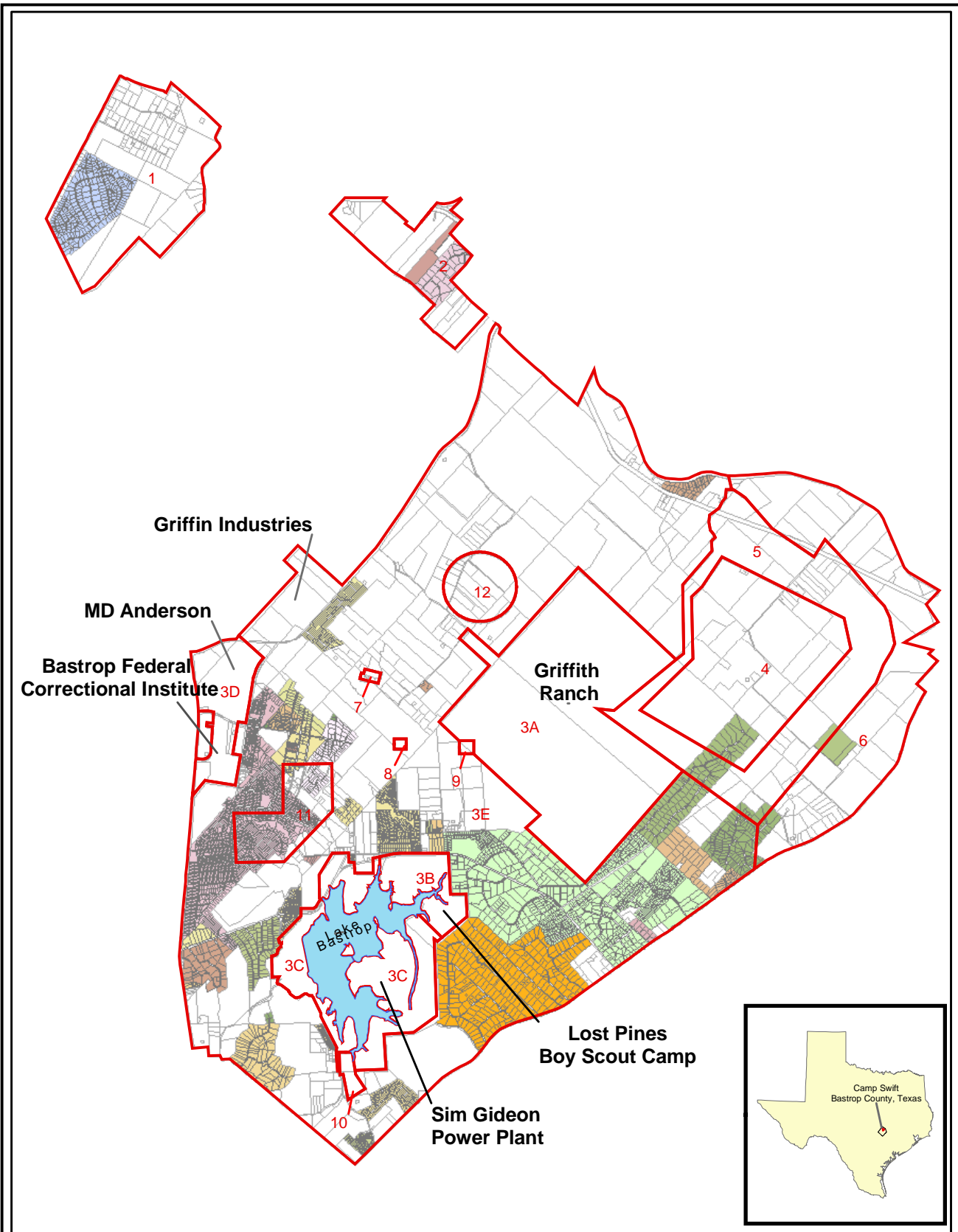
2.5.1 Current land use at the former Camp Swift site consists of limited industrial, agricultural, rural residential, the TARNG training site, a medical research facility (UTMDA), a federal correctional facility (BFCI), a power plant and two public parks operated by the Lower Colorado River Authority (LCRA), and two Boy Scout areas. Most of the former Camp Swift acreage, besides the TARNG facility, is rural residential and agricultural (USACE, 1994b). As shown on Figure 2.9, there are over 4,000 parcels of land within the former Camp Swift area (Bastrop County Appraisal District, 2001). Lake Bastrop, formed for power plant cooling by a dam constructed in 1964, covers 906 acres of the former Camp Swift.

2.5.2 Land use at the former Camp Swift varies widely, but agricultural and private rural residential areas dominate the majority of the land use. General land uses are shown in Figure 2.10. Some of the other major land uses at the former Camp Swift are discussed below.

2.5.3 Griffith League Ranch, an area that was recently acquired by the Capital Area Council of Boy Scouts, dominates the central portion of the former Camp Swift. This area encompasses nearly 5,000 acres, and is shown in Figure 2.9. The Boy Scouts plan to build camping facilities on the property, but currently use the area for limited scout activities. In addition, the Boy Scouts own Lost Pines Scout Reservation, which consists of 763 acres on the northern side of Lake Bastrop. Lost Pines Scout Reservation is home to Lost Pines Scout Camp and Tom Wooten Resident Cub Camp. Facilities include camp sites, swimming pool, archery range, obstacle course, and rappelling tower.

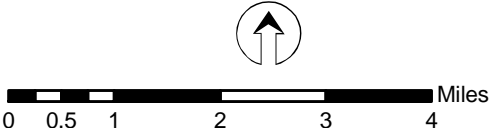
2.5.4 The remaining land surrounding Lake Bastrop, consisting of approximately 2,200 acres, is owned by the LCRA. The LCRA currently operates the Sim Gideon Power Plant on the east side of the lake, and a dam on the northwest side of the lake. The property surrounding the power plant and the dam is fenced and is not open to the public.





**Legend**

- 12 Sector Boundary
- CIRCLE D COUNTRY ACRES
- THE ARBORS AT DOGWOOD CREEK
- LAKE BASTROP ACRES
- KC ESTATES



Map Units: NAD 1983 Texas Central State Plane (Feet)

Figure 2.9  
Parcel Information,  
Subdivision,  
Camp Swift, Texas

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2.5.5 LCRA operates two parks adjacent to the lake: the North Shore Park and the South Shore Park. The North Shore Park consists of approximately 54 acres on the north side of Lake Bastrop, and the South Shore Park consists of approximately 66 acres on the south side. Each park has a boat ramp and dock, camping areas, beaches for swimming, and hiking trails. Both parks are open to the public.

2.5.6 LCRA also owns approximately 240 acres in the southwestern portion of the former Camp Swift, where it operates the Camp Swift Regional Wastewater System facility. This facility was built in 1991 to provide wastewater service to the TARNG Camp Swift facility, BFCI, UTMDA, and residential customers. The regional collection system includes a system of gravity collection lines with two lift stations and force mains to convey wastewater to the wastewater treatment plant.

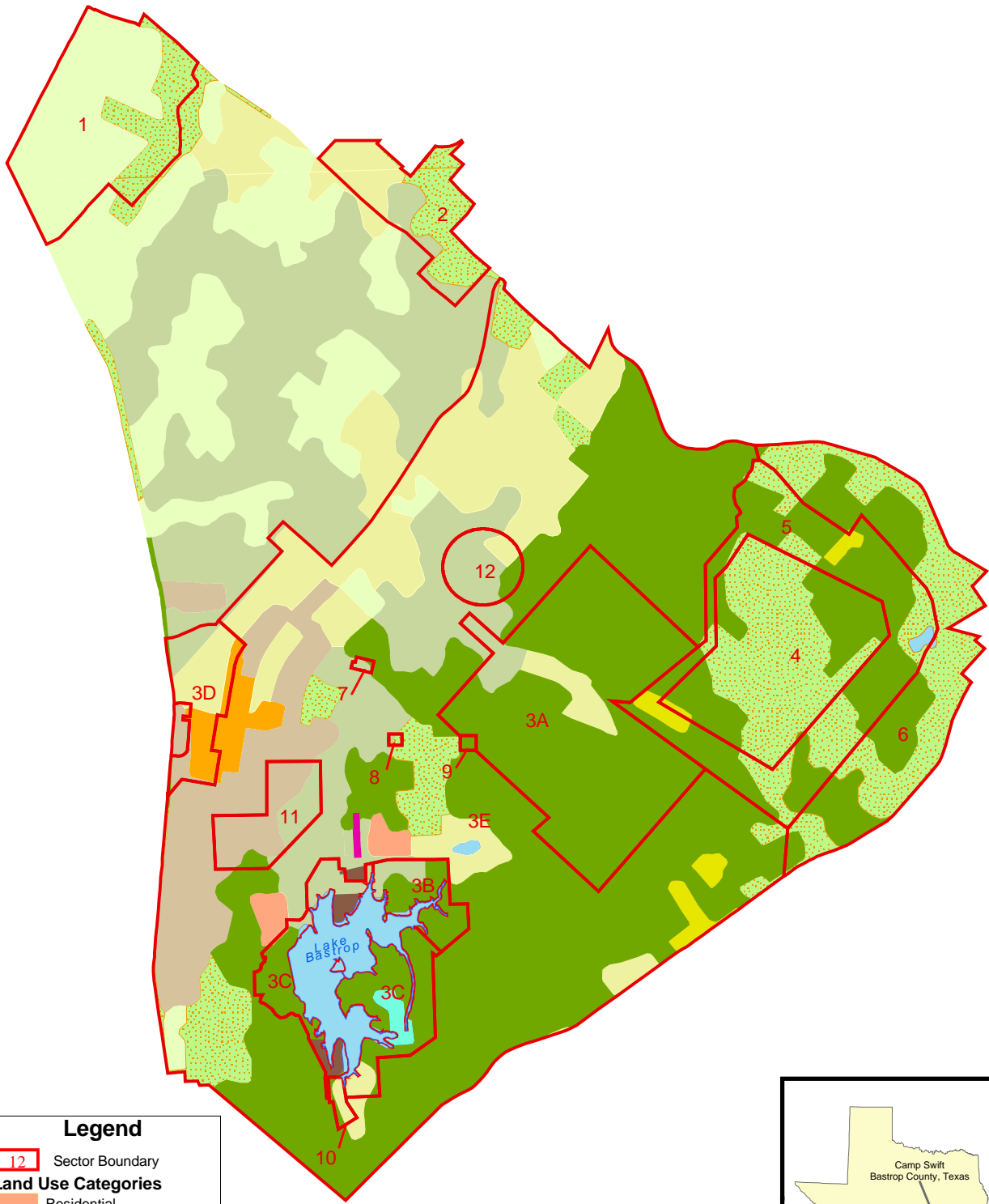
2.5.7 North of Lake Bastrop and west of Griffith League Ranch are two large private properties in the former Camp Swift area. On these properties are UTMDA and Griffin Industries. UTMDA is located along State Highway 95 and encompasses approximately 353 acres. The southern portions of the property are mainly livestock areas. The property is fenced and access is restricted.

2.5.8 Griffin Industries is situated on 397 acres and is located directly north of UTMDA, along Farm-to-Market Road (FM) 2336. Griffin Industries is a rendering facility. The property contains several processing buildings and open processing-fluid vats. The north portion of the property is open pasture area with free-roaming livestock.

2.5.9 BFCI is located on 173 acres south of UTMDA, along State Highway 95. The prison structure is set away from Highway 95, and the correctional facility is fenced around its entire perimeter. The security level at the majority of the facility is low, but there is an adjacent minimum security level camp. As of August 2002, the prisoner population in the low-level security facility was approximately 1,300, and approximately 150 prisoners were in the minimum-security camp.

2.5.10 Residential subdivisions within the former Camp Swift include the following:

- Circle D Country Acres-KC Estates: This subdivision is a CDP located northeast of Bastrop. Most of the lots in this subdivision range from one to five acres in size. As of 2001, approximately 500 of the more than 1,000 lots were unimproved (Bastrop County Appraisal District, 2001).
- Lake Bastrop Acres: Lake Bastrop Acres is located south of BFCI, and east of Highway 95. Approximately 1,600 lots are located in this subdivision, and the average lot size is approximately 0.5 acre. Approximately 1,200 of the lots are unimproved (Bastrop County Appraisal District, 2001).



**Legend**

12 Sector Boundary

**Land Use Categories**

- Residential
- Commercial
- Industrial
- Cropland & Pasture
- Herbaceous Rangeland
- Shrub & Brush Rangeland
- Mixed Rangeland
- Deciduous Forest
- Mixed Forest
- Reservoirs
- Transitional Areas
- School (Future)
- Recreational



Figure 2.10  
Land Use  
Camp Swift, Texas

Source: Modified from USGS Land Use and Land Cover Data.  
 Dataset created between 1970 and 1980.  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

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DESIGNED BY: EN	DATE: October, 2002	DRAWN BY: JB	FILE NUMBER:
		FILE NAME: j:\737805\GIS\ECA\Figure_landuse.mxd	

- The Arbors at Dogwood Creek: The Arbors subdivision is located approximately three miles from Elgin, between Highways 95 and 290. The subdivision consists of approximately 275 one to five acre lots. Approximately 200 of these lots are unimproved (Bastrop County Appraisal District, 2001).

Several other smaller subdivisions, including Green Oaks (45 lots), Lake Bastrop Estates (700 lots), Lake Bastrop Pines (160 lots), Pine View Estates (160 lots), Pioneer Pines Farm (150 lots), Ponderosa Homestead (100 lots), Sanders Estates (100 lots), are also located within the former Camp Swift boundary.

2.5.11 Other notable property uses include a future elementary school and a commercial paint ball and motorcross recreation area. In 2003, Bastrop ISD began construction of an elementary school on a 21-acre property north of the lake and north of FM 1441. The new school is scheduled to be open for the Fall 2004 semester. The motorcross recreation area is located on 24 acres north of Lake Bastrop and south of FM 1441.

2.5.12 Land further from Bastrop and Elgin, in the eastern and central areas of the former Camp Swift, has not been as extensively subdivided. Several very large lots (over 100 acres each) are located in this area and are used primarily for cattle grazing and ranching. However, subdivision of larger lots is also occurring in these areas. A 170-acre lot along Highway 290 was recently divided into 10 lots, and several other large property owners have indicated that they are selling their land.

## **2.6 ANALYSIS OF HISTORICAL RECORDS**

Results of analysis of historical records are provided in Subchapters 2.3 and 2.7.

## **2.7 PREVIOUS INVESTIGATIONS**

### **2.7.1 Inventory Project Report and Explosive Ordnance Risk Assessment**

2.7.1.1 An Inventory Project Report (INPR), dated June 3, 1991, was prepared by the U.S. Army Corps of Engineers, Fort Worth District. The purpose of the INPR was to establish the site as a FUDS, determine its eligibility for funding under the Defense Environmental Restoration Program (DERP), and evaluate the site for potential OE contamination.

2.7.1.2 In October 1991, an explosive ordnance risk assessment was conducted for a portion of the former Camp Swift as part of the evaluation of potential OE contamination. This assessment resulted in a RAC of 2, which indicates that action is required to mitigate hazard or protect personnel, and a feasibility study is appropriate.

### **2.7.2 Building Demolition/Debris Removal Projects**

In 1991 and 1992, two building demolition/debris removal (BD/DR) projects were conducted by the U.S. Army Corps of Engineers. In February 1991, a project was initiated to physically locate and cap with concrete approximately 200 sewer manholes associated with

the former Camp Swift's sewer lines. In September 1992, a project was initiated to investigate eleven large motor vehicle storage areas surrounding the former cantonment area for potential underground storage tanks (USTs). The results of these two BD/DR projects are not available.

### **2.7.3 Archives Search Report**

2.7.3.1 In 1994, the U.S. Army Corps of Engineers, Rock Island District, prepared an ASR to present the findings of a historical records search and site inspection for OE at the former Camp Swift (USACE, 1994a). The purpose of the investigation was to characterize the site for potential OE, including conventional munitions and CWM. This was achieved through evaluation of historical records, interviews, and on-site visual inspection.

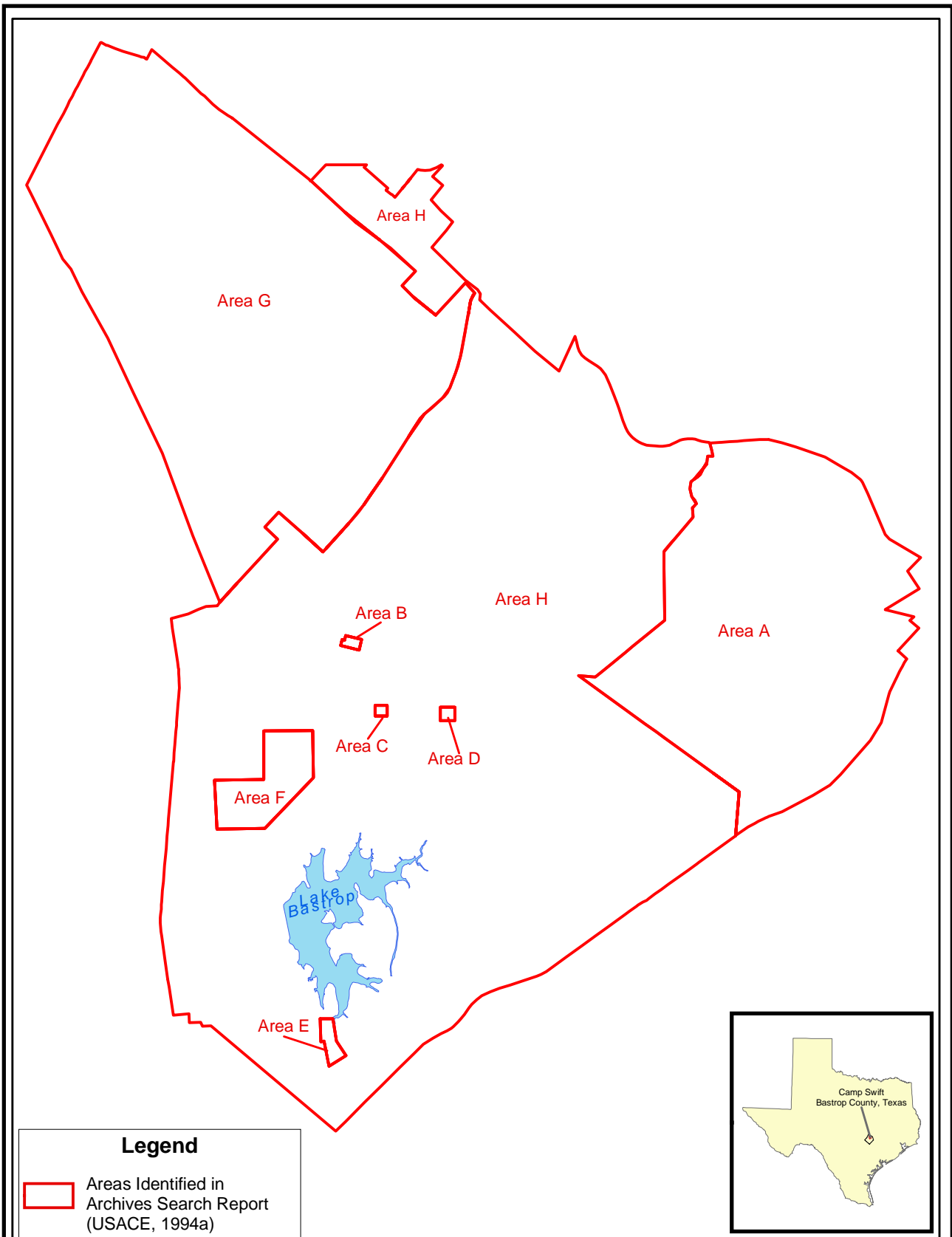
2.7.3.2 The ASR divided the former Camp Swift into eight areas, Areas A through H, based on historic documents, drawings, maps, aerial photographs, newspaper articles, technical ordnance data, real estate records, and other reports. The potential for ordnance hazards was evaluated for each of the areas to determine confirmed, potential, or unconfirmed ordnance presence. Confirmed ordnance presence was based on verifiable historical evidence or direct witness of ordnance items since site closure. Verifiable historical record evidence consisted of ordnance items located onsite and documented by local bomb squads, military explosive ordnance disposal teams, newspaper articles, and correspondence. The eight areas identified in the ASR are shown in Figure 2.11, and are listed below:

- Area A: Artillery Range Impact Area and Buffer Zone;
- Area B: Ammunition Storage Area;
- Area C: Booby Trap Area;
- Area D: Gas Area;
- Area E: Munitions Demolition Area;
- Area F: Hospital Area;
- Area G: Firing Ranges; and
- Area H: Remaining Lands.

2.7.3.3 Based on the information available for the ASR, two of the areas, the Artillery Range Impact Area (Area A) and the Hospital Area (Area F), were identified as potentially contaminated. The Munitions Demolition Area (Area E) was identified as confirmed contaminated.

### **2.7.4 Supplement to Archives Search Report**

2.7.4.1 In 1994, the St. Louis District of the U.S. Army Corps of Engineers prepared a supplement to the ASR prepared by the Rock Island District. The Supplement (USACE, 1994b) focused on determining possible use or disposal of CWM and conventional




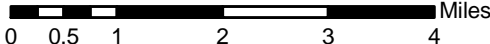
**Legend**

Areas Identified in Archives Search Report (USACE, 1994a)

Area A: Artillery Range/ Impact Area  
 Area B: Ammunition Storage Area  
 Area C: Booby Trap Training Area  
 Area D: Gas Area  
 Area E: Munitions Demolition Area  
 Area F: Hospital Area  
 Area G: Firing Ranges  
 Area H: Remaining Land



Figure 2.11  
 Areas of Interest  
 Identified in 1994 ASR

  
  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

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PROJECT NUMBER	ARH	CAMP SWIFT, TEXAS	
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APPROVED BY	JB	FILE NUMBER	737805
		FILE NAME	3737805GISSECAAreas_ofInterest.mxd

munitions on the site. Particular emphasis was placed on establishing the chemical (agent), the type of munitions or container, quantities, and areas of disposal.

2.7.4.2 The Supplement modified the definition and locations of the areas of interest, and added the following areas:

- Area I: North Transition Range;
- Area J: Fortified Area; and
- Area K: Near Cantonment Area.

The locations of the areas defined in the Supplement are shown in Figure 2.12. The Supplement concluded that “certain areas appear to require further investigation to determine their suitability for continued use.” The areas listed included the Artillery Impact Area (Area A), the Near Ammunition Storage Area (Area B), the Booby Trap Area (Area C), the gas area (Area D), the North Transition Range (Area I), the Fortified Area (Area J), and the Near Cantonment Area (Area K). The Supplement also agreed with the ASR conclusions that further action was necessary in the Artillery Impact Area (Area A), the Munitions Demolition Area (Area E), and the Hospital Area (Area F).

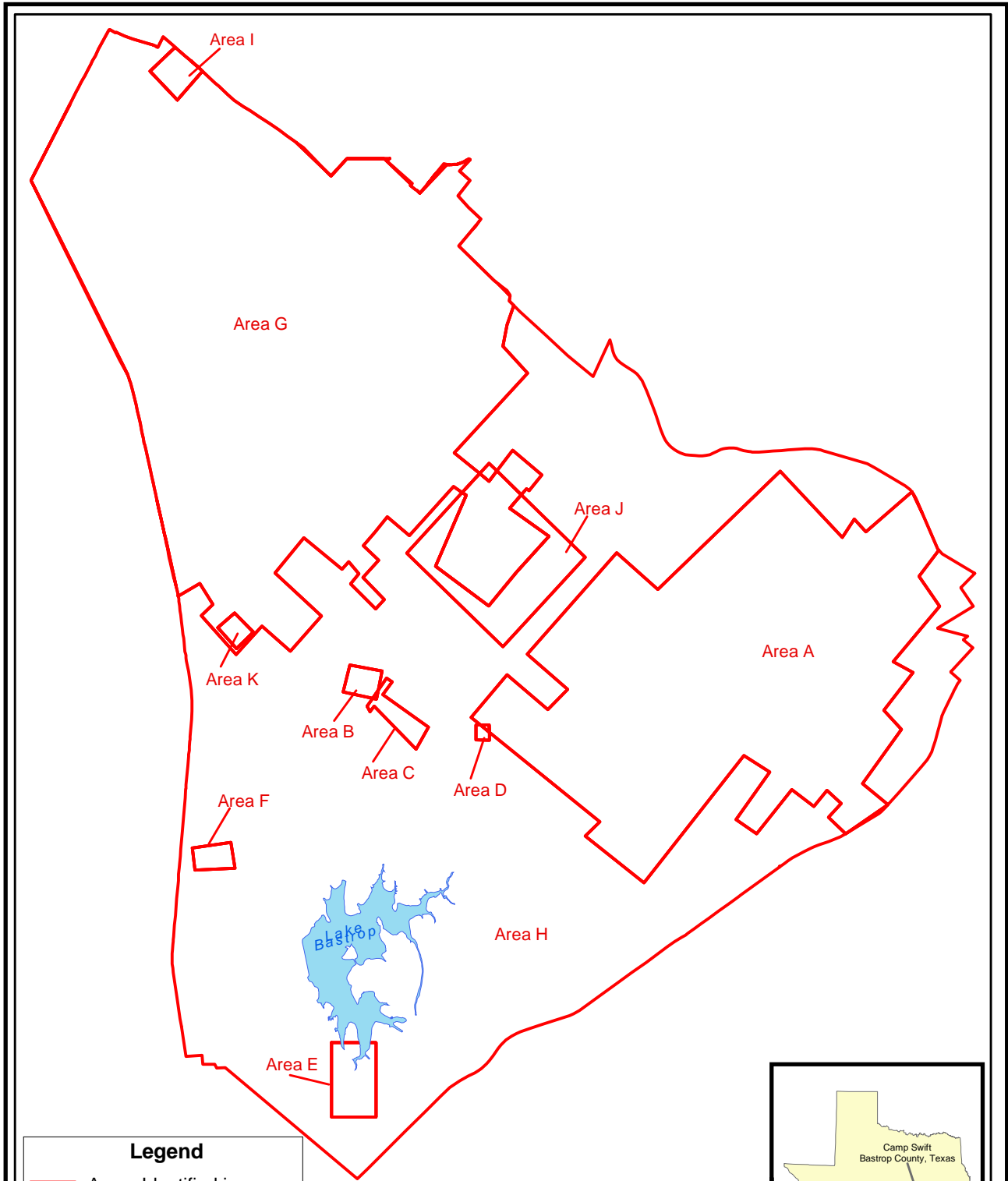
## 2.7.5 Cultural Resources Surveys

Several cultural resources surveys have been conducted within the former Camp Swift boundary. The majority of these studies were conducted by the LCRA, TARNG, and Texas Parks and Wildlife Department (TPWD). These studies were reviewed, and an archaeological sensitivity map (Parsons, 2001c) was prepared prior to conducting fieldwork for the EE/CA. Some additional information from these studies is provided in the following paragraphs.

### 2.7.5.1 LCRA Surveys

2.7.5.1.1 The LCRA Environmental Protection Division has conducted several cultural resources surveys on LCRA property within the former Camp Swift study area. One study of interest is *Cultural Resources Report No. 3: Intensive Cultural Resource Survey and Monitoring at the LCRA Camp Swift Regional Wastewater Project, Bastrop County, Texas* (LCRA, 1996).

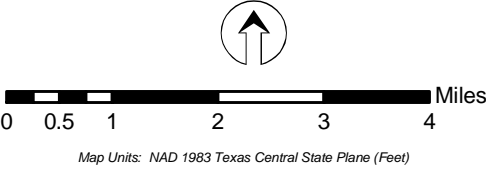
2.7.5.1.2 The project area was within the western uplands of the Colorado River along the primary tributary valley of Piney Creek. Ten prehistoric sites and four historic sites were documented during the investigation. The prehistoric sites are predominantly upland campsites with light scatters of chipped stone debris from primary and secondary reduction and tool maintenance activities. Impacts to the integrity of the sites include ranching, farming, and construction. Five prehistoric sites were recommended for avoidance because they contain possible intact subsurface deposits which would warrant testing to determine National Register of Historic Places (NRHP) nomination and State Archeological Landmark (SAL) status (LCRA, 1996).



- Legend**
- Areas Identified in Supplement to Archives Search Report (USACE, 1944b)
  - Area A: Artillery Impact Area
  - Area B: Near Ammunition Storage Area
  - Area C: Booby Trap Area
  - Area D: Gas Area
  - Area E: Demolition Area
  - Area F: Hospital Area
  - Area G: Firing Ranges
  - Area H: Other Remaining Land
  - Area I: North Transition Range
  - Area J: Fortified Area
  - Area K: Near Cantonment Area



Figure 2.12  
Areas of Interest Identified in 1994 ASR Supplement



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2.7.5.1.3 The four historic sites are associated with the World War II-era Camp Swift training facility. Three of these sites were recommended for monitoring and one for avoidance. They include a POW camp used to house German POWs and Eastern Europe conscript POWs, the Camp Swift wastewater treatment plant, the Camp Swift cantonment area, and a dump reportedly used by the Camp Swift regional hospital. Structures associated with the POW camp and cantonment areas have been demolished and hauled off since the late 1940s when the properties were transferred to private landowners. The concrete foundations that remain are now integrated in some cases with private housing and storage facilities. Five concrete foundations and one watchtower area have been preserved as representative examples of the remaining foundations documented during the investigation at the POW camp. The wastewater treatment facility site retains many of the original structures. None of the historic sites retained sufficient integrity of deposit or architecture to qualify for NRHP or SAL nomination. Since the sites exist on public land, they are the responsibility of the LCRA, whose cultural resource management staff monitors the sites (LCRA, 1996).

### **2.7.5.2 TPWD Survey**

2.7.5.2.1 The TPWD Public Lands Division produced a report in March 1996 entitled Stone Projectile Points to World War II Tank Destroyers and Land Mines: Intensive Archeological Survey at Lake Bastrop State Park, Bastrop County, Texas (TPWD, 1996a). According to the report, TPWD has a 25-year lease agreement with LCRA to develop and oversee 773 acres surrounding the man-made Lake Bastrop. The LCRA acreage is being utilized for park land and a Conservation Training Center surrounded by undeveloped buffer acres. The lease area was previously used for home sites, small-scale farming, timber production, pasture, and recreational purposes.

2.7.5.2.2 Archeological surveys were performed on the entire leased area in 1990. A total of 18 sites were recorded or updated on the property. These sites range in age from the Late Paleo-Indian/Early Archaic period up to and including the mobilization effort for World War II. A possible pre-Civil War homestead was one of the recorded resources as well as a Middle Archaic burned rock feature (TPWD, 1996a).

### **2.7.5.3 EE/CA Archaeological Sensitivity Map and Survey**

2.7.5.3.1 Prior to beginning fieldwork for the OE EE/CA, an archaeological sensitivity map was prepared to identify areas of prehistoric and historic archaeological sensitivity within former Camp Swift (Parsons, 2001c). The map was prepared in response to comments received from the Texas Historical Commission (THC) regarding the EE/CA Work Plan. The map identified areas of potential archaeological concern so that they could either be avoided during the EE/CA or additional archaeological investigation could be conducted following excavation in the areas of high sensitivity.

2.7.5.3.2 Cultural resource services conducted during the EE/CA included background research and records search, archaeological survey, and site recordation and mapping. An archaeological survey was conducted on portions of 23 parcels, totaling approximately 214 acres at the former Camp Swift. The survey resulted in the identification

of twelve new archaeological sites. This total includes eleven prehistoric sites and one historic site. The Archaeological Survey Report is included in Appendix C.

### 2.7.6 Parsons EE/CA Site Visit

In preparation for the EE/CA, Parsons conducted a site visit of Areas A, E, and G on February 15 and 16, 2000. An unexploded 75mm HE shell (UXO) was discovered in front of a gatepost on private property within Area A. In Area E, numerous craters were observed in the demolition area; however, no OE items were found on the ground surface in this area. No OE items were observed in Area G (Parsons, 2000a).

### 2.7.7 Historical Photograph Analysis

2.7.7.1 The USACE Topographic Engineering Center (TEC) conducted a GIS-based historical time-sequence analysis of the former Camp Swift using the 1946 master plan for the former Camp Swift, along with 1943 and 1944 aerial photos. Aerial photos were examined for land features which could be indicative of potential ordnance-related activities. Features identified in these aerial photos included berms, cleared areas, debris areas, depressions, disturbed ground, excavations, ground scars, and impact craters (ERDC, 2000).

2.7.7.2 The results of the aerial photograph analysis are summarized in Table 2.7. For the purpose of the EE/CA investigation, the ASR areas were further subdivided into sectors based on current and past land use. The EE/CA sectors are also listed in Table 2.7. Areas of disturbed ground, including all types of disturbance, are shown in Figure 2.13.

**Table 2.7 Summary of Historic Photograph Analysis Findings**

ASR Area	Description	EE/CA Sector	Historical Photo Analysis Findings
A	Artillery Range Impact Area	4	Numerous impact craters, shells found at residence.
	Artillery Range Buffer Zone	5	
	Other Artillery Lands	6	
B	Ammunition Storage Area	7	Possible impact craters and pits, mounded material.
C	Booby Trap Training Area	8	Evidence of impact craters, pits, berms, disturbed ground.
D	Gas Area	9	Numerous impact craters.
E	Munitions Demolition Area	10	Evidence of impact craters, ground scars, trenches, berms.
F	Hospital Area	11	Evidence of ground scars, pits, disturbed ground, some mounded material.
G	Firing Ranges	1	Evidence of ground scars and impact craters.
H	Remaining Lands	2, 3, 12	Evidence of impact craters and ground scars.

## 2.8 PREVIOUS REMOVAL ACTIONS

No formal removal actions have been conducted at the former Camp Swift since those mentioned in Subchapter 2.3.3; however, EOD units from Fort Sam Houston have responded on many occasions to suspected ordnance findings made by the public. In addition, several landowners reported to EE/CA field personnel and/or to CESWF on their ROE agreement form that they had found UXO or ordnance scrap on their property. These findings are described further in Chapters 3 and 4.

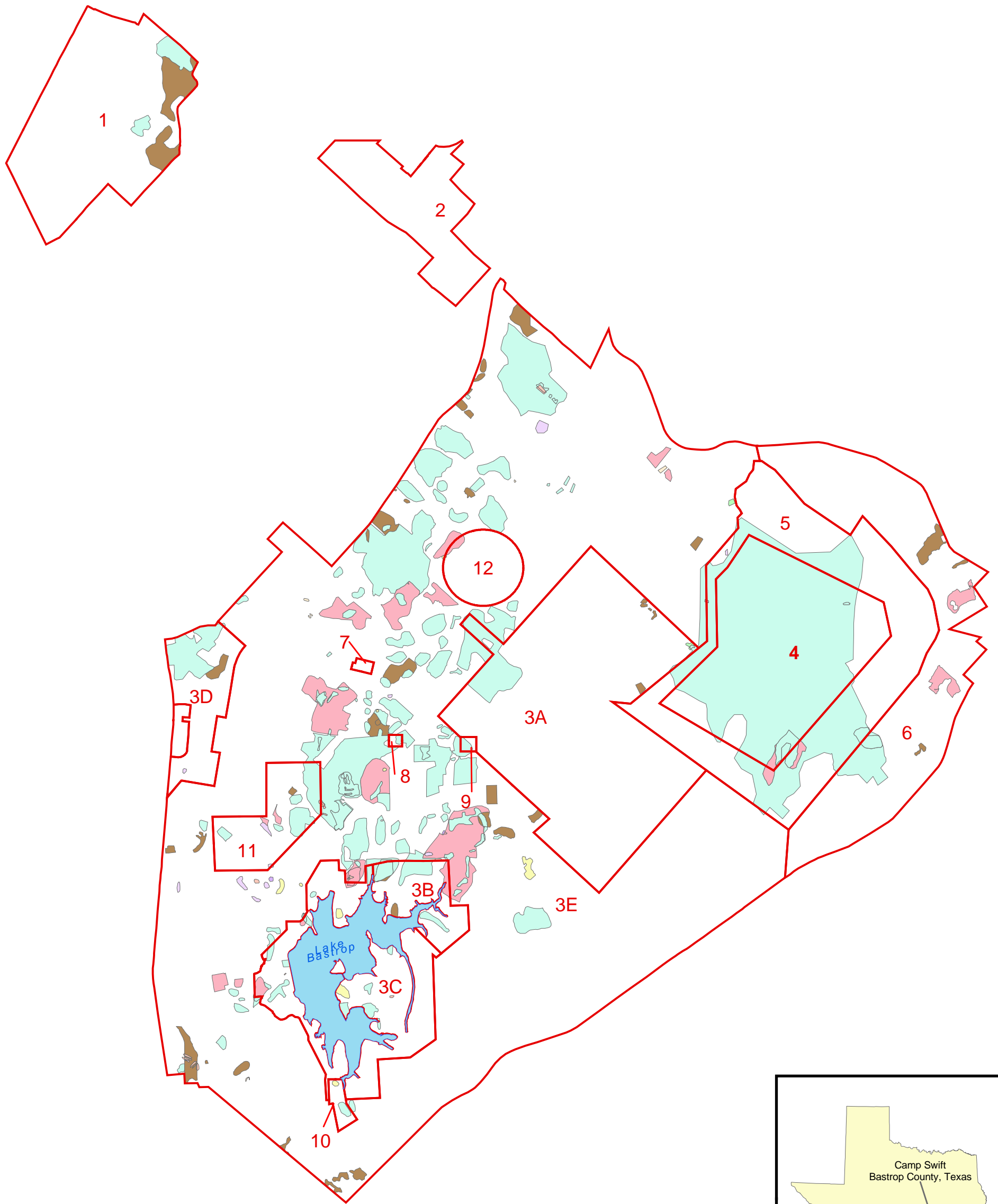



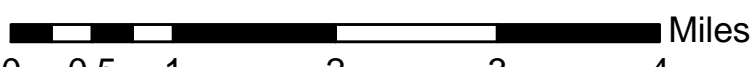
Figure 2.13  
Disturbed Ground  
Camp Swift, Texas

**Legend**

12 Sector Boundary

Disturbed Ground Identified during Historic Photograph Analysis (ERDC, 2000)

<span style="display: inline-block; width: 15px; height: 10px; background-color: #f4b084; border: 1px solid black;"></span> Berm	<span style="display: inline-block; width: 15px; height: 10px; background-color: #a2e4d6; border: 1px solid black;"></span> Impact Craters
<span style="display: inline-block; width: 15px; height: 10px; background-color: #c8a2e4; border: 1px solid black;"></span> Depression	<span style="display: inline-block; width: 15px; height: 10px; background-color: #e4c8e4; border: 1px solid black;"></span> Mounded Material
<span style="display: inline-block; width: 15px; height: 10px; background-color: #a2e4a2; border: 1px solid black;"></span> Excavation	<span style="display: inline-block; width: 15px; height: 10px; background-color: #ffffa2; border: 1px solid black;"></span> Pit
<span style="display: inline-block; width: 15px; height: 10px; background-color: #8b4513; border: 1px solid black;"></span> Ground Scar	<span style="display: inline-block; width: 15px; height: 10px; background-color: #f4a284; border: 1px solid black;"></span> Trench
<span style="display: inline-block; width: 15px; height: 10px; background-color: #f4a2c8; border: 1px solid black;"></span> Heavily Tracked Area	

  
  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

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## CHAPTER 3 SITE CHARACTERIZATION

### 3.1 SITE INVESTIGATIONS

Field work for the former Camp Swift EE/CA investigation took place from February 25, 2002 to June 27, 2002. This chapter describes the site investigations; the source, nature, and extent of OE; a description of hazards associated with specific OE encountered during the investigation; and a description of environmental soil sampling analytical results.

#### 3.1.1 Preparation for Field Work

Prior to beginning field work, coordination with stakeholders and landowners was necessary. The following paragraphs describe activities conducted in preparation for field work.

##### 3.1.1.1 Stakeholder Coordination

3.1.1.1.1 In November 2000, a TPP meeting was held by CESWF, USAESCH, and Parsons to get stakeholder input on the planned EE/CA at the former Camp Swift. Attendees included representatives from the THC, Texas Commission on Environmental Quality (TCEQ, formerly Texas Natural Resource Conservation Commission [TNRCC]), U.S. Environmental Protection Agency (USEPA), USFWS, TPWD, LCRA, Boy Scouts of America (BSA), and Camp Mabry. Based on this meeting and input from the USEPA, a limited soil sampling program was added to the scope of the EE/CA study.

3.1.1.1.2 Each of the TPP meeting attendees was asked to write a formal closure statement for the former Camp Swift site. Common objectives for all attendees included reducing the UXO risk in the area and identifying areas of high UXO risk. Some examples of the attendee statements include:

- “Remediate Camp Swift to achieve an acceptable level of risk based on current and future land use since 100% risk free is not possible. Ensure that potential environmental damage from releases of lead and/or explosives are minimized.”
- “Return the land to an acceptable state (acceptable by all interested parties) that would ensure the quality, protection, and safety of human health and the environment.”

3.1.1.1.3 In February 2001, the Camp Swift EE/CA Work Plan was completed and submitted to regulatory agencies for comment. Following a meeting with USFWS in May 2001, CESWF entered into Section 7 consultation with USFWS due to concerns regarding the endangered Houston toad. A Biological Assessment was submitted to USFWS in October 2001. In January 2002, USFWS provided its Biological Opinion (Appendix B), allowing the EE/CA field investigation to continue with stipulations described in Subchapter 2.2.5.

3.1.1.1.4 Following a meeting with THC in May 2001, an archaeological sensitivity map was prepared to identify areas within the former Camp Swift with high potential for historic and prehistoric sites. In November 2001, a second meeting was held with THC to identify state requirements to protect archaeological resources during the EE/CA investigation. It was agreed that excavations within the areas with high potential for archaeological sites would be subsequently investigated by an archaeologist. The results of this investigation are provided in Appendix C.

3.1.1.1.5 Finally, two public meetings were held before EE/CA field work began. The first was in September 2000, and the second in February 2002. Both meetings were held at the Bastrop High School, and the purpose of each was to inform the public of the upcoming EE/CA. In addition to these two public meetings, CESWF accepted invitations to make presentations at an annual Circle D Civic Association meeting (May 2001) and at a Bastrop County Houston Toad workgroup meeting (January 2001).

### **3.1.1.2 ROE Agreements**

3.1.1.2.1 As described in Chapter 2, approximately 4,000 parcels of privately-owned land are located within the former Camp Swift boundary. Work on all of this property could only be done with a valid ROE agreement between CESWF and each landowner. If additional ROEs are obtained in the future, it is recommended that additional investigation be conducted.

3.1.1.2.2 Parsons obtained parcel boundary and owner information from the Bastrop County Appraisal District in February 2001. Planned locations of survey transects were placed randomly across the former Camp Swift in the EE/CA Work Plan (Parsons, 2001a). The names and addresses of owners of land over which a planned transect crossed were provided to CESWF. In March 2001, CESWF began mailing out ROE agreement forms to these landowners. These agreements were valid for one year from date of signature. ROE agreements were received from approximately 1,200 property owners, whose land consisted of approximately 48% of the land within the former Camp Swift (excluding TARNG). However, no ROE agreements were received for land within Sectors 2 and 8. Very limited ROE agreements were received for land in the portion of Sector 3E which is north of Sectors 12 and 3A.

3.1.1.2.3 Information regarding the ROE duration, special landowner requests (such as prior contact before accessing land), and landowner names were maintained in a GIS and database. The commencement of fieldwork was delayed due to ongoing regulatory discussions; therefore, some ROE agreements were near their expiration date when fieldwork began on February 25, 2002. However, fieldwork was conducted in a manner to access as many properties as possible prior to ROE agreement expiration.

3.1.1.2.4 Because the land for which ROE was received was only a portion of what was requested, locations of transects had to be modified significantly from what was planned in the Work Plan. Utilizing information stored in the GIS and database systems, the area for each property with ROE was compared to the total area for all properties within a sector where ROE was obtained. Using this ratio and the total amount of transect length desired for each sector, a desired transect length for each property was determined. Each geophysical

survey team was provided parcel numbers, parcel locations, landowner contact information, and target transect lengths per parcel each morning. In addition, each team was provided with detailed maps of the former Camp Swift which showed disturbed areas identified during historical aerial photograph analysis by the TEC. The geophysical survey teams were therefore able to focus on these historically disturbed areas during data collection.

3.1.1.2.5 In March 2002, Parsons obtained an updated property owner list from the Bastrop County Appraisal District. In April 2002, CESWF began sending out another round of ROE agreement requests. Some properties for which ROE was initially provided were not accessed due to ROE expiration, thick vegetation, aggressive animals, and/or a large amount of metal or other landowner items (such as vehicles, buildings, chain link fences, machinery) on the ground surface.

### **3.1.2 Instrumentation**

A site-specific geophysical prove-out was performed at the former Camp Swift during September 2000 to identify the optimal equipment to be used during the geophysical investigation. The geophysical prove-out report was included in the workplan for the EE/CA report (Parsons, 2001a), and is available at the Bastrop Public Library, Bastrop, Texas (<http://www.bastroplibrary.org/>). The geophysical tools tested were the Geonics® EM-61 Time Domain Electromagnetic Metal Detector (TDMD) and the Geometrics® G-858G Cesium Vapor Magnetic Gradiometer (G-858G). The G-858G was more effective at detecting deeper items compared to the EM-61, while still providing similar capabilities for shallower smaller targets (Parsons, 2001a). The degraded EM-61 response at depth was likely caused by the conductive, high clay content soils present at the former Camp Swift. In addition, the G-858G offered advantages because it is man-portable using a single operator, in terrain where the EM-61 would require additional vegetation clearing or a two-man operation. The G-858G was therefore chosen as the proper equipment for data acquisition, anomaly reacquisition, and quality assurance (QA)/quality control (QC).

#### **3.1.2.1 Geometrics® G-858G Cesium Vapor Magnetic Gradiometer**

The Geometrics G-858G Magnetometer is a cesium vapor (non-radioactive) sensor that produces a signal proportional to the intensity of the ambient magnetic field. The sensitivity of the instrument is 0.05 nanoTesla (nT) and can be read as fast as ten times per second. The G-858G data logger collects data at automatic time intervals determined by the user. The instrument was set up in the gradiometer mode (two sensors mounted one above the other) with the sensors separated by 24 inches. Photograph 3.1 shows the usage of the G-858G at the site.

#### **3.1.2.2 Schonstedt Magnetic Locator**

Schonstedt Heliflux® Magnetic Locators detect subsurface ferrous metal items. The technology is based upon fluxgate sensors organized in a gradiometer format. The Schonstedt locator is a hand-held unit that employs two fluxgate magnetometers that are aligned and mounted a fixed distance apart to detect changes in the earth's

ambient magnetic field caused by ferrous metal (the sensors are fixed and aligned to eliminate a response to the earth's ambient field). The Magnetic Locators generate an audio output and a meter deflection when either of the two sensors is exposed to a disturbance of the earth's ambient field associated with a ferrous target and/or the presence of a permanent field associated with a ferrous target (in most cases, it will be a combination of both circumstances). Schonstedt Magnetic Locators were utilized by the USA Environmental excavation crews to verify that the anomaly had been excavated.



**Photograph 3.1 Geophysicist conducting survey with G-858G Magnetometer**

### **3.1.2.3 Trimble® ProXRS™ Global Positioning System**

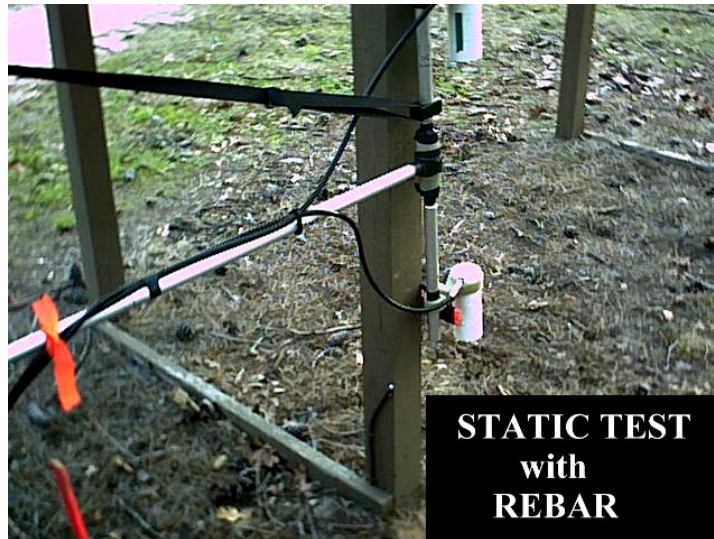
The Trimble® ProXRS™ Global Positioning System (GPS) unit is small and lightweight (2.7 pounds) with an integrated GPS receiver and radio receiver capable of performing real-time differential corrections via the OmniSTAR® system. The accuracy of positions calculated by this unit can achieve the sub-meter level; however, due to the site conditions of thick forest canopy, the positional accuracies of this unit were degraded. The Trimble® ProXRS™ system was utilized, rather than a real-time kinematic system capable of centimeter level accuracy, because it can still provide positional information in the marginal site conditions (thick canopy) at the former Camp Swift site. The positional data from the Trimble® ProXRS™ system was streamed into the G-858G data-logger console to give real-time positions of each magnetometer reading as the field technician completed the meandering paths. The ProXRS™ was used for data acquisition, anomaly reacquisition, and QA/QC.



### 3.1.3 Quality Control of Geophysical Data

3.1.3.1 The field crew performed and recorded the following QC tests for all instruments during each day of data acquisition:

- Static QC test with and without a piece of rebar to simulate an anomaly. This test was performed each morning and evening. Photograph 3.2 displays the static test setup.



**Photograph 3.2 G-858G Static Test Layout**

- Survey of a QC line before commencing data acquisition. The line was 100 feet in length having a standard metallic object placed at a known location. This line was surveyed six times, at varying speeds and with the target present or absent. The test was performed each morning.
- Survey of a standardized meandering path, with standard metallic objects located at known positions along the meandering path. This test was performed each morning.
- GPS survey of a standard survey point. This test was performed each morning and evening.

3.1.3.2 The QC readings taken at the beginning and end of each day were compared, and if they differed by more than 25%, then the data were reevaluated and, if necessary, the problem was corrected or the instrument was replaced. On occasion, G-858G readings were found to vary by more than 25%, and upon review, the variations were found to be due to either varying instrument heights over the QC spike item or differences in the orientation of the QC spike item with respect to the instrument sensors. In all such cases, the data were reviewed by the Senior Project Geophysicist and found to be of good quality and

were accepted. Corrective actions were also taken by informing the survey teams of the variations and providing instructions to modify their procedures.

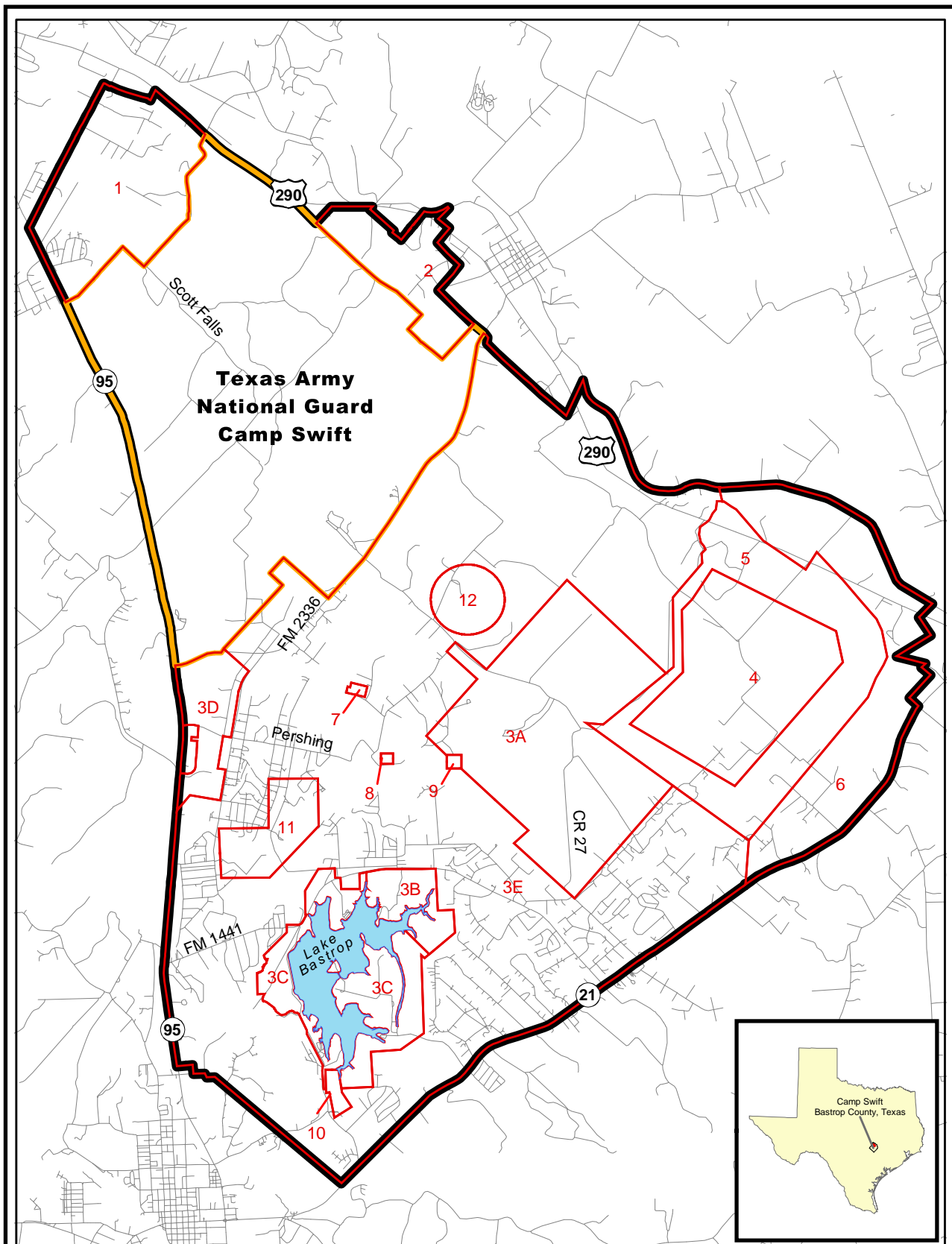
3.1.3.3 Additional QC was achieved by placing the QC spike object at a known location for the duration of data acquisition. The location of this item was recorded by the field crew and the anomaly response from the QC item was analyzed during the data processing. The response and location of this item within the survey grid provided QC of both instrument functionality and data positioning.

3.1.3.4 During data reacquisition, only the static QC test and the GPS survey were performed. Both tests were performed in the morning and evening each day of reacquisition. All QC objectives associated with the geophysical data were achieved and were documented each morning and evening on daily QC logs.

### **3.1.4 Geophysical Survey**


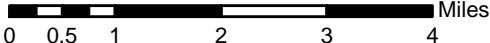
3.1.4.1 As described in Subchapter 2.7.7, the former Camp Swift was divided into twelve sectors based on the land use descriptions presented in the ASR (USACE, 1994a) and current land use. One sector, Sector 3, was further subdivided into Sectors 3A, 3B, 3C, 3D, and 3E. The total number of sectors for the site investigation then became sixteen. Sector locations are shown in Figure 3.1. Prior to conducting the EE/CA field investigation, the amount of sampling necessary within each sector was determined by USAESCH using their UXO sampling protocols and the required acreages were specified in the project SOW (Appendix A). Although the ASR (USACE, 1994a) and ASR Supplement (USACE, 1994b) did not recommend further investigation of all areas of the former camp, results of the historical aerial photograph survey indicated evidence of impact craters and ground scars in many sectors (see Table 2.6), including those areas not within training areas. In addition, several landowners within areas identified as “Other Remaining Lands” have reported finding UXO and ordnance scrap on their property. Therefore, all portions of the former camp were suspected of potentially containing UXO.

3.1.4.2 USAESCH calculated appropriate sampling acreages for each sector using percentages specified in Engineer Manual (EM) 1110-1-4009, Ordnance and Explosives Response (USACE, 2000a) for recommended minimum survey acreages. The larger the sector, the smaller the percentage of sampling is required. The total acreage specified for surveying in the SOW (listed in Table 3.1) was based on the assumption that the entire area could be accessed. Table 3.1 also shows the recommended and required minimum acreages for the amount of land per sector for which ROE was granted.



**Legend**

- 12 Sector Boundary
- Texas Army National Guard Boundary
- Former Camp Swift Boundary
- Roads

  
  
 0 0.5 1 2 3 4 Miles  
 Map Units: NAD 1983 Texas Central State Plane (Feet)

**Figure 3.1**  
Sector Location Map  
Camp Swift, Texas

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: MS	SCALE: 1:115,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: November, 2002	PAGE NUMBER:	
SUBMITTED BY: JB	FILE: j3737805GISECALocatorMap.mxd		

3.1.4.3 The geophysical survey to detect ferrous metal objects at former Camp Swift was performed between February 25 and May 7, 2002. The total area surveyed was approximately 213.7 acres. Although the SOW indicated that 319 acres should be surveyed, this area was based on 100% ROE over the former Camp Swift. However, as discussed previously, ROE was granted for only approximately 48% of the former Camp Swift area. Therefore, the amount of area to survey was decreased. No work was performed in Sectors 2 and 8 since ROE was not granted for any portion of these sectors. As shown in Table 3.1, the recommended minimum investigation area was met or exceeded for all investigated sectors except Sectors 7, 9, and 12. Although the recommended minimum investigation area was not achieved in Sector 7, the amount of area surveyed did meet the required minimum investigation acreage. ROE was very limited in Sector 12, which did not allow for attaining the recommended or required minimum investigation areas. Sector 9 consists of 20 acres, almost all of which is covered by thick vegetation. This thick vegetation hampered the geophysical survey of Sector 9, making it difficult to carry the magnetometer in a stable position or obtain quality GPS data without vegetation clearing. For the portion of Sector 9 that was surveyed, ordnance scrap was found and a chemical training bottle was found during the soil sampling activities, as described in further detail in Subchapter 3.2. Therefore, additional site characterization would not change the conclusions and recommendations for this area.

**Table 3.1 Former Camp Swift Field Investigation Acreages**

Sector	Total Acreage	Acreage with ROE <sup>(a)</sup>	Planned Investigation Acreage (per SOW)	Recommended Minimum Investigation Acreage <sup>(b)</sup>	Required Minimum Investigation Acreage <sup>(b)</sup>	Actual Survey Acreage Completed
1 Firing Ranges	2,321	1,363	18	10.2	6.8	14.9
2 Remaining Lands	1,031	0	10	0	0	0
3 Remaining Lands	27,937	14,867	207	125.7	97.9	143.7
4 Artillery Range Impact Area	2,515	713	18	10.7	7.1	13.9
5 Artillery Range Buffer Zone	2,720	866	21	13	8.7	14.4
6 Other Artillery Lands	2,827	1,262	19	9.5	6.3	17.7
7 Ammunition Storage Area	20	12.6	2	0.9	0.6	0.85
8 Booby Trap Training Area	13	0	1	0	0	0
9 Gas Area	20	20	2	1.5	1	0.17
10 Munitions Demolition Area	69	64	4	2.9	1.9	3.0
11 Hospital Area	627	82	9	3.7	2.5	4.3
12 Fortified Area	419	133	8	4	2.7	0.9
Total	40,519	19,382	319	154.3	102.9	213.7

<sup>(a)</sup> Acreage amount listed is total acreage for which ROE was granted over the course of the project. At any given time during the project, the acreage with current ROE may have been less due to expiring ROEs and changes in land ownership. Minimum acreage could not be obtained in Sectors 9 and 12 due to limited ROEs and thick vegetation that hampered and prevented geophysical surveys.

<sup>(b)</sup> Calculated using percentages in Table 7.4 of EM 1110-1-4009, and acreage with ROE.

3.1.4.4 The geophysical survey was performed using the meandering path survey technique. Meandering path sampling is a process where a geophysical investigation instrument is integrated with a navigation instrument that links extremely accurate positional data with the geophysical readings. Then, a geophysical team “meanders” randomly throughout a site, until the total area geophysically mapped equals the area required. Meandering path sampling is the best sampling strategy for sites with difficult vegetation and terrain (USACE, 2000a). Use of this strategy at the former Camp Swift also allowed for avoidance of buildings, fences, archaeological sites, and other man-made features. An area approximately 2,000 feet around the Sim Gideon Power Plant was also avoided due to LCRA concerns regarding the need for potential evacuation for ordnance detonation.

3.1.4.5 Survey activities were conducted by carrying the G-858G magnetometer for the collection of geophysical data in conjunction with the ProXRS™ GPS unit, which recorded real-time positions for the G-858G readings. The magnetometer collected 10 readings per second and received positional information from the ProXRS™ every second so the geophysical data and GPS data could be synchronized. After collection, magnetometer data and GPS data were downloaded separately for data processing. A UXO-qualified technician provided advance visual surface OE removal of the surveyed areas for the magnetometer operators and served as an assistant to the geophysicist. Photograph 3.3 displays a geophysical team performing a meandering path survey. The person in the foreground is a UXO-qualified technician. The area covered by a transect was calculated as the distance traveled multiplied by the width of the G-858G influence (three feet). Five ordnance scrap items were identified on the ground surface by field teams during the geophysical survey. These findings are described in detail in Subchapter 3.2.



**Photograph 3.3 Meandering Path Survey**

3.1.4.6 Occasionally the ProXRS units would be unable to provide positional information, usually due to the inability to receive information from at least four GPS satellites. If this occurred during the geophysical survey, the survey was temporarily halted until positional information was again available or the geophysicist kept walking a straight line segment, so equipment position could be reconstructed by a time-average across the distance lost until GPS positional information was regained. If the GPS unit was unable to regain sufficient information from the GPS satellites or the operator was not able to navigate a straight line, the transect was terminated and the operator moved to a location with less tree canopy and waited until GPS positioning was regained. The operator would then start a new transect. In the worst case, very small data segments in the transect were lost. This very small data loss is inconsequential, as transects were typically lengthened during the survey in anticipation of these minor losses.

### **3.1.5 Anomaly Identification**

3.1.5.1 Data from the geophysical surveys were downloaded from the G-858 and GPS data loggers to field laptop computers. At the end of each day or the morning of the following workday, the data from the survey teams were transferred to the lead geophysicist and were processed using manufacturer-supplied software (MagMap2000™ for the G-858 data and Trimble Pathfinder Office for the GPS data). The GPS data were postprocessed using a base station located at the Parsons trailer to improve the positional accuracy. The data was filtered based on a measurement of horizontal accuracy and then exported in Texas Central State Plane coordinates. The magnetometer data were filtered for dropouts and the time stamps in the data corrected to GPS time, based on the data that was streamed in real-time to the magnetometer console during data acquisition. The magnetometer data were then imported into Geosoft Oasis Montaj and the positions for each measurement were interpolated from the GPS data, based on the synchronized time information. The magnetometer data were checked for spikes and then the analytic signal was computed along the transects. The analytic signal, vertical gradient, and velocity that the operator was walking were then reviewed for anomaly identification.

3.1.5.2 Once processing and review of the data were completed, anomalies were identified based on observed peaks in the data. The instrument responses for each anomaly were then analyzed and entered into an anomaly ranking process. The ranking process focused on assigning higher ranks to anomalies that were more likely to be associated with buried or unknown items, and on reducing the number of false positive anomalies. The rankings were based on the amplitude of the anomaly above the noise threshold as well as the half-width of the anomaly (the width of the anomaly when the values were half of the peak value). Ranking guidelines are listed in Table 3.2.



**Table 3.2 Anomaly Ranking Guidelines**

Rank	Ratio of Anomaly Amplitude to Noise Threshold	Anomaly Half-Width
1	>3	>10
2	>3	<10 and >5
3	>3	<5

3.1.5.3 Rank 1, 2, and 3 anomalies were considered likely to be due to the presence of buried metal. Rank 1 anomalies were considered to be more likely due to the presence of buried UXO items, based on an analysis of the prove-out data. These anomalies were the largest, and therefore considered most likely to be related to potential UXO items. Ranks 2 and 3 were given lower probabilities of being due to buried UXO. Because this ranking system was used for meandering path data, it assumes that the survey path was directly over the anomaly source. It is possible that an anomaly with a smaller amplitude was really caused by a large item located several feet off the survey path. Due to the inherent nature of the meandering path data, none of the three anomaly ranks could be eliminated from further investigation. The system only indicated a greater likelihood that UXO would be found at Rank 1 anomalies.

3.1.5.4 For tracking purposes, other anomalies in the data not caused by buried metal sources were tagged with Ranks 4, 5, and 6. Rank 4 denoted that the G-858G signal was not sufficiently above the equipment noise floor. Rank 5 meant that the anomaly was due to a known object. Rank 6 was designated as noise. In some cases anomalies resulted from features such as power lines, short equipment sensor malfunctions, or equipment jolting where the operator stumbled or sensors became snagged in vegetation. If the on-site project geophysicist felt that an anomaly was caused by one of these circumstances, then a noise comment was listed for that anomaly. This was often determined by looking at the speed at which the operator was walking at the time. If there was a sharp decrease in speed at the time when the anomaly occurred, it was interpreted to be due to the operator stumbling, or the sensors being caught in vegetation. In other cases, field notes would explain the cause of the anomaly.

3.1.5.5 Data processors selected 14,072 anomalies (Ranks 1 through 6) based on application of the approved anomaly ranking and selection strategy to the digitally recorded geophysical data. However, a total of 2,492 of these anomalies were ranked 4, 5, or 6, and were therefore, not considered to be potentially related to OE or other buried metal. These Rank 4 through 6 anomalies were eliminated from further investigation and are not discussed further. Of the 11,661 Rank 1 through 3 anomalies, approximately 48% were Rank 1, 37% were Rank 2, and 15% were Rank 3 anomalies.

### 3.1.6 Anomaly Reacquisition

3.1.6.1 Locations of anomalies selected for investigation had to be “reacquired” using the GPS and G-858G equipment and flagged for the intrusive investigation team. Prior to reacquiring locations in the field, reacquisition sheets were prepared for the reacquisition teams. Selected anomalies were provided to USAESCH prior to reacquisition.

3.1.6.2 Reacquisition sheets were developed based upon the interpretations of the Geophysical Coordinator or based upon the interpretations of the Project Geophysicist under the supervision of the Geophysical Coordinator. Each anomaly identified was assigned a unique anomaly identification (ID) that reflected the Parcel ID, the transect ID, and the sequential anomaly ID for that respective transect. All reacquisition sheets are presented in Appendix H.

3.1.6.3 All selected anomalies for a particular transect were tabulated on a reacquisition sheet which included the Texas Central State Plane coordinate of the anomaly as well as the amplitude of the peak signal associated with the anomaly. Reacquisition sheets included the target ID, the parcel ID, the target location, sector location, and the predicted anomaly strength.

3.1.6.4 Reacquisition was performed by Parsons using a ProXRS™ GPS unit to reacquire the selected anomaly locations and the G-858G to verify the maximum signal amplitude. Reacquisition took place from April 24 to June 20, 2002. Once the interpreted location was determined in the field, the actual location of the anomaly was determined by searching out from the existing flag and comparing the amplitude of the reacquired anomaly with the amplitude value of the peak signal associated with the interpreted anomaly. The actual location could differ significantly from the mapped locations for two reasons: 1) the fact that the transects probably did not go over the actual anomaly itself, but that the anomaly was likely to be located off to the side of the transect, and 2) the positional inaccuracies inherent in using the ProXRS™ could result in errors of up to 6 feet when attempting to navigate back to the same point. Positional inaccuracies were only encountered in areas where trees and structures interfered with the GPS receiver readings. These types of inaccuracies are dictated by field conditions, and not by limitations of the equipment. The amplitude of the reacquired anomaly was as large, or larger, than the interpreted anomaly due to the fact that the original survey may not have passed directly over the interpreted anomaly. During reacquisition, the G-858G operators were able to position themselves directly over the interpreted anomaly and were aware that the amplitude should be at least equal to that listed on the reacquisition sheet. The geophysical teams pinpointed and flagged the actual field location of each identified anomaly shown on the reacquisition sheet using positional and anomaly amplitude information and painted the ground at the flag location with high-visibility paint.

3.1.6.5 The source of many anomalies was identified in the field during reacquisition. As the precise location of the anomaly was determined in the field, metal on the ground surface or under leaves was identified as the source of some anomalies. The source of 625 anomalies was identified during reacquisition; nine of which were caused by inert ordnance scrap items. The remaining 616 anomalies were caused by barb wire,



pipelines, sprinkler heads, rebar, tent pegs, and various other pieces of non-ordnance metal or metal scrap. Reacquisition sheets are presented in Appendix H.

### **3.1.7 Intrusive Investigation**

3.1.7.1 The intrusive investigation at the former Camp Swift was conducted from April 29 through June 27, 2002. A total of 2,494 anomalies were intrusively investigated, and an additional 625 anomalies were identified during reacquisition, as described in Subchapter 3.1.6. Anomalies within each of the sectors (except Sectors 2 and 8) were investigated. These anomalies were distributed throughout the sectors, to the extent that ROE would allow, so that data would be obtained from all areas of each sector. For the Camp Swift investigation, risk was evaluated based on the number of UXO found per number of digs in a particular sector. If UXO was found, the area was considered characterized, and the investigation focus was shifted to areas with less data. Multiple UXO items were recovered from some sectors because additional investigation in another area of that sector may have been conducted. If a sector was very large, such as Sector 3E, finding UXO in a particular area within Sector 3E may characterize that area but additional investigation may have been conducted to obtain representative data for the entire sector. If UXO was found, removal action is recommended for the area regardless of the number of UXO found. The relative risk level for an area is based on the density of UXO and ordnance scrap per excavation and the type of UXO found.

3.1.7.2 The source of some anomalies was identified during reacquisition, as described in Subchapter 3.1.6. Small pieces of metal on the ground surface and utilities which caused some anomalies were not noticed during the geophysical survey, but were later identified during reacquisition. In addition, a small number of anomalies were located under a paved surface (such as a driveway or road), and were therefore not investigated. The ROE agreement for some properties expired and was not renewed between the geophysical survey and intrusive investigation. In two cases, the ROE agreement was revoked, and in several cases, the landowner changed (therefore making the ROE invalid). In some areas, occupants within the minimum separation distance from the anomaly location would not or could not evacuate during the intrusive investigation. Finally, for a small number of anomalies, the flag could not be found by the intrusive investigation team. At one parcel, the landowner removed the flags before the intrusive investigation team arrived on site.

3.1.7.3 Anomalies targeted for intrusive investigation were prioritized based on location within disturbed areas identified by the TEC, ordnance-related findings reported by landowners, and adequate coverage over the sector (within ROE constraints). Within these high priority areas, Rank 1, 2, and 3 anomalies were investigated at a rate of 30 randomly-selected anomalies per acre. The number of each of these ranked anomalies was proportional to the number of the anomalies identified in the property. However, as described previously in 3.1.7.1, if a UXO item was identified, further investigation of anomalies in the vicinity was not conducted because the area was considered characterized. The sampling characterization was done to determine if contamination was present, but not intended to clear all anomalies in a given area.

3.1.7.4 Each anomaly identified for excavation was listed on an Anomaly Dig Sheet. Anomaly Dig Sheets were developed based upon the interpretations of the Geophysical Coordinator or based upon the interpretations of the Project Geophysicist under the supervision of the Geophysical Coordinator. Each anomaly identified during the EE/CA project was assigned a unique anomaly ID that reflected the Parcel ID and the sequential anomaly number. All selected anomalies for a particular transect were tabulated on an Anomaly Dig Sheet which included the Texas Central State Plane coordinate of the anomaly as well as the amplitude of the peak signal associated with the anomaly. Anomaly dig sheets also included the date of reacquisition and whether the anomaly was located within an area with high potential for an archaeological site. All of the Anomaly Dig Sheets are presented in Appendix I.

3.1.7.5 All anomalies identified for intrusive investigation were excavated by qualified UXO personnel. During the intrusive excavation, each anomaly was treated as a suspect UXO item until it was determined otherwise. Occasionally, intrusive investigation teams could not identify any metallic objects at an anomaly location. These locations were designated as “false positives” (shown as “no contact” on the dig sheets). Site-wide, 27 “false positives” (1%) were identified from the 2,494 dug anomalies. The presence of some “false positives” is inherent in geophysical/intrusive investigations; with 15% considered the maximum acceptable occurrence level (USACE DID OE-005-05, March 2000, paragraph 10.4.3). Many reasons exist for the presence of “false positives” including residual rust in the soil, proximity of power lines, metallic surface debris moved after initial survey, rough terrain causing equipment jolts, etc. In addition, a total of 453 magnetic anomalies were due to the presence of iron-bearing rocks in the soil (376 anomalies) or underground utilities (77 anomalies). Because there is a significant amount of iron present in the groundwater underlying the former Camp Swift, the presence of high iron content rocks is not unexpected. The Queen City Sand in particular is noted as having lenses of iron-bearing conglomerate, and the presence of a higher number of metallic rocks may be due to outcrops of these lenses. These anomalies are discussed further in Subchapter 3.1.8.3.2.

3.1.7.6 After an anomaly was excavated, the intrusive investigation team recorded the anomaly type, a brief description of their finding(s), the anomaly depth, and any actions taken. The Parsons Project Geophysicist compared the findings from each intrusively investigated anomaly with the maximum amplitude originally recorded by the geophysical instrument to ensure the item recovered was reasonable for the reading. If the item excavated was not consistent with the selected anomaly data, further investigation of the anomaly location was conducted.

### **3.1.8 Investigation Findings**

The items recovered during the EE/CA field investigation were classified into one of three categories: UXO, ordnance scrap, or non-ordnance scrap. Table 3.3 summarizes the number of each of these types of items recovered per sector at former Camp Swift, and a detailed list is provided in Appendix D. Table 3.3 also summarizes the number of anomalies identified during reacquisition and the number of items that were found during completion of the geophysical survey. OE is defined by the USAESCH as either: (1) Ammunition,

ammunition components, chemical or biological warfare material or explosives that have been abandoned, expelled from demolition pits or burning pads, lost, discarded, buried, or fired. Such ammunition, ammunition components, and explosives are no longer under the accountable record control of any DoD organization or activity; or (2) "Explosive Soils." UXO is a subset of OE.

### **3.1.8.1 Unexploded Ordnance (UXO)**

3.1.8.1.1 Thirteen UXO items (<1% of the excavated anomalies) were recovered and destroyed during the EE/CA. Anomalies were identified as UXO if the recovered item was "a military munition that contains explosive, pyrotechnic, or a chemical agent and has been primed, fuzed, armed, or otherwise prepared for action, and which has been fired, placed, dropped, launched, projected, and remains unexploded by design or malfunction" (USACE, 1998b).

3.1.8.1.2 The thirteen items recovered included eight anti-tank mines, one fuze, two 4.2-inch mortars, and two 105mm projectiles. Ten of the 13 items were found 6 or less inches bgs. The remaining three were recovered at depths ranging from 20 to 30 inches.

3.1.8.1.3 In addition, to the 13 UXO items identified during the intrusive investigation, one item was identified by a landowner in Sector 4. Several other UXO or suspected UXO items have been identified by landowners. Two items found by landowners were confirmed to be UXO by the Parsons UXO Safety Officer (UXOSO) and the USAESCH OE Safety Specialist during the EE/CA field investigation. Per USAESCH direction, a 105mm projectile identified by a landowner was blown-in-place by USA Environmental. Another UXO item, a MkII grenade, was in the possession of a landowner in Sector 3E whose property was surveyed. This unexploded item was part of a collection of OE items (mostly scrap) that the landowner allowed the Parsons UXOSO to inspect. The MkII hand grenade was subsequently removed from the property by the Fort Sam Houston EOD unit. Additional items identified by landowners are described in Subchapter 3.2.

**Table 3.3 Former Camp Swift Anomaly Summary**

Sector	Total Number of Anomalies*	Total Anomalies Identified	Items Identified During Geophysical Survey	Anomalies Identified during Intrusive Investigation				Anomalies Identified during Reacquisition	
				UXO	Ordnance scrap	Non-Ordnance scrap	No Contact	Ordnance scrap	Non-Ordnance scrap
1	510	212	1	--	41	73	1	6	90
2	NA	--	--	--	--	--	--	--	--
3A	602	201	--	--	22	140	6	--	33
3B	826	335	--	--	--	251	--	--	84
3C	24	11	--	--	--	9	--	--	2
3D	403	79	--	--	--	67	5	--	7
3E	6,053	986	1	5	19	748	9	--	204
4	1,221	625	--	4	513	87	1	2	18
5	465	86	--	1	23	24	3	--	35
6	767	292	2	2	5	220	2	--	61
7	58	24	--	--	--	20	--	--	4
8	NA	--	--	--	--	--	--	--	--
9	8	8	--	--	1	5	--	--	2
10	268	95	1	1	6	67	--	1	19
11	436	148	--	--	3	93	--	--	52
12	27	22	--	--	1	16	--	--	5
<b>Total</b>	<b>11,666</b>	<b>3,124</b>	<b>5</b>	<b>13</b>	<b>634</b>	<b>1,820</b>	<b>27</b>	<b>9</b>	<b>616</b>

\* This total number of anomalies includes five items identified during the geophysical survey. These five items are not really anomalies because they were recovered before the geophysical instrument went over the area.

### 3.1.8.2 Ordnance Scrap

A total of 643 ordnance scrap items were recovered during the EE/CA intrusive investigation, and nine were identified during reacquisition. Ordnance scrap is nonhazardous and includes inert items such as expended ordnance, fragments of functioned ordnance, and small arms. Anomalies were identified as Ordnance Scrap if the recovered item was “a military munition or component thereof which contains no explosive, pyrotechnic, or chemical agent. Fragments of military munitions, which have functioned as designed or were destroyed, are ordnance scrap if they have no explosive, pyrotechnic, or chemical filler” (USACE, 1998b). Small arms do not indicate the potential for explosive hazard.

### 3.1.8.3 Other

By definition, anomalies identified as non-munitions found at ordnance sites are designated as “Other” (USACE, 1998b). Due to the high number of anomalies attributed to iron-bearing rocks, the Other category was sub-divided as described below to distinguish between man-made items and geologic conditions. Regardless of the fact that the items were not ordnance, investigation of all types of anomaly signatures assures that intrusive investigations were performed in an unbiased manner.

#### 3.1.8.3.1 Non Ordnance Scrap

A total of 1,820 non ordnance scrap items were encountered during the EE/CA intrusive investigation, and 616 non ordnance scrap items were identified during reacquisition. Anomalies were identified as “Scrap” if the recovered items were not related to

any ammunition and/or ammunition components. These items included metal scrap such as nails, chains, cables, metal wire, and pipes.

#### **3.1.8.3.2 Other**

A total of 453 anomalies were considered geological interference because they were not related to ammunition nor were they man-made metallic debris. These items included materials such as iron-bearing rock (ubiquitous in the area), ferrous soil with no visible metallic item, and any item not fitting one of the categories above.

#### **3.1.8.4 No Contact**

As described previously, a total of 27 anomalies were identified as “No Contact” during the EE/CA. Anomalies were identified as “No Contact” if no discernable metallic objects were identified at the anomaly excavation location and the magnetometer did not display an audible signal either at the triangulated location or in the general vicinity (approximate 5 foot radius around the pin-flagged location).

### **3.1.9 Demolition of Ordnance and Explosives**

3.1.9.1 A total of 13 UXO items were recovered during the EE/CA field investigation and were destroyed by means of explosive demolition. An additional item, a 105mm projectile identified by a landowner and confirmed to be UXO, was also detonated, per USAESCH direction. Prior to the demolition of UXO, preparations were made in order to mitigate blast effects. This entailed the building of sandbag enclosures around the UXO item(s) to be destroyed. Photograph 3.4 displays a sandbag setup for UXO detonation.

3.1.9.2 Initially, explosives were delivered to the site on an as-needed basis. However, due to difficulties in receiving on-call explosives from the local supplier in a timely manner, an explosives storage magazine was mobilized to the site. An Explosives Siting Plan and an Explosives Management Plan were submitted to USAESCH on May 10, 2002, and, following approval of the plans by USAESCH, the magazine was ready for use on May 14, 2002. BSA allowed the magazine to be set up on the Griffith League Ranch property. Photograph 3.5 displays the magazine setup.

3.1.9.3 Once all safety precautions were implemented, each UXO item was explosively destroyed. All items were blown-in-place (BIP), except four training anti-tank mines which were moved to a remote designated detonation area at Griffith League Ranch with concurrence of the USAESCH OE Safety Specialist and BSA.



**Photograph 3.4 Sandbag Setup for UXO Detonation**



**Photograph 3.5 Explosives Storage Magazine**

### **3.1.10 Ordnance Scrap Disposal**

At the completion of the EE/CA, the recovered ordnance scrap items were inspected by the Parsons UXOSO and the USAESCH OE Safety Specialist and certified as nonhazardous scrap and disposed of through a local metal recycling facility, Austin Metal and Iron, Austin, Texas. Documentation associated with the disposal is provided in Appendix E.

### 3.2 SOURCE, NATURE, AND EXTENT OF OE

This subchapter provides an overview of the results of the intrusive investigation performed at the former Camp Swift. The investigated area was divided into 12 sectors as described in Subchapter 3.1.3. The sector locations are shown on Figure 3.1. The largest sector, Sector 3, was subdivided into Sectors 3A through 3E to isolate specific areas based on current land use. This brought the total number of sectors to sixteen. The results of the EE/CA investigation are presented for each of the sectors in the following paragraphs. UXO was found in Sectors 3E, 4, 5, 6, and 10, and ordnance scrap was recovered from Sectors 1, 3A, 3E, 4, 5, 6, 9, 10, 11, and 12. No fieldwork was conducted in Sectors 2 or 8 since ROE was not granted in those sectors.

**Table 3.4 UXO Items Recovered at the Former Camp Swift**

Sector	Parcel ID	North Coordinate	East Coordinate	UXO Item	Depth (inches)	Disposal Actions
3E	R23285	10030355.8	3253372.0	Mine, anti-tank, practice	0	Consolidated and Detonated
3E	R23285	10030342.1	3253209.9	Mine, anti-tank, M1 practice with booby trap	1	Blown in Place
3E	R26199	10047863.9	3258010.1	Mine, anti-tank, M1 practice	1	Consolidated and Detonated
3E	R25685	10051769.9	3255579.8	Mine, anti-tank, M1B1 practice	4	Blown in Place
3E	R25685	10051819.6	3255882.5	Mine, anti-tank, M1B1 practice	4	Blown in Place
4	R10421	10051077.3	3284159.5	105mm Projectile, M1, HE	6	Blown in Place
4	R10421	10050229.1	3283324.3	Mine, anti-tank, M1, practice	30	Consolidated and Detonated
4	R10421	10049993.0	3285538.7	4.2-inch Mortar, M2 w/M8 fuze & M14 burster	20	Blown in Place
4	R10421	10051138.0	3284249.1	4.2-inch Mortar, M3 w/M9 fuze	24	Blown in Place
5	R10421	10053235.2	3283051.2	105mm Projectile, HE	27	Blown in Place
6	R10101	10064870.9	3294196.1	M1 Fuze	1	Blown in Place
6	R10101	10064873.1	3294254.9	Mine, anti-tank, M1 practice	1	Blown in Place
10	R23197	10024550.8	3260918.0	Mine, anti-tank, M1B1 practice	4	Consolidated and Detonated

#### 3.2.1 Sector 1, Firing Ranges

3.2.1.1 Sector 1 is located in the northern portion of the former Camp Swift area, north of the currently active TARNG (Figure 3.2). Sector 1 comprises approximately 2,321 acres and consists of mostly private residential areas and rural land. ROE was granted for 1,363 acres during the EE/CA.

3.2.1.2 Sector 1 is an area previously used for small arms training and was designated as “uncontaminated” in the ASR. The “uncontaminated” classification for this area was based primarily on the fact that the site was used for small arms training and that no historical documentation or interview data showed this area as having any potential for OE contamination. Sector 1 received a RAC of 5 in the ASR, which indicated no action is required. There have not been any landowner reports of UXO or ordnance scrap in this area. However, the aerial photograph analysis (ERDC, 2000) identified some ground scars and impact craters in the eastern portion of this area. Furthermore, the 1946 Master Plan (U.S. Army, 1946) of the former camp showed two ordnance ranges in this area: Transition Range No. 2 and Field Combat Range No. 7. The results of the aerial photograph analysis and the former range locations are shown in Figure 3.2.

3.2.1.3 A total of 14.9 acres were surveyed in Sector 1 during the EE/CA field investigation. Transect locations are shown in Figure 3.2. Of the 212 items investigated, none were caused by UXO. A total of 48 ordnance scrap items were recovered from Sector 1 (41 during intrusive investigations, 6 during reacquisition, and 1 during the geophysical survey). Ordnance scrap included expended 4.2-inch mortars, a 105mm projectile, 60mm mortars, a 2.36-inch rocket, and rifle grenades. A total of 68.58 pounds of ordnance scrap was removed. Ordnance scrap is inert, and will not cause injury. Although the presence of ordnance scrap is inconsistent with the ASR findings, it is consistent with the locations of former range fans and disturbed ground. Based on the type of ordnance scrap found in Sector 1, it is highly possible that UXO is present within portions of Sector 1.

### **3.2.2 Sector 2, Other Remaining Lands**

3.2.2.1 Sector 2 is located along the northern boundary of the Camp Swift TARNG (Figure 3.1). It is comprised of 1,031 acres and consists primarily of private residential areas. The ASR states that Sector 2 has no history of ordnance-related activities. ASR interviews did not produce any ordnance-related information with respect to Sector 2. There have not been any landowner reports of UXO or ordnance scrap in this sector, and no disturbed ground was identified in this sector during the historical aerial photograph analysis (ERDC, 2000). The 1946 Master Plan of the former camp showed five firing ranges within this area, including two rifle and carbine transition ranges, Field Combat Range No. 4, a tank destroyer moving target range, and a rocket and grenade launcher range. The locations of these former ranges are shown in Figure 3.3.

3.2.2.2 No ROE agreements were obtained for Sector 2 properties. Therefore, no geophysical data were collected in Sector 2, and no anomalies were identified or excavated.

### **3.2.3 Sector 3A, Other Remaining Lands (Griffith League Ranch)**

Sector 3A consists of the Griffith League Ranch Boy Scout Area, located in the southern portion of the former Camp Swift area (Figure 3.1). It comprises 4,127 acres and most of it is densely wooded; however, the central portion of Sector 3A contains several acres of open grassy areas. ROE was granted for the entire sector.



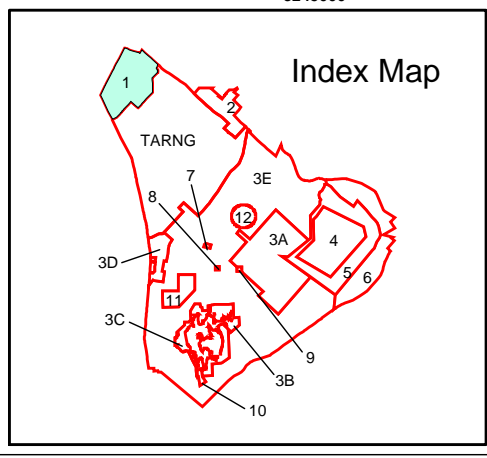


**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors
- Former Firing Ranges

**Disturbed Ground**

- Berm
- Ground Scar
- Mounded Material
- Depression
- Heavily Tracked Area
- Pit
- Excavation
- Impact Crater
- Trench



0 1,000 2,000 Feet

Map Units: NAD 1983 Texas Central State Plane (Feet)  
 Aerial Photography Source: TNRIS  
 Aerial Photography Date: 1995 - 1997

Figure 3.2  
 EE/CA Field Investigation Results  
 Sector 1

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:15,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: August, 2003	PAGE NUMBER:	
SUBMITTED BY: JB	FILE: j3737805\GIS\EECA\Sector_1.mxd		



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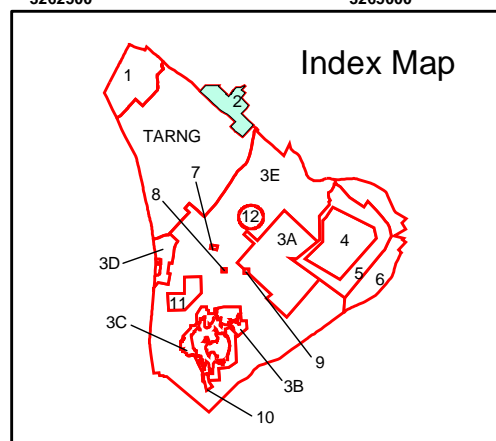


**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors

**Disturbed Ground**

Berm	Ground Scar	Mounded Material
Depression	Heavily Tracked Area	Pit
Excavation	Impact Crater	Trench



Map Units: NAD 1983 Texas Central State Plane (Feet)

Aerial Photography Source: TNRIS  
Aerial Photography Date: 1995 - 1997

0 880 1,760 Feet

Figure 3.3  
EE/CA Field Investigation Results  
Sector 2

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:18,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: August, 2003	PAGE NUMBER:	
SUBMITTED BY: JB	FILE: j:\737805\GIS\EECA\Sector_2.mxd		



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3.2.3.2 Sector 3A was not inspected during the ASR survey. According to the ASR, this area has no history of ordnance-related activities and no interviewee was aware of any OE discoveries in Sector 3A. There have been no landowner reports of UXO or ordnance scrap in this area. However, analysis of the 1943 Camp Swift aerial photograph showed evidence of impact craters in the northwest portion of this sector (ERDC, 2000). The results of the historical aerial photograph analysis are shown in Figure 3.4. No firing ranges or other ordnance training areas were located in this sector according to the 1944-1945 or 1946 Master Plans. In December 2002, a Boy Scouts employee located several practice anti-tank mines in this sector, at a location near the former impact area.

3.2.3.3 Figure 3.4 shows the transect locations in Sector 3A. A total of 24.37 acres were surveyed and 201 anomalies were investigated. No UXO items were recovered in Sector 3A during the EE/CA investigation. A total of 22 items were ordnance scrap, all of which were recovered during intrusive investigations. Ordnance scrap is inert, and will not cause injury. Of these ordnance scrap items, two were identifiable. One expended 60mm illumination mortar and an inert rifle grenade were found in the far northwest extension of the property. The expended mortar was found 2 inches bgs, while the rifle grenade was found 4 inches bgs. Ordnance scrap was also recovered in the northeast portion of the sector, in the area immediately adjacent to Sector 5, the Artillery Range Buffer Zone. The total weight of ordnance scrap removed from Sector 3A was 7.5 pounds. The presence of ordnance scrap in the area, the identification of impact craters in the area on historic aerial photographs, and the proximity of Sector 12, the Fortified Area, and Sector 5, the Artillery Range Buffer Zone, suggest that UXO may be present in portions of Sector 3A.

### **3.2.4 Sector 3B, Other Remaining Lands (Boy Scouts)**

3.2.4.1 Sector 3B is located on the north and northeastern edges of Lake Bastrop and is owned by the Boy Scouts of America (Figure 3.1). The property comprises 470 acres and is used by the Boy Scouts for various camping and outdoor activities. ROE was granted for the entire sector.

3.2.4.2 Sector 3B was not inspected during the ASR survey. According to the ASR, this area has no history of ordnance-related activities and no interviewee was aware of any OE discoveries in Sector 3B. However, analysis of a 1943 Camp Swift aerial photograph showed evidence of impact craters (ERDC, 2000), mostly along the northern boundary of the sector. Locations of the disturbed areas identified during the historical aerial photograph analysis are shown in Figure 3.5. No firing ranges or other ordnance training areas were located in this sector according to the 1944-1945 or 1946 Master Plans.

3.2.4.3 A total of 5.16 acres were surveyed in Sector 3B during the EE/CA. Figure 3.5 shows the transect locations. None of the 335 investigated anomalies were caused by UXO or ordnance scrap items, which is consistent with the ASR information.

### **3.2.5 Sector 3C, Other Remaining Lands (LCRA)**

3.2.5.1 Sector 3C is located along the eastern and western edges of Lake Bastrop, bounding all portions of the lake's edge that are not bounded by Sector 3B (Figure 3.1). This area comprises 1,451 acres and is owned by the LCRA. ROE was granted for the entire sector; however, access was limited per LCRA's request that no surveying or excavation be conducted within 2,000 feet of the Sim Gideon Power Plant and within 500 feet of power lines due to their concerns regarding potential evacuations for ordnance detonations. The area in the immediate vicinity of the Lake Bastrop dam was also avoided. Due to these requirements, and the required avoidance of known archaeological sites, the amount of land available for survey was significantly reduced in Sector 3C.

3.2.5.2 Sector 3C was not inspected during the ASR survey. According to the ASR, this area has no history of ordnance-related activities and no interviewee was aware of any OE discoveries in Sector 3C. However, analysis of the 1943 Camp Swift aerial photograph showed some evidence of impact craters, pits, and heavily tracked areas in the sector (ERDC, 2000). Locations of the disturbed areas identified during the historical photograph analysis are shown in Figure 3.6. No firing ranges or other ordnance training areas were located in this sector according to the 1944-1945 or 1946 Master Plans.

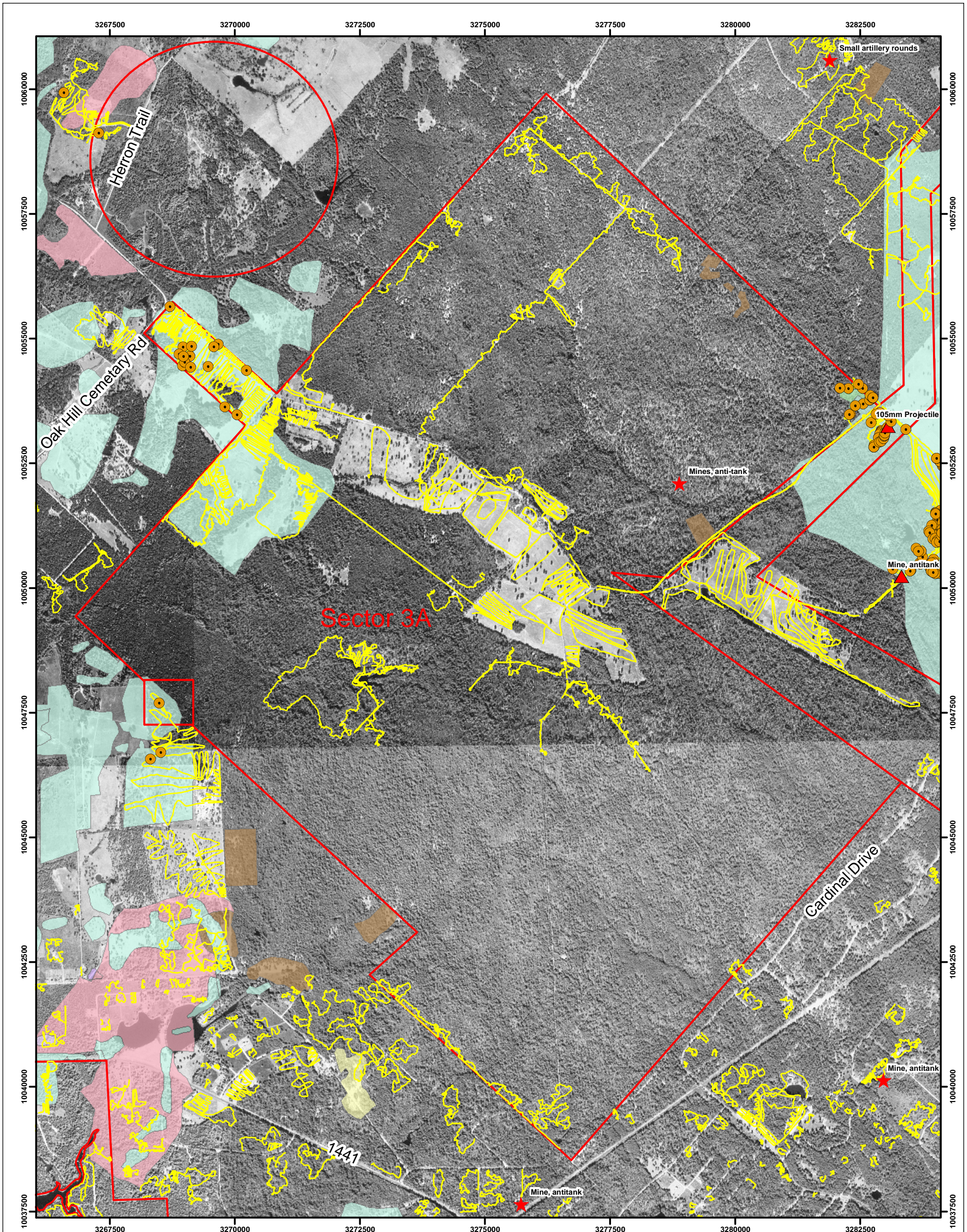
3.2.5.3 Figure 3.6 shows the transect locations for Sector 3C. A total of 0.82 acres were surveyed in the sector. None of the 11 investigated anomalies were caused by UXO or ordnance scrap items, which is consistent with the ASR information.

### **3.2.6 Sector 3D, Other Remaining Lands (UTMDA and BFCI)**

3.2.6.1 Sector 3D is located along the western boundary of the former Camp Swift, directly south of the Camp Swift TARNG (Figure 3.1). The area comprises 589 acres, including properties owned by UTMDA and BFCI.

3.2.6.2 Sector 3D was not inspected during the ASR survey. According to the ASR, this area has no history of ordnance-related activities and no interviewee was aware of any OE discoveries in Sector 3D. However, analysis of the 1943 Camp Swift aerial photograph showed evidence of impact craters and ground scars in the northern portion of the sector (ERDC, 2000). Locations of the disturbed areas identified during the historical aerial photograph analysis are shown in Figure 3.7. No firing ranges or other ordnance training areas were located in this sector according to the 1944-1945 or 1946 Master Plans. Although Sector 3D has no history of ordnance-related activities, an employee at the BFCI reported finding a practice grenade on the property. The exact location at which this item was found is not known.



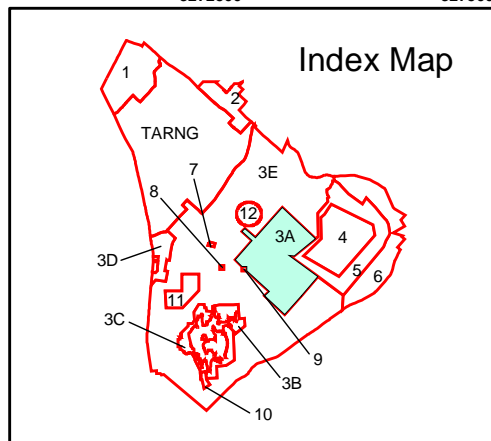


**Legend**

- Transect
- ★ Ordnance Finding Reported by Landowner
- OE Scrap
- ▲ UXO
- ▭ Sectors

**Disturbed Ground**

<span style="background-color: #f08080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Berm	<span style="background-color: #800000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ground Scar	<span style="background-color: #d8bfd8; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Mounded Material
<span style="background-color: #800080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Depression	<span style="background-color: #ff0000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Heavily Tracked Area	<span style="background-color: #ffff00; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Pit
<span style="background-color: #90ee90; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Excavation	<span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Impact Crater	<span style="background-color: #ffa07a; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Trench



0 1,000 2,000 Feet

Map Units: NAD 1983 Texas Central State Plane (Feet)  
Aerial Photography Source: TNRS  
Aerial Photography Date: 1995 - 1997

**Figure 3.4**  
EE/CA Field Investigation Results  
Sector 3A

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:22,000	PROJECT NUMBER: 737805	
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SUBMITTED BY: JB	FILE: j:\737805\GIS\EECA\Sector_3A.mxd		



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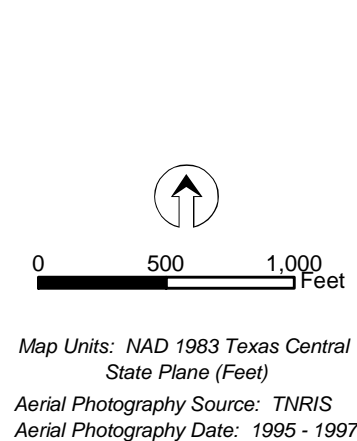
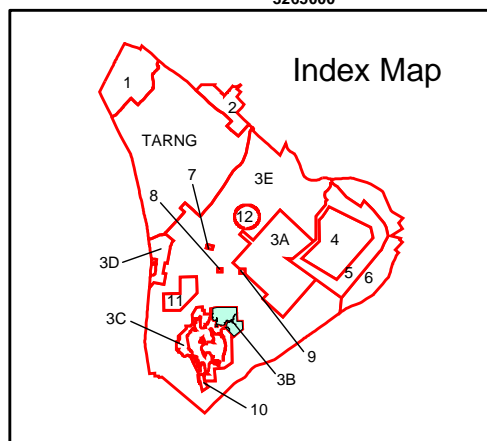
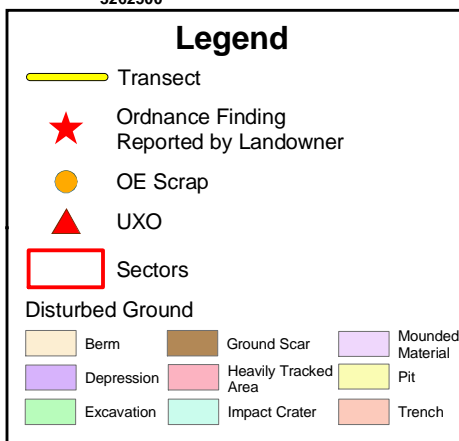
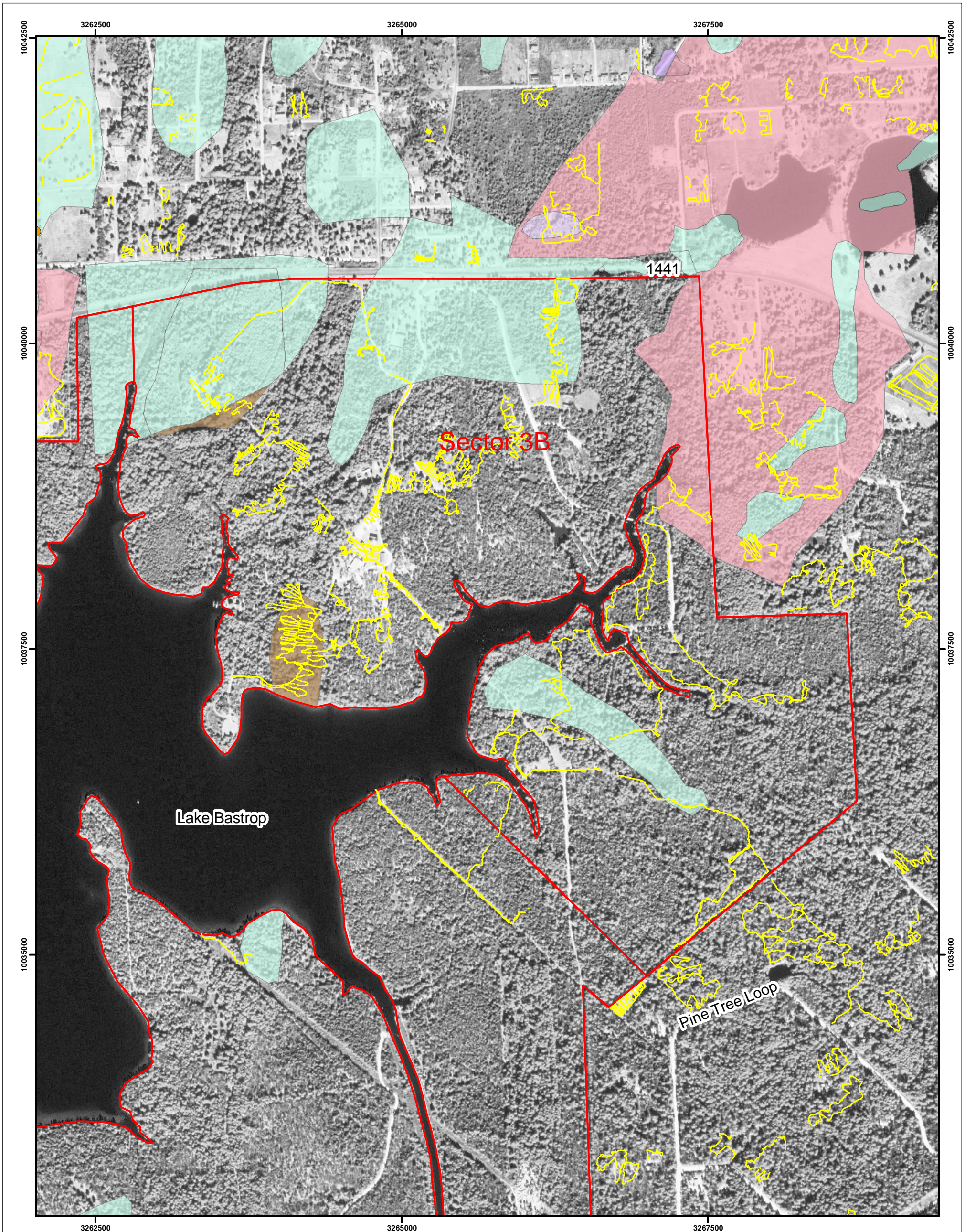


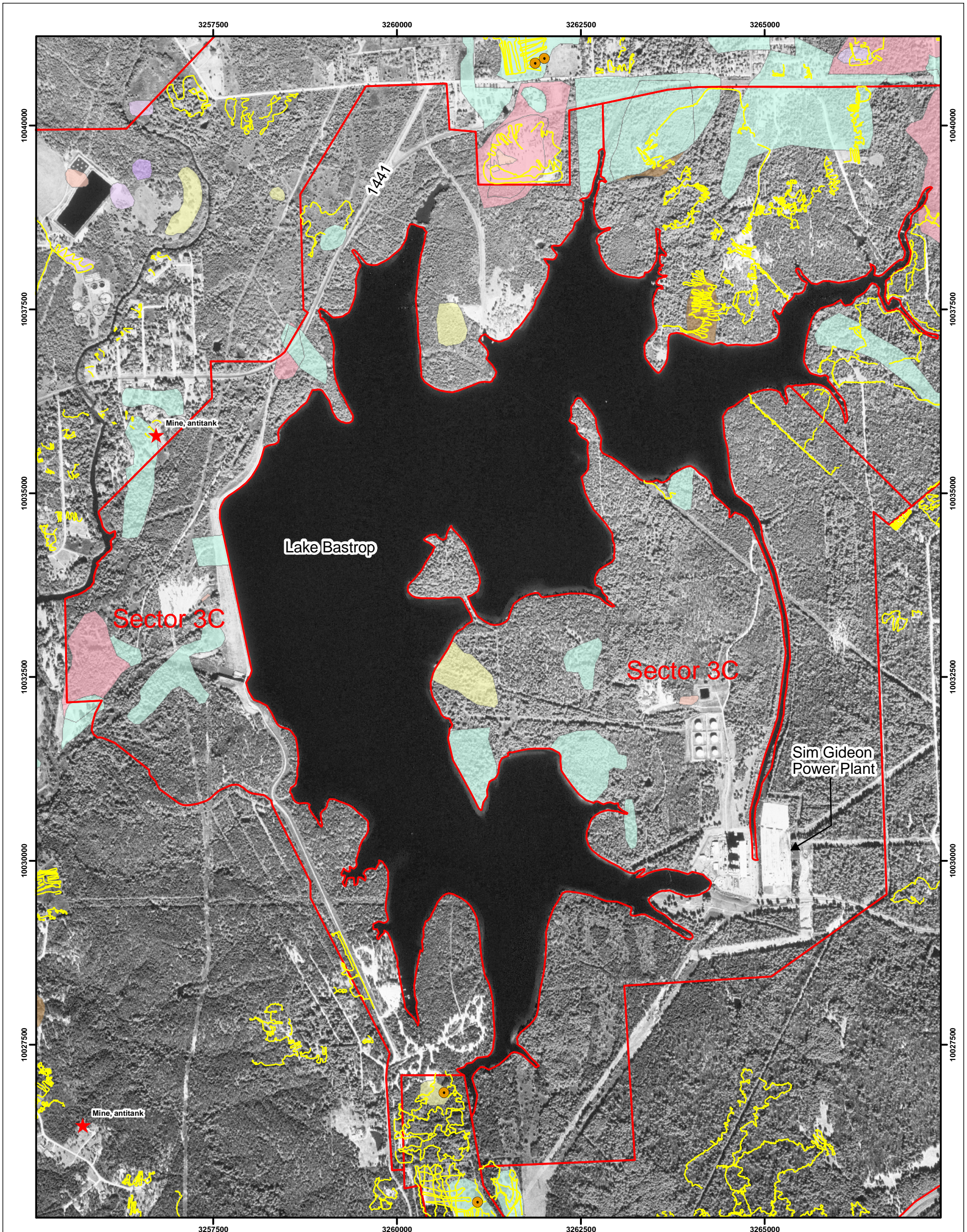
Figure 3.5  
 EE/CA Field Investigation Results  
 Sector 3B

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DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:9,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: November, 2002	PAGE NUMBER:	
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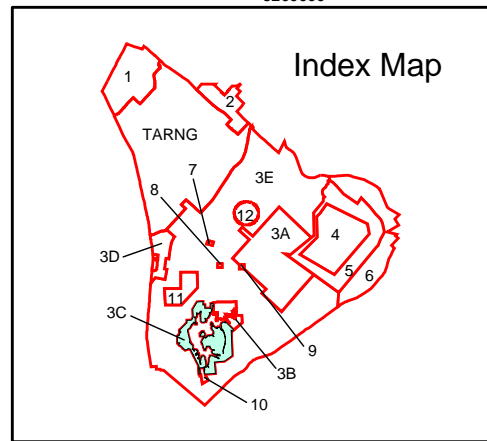


**Legend**

- Transect
- ★ Ordnance Finding Reported by Landowner
- OE Scrap
- ▲ UXO
- ▭ Sectors

**Disturbed Ground**

<span style="background-color: #f0e68c; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Berm	<span style="background-color: #8b4513; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ground Scar	<span style="background-color: #d8bfd8; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Mounded Material
<span style="background-color: #9370db; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Depression	<span style="background-color: #f08080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Heavily Tracked Area	<span style="background-color: #ffff00; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Pit
<span style="background-color: #90ee90; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Excavation	<span style="background-color: #7fffd4; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Impact Crater	<span style="background-color: #ffa07a; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Trench



0 1,000 2,000 Feet

Map Units: NAD 1983 Texas Central State Plane (Feet)  
 Aerial Photography Source: TNRS  
 Aerial Photography Date: 1995 - 1997

**Figure 3.6**  
 EE/CA Field Investigation Results  
 Sector 3C

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:15,000	PROJECT NUMBER: 737805	
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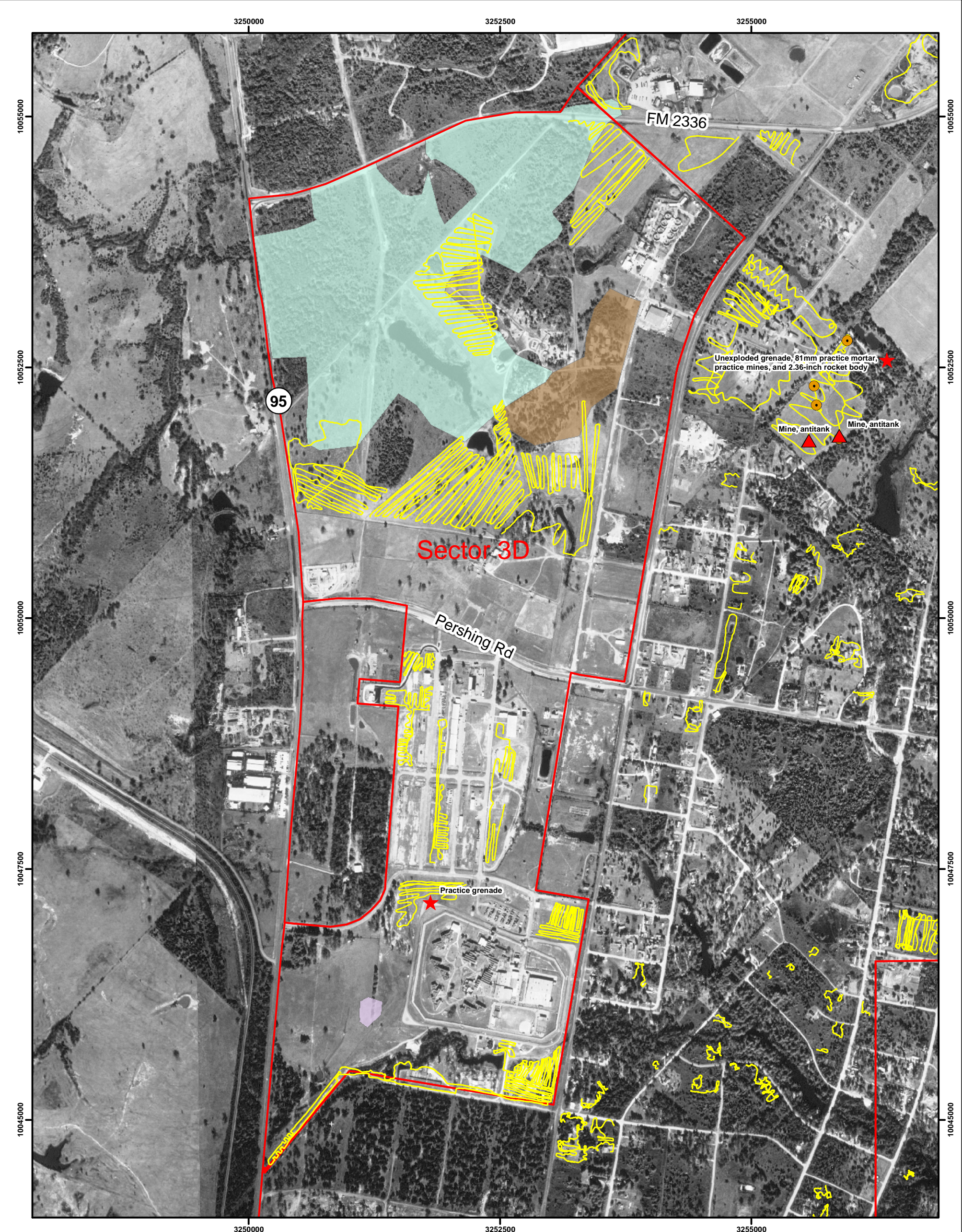
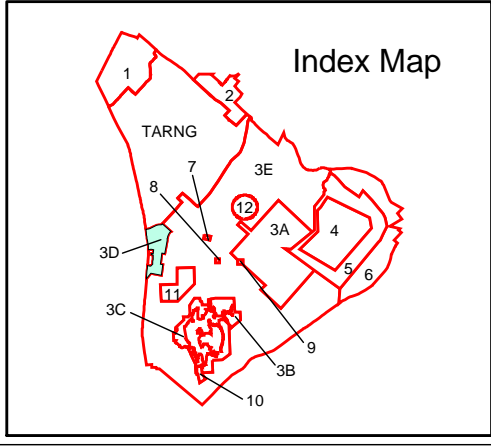


Figure 3.7  
EE/CA Field Investigation Results  
Sector 3D

Legend		
	Transect	
	Ordnance Finding Reported by Landowner	
	OE Scrap	
	UXO	
	Sectors	
Disturbed Ground		
	Berm	
	Excavation	
	Ground Scar	
	Heavily Tracked Area	
	Mounded Material	
	Pit	
	Trench	



0 600 1,200 Feet

Map Units: NAD 1983 Texas Central State Plane (Feet)  
Aerial Photography Source: TNRIS  
Aerial Photography Date: 1995 - 1997

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
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3.2.6.3 Figure 3.7 shows the transect locations for Sector 3D. Collection of geophysical data was not possible in much of the historically disturbed area due to buildings in the UTMDA complex and heavy vegetation. A total of 10.92 acres were surveyed in the sector. Of the 79 investigated anomalies in Sector 3D, none were OE. This conclusion is consistent with the ASR information for Sector 3D, and the presence of UXO in this area is considered remote.

3.2.6.4 During the geophysical survey of Sector 3D, medical waste was discovered on the BFCI property. The items were located behind the prison, approximately 300 yards outside of the fence perimeter. The medical waste consisted of medical kits containing large (2mm) needles and approximately three feet of tubing contained in a brown, folded bag that resembled an I.V. (intravenous) type bag. Printed numbers were found on the tubing, and the plastic needle sheaths had the word "FENWAL" molded into them. FENWAL Corporation was contacted regarding the origin of these items. FENWAL replied that their company was formed in 1949 and confirmed that the waste consisted of blood packs that had been manufactured after 1947, specifically early 1970's or later. The numbers on the tubing were determined to be segment numbers, which tie a blood donor and the donor's blood sample to the collection of the blood, so the numbers were no indicator of the manufacture date of the product. A record and photo search by FENWAL determined the earliest date these items could have been manufactured was 1972. By the appearance of the general area that the waste was found, it is likely that additional waste is present in the subsurface. However, because the manufacture date of the items identified on the surface was after Camp Swift closed, it is concluded that the Army camp was not the source of this waste material.

### **3.2.7 Sector 3E, Other Remaining Lands (Other)**

3.2.7.1 Sector 3E is a very large area, comprising approximately 21,300 acres (Figure 3.1). Sector 3E is composed of those lands in Sector 3 that are not occupied by Sectors 3A, 3B, 3C, or 3D. This sector includes many residential areas and some large rural areas.

3.2.7.2 Sector 3E was not inspected during the ASR survey. According to the ASR, this area has no history of ordnance-related activities and no interviewee was aware of any OE discoveries in Sector 3E. However, analysis of the 1943 Camp Swift aerial photograph showed evidence of impact craters and ground scars in numerous areas (ERDC, 2000), as shown in Figure 3.8. According to the 1946 Master Plan, portions of four firing range fans were located in the northern portion of the former camp, adjacent to the present-day TARNG facility. The ranges included Rifle Range No. 1, Infiltration Course No. 1, and two machine gun ranges. Locations of the former ranges are shown in Figure 3.8.

3.2.7.3 Numerous ordnance-related discoveries have been reported by residents that live within Sector 3E. Four property owners have found practice anti-tank mines on their properties. An LCRA employee also found an anti-tank mine on the LCRA wastewater treatment facility property. A resident living directly east of the UTMDA property found an unexploded grenade, 81mm practice mortar, practice anti-tank mines, and a 2.36-inch rocket body on his property. Another property owner that owns a property partially within Sector 3E

and the northern portion of Sector 11 reported finding and burying two unexploded rifle grenades on the property. Two additional residents reported the presence of various small arms on their properties. Finally, the volunteer fire department has noted on several occasions hearing detonations while fighting grass fires in the Lake Bastrop Acres area. In September 2002, the fire fighting crew heard a detonation while a backhoe cleared vegetation for a fire break. Later they found an anti-tank mine in the area. Exact locations of most of these landowner-reported findings are not known. Locations shown in Figure 3.8 are the center of the landowner's land parcel.

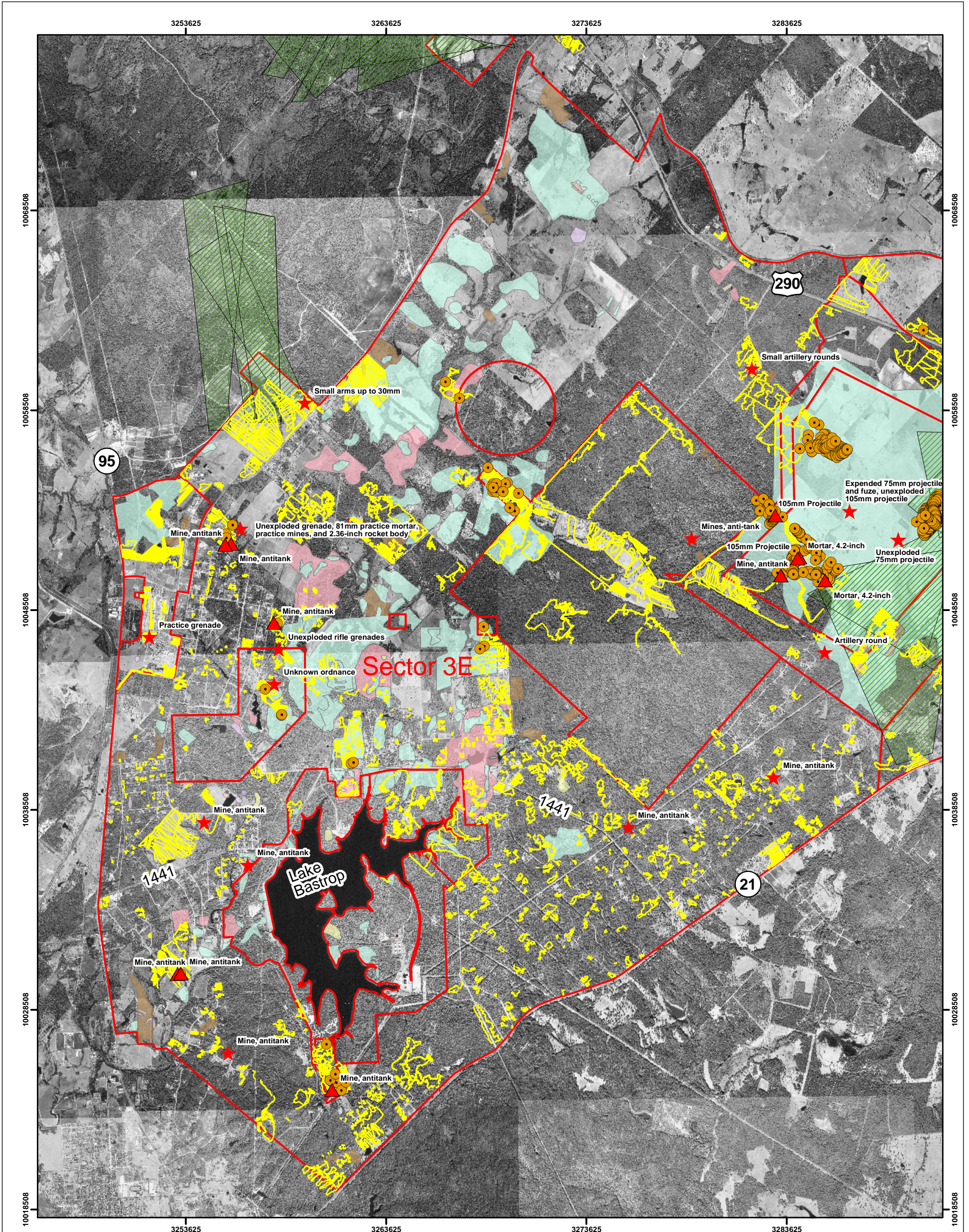
3.2.7.4 Figure 3.8 displays the transect locations for Sector 3E. A total of 102.38 acres were surveyed in Sector 3E, and 985 anomalies were investigated. Surveyed areas are distributed well throughout the sector, except in the northern portion of the sector where there was a lack of ROE granted. Five UXO items, all practice anti-tank mines (which have an energetic charge), were recovered in Sector 3E (Table 3.4). One of the mines was found to be booby-trapped with a mouse trap. The mines were found from 0 to 4 inches bgs. Three of the mines were blown-in-place (BIP) and two were removed from their original location and detonated at the Griffith League Ranch. In addition, one of the anomaly locations was identified as a possible demolition pit area.

3.2.7.4 A total of 20 ordnance scrap items were recovered from Sector 3E (19 during intrusive investigations and one during the geophysical survey), including three practice 2.36-inch rockets. This type of rocket can often only be identified as a practice rocket after detonation. Several other ordnance scrap items recovered during the EE/CA were identifiable, including five expended practice anti-tank mines and three expended 60mm mortars. A total of 19.18 pounds of ordnance scrap was removed from Sector 3E.

### **3.2.8 Sector 4, Artillery Range Impact Area**

3.2.8.1 Sector 4 is located in the eastern portion of the former Camp Swift and is comprised of 2,515 acres (Figure 3.1). Sector 4 was designated as an area with "potential for OE waste contamination" in the ASR and received a RAC of 4, which means that action is required to evaluate the potential threat. This area was used by the military as the main artillery range and impact area. The area consists of mostly rural land, with cattle grazing being the predominant land use activity. Numerous impact craters were identified in the 1943 aerial photograph during the historical photo analysis (ERDC, 2000), as shown in Figure 3.9, and most of the land in this area had a surface use-only recommendation restriction at the time that it was transferred back to private owners (see Figure 2.7). The 1946 Master Plan of the former camp shows five firing ranges directed towards Sector 4, the Artillery Range Impact Area. These ranges, shown in Figure 3.9, included Field Combat Ranges Nos. 11 through 15.



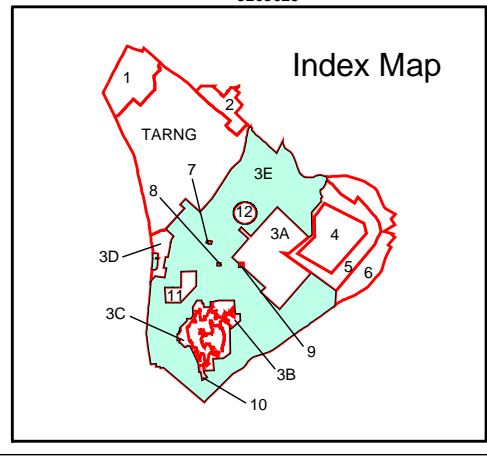


**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors
- Former Firing Ranges

**Disturbed Ground**

- Berm
- Ground Scar
- Mounded Material
- Depression
- Heavily Tracked Area
- Pit
- Excavation
- Impact Crater
- Trench



Map Units: NAD 1983 Texas Central State Plane (Feet)

Aerial Photography Source: TNRIS

Aerial Photography Date: 1995 - 1997

Figure 3.8  
EE/CA Field Investigation Results  
Sector 3E

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
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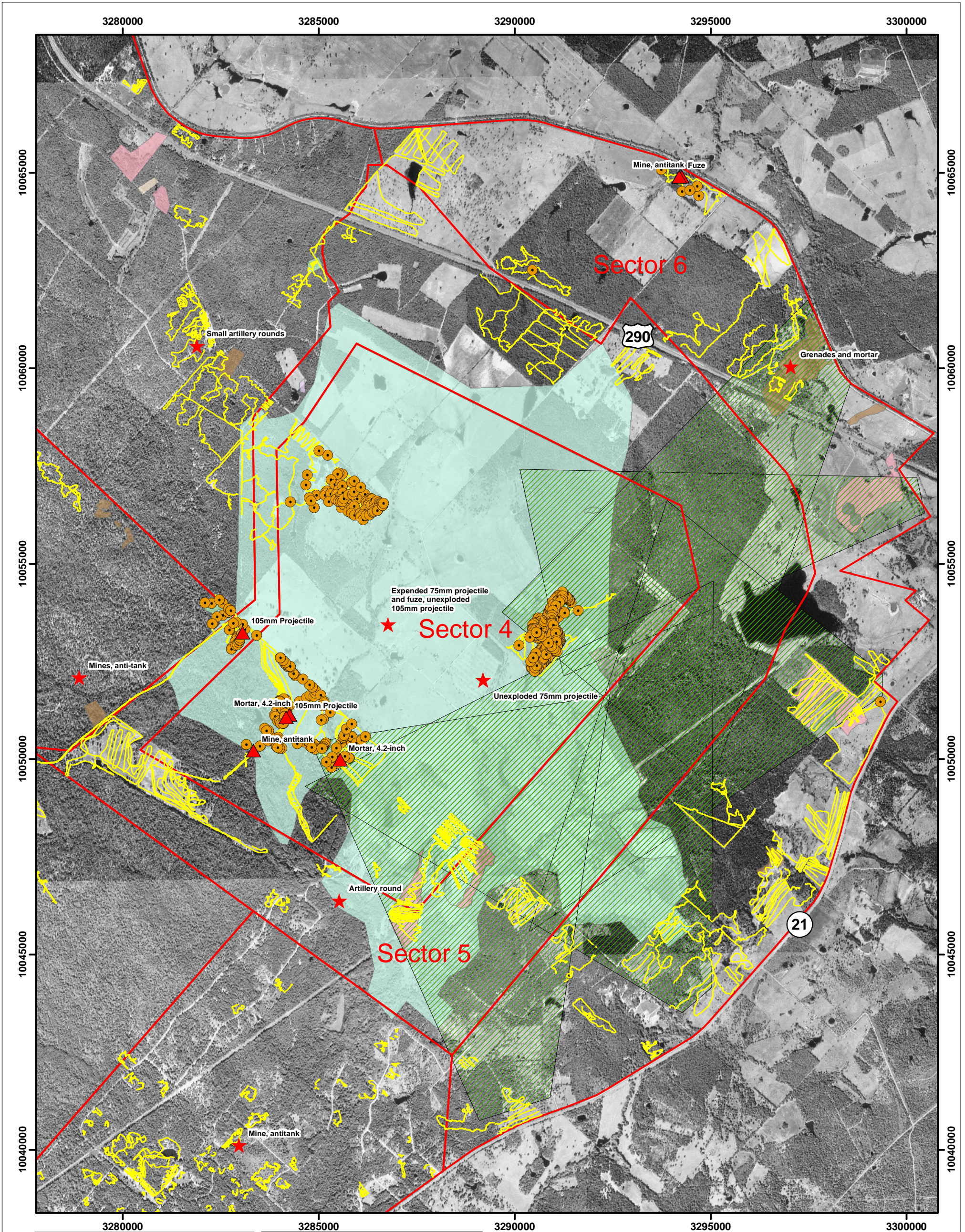
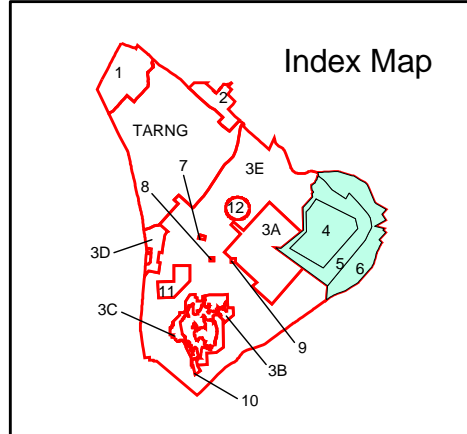


Figure 3.9  
EE/CA Field Investigation Results  
Sector 4, 5, and 6

Legend		
	Transect	
	Ordnance Finding Reported by Landowner	
	OE Scrap	
	UXO	
	Sectors	
	Former Firing Ranges	
Disturbed Ground		
	Berm	
	Ground Scar	
	Heavily Tracked Area	
	Excavation	
	Impact Crater	
	Mounded Material	
	Pit	
	Trench	



0 1,500 3,000 Feet

Map Units: NAD 1983 Texas Central State Plane (Feet)

Aerial Photography Source: TNRIS  
Aerial Photography Date: 1995 - 1997

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
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3.2.8.2 Most of the artillery range impact area is not heavily vegetated and includes large open areas of land. The entire area is privately-owned land, contains wide-open fields, and has numerous owners. During a February 15, 2000 site visit conducted by USAESCH and Parsons (Parsons, 2000a), a landowner stated that after the government deeded the property back to his grandparents they found numerous Army items, including helmets, carbine rifles, ammunition, and bayonets. The landowner also found six 105mm shells on his property that were sitting in front of his garage at his residence. The shells were identified as expended base ejection rounds and not dangerous. The landowner also indicated that he found a similar type shell, but not quite as large, while tilling his property. The UXO item was found to be an unexploded 75mm HE lying on its side in front of the gate post. An EOD team from Fort Sam Houston in San Antonio, Texas was dispatched after being notified by the Bastrop County Sheriff's Department. The unexploded shell was blown in-place in February 2000. Other OE items found along the access road and fence line in the area included a small fragment of munitions weighing approximately 3 to 4 pounds and a portion of a 4.2-inch mortar round. Although the ASR stated that this area has potential for ordnance contamination, the findings of the 75mm and 105mm shells and a portion of a 4.2-inch mortar round confirm that this area does have contamination.

3.2.8.3 In addition to the abovementioned ordnance-related findings, a property owner contacted Parsons during the EE/CA investigation about ordnance items on their property and asked that these items be detonated, if UXO. The Parsons UXOSO found an expended 75mm projectile, an unexploded 105mm projectile, and expended fuze on the ground surface of the property, which is located in the central portion of Sector 4. The 105mm projectile was BIP, per USAESCH direction.

3.2.8.4 Figure 3.9 displays the transect locations for Sector 4. Most of Sector 4 was disturbed in the 1943 aerial photograph of the camp. A total of 13.94 acres were surveyed in Sector 4, and 625 anomalies were investigated. Four UXO items were recovered in Sector 4: two 4.2-inch mortars, one 105mm projectile, and one practice anti-tank mine. All except the anti-tank mine were BIP. The mine was removed and detonated at a designated area at Griffith League Ranch. Each of the items was found between 6 and 30 inches bgs, as shown in Table 3.4.

3.2.8.5 A total of 516 ordnance scrap items were discovered in Sector 4, including inert or expended 4.2-inch mortars, 81mm mortars, a practice 2.36-inch rocket, fuzes, 105mm projectiles, and a 37mm projectile. A total of 840 pounds of ordnance scrap items were removed. The presence of UXO in Sector 4 is consistent with the ASR information and the fact that portions of Sector 4 are within former Camp Swift practice range firing fans.

### 3.2.9 Sector 5, Artillery Range Buffer Zone

3.2.9.1 Sector 5 is located in the eastern portion of the former Camp Swift and is comprised of 2,720 acres (Figure 3.1). Sector 5 surrounds Sector 4 and is a former artillery range buffer zone (USACE, 1994a). The area consists of mostly rural land, with cattle grazing being the predominant land use activity.

3.2.9.2 Sector 5 was designated as an area with “potential for OE waste contamination” in the ASR and, like Sector 4, received a RAC of 4. Numerous impact craters were identified in the 1943 aerial photograph during the historical photo analysis (ERDC, 2000), as shown in Figure 3.9. The 1946 Master Plan shows five field combat ranges crossing the sector. In addition, one landowner within the sector reported finding an artillery round on their property, but no further information about the item found or its exact location are available.

3.2.9.3 A total of 14.36 acres were surveyed in Sector 5 (Figure 3.9). Of the 86 anomalies investigated, one UXO item was recovered: a 105mm projectile located 27 inches bgs (Table 3.4). In addition, 23 ordnance scrap items (38 pounds) were recovered from the sector. The presence of UXO in Sector 5 is consistent with the ASR information and the fact that portions of Sector 5 are within former Camp Swift practice range firing fans.

### **3.2.10 Sector 6, Other Artillery Lands**

3.2.10.1 Sector 6 is located in the eastern portion of the former Camp Swift and is comprised of 2,827 acres (Figure 3.1). Sector 6 was designated as an area with “potential for OE waste contamination” in the ASR (USACE, 1994a) and received a RAC of 4. The area consists of mostly rural land, with cattle-grazing being the predominant land use activity. Ground scars were identified in a small portion of the northern half of Sector 6 in the 1943 aerial photograph (ERDC, 2000), and impact craters were identified in the southern half, as shown in Figure 3.9. Portions of five field combat ranges were located within Sector 6, as shown in Figure 3.9. In addition, a landowner in Sector 6 reported finding grenades and a mortar on his property.

3.2.10.2 A total of 17.69 acres were surveyed in Sector 6 (Figure 3.9), and 290 anomalies were investigated. Two UXO items, a fuze and a practice anti-tank mine, were recovered in the sector (Table 3.4). Both UXO items were found at one inch bgs and were BIP. An additional seven ordnance scrap items were recovered in Sector 6 (five during intrusive investigations and two during the geophysical survey), including a practice rifle grenade found on the ground surface. A total of 15 pounds of ordnance scrap items were recovered. The presence of UXO in Sector 6 is consistent with the ASR information. In addition, portions of Sector 6 are within former Camp Swift practice range firing fans.

### **3.2.11 Sector 7, Ammunition Storage Area**

3.2.11.1 Sector 7 is located in the central portion of the former Camp Swift area, approximately one mile south of the TARNG (Figure 3.1). The sector is comprised of 20 acres. Sector 7 was an ammunition storage area at the former Camp Swift. No disturbed areas were noted in this area in the 1943 aerial photograph (ERDC, 2000), as shown in Figure 3.10, and there were no firing ranges or other ordnance training areas shown in this sector in the 1944-1945 or 1946 Master Plans.



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3262512

10053381

10053381

10052881

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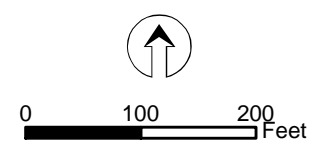
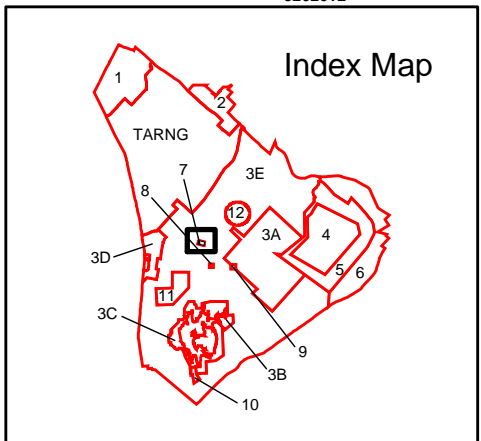
3262512

**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors

**Disturbed Ground**

Berm	Ground Scar	Mounded Material
Depression	Heavily Tracked Area	Pit
Excavation	Impact Crater	Trench



Map Units: NAD 1983 Texas Central State Plane (Feet)  
 Aerial Photography Source: TNRIS  
 Aerial Photography Date: 1995 - 1997

Figure 3.10  
 EE/CA Field Investigation Results  
 Sector 7

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
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DRAWN BY: PDS	SCALE: 1:2,000	PROJECT NUMBER: 737805	PAGE NUMBER:
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3.2.11.2 A total of 0.85 acres were surveyed in Sector 7 (Figure 3.10), and 24 anomalies were investigated. No ordnance-related items were discovered in Sector 7, consistent with the ASR information.

### **3.2.12 Sector 8, Booby Trap Training Area**

Sector 8 is located on 13 acres in the central portion of the former Camp Swift area, directly south of Sector 7 (Figure 3.1). Sector 8 was a booby trap training area at the former Camp Swift and was deemed to be uncontaminated by past ordnance activities in the ASR. Evidence of impact craters, pits, berms, and disturbed ground were identified in the sector in a 1943 aerial photograph (ERDC, 2000), as shown in Figure 3.11. No ROE agreements were obtained for Sector 8 properties. Therefore, no geophysical data were collected in Sector 8, and no anomalies were identified or excavated.

### **3.2.13 Sector 9, Gas Area**

3.2.13.1 Sector 9 is located on 20 acres along the southern boundary of the Griffith League Ranch Boy Scout Property (Figure 3.1). The ASR (USACE, 1994a) identified this area as a "Gas Area." The ASR Supplement identified small pits on the side of a hill and rough, scarred ground in the area. Impact craters were identified by the historic aerial photograph analysis (ERDC, 2000), as shown in Figure 3.12.

3.2.13.2 A total of 0.17 acres were surveyed in Sector 9 (Figure 3.12). This sector is very small and heavily vegetated. Due to the heavy vegetation, it was not possible for a survey crew to traverse much of the sector area with the magnetometer equipment and obtain additional geophysical survey acreage.

3.2.13.3 A total of 8 anomalies were identified in this area. During reacquisition, two of the anomalies were found to be caused by a wire and scrap metal on the ground surface. Of the six intrusively investigated anomalies, one ordnance scrap item, which weighed 0.25 pounds, was found. However, a clean empty bottle marked with the words "HS Toxic Gas Set, M1" was found on the ground surface during soil sampling conducted on June 13, 2002. The markings on the bottle indicate that it was part of a chemical agent identification set. These sets were used for training identification of various chemical agents that could be encountered on the battlefield. The bottle found in Sector 9, shown in Photograph 3.6, was placed in the custody of a USAESCH representative.



**Photograph 3.6 Bottle from HS Toxic Gas Set**

### **3.2.14 Sector 10, Munitions Demolition Area**

3.2.14.1 Sector 10 is located in the southern portion of the former Camp Swift and is comprised of 69 acres (Figure 3.1). This sector was identified as a “Demolition Area” on the 1944-1945 Master Plan of the former camp. Sector 10 currently consists partially of LCRA property, including an expansion area of the LCRA South Shore Park, and privately-owned property. The vegetation generally consists of pine and oak trees and some moderate underbrush. The ground cover consists of large clumps of grass and a thick bed (2- to 4-inches) of pine needles.

3.2.14.2 Sector 10 has confirmed past ordnance usage and confirmed past discoveries of OE; however, no OE items were discovered during the ASR survey nor during the February 2000 site visit. Past discoveries included practice mines and practice mine fuzes. Sector 10 was designated as an area with “confirmed contamination” in the ASR and received a RAC of 4. Numerous craters were observed during the February 2000 site visit of the demolition area. Analysis of the 1943 aerial photograph indicated evidence of impact craters and a pit in the area (ERDC, 2000), as shown in Figure 3.13.

3.2.14.3 A total of 2.95 acres were surveyed in Sector 10 (Figure 3.13), and 94 anomalies were investigated. One UXO item was discovered in the sector: a practice anti-tank mine with energetic charge was found 4 inches bgs (Table 3.4). Six ordnance scrap items were recovered from this area during intrusive investigations, one was recovered during reacquisition, and another was recovered during the geophysical survey. The recorded weight for these items was 11 pounds. The presence of UXO in Sector 10 is consistent with the ASR information.





3265000

10047500

10047500

Sector 8

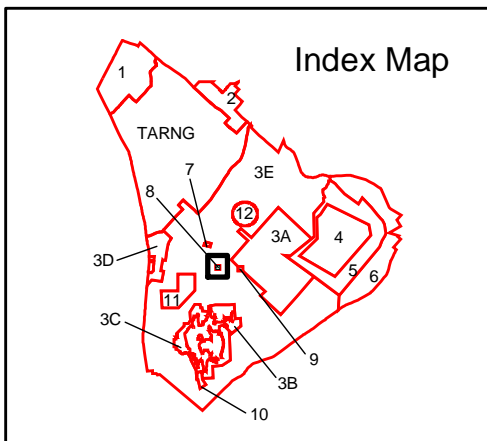
3265000

**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors

**Disturbed Ground**

Berm	Ground Scar	Mounded Material
Depression	Heavily Tracked Area	Pit
Excavation	Impact Crater	Trench



0      140      280  
Feet

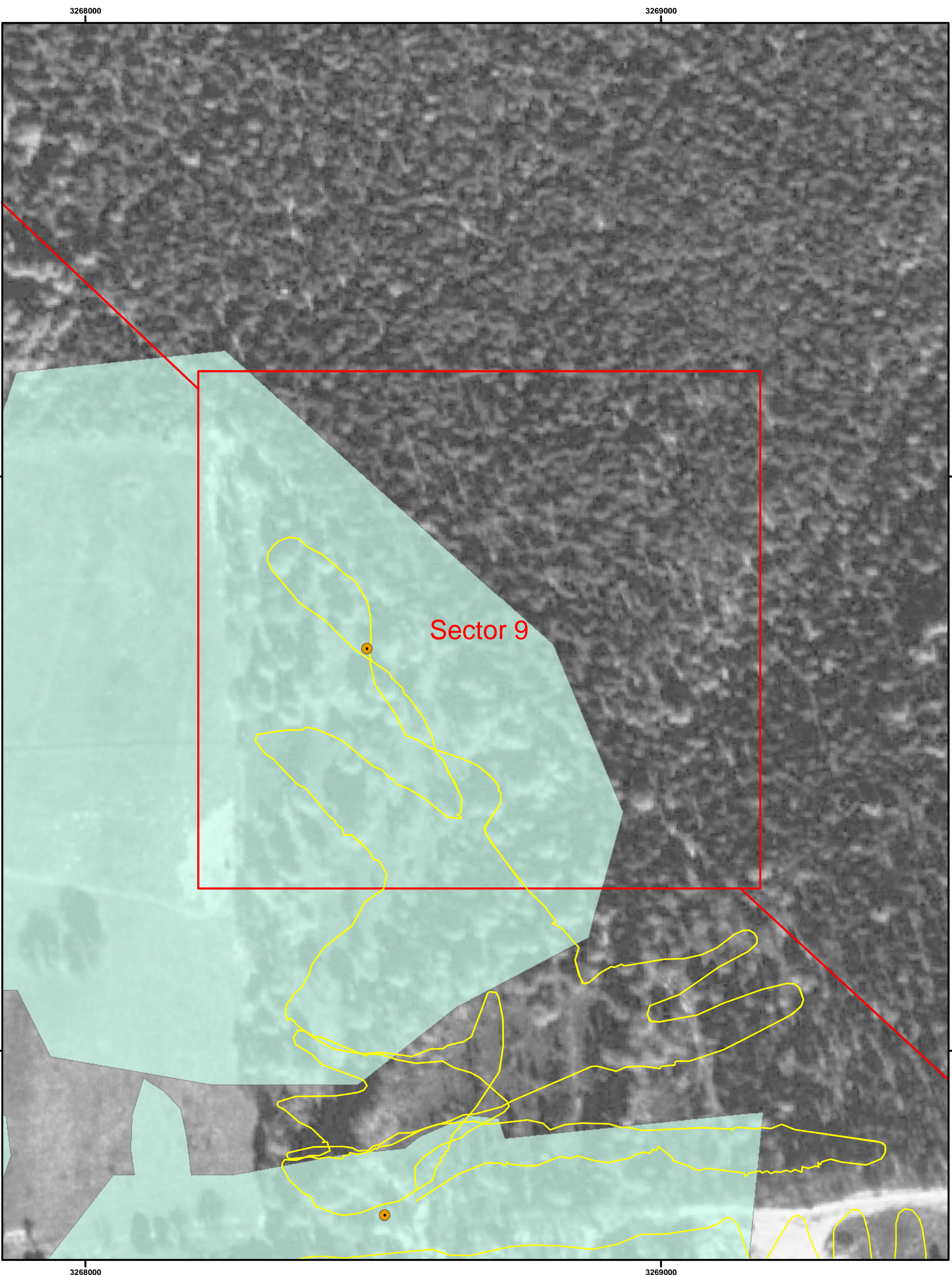
Map Units: NAD 1983 Texas Central State Plane (Feet)  
Aerial Photography Source: TNRIS  
Aerial Photography Date: 1995 - 1997

Figure 3.11  
EE/CA Field Investigation Results  
Sector 8

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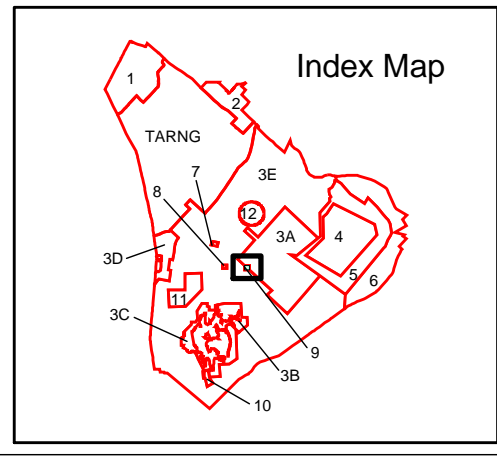


**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors

**Disturbed Ground**

Berm	Ground Scar	Mounded Material
Depression	Heavily Tracked Area	Pit
Excavation	Impact Crater	Trench



0 100 200 Feet

Map Units: NAD 1983 Texas Central State Plane (Feet)  
 Aerial Photography Source: TNRIS  
 Aerial Photography Date: 1995 - 1997

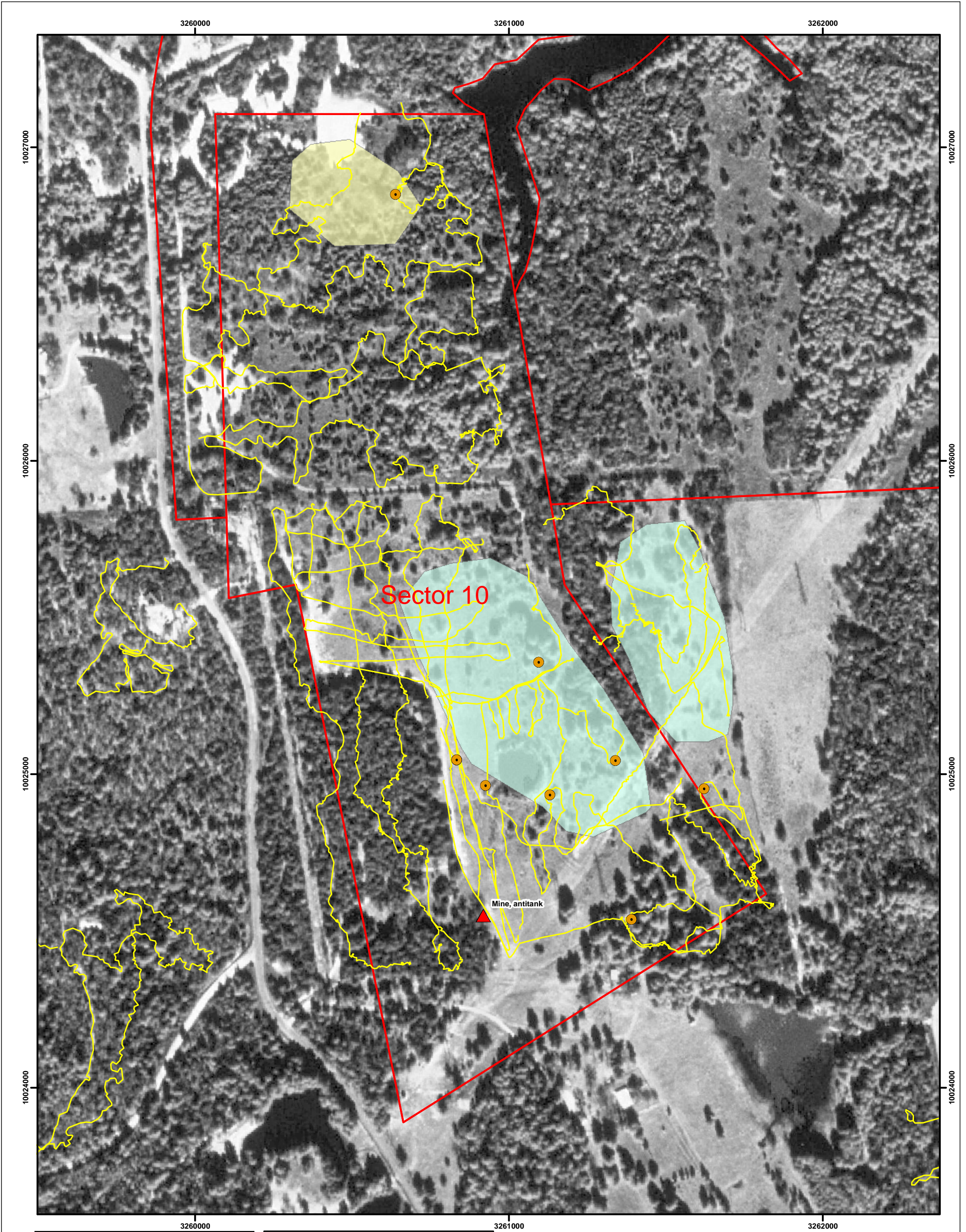
**Figure 3.12**  
**EE/CA Field Investigation Results**  
**Sector 9**

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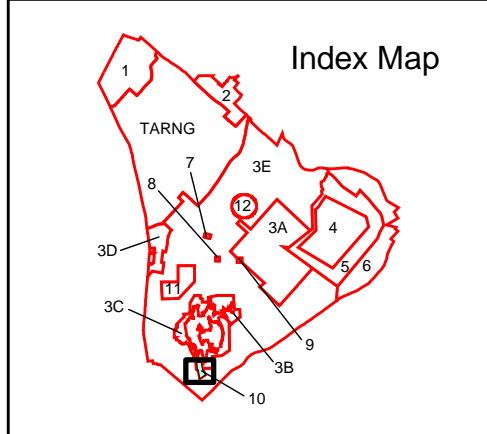


**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors

**Disturbed Ground**

Berm	Ground Scar	Mounded Material
Depression	Heavily Tracked Area	Pit
Excavation	Impact Crater	Trench



0      220      440 Feet

Map Units: NAD 1983 Texas Central State Plane (Feet)  
Aerial Photography Source: TNRIS  
Aerial Photography Date: 1995 - 1997

Figure 3.13  
EE/CA Field Investigation Results  
Sector 10

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
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### **3.2.15 Sector 11, Hospital Area**

3.2.15.1 Sector 11 is located in the southwestern portion of the former Camp Swift and is comprised of 627 acres (Figure 3.1). Part of Lake Bastrop Acres, a residential subdivision, is located within Sector 11.

3.2.15.2 No historical documentation exists which would indicate that Sector 11 was used for munitions training; however, the site does have two alleged OE discoveries, as reported in the ASR. An HE mortar was reportedly discovered by two teenagers in the woods behind a rural housing area north of Route 1441. The other alleged discovery involved practice land mines found under a dirt road and occurred in the general vicinity of Sector 11. Additional information regarding the exact locations of these items is not available. The ASR recommended that, due to the two alleged discoveries, the status of Sector 11 be changed to potential OE contamination.

3.2.15.3 Analysis of a 1943 aerial photograph (ERDC, 2000) indicated evidence of pits, ground scars, impact craters, and some mounded material in Sector 11, as shown in Figure 3.14. The 1944-1945 and 1946 Master Plans for Camp Swift show the hospital in an area located to the west of this sector (see Figures 2.5 and 2.6), and Wake Island, the tank destroyer training area, was located just to the southeast of Sector 11. Three landowners reported on their ROE agreements that they have found OE on their property. One landowner reported finding unexploded rifle grenades on their property, and the other reported finding an unknown type of ordnance. The third reported finding numerous rockets on his two parcels in the north-central portion of the site. Further information regarding the types or exact locations of items found are not available. Locations shown on Figure 3.14 are the center points of the landowner's properties.

3.2.15.4 A total of 4.32 acres were surveyed in Sector 11 (Figure 3.14), and 148 anomalies were investigated. No UXO was encountered, but three ordnance scrap items were recovered during the intrusive investigations (total weight of 4.25 pounds). These included an expended 2.36-inch rocket, an expended fuze, and a practice 2.36-inch rocket, all found at depths ranging from 4 to 5 inches. The practice rocket was BIP before it was determined to be a practice round.

### **3.2.16 Sector 12, Fortified Area**

3.2.16.1 Sector 12 was the fortified area, and it is located on 419 acres in the central portion of the former Camp Swift area (Figure 3.1). There was evidence of heavily-tracked areas in the northwest portion of the sector, but no other signs of disturbed ground were noted in the 1943 aerial photograph (ERDC, 2000), as shown in Figure 3.15.

3.2.16.2 A total of 0.88 acres were surveyed in Sector 12 (Figure 3.15), and 22 anomalies were investigated. One of the anomalies was an ordnance scrap item (weight of 1 pound). Although ROE was initially available for about 32% of Sector 12, several of the ROEs expired before the properties could be surveyed. Some property ownership changed

over the course of the project, and renewed ROEs could not be obtained. In addition, none of the properties for which ROE was granted were located in the central area of the sector.

### 3.3 DESCRIPTION OF HAZARDS OF OE RECOVERED DURING THE EE/CA

The following paragraphs summarize the types of UXO recovered during the EE/CA field investigation and the purpose/function of each item. For each of the UXO items recovered, an individual would have to perform some deliberate act to be exposed to OE risk. In terms of sensitivity, UXO items that are classified as “very sensitive” are likely to detonate with very little effort (e.g. simple touch or movement). UXO items that are classified as “less sensitive” are likely to detonate with moderate effort (e.g. dropping the item, striking it, driving over it, or exposing it to extreme heat). UXO items classified as a “residual risk” are those that would require extreme effort (i.e. cutting the item, drilling into it, mutilating it, or crushing it) to detonate.

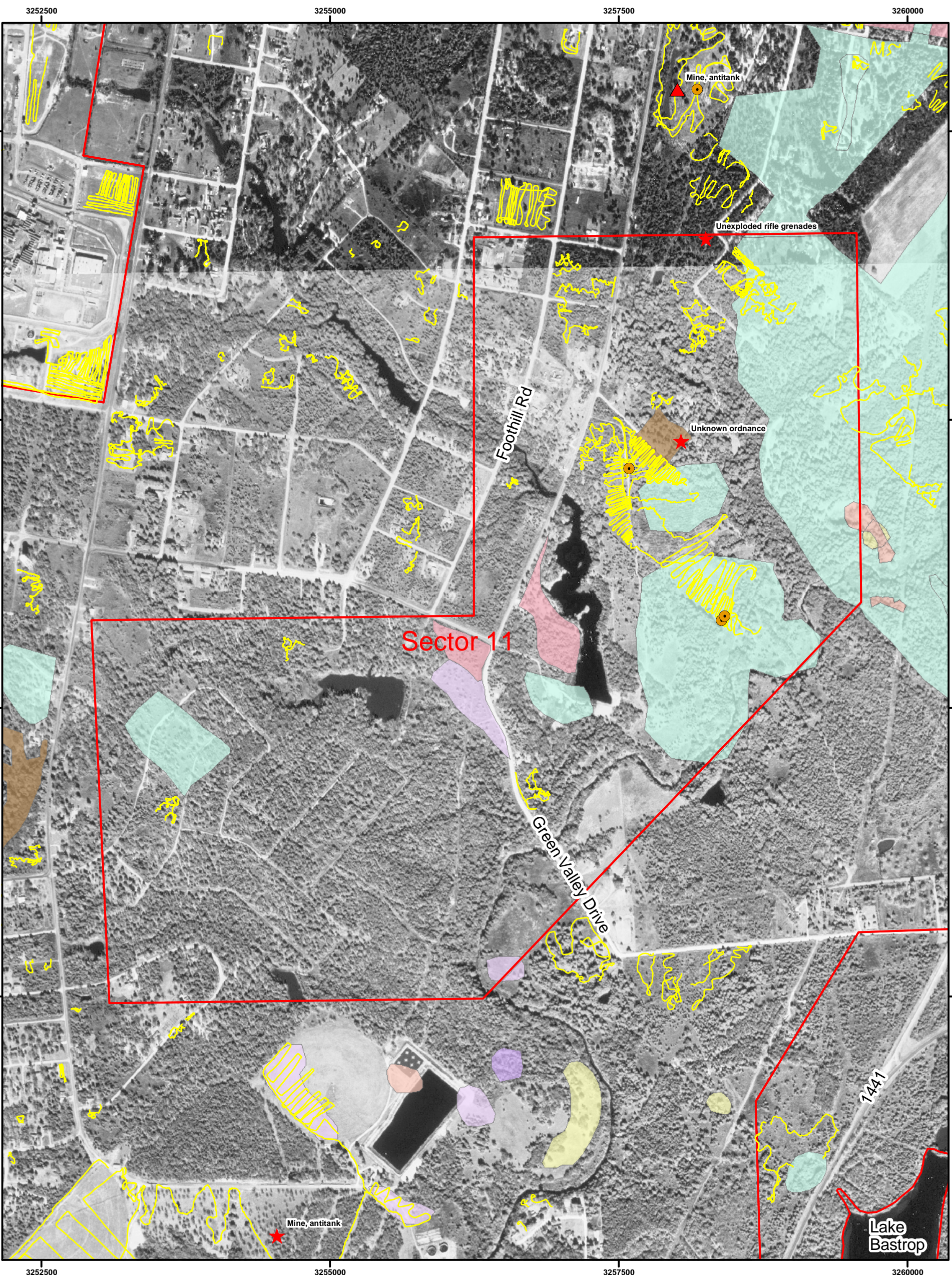
UXO items recovered during the former Camp Swift EE/CA include practice anti-tank mines with energetic charges, 4.2-inch mortars, 105mm projectiles, fuzes, and a rifle grenade. An unexploded 75mm projectile was identified during the EE/CA site visit, as well. In addition, inert or expended ordnance scrap from the following types of ordnance have been recovered at the site: 81mm mortar, 2.36-inch rockets, 60mm mortars, 75mm projectile, and a 37mm projectile. Of the sixteen sectors at the former Camp Swift (listed in Table 3.3), UXO was recovered from five sectors and ordnance scrap was recovered from ten sectors. A description of each of the types of ordnance encountered at Camp Swift is provided in the following paragraphs. Table 3.5 summarizes the types of UXO and identifiable ordnance scrap found in each of the sectors during intrusive investigations, reacquisition, and the geophysical survey. The number of OE types that were UXO items is in parentheses next to the total.

**Table 3.5 Summary of OE Types Recovered at Former Camp Swift**

OE Type	Sector 1	Sector 3A	Sector 3E	Sector 4 <sup>b</sup>	Sector 5	Sector 6	Sector 9	Sector 10	Sector 11	Sector 12	Total
4.2-inch Mortar	6			15(2)							21
Anti-tank Mine			10(5)	1(1)		7(1)		2(1)			20
2.36-inch Rocket	1		3	1				1	2		8
81mm Mortar				6							6
Fuze				3		1(1)			1		5
105mm Projectile	1			3(1)	1(1)						5
60mm Mortar	2	1	3								6
37mm Projectile				1							1
75mm Projectile											
Rifle Grenade	3	1				1					5
Fragment	35	20	9	489	23		1	6		1	584
<b>Total per Sector</b>	<b>48</b>	<b>22</b>	<b>25</b>	<b>519</b>	<b>24</b>	<b>9</b>	<b>1</b>	<b>9</b>	<b>3</b>	<b>1</b>	<b>661</b>

Notes: <sup>a</sup> Table lists items recovered as part of the EE/CA investigation only. Landowner reported items are not included.  
<sup>b</sup> The number of OE types that were UXO is shown in parentheses. For example, of the fifteen 4.2-inch mortars recovered from Sector 4, two were UXO. The remaining thirteen were expended and did not contain any explosive residue.





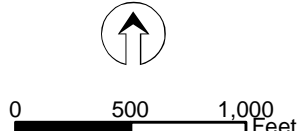
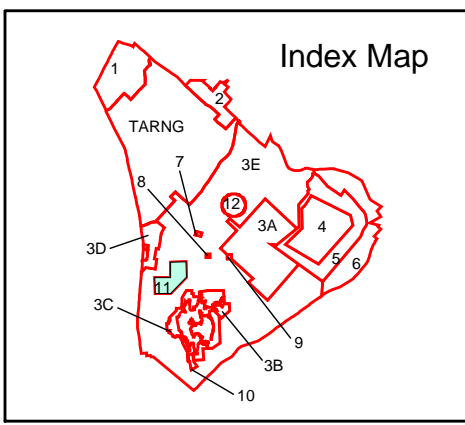
Sector 11

**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors

**Disturbed Ground**

Berm	Ground Scar	Mounded Material
Depression	Heavily Tracked Area	Pit
Excavation	Impact Crater	Trench



Map Units: NAD 1983 Texas Central State Plane (Feet)  
 Aerial Photography Source: TNRIS  
 Aerial Photography Date: 1995 - 1997

Figure 3.14  
 EE/CA Field Investigation Results  
 Sector 11

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:10,000	PROJECT NUMBER: 737805	PAGE NUMBER:
CHECKED BY: EN	DATE: November, 2002		
SUBMITTED BY: JB	FILE: j:\737805\GIS\EECA\Sector_11.mxd		



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**Legend**

- Transect
- Ordnance Finding Reported by Landowner
- OE Scrap
- UXO
- Sectors

**Disturbed Ground**

Berm	Ground Scar	Mounded Material
Depression	Heavily Tracked Area	Pit
Excavation	Impact Crater	Trench

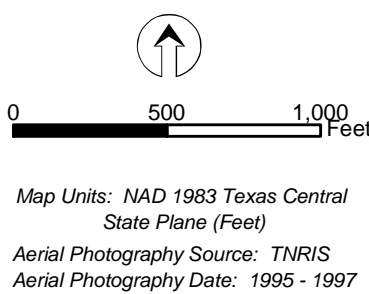
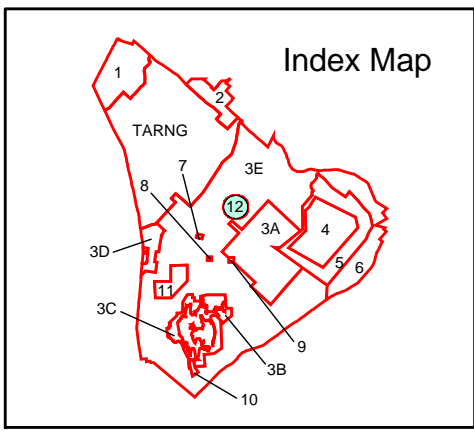


Figure 3.15  
 EE/CA Field Investigation Results  
 Sector 12

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:7,500	PROJECT NUMBER: 737805	PAGE NUMBER:
CHECKED BY: EN	DATE: November, 2002	FILE: j:\737805\GIS\EECA\Sector_12.mxd	
SUBMITTED BY: JB			



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### 3.3.1 4.2-Inch Mortars

3.3.1.1 The 4.2-inch mortar is a spin-stabilized projectile. This type of ordnance is considered “less sensitive” because it has standard fuzing. Bases from M2 and M3 4.2-inch mortars were identified at former Camp Swift. M2 4.2-inch mortars may be filled with WhP (3.4 kilograms), which ignites on contact with air. These projectiles must be transported carefully due to their percussion-fired ignition primer. The M3 model is filled with 3.7 kilograms of trinitrotoluene (TNT).

3.3.1.2 Two unexploded 4.2-inch mortars (UXO) were found in Sector 4, at depths ranging from 20 to 24 inches bgs. Thirteen 4.2-inch mortar ordnance scrap items were also identified in Sector 4, and six were recovered from Sector 1. This type of ordnance was not found in any other sector. Sector 4 was the artillery impact area, and it is located near the eastern border of the former Camp Swift. Sector 1 is located north of the TARNG Camp Swift. An impact area was also located in the area where TARNG Camp Swift is currently located. Photograph 3.7 shows an unexploded 4.2-inch mortar that was discovered in Sector 4.



**Photograph 3.7 4.2-inch Mortar found at former Camp Swift**

### 3.3.2 Practice Anti-Tank Mines

3.3.2.1 Twenty practice anti-tank mines (eight were designated UXO) were discovered during investigations at the former Camp Swift, making them the second-most common ordnance discovered during the field investigation. Mines were discovered in Sectors 3E, 4, 6, and 10. One of the mines discovered in Sector 3E was booby-trapped. Anti-tank mine occurrence is widespread throughout the southern portion of the former Camp Swift. The range of depths spanned from ground surface to 30 inches bgs. Only three of the mines were found 6 or more inches bgs. Mines and booby traps are considered “very sensitive.”

3.3.2.2 The mines found at the former Camp Swift were M1 or M1B1 practice mines with manually-armed, pressure-actuated fuzes. These mines contain smoke charges. Because of this explosive charge, these items are considered UXO if not expended. Photograph 3.8 displays the booby-trapped mine found in Sector 3E.



**Photograph 3.8 Practice Anti-Tank Mine (with booby trap) found at former Camp Swift**

### **3.3.3 2.36-Inch Rockets**

3.3.3.1 Eight 2.36-inch rockets (or portions thereof) were recovered during the EE/CA. All of these items were either inert portions of the rocket, or were M7A1 practice rockets. The M7A1 practice rockets do not contain any explosives; they are inert-loaded and have a dummy fuze or steel weight to replace the fuze. However, in some cases the identity of the item as a practice round cannot be determined without detonation. The M6 series 2.36-inch rocket warhead contains 8 ounces of explosive filler (pentolite), is designed to penetrate armored vehicles, and is difficult to distinguish from the M7A1 practice 2.36-inch rocket. Practice 2.36-inch rockets are considered “inert.”

3.3.3.2 During the EE/CA investigation at former Camp Swift, one M7A1 practice rocket was found in Sector 1, three were found in Sector 3E, one in Sector 4, one in Sector 10, and two in Sector 11. The rockets were found at depths ranging from 1 to 8 inches bgs. Only one was found greater than 6 inches bgs. Photograph 3.9 displays an inert 2.36-inch rocket found in Sector 3E.



**Photograph 3.9 2.36-inch Practice Rocket found at former Camp Swift**

### **3.3.4 81mm Mortars**

3.3.4.1 These projectiles are fin-stabilized projectiles that contain either a parachute-suspended illuminant charge or a WhP smoke projectile. The 81mm mortars with WhP were used for screening or spotting targets. This type of ordnance is considered “less sensitive” because it has standard fuzing.

3.3.4.2 Six inert 81mm mortars were discovered during intrusive investigations at the former Camp Swift. All were found in Sector 4, at depths ranging from 2 to 12 inches bgs. Four of the mortars were found 6 or more inches bgs.

### **3.3.5 Fuzes**

3.3.5.1 Several types of fuzes were identified at former Camp Swift. Expended M48, M54, and M65 fuzes were recovered (three from Sector 4 and one from Sector 11), and one unexploded fuze for an M1 practice anti-tank mine was BIP in Sector 6. The fuze for the M1 mine is manually-armed, pressure-actuated and has a smoke charge incorporated in it. These fuzes are not electronic; therefore, they are considered “less sensitive.”

3.3.5.2 The M48 fuze is associated with 105mm projectiles, the M54 fuze is associated with 75mm and 105mm projectiles, and the M65 fuze is associated with 60mm illumination mortars. These fuzes contain a very small quantity of explosives and functions as the detonator of the projectile it is attached to. Fuzes are not designed to project fragments.



### 3.3.6 105mm Projectiles

3.3.6.1 The M1 105mm projectile contains 80 ounces of explosive filler, is designed to be deployed from land-based gun platforms, and projects high velocity fragments in a 360-degree pattern. These projectiles are spin-stabilized, Howitzer-fired, high explosive rounds. The fuze is located in the nose of the projectile and it is percussion-primed. Fragments may project to a distance of up to 1,939 feet. This type of ordnance is considered “less sensitive” because it has standard fuzing. Photograph 3.10 shows a 105mm projectile found at Camp Swift.



**Photograph 3.10 105mm Projectile found at former Camp Swift**

3.3.6.2 Two unexploded 105mm projectiles were discovered during intrusive investigations at the former Camp Swift. One unexploded 105mm was discovered in Sector 5 and another was discovered in Sector 4. Sector 5 is located in the eastern portion of the former Camp Swift area and surrounds Sector 4. As discussed above, this area was previously an artillery range and impact area. The projectiles were found at depths ranging from 6 to 30 inches bgs. Two pieces of ordnance scrap from 105mm projectiles were also recovered from Sector 4 and one was recovered from Sector 1.

### 3.3.7 60mm Mortars

3.3.7.1 The 60mm mortars found at the former Camp Swift are illuminator rounds that are fin-stabilized and contain a parachute-suspended illuminant charge. The illuminator mortars were designed to burn extremely hot and produce a bright light for night missions. Although OE with illumination fillers are less hazardous than high explosive or white phosphorous rounds, they can still be extremely dangerous to individuals handling them. This type of ordnance is considered “less sensitive” because it has standard fuzing.

3.3.7.2 Six expended 60mm mortars were discovered during intrusive investigations at the former Camp Swift, two in Sector 1, one in Sector 3A, and three in Sector 3E. Photograph 3.11 shows a 60mm mortar discovered in Sector 3A.



**Photograph 3.11 Expended 60mm Mortar found at former Camp Swift**

### **3.3.8 37mm Projectiles**

3.3.8.1 The 37mm projectile was used in a subcaliber gun as a spotting charge. The explosive filler consisted of graphite (15 percent) and black powder. This type of ordnance is considered “less sensitive” because it has standard fuzing.

3.3.8.2 One expended 37mm projectile (MkII A1), located 5 inches bgs, was discovered during intrusive investigations at the former Camp Swift. The projectile was found in Sector 4, an area that was previously an artillery range and impact area. Photograph 3.12 displays the 37mm projectile found in Sector 4.



**Photograph 3.12 Expended 37mm Projectile found at former Camp Swift**

### **3.3.9 75mm Projectiles**

3.3.9.1 The 75mm projectile contains 23.7 ounces of explosive filler, is designed to be deployed from land-based gun platforms, and projects high velocity fragments in a 360-degree pattern. Fragments may project to a distance of up to 1,701 feet. This type of ordnance is considered “less sensitive” because it has standard fuzing.

3.3.9.2 One unexploded 75mm projectile was discovered during the former Camp Swift site visit conducted in February 2002. The projectile was found in Sector 4, the former artillery range impact area.

### 3.3.10 Rifle Grenades

3.3.10.1 Five inert rifle grenades were discovered during intrusive investigations at the former Camp Swift. The grenades were M11 practice grenades and were found in Sectors 1, 3A, and 4. Because these were practice grenades, they are considered “inert.”

### 3.3.11 Hand Grenades

3.3.11.1 Although no hand grenades were found at Camp Swift during the EE/CA investigation, a landowner in Sector 3E found one on his property.

3.3.11.2 The hand grenade was an M21, which is a practice version of the Mk 2 grenade. These grenades are referred to as “pineapples” due to their shape and external grooved pattern. The Mk 2 is a fragmenting, antipersonnel, delay-detonating grenade. Photograph 3.13 displays the inert hand grenade found in Sector 3E.

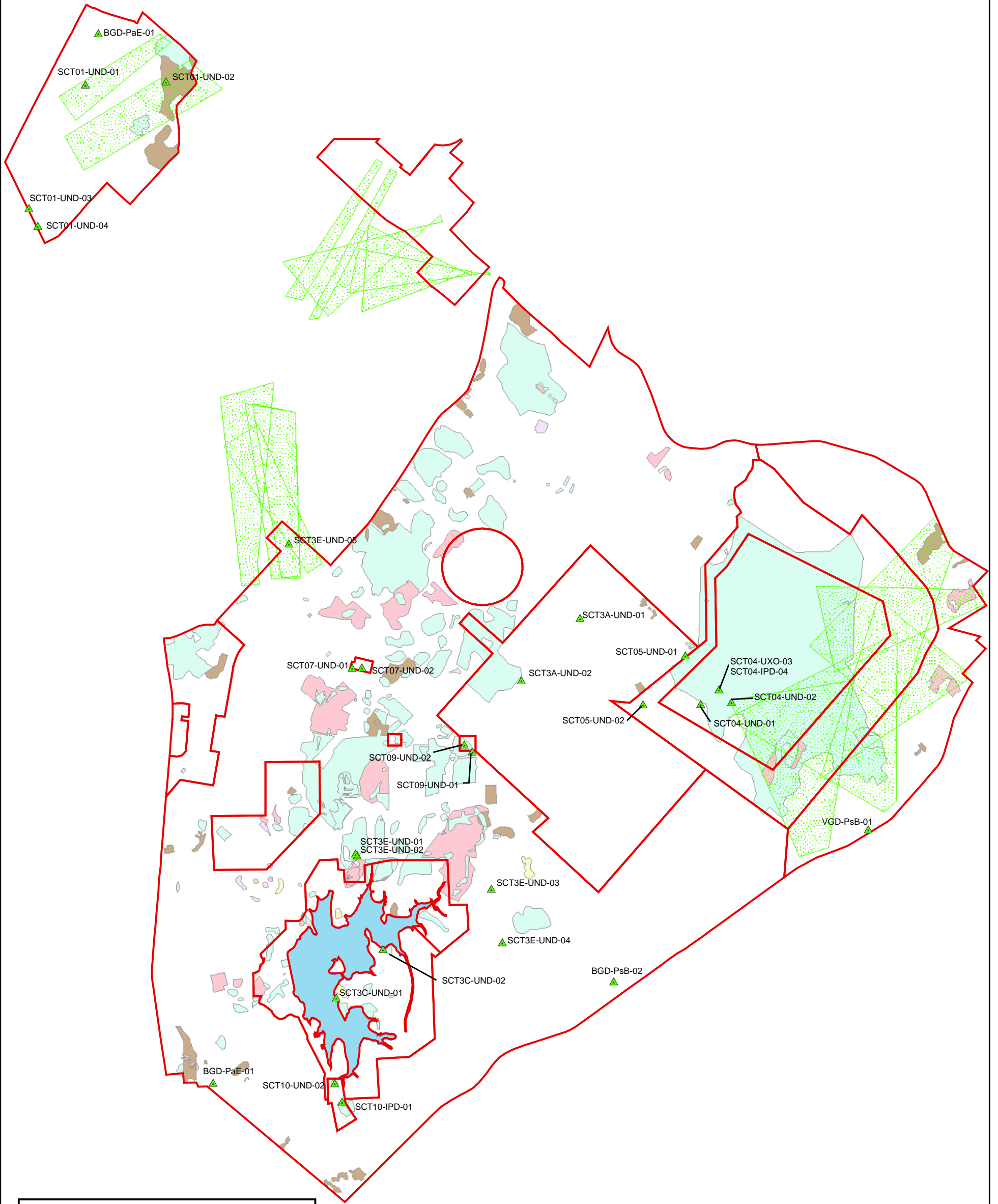


**Photograph 3.13 Practice Hand Grenade found at former Camp Swift**

## 3.4 ADDITIONAL SITE CHARACTERIZATION DATA

3.4.1 Soil sampling was performed at former Camp Swift on June 12 and 13, 2002. Soil samples were collected from 29 discrete locations within Sectors 1, 3A, 3C, 3E, 4, 5, 7, 9, and 10, as shown in Figure 3.16. Samples were collected at the ground surface from 0 to 0.5 feet, from undisturbed areas, disturbed areas, areas next to UXO items, and areas where UXO items were BIP. The sample IDs reflect what type of location the sample was collected from and Table 3.6 footnotes explain the sample naming convention. Although most of the sample IDs indicate samples





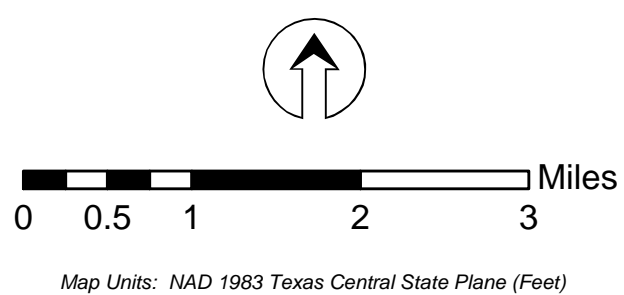
**Legend**

- 12 Sector Boundary
- ▲ Soil Sampling Locations and Sampling Identification
- Range Boundaries

Disturbed Ground Identified during Historic Photograph Analysis (ERDC, 2000)

<span style="background-color: orange; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Berm	<span style="background-color: lightblue; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Impact Craters
<span style="background-color: purple; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Depression	<span style="background-color: lightpurple; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Mounded Material
<span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Excavation	<span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Pit
<span style="background-color: brown; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Ground Scar	<span style="background-color: pink; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Trench
<span style="background-color: pink; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> Heavily Tracked Area	

**Figure 3.16**  
Soil Sampling Location Map  
Camp Swift, Texas



PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:72,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: April, 2003	PAGE NUMBER:	
SUBMITTED BY: JB	FILE: J:\737805\GIS\EECA\SoilSampling_large.mxd		

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**Table 3.6 Summary of Former Camp Swift Soil Sampling Program**

Sample Identification	Sector Location	Historic Range/Training Area (as identified in 1943-44 Master Plan [Figure 2.5] and/or 1946 Master Plan [Figure 2.6])	Historic Ground Disturbance Type (as identified during Historical Aerial Photo Analysis [Figure 2.13])	Other Comments	Explosives Analysis		Metals Analysis	
					Normal Sample (Field Test Kits)	Duplicate Sample (Offsite Lab)	Normal Sample (Offsite Lab)	Duplicate Sample (Offsite Lab)
SCT01-UND-01	1: Firing Ranges	Field Combat Range No. 7			X		X	
SCT01-UXO-02		Transition Range No. 2	Ground Scar	Adjacent to UXO	X		X	
SCT01-UND-03		Submachine Gun Ranges Nos. 2-7					X	
SCT01-UND-04		Submachine Gun Ranges Nos. 2-7					X	
SCT03A-UND-01	3A: Remaining Lands (Boy Scouts)				X		X	
SCT03A-UND-02					X			
SCT03C-UND-01	3C: Remaining Lands (LCRA)				X		X	
SCT03C-UND-02					X	X	X	X
SCT03E-UND-01	3E: Remaining Lands (Other Areas)	Wake Island (Anti-Tank Training Area)	Impact Craters		X		X	
SCT03E-UND-02		Wake Island (Anti-Tank Training Area)	Impact Craters		X		X	
SCT03E-UND-03					X		X	
SCT03E-UND-04					X		X	
SCT03E-UND-05		Close Combat Range No. 1, Infiltr. Course No. 1					X	
SCT04-UND-01	4: Artillery Range Impact Area	Field Combat Ranges Nos. 11-15			X		X	
SCT04-UND-02		Field Combat Ranges Nos. 11-15	Impact Craters		X	X	X	X
SCT04-UXO-03		Field Combat Ranges Nos. 11-15	Impact Craters	Adjacent to UXO	X			
SCT04-IPD-04		Field Combat Ranges Nos. 11-15	Impact Craters	Post-BIP	X			
SCT05-UND-01	5: Artillery Impact Area Buffer	Danger Zone			X			
SCT05-UND-02		Danger Zone			X			
SCT07-UND-01	7: Ammo Storage Area	Ammo Storage Area			X	X	X	
SCT07-UND-02		Ammo Storage Area			X			
SCT09-UND-01	9: Gas Area	Gas Area	Impact Craters		X		X	
SCT09-UND-02		Gas Area			X			
SCT10-VIC-01	10: Demolition Area	Demolition Area	Impact Craters	Impact Craters	X		X	
SCT10-IPD-02		Demolition Area	Pits	Post-BIP	X		X	
BGD-PsB-01	1: Firing Ranges						X	
BGD-PsB-02	3E: Remaining Lands (Other Areas)						X	
BGD-PaE-01							X	
BGD-PaE-02								X
<b>Total # of Analyses:</b>					22	3	22	3

IPD = In-place disposal crater  
PaE = Patilo-Demona-Silstid Association soils  
PsB = Axtell-Tabor Association soils

UND = Undisturbed soil  
UXO = Adjacent to UXO or ordnance remnant  
VIC = Visually-identifiable historic detonation crater



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taken from undisturbed soils, most of these samples were actually taken from areas where historical photos show disturbed areas or from former combat/firing ranges. Sample IDs were assigned in the field and were based on visual observation of the sampling location at the time of sampling, not historic site activity.

3.4.2 Samples were analyzed for explosives and Resource Conservation and Recovery Act (RCRA) metals. Some sample locations were analyzed for metals and explosives and some were analyzed for one or the other, based on the historical use and what types of ordnance were suspected to possibly be present in each sector. Most of the explosives analyses were conducted using field test kits, and metals analyses were performed by an offsite laboratory, DHL Analytical in Round Rock, Texas. Three of the explosives samples were also submitted for laboratory analysis at DHL for QA/QC. Four samples were collected as background samples to establish standards for metals concentrations in Camp Swift soils. These sample results are presented in Table 3.7. Field test kit results are documented on Explosives DTech<sup>®</sup> Testing Sheets, presented in Appendix F. Offsite laboratory analytical results are also included in Appendix F. The sample locations are presented on Figure 3.16. A summary of the sampling program is presented in Table 3.6.

3.4.3 Explosives samples (22 total) were analyzed using DTech<sup>®</sup> TNT and RDX Explosives field test kits. The field test kits analyze for TNT and RDX (Royal Defense Explosive, chemical name cyclo-1,3,5-trimethylene-2,4,6-trinitramine, or cyclonite). Three duplicate samples (SCT03C-UND-02, SCT04-UND-02, and SCT07-UND-01) were also analyzed for explosives by DHL Analytical using USEPA Method SW-8330 to provide confirmation of the field test kit results. Explosives laboratory results are presented in Table 3.8 and field test kit results are presented in Table 3.9. Nine of the 22 samples were collected within disturbed areas, a former firing range, adjacent to a BIP location, or a combination of location types. In addition, four samples (two from Sector 4 and two from Sector 7) were collected in the former impact range or the former ammunition storage area. The remaining 13 samples were collected from undisturbed areas (ERDC, 2000). Explosives were not detected in any of the samples.

3.4.4 A total of 25 metals samples were submitted to DHL Analytical for analysis, including 18 normal samples, 4 background samples, 2 field duplicate samples, and 1 equipment rinsate sample. Metals analyses included USEPA Method SW-6020 for arsenic, barium, cadmium, chromium, lead, selenium, and silver, and USEPA Method SW-7470A/7471A for mercury.

3.4.5 Results of the four background samples are presented in Table 3.7. Two samples each were collected from Patilo-Demona-Silstid association (PaE) and Axtell-Tabor association (PsB) soil types. The two Axtell-Tabor soil samples were identified as BGD-PaE-01 and BGD-PaE-02 and were collected in Sectors 1 and 3E. The two Patilo-Demona-Silstid soil samples were identified as BGD-PsB-01 and BGD-PsB-02 and were collected from Sectors 6 and 3E. For this small-scale sampling program at former Camp Swift, these four results provide a guideline for background metals levels that can be anticipated in the area. Texas-specific median background concentrations for metals provided

in 30 Texas Administrative Code (TAC) 351.51(m) are also used for comparison purposes, as well as residential soil protective concentration limits (PCL) for combined inhalation, ingestion, dermal, and vegetable consumption pathways provided in 30 TAC 350. These values are listed in Table 3.8.

3.4.6 Four normal metals samples were collected in Sector 1: SCT01-UND-01, SCT01-UXO-02, SCT01-UND-03, and SCT01-UND-04 (Table 3.8). SCT01-UND-01 was collected within the former extent of Field Combat Range No. 7, while SCT01-UXO-02 was collected within the former extent of Transition Range No. 2, a ground scar area, and next to an ordnance remnant (ERDC, 2000). SCT01-UND-03 and SCT01-UND-04 were collected in undisturbed areas. Arsenic, barium, chromium, and lead were detected among the samples, but none of the detected concentrations exceeded the Texas-specific median background concentrations. Sector 1 is an area formerly used for small arms training and was designated as “uncontaminated” in the ASR.

3.4.7 Eight normal metals samples and one field duplicate sample were collected in Sector 3: SCT03A-UND-01, SCT-03C-UND-01, SCT-03C-UND-02 (normal and duplicate sample), SCT-03E-UND-01, SCT-03E-UND-02, SCT-03E-UND-03, SCT-03E-UND-04, and SCT-03E-UND-05 (Table 3.8). SCT-03E-UND-01 and SCT-03E-UND-02 were collected in disturbed areas (former impact crater), while SCT03E-UND-05 was collected within the extent of three former firing ranges. The remaining samples were collected in undisturbed areas (ERDC, 2000). Arsenic, barium, chromium, lead, and selenium were detected in the samples. The only detected metal value that exceeded the Texas-specific median background concentration was a selenium concentration of 3.7 milligrams per kilogram (mg/kg), detected in sample SCT03C-UND-01 (normal sample). Neither this concentration, nor any of the others for samples collected in this area, exceeded residential soil PCLs. The Texas-specific median background concentration for selenium is 0.3 mg/kg. This sample was collected just to the east of Lake Bastrop, and no waste was observed in the area. According to the aerial photographic analysis (ERDC, 2000), an area that appeared to be a pit was noted just to the north of this sampling location.

3.4.8 Two normal metals samples and one field duplicate sample were collected in Sector 4: SCT04-UND-01 and SCT04-UND-02 (normal and duplicate sample) (Table 3.8). None of the samples exceeded the Texas-specific median background concentrations or residential soil PCLs. Aerial photograph analysis shows both Sector 4 samples to be located in undisturbed areas, but the entire Sector 4 area is designated as a former impact area in the ASR (ERDC, 2000).



**Table 3.7  
Summary of Background Metals Concentrations in Soil  
Camp Swift  
June 2002**

Sample ID	BGD-PaE-01				BGD-PaE-02				BGD-PsB-01				BGD-PsB-02						
	Sample Date	Sample Type	Soil Type	Beginning Depth	Ending Depth	Lab ID	Percent Moisture	Results	Dilution	MDL	RL	Results	Dilution	MDL	RL	Results	Dilution	MDL	RL
	06/12/02	N1	Soil	0	0.5	0206057-03	32.0%												
	06/12/02	N1	Soil	0	0.5	0206057-04	4.03%												
	06/13/02	N1	Soil	0	0.5	0206057-21	7.04%												
	06/13/02	N1	Soil	0	0.5	0206057-22	3.73%												
<b>SW6020 (mg/kg)</b>								Results	Dilution	MDL	RL	Results	Dilution	MDL	RL	Results	Dilution	MDL	RL
Arsenic	ND	5	1.4	1.35	ND	5	0.99	0.992	ND	5	0.99	0.986	ND	5	0.97	0.971			
Barium	20.0	5	3.4	3.37	26.8	5	2.5	2.48	11.7	5	2.5	2.46	13.5	5	2.4	2.43			
Cadmium	ND	5	0.14	0.135	0.103	5	0.099	0.0992	0.210	5	0.099	0.0986	ND	5	0.097	0.0971			
Chromium	ND	5	2.6	2.69	2.29	5	2.0	1.98	2.48	5	1.9	1.97	ND	5	2.0	1.94			
Lead	5.30	5	0.41	0.404	4.17	5	0.30	0.298	5.65	5	0.30	0.296	3.82	5	0.29	0.291			
Selenium	ND	5	1.4	1.35	ND	5	0.99	0.992	ND	5	0.99	0.986	ND	5	0.97	0.971			
Silver	ND	5	0.34	0.337	ND	5	0.25	0.248	ND	5	0.25	0.246	ND	5	0.24	0.243			
<b>SW7471A (mg/kg)</b>																			
Mercury	ND	1	0.050	0.0499	ND	1	0.039	0.0381	ND	1	0.038	0.0381	ND	1	0.037	0.0370			

Tables present all laboratory results for analytes detected above the method detection limit.  
All samples were analyzed by DHL Laboratory, Round Rock, Texas.

Abbreviations and Notes:

MDL Method Detection Limit  
 N/A Not Available  
 PaE Patito-Demona-Silstid association soils  
 PsB Axtell-Tabor association soils  
 RL Reporting Limit  
 ND Not Detected  
 \* Texas-Specific Median Background Concentrations (30 TAC 350.51(m))

**Table 3.8**  
**Summary of Chemical Constituents Detected in Soil, June 2002**  
**Former Camp Swift, Texas**

	Sample ID				SCT01-UND-01				SCT01-UXO-02				SCT01-UND-03				SCT01-UND-04				SCT03A-UND-01			
	Sample Date				06/12/02				06/12/02				06/12/02				06/12/02				06/13/02			
	Sample Type				N1				N1				N1				N1				N1			
	Soil Type				PsB				PaE				PsB				PsB				PsB			
Beginning Depth				0				0				0				0				0				
Ending Depth				0.5				0.5				0.5				0.5				0.5				
Lab ID				0206057-01				0206057-02				0206057-23				0206057-24				0206057-17				
Percent Moisture				26.5%				6.5%				6.18%				6.18%				2.04%				
	Background Concentrations			Risk-Based Concentrations	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL
	PaE Soils Range	PsB Soils Range	Texas-Specific*	Residential Soil PCLs**																				
<b>SW6020 (mg/kg)</b>																								
Arsenic	ND	ND	5.9	24	ND	5	1.3	1.30	1.50	5	1.0	1.04	ND	5	1.0	1.04	ND	5	1.0	0.999	ND	5	0.99	0.991
Barium	20 - 26.8	11.7 - 13.5	300	2,800	47.0	5	3.3	3.24	31.4	5	2.6	2.60	32.1	5	2.7	2.61	15.2	5	2.5	2.49	6.92	5	2.4	2.48
Cadmium	ND - 0.103	ND - 0.210	N/A	52	ND	5	0.13	0.130	ND	5	0.10	0.104	ND	5	0.10	0.104	ND	5	0.10	0.0999	ND	5	0.099	0.0991
Chromium	ND - 2.29	ND - 2.48	30	30,000	ND	5	2.6	2.59	7.23	5	2.0	2.08	2.37	5	2.1	2.09	ND	5	2.0	2.00	2.36	5	1.9	1.98
Lead	4.17 - 5.3	3.82 - 5.65	15	500	5.90	5	0.39	0.389	12.5	5	0.31	0.311	6.67	5	0.31	0.313	4.42	5	0.30	0.300	4.54	5	0.30	0.297
Selenium	ND	ND	0.3	310	ND	5	1.3	1.30	ND	5	1.0	1.04	ND	5	1.0	1.04	ND	5	1.0	0.999	ND	5	0.99	0.991
Silver	ND	ND	N/A	96	ND	5	0.33	0.324	ND	5	0.26	0.260	ND	5	0.27	0.261	ND	5	0.25	0.249	ND	5	0.24	0.248
<b>SW7471A (mg/kg)</b>																								
Mercury	ND	ND	0.04	8.3	ND	1	0.053	0.0525	ND	1	0.039	0.0387	ND	1	0.036	0.0357	ND	1	0.041	0.0409	ND	1	0.039	0.0388
<b>SW8330 (mg/kg)</b>																								
Amino-2,6-dinitrotoluene, 4-	--	--	--	9.8																				
Amino-4,6-dinitrotoluene, 2-	--	--	--	10.																				
Dinitrobenzene, 1,3-	--	--	--	6.5																				
Dinitrotoluene, 2,4-	--	--	--	6.9																				
Dinitrotoluene, 2,6-	--	--	--	6.9																				
HMX	--	--	--	350																				
Nitrobenzene	--	--	--	31.																				
Nitrotoluene, 2-	--	--	--	380																				
Nitrotoluene, 3-	--	--	--	390																				
Nitrotoluene, 4-	--	--	--	380																				
RDX	--	--	--	43.																				
Tetryl	--	--	--	68.																				
Trinitrobenzene, 1,3,5-	--	--	--	2000																				
Trinitrotoluene, 2,4,6-	--	--	--	23.																				

Tables present all laboratory results for analytes detected above the method detection limit. Bolded type indicates samples that exceeded Texas-Specific Median Background levels. Values listed for explosives are total combined soil PCLs.  
 All samples were analyzed by DHL Analytical, Round Rock, Texas.

**Abbreviations and Notes:**

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- N/A Not Available
- PaE Patilo-Demona-Silstid association soils
- PsB Axtell-Tabor association soils
- PCL Protective concentration limit
- RL Reporting Limit
- ND Not Detected
- \* Texas-Specific Median Background Concentrations (30 TAC 350.51(m))
- \*\* Texas Risk Reduction Program soil PCLs for combined inhalation, ingestion, dermal, and vegetable consumption pathways (0.5-acre source area)

**Table 3.8**  
**Summary of Chemical Constituents Detected in Soil, June 2002**  
**Former Camp Swift, Texas**

	Sample ID				SCT03C-UND-01				SCT03C-UND-02				SCT03C-UND-02				SCT03E-UND-01				SCT03E-UND-02			
	Sample Date				06/12/02				06/12/02				06/12/02				06/13/02				06/13/02			
	Sample Type				N1				N1				Duplicate				N1				N1			
	Soil Type				PaE				PaE				PaE				PaE				PaE			
Beginning Depth				0				0				0				0				0				
Ending Depth				0.5				0.5				0.5				0.5				0.5				
Lab ID				0206057-11				0206057-12				0206057-13				0206057-07				0206057-08				
Percent Moisture				5.55%				4.77%				11.9%				2.33%				1.59%				
	Background Concentrations			Risk-Based Concentrations	Results				Results				Results				Results				Results			
	PaE Soils Range	PsB Soils Range	Texas-Specific*	Residential Soil PCLs**	Dil	MDL	RL	Dil	MDL	RL	Dil	MDL	RL	Dil	MDL	RL	Dil	MDL	RL	Dil	MDL	RL		
<b>SW6020 (mg/kg)</b>																								
Arsenic	ND	ND	5.9	24	5.34	5	0.98	0.990	1.21	5	1.0	1.00	ND	5	1.1	1.05	ND	5	0.95	0.957	ND	5	0.98	0.978
Barium	20 - 26.8	11.7 - 13.5	300	2,800	44.4	5	2.4	2.48	16.2	5	2.5	2.50	16.2	5	2.6	2.62	18.0	5	2.4	2.40	12.9	5	2.4	2.44
Cadmium	ND - 0.103	ND - 0.210	N/A	52	ND	5	0.098	0.0990	ND	5	0.10	0.100	ND	5	0.11	0.105	ND	5	0.095	0.0957	ND	5	0.098	0.0978
Chromium	ND - 2.29	ND - 2.48	30	30,000	12.1	5	2.0	1.98	4.00	5	2.0	2.00	3.46	5	2.2	2.10	3.72	5	1.9	1.91	3.87	5	1.9	1.95
Lead	4.17 - 5.3	3.82 - 5.65	15	500	11.8	5	0.30	0.296	5.45	5	0.30	0.300	5.17	5	0.32	0.316	5.02	5	0.29	0.287	4.56	5	0.29	0.293
Selenium	ND	ND	0.3	310	<b>3.70</b>	<b>5</b>	<b>0.98</b>	<b>0.990</b>	ND	5	1.0	1.00	ND	5	1.1	1.05	ND	5	0.95	0.957	ND	5	0.98	0.978
Silver	ND	ND	N/A	96	ND	5	0.24	0.248	ND	5	0.25	0.250	ND	5	0.26	0.262	ND	5	0.24	0.240	ND	5	0.24	0.244
<b>SW7471A (mg/kg)</b>																								
Mercury	ND	ND	0.04	8.3	ND	1	0.039	0.0393	ND	1	0.038	0.0373	ND	1	0.040	0.0397	ND	1	0.037	0.0366	ND	1	0.038	0.0375
<b>SW8330 (mg/kg)</b>																								
Amino-2,6-dinitrotoluene, 4-	--	--	--	9.8					ND	1	0.20	0.493												
Amino-4,6-dinitrotoluene, 2-	--	--	--	10.					ND	1	0.099	0.493												
Dinitrobenzene, 1,3-	--	--	--	6.5					ND	1	0.099	0.493												
Dinitrotoluene, 2,4-	--	--	--	6.9					ND	1	0.099	0.493												
Dinitrotoluene, 2,6-	--	--	--	6.9					ND	1	0.099	0.493												
HMX	--	--	--	350					ND	1	0.099	0.493												
Nitrobenzene	--	--	--	31.					ND	1	0.099	0.493												
Nitrotoluene, 2-	--	--	--	380					ND	1	0.20	0.493												
Nitrotoluene, 3-	--	--	--	390					ND	1	0.20	0.493												
Nitrotoluene, 4-	--	--	--	380					ND	1	0.20	0.493												
RDX	--	--	--	43.					ND	1	0.30	0.493												
Tetryl	--	--	--	68.					ND	1	0.099	0.493												
Trinitrobenzene, 1,3,5-	--	--	--	2000					ND	1	0.20	0.493												
Trinitrotoluene, 2,4,6-	--	--	--	23.					ND	1	0.099	0.493												

Tables present all laboratory results for analytes detected above the method detection limit. Bolded type indicates samples that exceeded Texas-Specific Median Background levels. Values listed for explosives are total combined soil PCLs.  
 All samples were analyzed by DHL Analytical, Round Rock, Texas.

**Abbreviations and Notes:**

- Dil Dilution
- MDL Method Detection Limit
- N/A Not Available
- PaE Patilo-Demona-Silstid association soils
- PsB Axtell-Tabor association soils
- PCL Protective concentration limit
- RL Reporting Limit
- ND Not Detected
- \* Texas-Specific Median Background Concentrations (30 TAC 350.51(m))
- \*\* Texas Risk Reduction Program soil PCLs for combined inhalation, ingestion, dermal, and vegetable consumption pathways (0.5-acre source area)



**Table 3.8**  
**Summary of Chemical Constituents Detected in Soil, June 2002**  
**Former Camp Swift, Texas**

	Sample ID				SCT03E-UND-03				SCT03E-UND-04				SCT03E-UND-05				SCT04-UND-01				SCT04-UND-02				
	Sample Date				06/13/02				06/13/02				06/13/02				06/12/02				06/13/02				
	Sample Type				N1				N1				N1				N1				N1				
	Soil Type				PsB				PsB				PaE				PsB				PsB				
Beginning Depth				0				0				0				0				0					
Ending Depth				0.5				0.5				0.5				0.5				0.5					
Lab ID				0206057-09				0206057-10				0206057-20				0206057-14				0206057-15					
Percent Moisture				5.28%				3.53%				3.21%				3.50%				3.50%					
	Background Concentrations			Risk-Based Concentrations	Residential Soil PCLs**	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL
	PaE Soils Range	PsB Soils Range	Texas-Specific*																						
<b>SW6020 (mg/kg)</b>																									
Arsenic	ND	ND	5.9	24	ND	5	1.0	1.05	ND	5	1.0	1.03	1.20	5	0.96	0.957	ND	5	1.0	1.01	ND	5	1.0	1.03	
Barium	20 - 26.8	11.7 - 13.5	300	2,800	12.8	5	2.6	2.62	8.32	5	2.6	2.57	27.4	5	2.4	2.39	8.43	5	2.5	2.52	14.9	5	2.6	2.58	
Cadmium	ND - 0.103	ND - 0.210	N/A	52	ND	5	0.10	0.105	ND	5	0.10	0.103	ND	5	0.096	0.0957	ND	5	0.10	0.101	ND	5	0.10	0.103	
Chromium	ND - 2.29	ND - 2.48	30	30,000	2.51	5	2.1	2.09	ND	5	2.1	2.05	6.12	5	2.0	1.91	ND	5	2.0	2.01	ND	5	2.1	2.06	
Lead	4.17 - 5.3	3.82 - 5.65	15	500	3.67	5	0.32	0.314	3.19	5	0.31	0.308	6.27	5	0.29	0.287	3.41	5	0.30	0.302	4.41	5	0.31	0.310	
Selenium	ND	ND	0.3	310	ND	5	1.0	1.05	ND	5	1.0	1.03	ND	5	0.96	0.957	ND	5	1.0	1.01	ND	5	1.0	1.03	
Silver	ND	ND	N/A	96	ND	5	0.26	0.262	ND	5	0.26	0.257	ND	5	0.24	0.239	ND	5	0.25	0.252	ND	5	0.26	0.258	
<b>SW7471A (mg/kg)</b>																									
Mercury	ND	ND	0.04	8.3	ND	1	0.041	0.0408	ND	1	0.034	0.0346	ND	1	0.036	0.0365	ND	1	0.038	0.0381	ND	1	0.037	0.0365	
<b>SW8330 (mg/kg)</b>																									
Amino-2,6-dinitrotoluene, 4-	--	--	--	9.8																	ND	1	0.20	0.488	
Amino-4,6-dinitrotoluene, 2-	--	--	--	10.																	ND	1	0.098	0.488	
Dinitrobenzene, 1,3-	--	--	--	6.5																	ND	1	0.098	0.488	
Dinitrotoluene, 2,4-	--	--	--	6.9																	ND	1	0.098	0.488	
Dinitrotoluene, 2,6-	--	--	--	6.9																	ND	1	0.098	0.488	
HMX	--	--	--	350																	ND	1	0.098	0.488	
Nitrobenzene	--	--	--	31.																	ND	1	0.098	0.488	
Nitrotoluene, 2-	--	--	--	380																	ND	1	0.20	0.488	
Nitrotoluene, 3-	--	--	--	390																	ND	1	0.20	0.488	
Nitrotoluene, 4-	--	--	--	380																	ND	1	0.20	0.488	
RDX	--	--	--	43.																	ND	1	0.29	0.488	
Tetryl	--	--	--	68.																	ND	1	0.098	0.488	
Trinitrobenzene, 1,3,5-	--	--	--	2000																	ND	1	0.20	0.488	
Trinitrotoluene, 2,4,6-	--	--	--	23.																	ND	1	0.098	0.488	

Tables present all laboratory results for analytes detected above the method detection limit. Bolded type indicates samples that exceeded Texas-Specific Median Background levels. Values listed for explosives are total combined soil PCLs. All samples were analyzed by DHL Analytical, Round Rock, Texas.

**Abbreviations and Notes:**

- Dil Dilution
- MDL Method Detection Limit
- N/A Not Available
- PaE Patilo-Demona-Silstid association soils
- PsB Axtell-Tabor association soils
- PCL Protective concentration limit
- RL Reporting Limit
- ND Not Detected
- \* Texas-Specific Median Background Concentrations (30 TAC 350.51(m))
- \*\* Texas Risk Reduction Program soil PCLs for combined inhalation, ingestion, dermal, and vegetable consumption pathways (0.5-acre source area)

**Table 3.8**  
**Summary of Chemical Constituents Detected in Soil, June 2002**  
**Former Camp Swift, Texas**

	Sample ID				SCT04-UND-02				SCT07-UND-01				SCT09-UND-01				SCT10-VIC-01				SCT10-UND-02				
	Sample Date				06/13/02				06/13/02				06/13/02				06/12/02				06/12/02				
	Sample Type				Duplicate				N1				N1				N1				N1				
	Soil Type				PsB				PaE				PaE				PsB				PsB				
Beginning Depth				0				0				0				0				0					
Ending Depth				0.5				0.5				0.5				0.5				0.5					
Lab ID				0206057-16				0206057-05				0206057-06				0206057-18				0206057-19					
Percent Moisture				9.19%				34.0%				3.42%				8.12%				1.46%					
	Background Concentrations			Risk-Based Concentrations	Residential Soil PCLs**	Results				Results				Results				Results				Results			
	PaE Soils Range	PsB Soils Range	Texas-Specific*			Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL	Results	Dil	MDL	RL
<b>SW6020 (mg/kg)</b>																									
Arsenic	ND	ND	5.9	24	ND	5	1.1	1.08	2.15	5	1.5	1.47	ND	5	0.99	0.996	1.13	5	1.0	1.05	1.06	5	0.98	0.985	
Barium	20 - 26.8	11.7 - 13.5	300	2,800	19.7	5	2.8	2.70	30.8	5	3.6	3.68	12.4	5	2.5	2.48	118	5	2.6	2.61	33.8	5	2.4	2.47	
Cadmium	ND - 0.103	ND - 0.210	N/A	52	0.127	5	0.11	0.108	0.150	5	0.15	0.147	ND	5	0.099	0.0996	ND	5	0.10	0.105	ND	5	0.098	0.0985	
Chromium	ND - 2.29	ND - 2.48	30	30,000	2.36	5	2.2	2.16	8.22	5	2.9	2.94	2.73	5	2.0	1.99	8.18	5	2.1	2.09	5.26	5	1.9	1.97	
Lead	4.17 - 5.3	3.82 - 5.65	15	500	5.38	5	0.32	0.324	7.74	5	0.44	0.441	6.72	5	0.30	0.298	<b>29.2</b>	<b>5</b>	<b>0.32</b>	<b>0.313</b>	5.96	5	0.29	0.295	
Selenium	ND	ND	0.3	310	ND	5	1.1	1.08	ND	5	1.5	1.47	ND	5	0.99	0.996	ND	5	1.0	1.05	ND	5	0.98	0.985	
Silver	ND	ND	N/A	96	ND	5	0.28	0.270	ND	5	0.36	0.368	ND	5	0.25	0.248	ND	5	0.26	0.261	ND	5	0.24	0.247	
<b>SW7471A (mg/kg)</b>																									
Mercury	ND	ND	0.04	8.3	ND	1	0.037	0.0372	ND	1	0.059	0.0591	ND	1	0.036	0.0364	ND	1	0.036	0.0364	ND	1	0.036	0.0353	
<b>SW8330 (mg/kg)</b>																									
Amino-2,6-dinitrotoluene, 4-	--	--	--	9.8					ND	1	0.20	0.498													
Amino-4,6-dinitrotoluene, 2-	--	--	--	10.					ND	1	0.10	0.498													
Dinitrobenzene, 1,3-	--	--	--	6.5					ND	1	0.10	0.498													
Dinitrotoluene, 2,4-	--	--	--	6.9					ND	1	0.10	0.498													
Dinitrotoluene, 2,6-	--	--	--	6.9					ND	1	0.10	0.498													
HMX	--	--	--	350					ND	1	0.10	0.498													
Nitrobenzene	--	--	--	31.					ND	1	0.10	0.498													
Nitrotoluene, 2-	--	--	--	380					ND	1	0.20	0.498													
Nitrotoluene, 3-	--	--	--	390					ND	1	0.20	0.498													
Nitrotoluene, 4-	--	--	--	380					ND	1	0.20	0.498													
RDX	--	--	--	43.					ND	1	0.30	0.498													
Tetryl	--	--	--	68.					ND	1	0.10	0.498													
Trinitrobenzene, 1,3,5-	--	--	--	2000					ND	1	0.20	0.498													
Trinitrotoluene, 2,4,6-	--	--	--	23.					ND	1	0.10	0.498													

Tables present all laboratory results for analytes detected above the method detection limit. Bolded type indicates samples that exceeded Texas-Specific Median Background levels. Values listed for explosives are total combined soil PCLs.  
 All samples were analyzed by DHL Analytical, Round Rock, Texas.

**Abbreviations and Notes:**

- Dil Dilution
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- PCL Protective concentration limit
- RL Reporting Limit
- ND Not Detected
- \* Texas-Specific Median Background Concentrations (30 TAC 350.51(m))
- \*\* Texas Risk Reduction Program soil PCLs for combined inhalation, ingestion, dermal, and vegetable consumption pathways (0.5-acre source area)

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**Table 3.9 TNT and RDX Field Test Kit Analytical Results**

Sample ID	Sample Date	Sample Time	TNT (ppm)	RDX (ppm)
SCT01-UND-01	6/12/2002	1100	<0.5	<0.5
SCT01-UXO-02	6/12/2002	1115	<0.5	<0.5
SCT03A-UND-01	6/13/2002	1405	<0.5	<0.5
SCT03A-UND-02	6/13/2002	1420	<0.5	<0.5
SCT03C-UND-01	6/12/2002	1600	<0.5	<0.5
SCT03C-UND-02	6/12/2002	1530	<0.5	<0.5
SCT03E-UND-01	6/13/2002	0815	<0.5	<0.5
SCT03E-UND-02	6/13/2002	0820	<0.5	<0.5
SCT03E-UND-03	6/13/2002	1155	<0.5	<0.5
SCT03E-UND-04	6/13/2002	1210	<0.5	<0.5
SCT04-UND-01	6/13/2002	1320	<0.5	<0.5
SCT04-UND-02	6/13/2002	1315	<0.5	<0.5
SCT04-UXO-03	5/8/2002	1000	<0.5	<0.5
SCT04-IPD-04	5/9/2002	1600	<0.5	<0.5
SCT05-UND-01	6/13/2002	1340	<0.5	<0.5
SCT05-UND-02	6/13/2002	1330	<0.5	<0.5
SCT07-UND-01	6/13/2002	1000	<0.5	<0.5
SCT07-UND-02	6/13/2002	1010	<0.5	<0.5
SCT09-UND-01	6/13/2002	1110	<0.5	<0.5
SCT09-UND-02	6/13/2002	1120	<0.5	<0.5
SCT10-VIC-01	6/12/2002	1345	<0.5	<0.5
SCT10-UND-02	6/12/2002	1430	<0.5	<0.5

Note: The detection limit for the TNT and RDX kits is 0.5 parts per million (ppm).

3.4.9 One normal metals sample was collected from Sector 7, SCT07-UND-01 (Table 3.8). Although arsenic, barium, cadmium, chromium, and lead were detected in SCT07-UND-01, none of the detected concentrations exceeded the Texas-specific median background concentrations or residential soil PCLs. SCT07-UND-01 was collected in an undisturbed area, but Sector 7 was the ammunition storage area for the former camp.

3.4.10 One normal metals sample was collected from Sector 9, SCT09-UND-01 (Table 3.8). Although barium, chromium, and lead were detected in SCT09-UND-01, none of the detected concentrations exceeded the Texas-specific median background concentrations or residential soil PCLs. Sector 9 was identified as the “Gas Area” in historic master plans for the former camp, and impact craters were identified in the southwestern half of the area (ERDC, 2000). The SCT09-UND-01 sample location lies within the extent of the impact craters.

3.4.11 Two normal metals samples were collected from Sector 10: SCT10-VIC-01 and SCT10-UND-02 (Table 3.8). SCT10-VIC-01 and SCT10-UND-02 were collected within an impact crater and pit area, respectively (ERDC, 2000). Arsenic, barium, chromium, and lead were detected in both samples, but the only detected metal value that exceeded the

Texas-specific median background concentration was a lead concentration of 29.2 mg/kg, detected in sample SCT10-VIC-01. Neither this concentration, nor any of the others for samples collected in this area, exceeded residential soil PCLs. The Texas-specific median background concentration for lead is 15 mg/kg. This sample was collected after detonation of a practice anti-tank mine. Sector 10 is a former munitions demolition area.

3.4.12 In summary, analytical results from this sampling program show one selenium exceedance and one lead exceedance. The selenium exceedance was located in Sector 3C, an area that has no history of ordnance-related activities and is not a historically disturbed area. Since selenium was not detected in 21 of the 22 samples, unknown causes or variations in natural levels may account for this detection. The lead concentration of 29.2 mg/kg exceeded the established background range of 3.82-5.65 mg/kg for Axtell-Tabor soils. Since the sample was collected from a visually identifiable crater in a former demolition area, it is possible that soils in Sector 10 may have been impacted by demolition activities.

3.4.13 Thirteen of 22 samples that were analyzed for TNT and RDX explosives using field test kits were collected from undisturbed areas. All of the sample results were less than 0.5 mg/kg for TNT and RDX in these samples. The remaining nine samples were collected within disturbed areas, a former firing range, adjacent to a BIP location, or a combination of location types. These results were also less than 0.5 mg/kg for all samples. Three of the samples that were collected from undisturbed areas were submitted for lab analysis to provide QA/QC for the samples. No explosives were detected in these samples.

3.4.14 Eighteen metals samples were submitted for laboratory analysis, minus the four collected for background samples. Nine were collected in undisturbed areas, while the remaining nine samples were collected within disturbed areas, former firing ranges, adjacent to a BIP location, or a combination of location types. One selenium result exceeded background in a sample collected from an undisturbed area and one lead result exceeded background from the sample collected within a visually-identifiable historic detonation crater.

3.4.15 The objective of the soil sampling was to determine if ordnance-related chemical constituents were present in former Camp Swift soils. To obtain representative data, samples were biased towards known historical firing ranges, areas with visible staining, disposal craters, historic detonation craters, or where UXO had been found. The soil sampling and analysis plan stated that samples were to be collected from Sectors 1, 2, 3E, 4, 5, 6, and 10. Sampling was conducted with these objectives in mind, but right-of-entry agreements dictated where samples could be obtained. ROEs for some sectors were initially sparse and ROEs were expiring as fieldwork was being conducted. Although ROEs did limit the sampling routine, most of the soil samples were collected in disturbed areas or former firing ranges. Samples collected in undisturbed areas showed no signs of explosives or metals contamination. Outside of a 3.7 mg/kg selenium result from a sample in Sector 3C, all undisturbed area samples were non-detects or below Texas-specific median background concentrations. Of the samples collected in disturbed areas, only a single lead result from a Sector 10 historic detonation crater sample exceeded Texas-specific median background concentrations.

3.4.16 The sampling routine is believed to have properly characterized the soils at the former Camp Swift and project data quality objectives (DQO) have been met. The absence of contamination in samples collected from disturbed areas, whether a BIP location or location identified on historical photographs, indicates that soils have not been substantially impacted by past camp activities. Additional soil sampling will be included in future Remedial Investigation/Feasibility Study (RI/FS) reports, and current guidance and sampling methodology will be used.

### **3.5 UPDATE TO ASR FINDINGS**

The Camp Swift ASR and Supplement to the ASR are described in Subchapters 2.7.3 and 2.7.4, respectively. Similar background information is included in the historical photograph analysis (Subchapter 2.7.7) and various landowner findings that are discussed by sector throughout Chapter 3.



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## CHAPTER 4 RISK EVALUATION

### 4.1 INTRODUCTION

4.1.1 Using the Interim Guidance for OE Risk Impact Assessment (USACE, 2001), a qualitative risk evaluation was conducted to assess explosive safety risk to the public at the former Camp Swift. The OE Risk Impact Assessment (OERIA) uses direct analysis of site conditions and demographics to evaluate OE risk. The risk evaluation presented herein is based on the EE/CA site characterization findings presented in Chapter 3. The results of this risk assessment were used to help determine the most appropriate OE response action alternatives for the former Camp Swift (identified in Chapter 8).

4.1.2 For the purposes of conducting this qualitative risk evaluation, the sixteen sector boundaries presented in Chapter 3 of this EE/CA were further partitioned using land use designations, property ownership boundaries, and the sample locations and results of the EE/CA field investigation. Using this information, 23 individual risk evaluation areas of interest (AOIs) were delineated (Figure 4.1) throughout the EE/CA field investigation area so that the most effective OE response action alternatives could be recommended for the former Camp Swift site.

4.1.3 Subchapters 4.1 and 4.2 discuss the definition of risk factors and the approach and rationale used in this qualitative risk evaluation. Subchapter 4.3 provides the qualitative risk assessment for each AOI. Subchapter 4.4 summarizes the results of the risk assessment for the former Camp Swift.

### 4.2 RISK EVALUATION FACTORS, CATEGORIES, AND SUBCATEGORIES

The potential risk posed by OE was characterized qualitatively by evaluating three primary risk factors, including: 1) presence of OE, 2) site characteristics, and 3) human factors. By performing a qualitative assessment of these three factors, an overall assessment of the safety risk posed by OE was evaluated. The following paragraphs describe the components of each of the primary risk factors.

#### 4.2.1 Presence of OE Factors

4.2.1.1 There are four categories that are evaluated to assess the factors associated with the presence of OE. These include the OE type, OE sensitivity, OE density, and OE depth distribution.

4.2.1.2 **Type.** The OE type affects the likelihood of injury and the severity of exposure. For the Camp Swift investigation, risk was evaluated based on the number of UXO found per number of excavations in a particular area. If UXO was found, the area was considered characterized, and the investigation focus was shifted to areas with less data. Multiple UXO items were recovered from some sectors because additional investigation in another area of that sector may have been conducted. If a sector was very large, additional

investigation may have been conducted to obtain representative data for the entire sector. Also, in the initial days of the intrusive investigation, a UXO corrosion study was being conducted by USAESCH. For this study, samples of soil adjacent to UXO were needed; therefore, additional intrusive investigations were conducted in AOI 4-1, the impact area. However, the risk level for an area is based on the density of UXO and ordnance scrap per excavation and the type of UXO found. Additional data in one AOI will not affect the overall site conclusions. If multiple OE items were identified during intrusive activities in a particular sector, that item which poses the greatest risk to public health is selected for risk evaluation. There are four subcategories of OE type, as shown in Table 4.1. These subcategories are presented in order of severity from highest to lowest risk.

**Table 4.1  
OE Type Subcategories**

Subcategory	OE Type Description
Most Severe	UXO that may be lethal if detonated by an individual's activities
Moderate Severity	UXO that may cause major injury to an individual if detonated by an individual's activities
Least Severity	UXO that may cause minor injury to an individual if detonated by an individual's activities
No Injury	Ordnance scrap (inert), will cause no injury

4.2.1.3 **Sensitivity.** OE sensitivity affects the likelihood of detonation and the severity of exposure. Factors considered in evaluating sensitivity include fuzing and environmental factors such as weathering. There are four potential subcategories of OE sensitivity. The category of sensitivity is based on the results of the EE/CA field investigation as well as the results of archival searches. When multiple subcategories of OE types are discovered in an area, the highest risk subcategory is used in the risk evaluation. The subcategories of sensitivity are defined and presented in order from highest to lowest in Table 4.2.

**Table 4.2 OE Sensitivity Subcategories**

Subcategory	OE Sensitivity
Very Sensitive	UXO that is very sensitive, i.e., electronic fuzing, land mines, booby traps
Less Sensitive	UXO that has standard fuzing
Insensitive	UXO that may have functioned correctly, or is unfuzed, but has a residual risk
Inert	Ordnance scrap (inert), will cause no injury



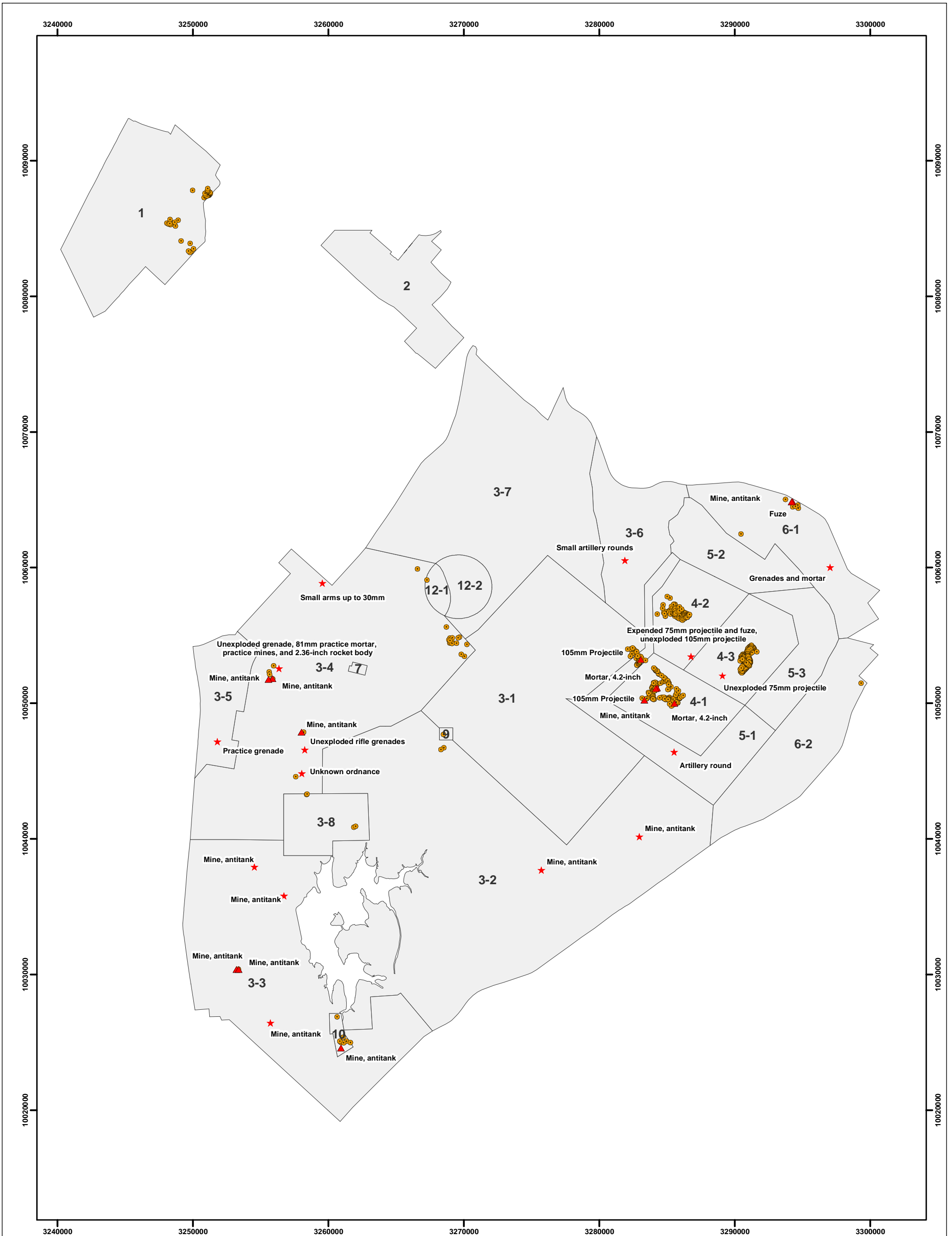
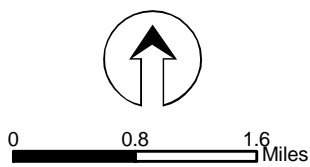


Figure 4.1  
EE/CA Areas Of Interest

**Legend**

- OE Scrap found during EE/CA
- ▲ UXO found during EE/CA
- ★ Ordnance Finding Reported by Landowner
- AOI (Areas Of Interest)



Map Units: NAD 1983 Texas Central State Plane (Feet)

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	PROJECT NUMBER: 737805		
CHECKED BY: EN	SCALE: 1:80,000	DATE: April, 2003	
SUBMITTED BY: JB	FILE: J:\737805\GIS\EECA\Fig4_1_AOI_UXO.mxd	PAGE NUMBER:	

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4.2.1.4 **Density.** OE density affects the likelihood that an individual will be exposed to UXO. There exists a direct relationship between density and potential for harm. For example, the more ordnance per acre, the greater the likelihood of exposure to a UXO item and thereby an opportunity to create an incident. Density can be estimated either qualitatively or quantitatively.

4.2.1.5 **Depth Distribution.** The OE depth distribution refers to where the OE is located vertically in the subsurface. The OE depth distribution affects the likelihood that an individual will be exposed to OE. There exists a direct relationship between the depth at which OE are found and the likelihood of exposure to the OE. That is, the greater the depth where the OE are found, the lower the risk of exposure. There are two subcategories within the OE depth distribution category: surface and subsurface. The surface subcategory includes those items recovered from between 0 and 6 inches bgs. The subsurface subcategory includes those items recovered from greater than 6 inches bgs. Assessment of this risk category reflects the findings of the EE/CA field investigation.

#### 4.2.2 Site Characteristics Factors

4.2.2.1 There are two categories that are evaluated in the site characteristics risk factor. These are site accessibility and site stability.

4.2.2.2 **Site Accessibility.** The accessibility of a site affects the likelihood of encountering OE. Natural or physical barriers can limit the accessibility. Natural barriers can include the terrain or topography of the site as well as the vegetation. Physical barriers can include walls and fences that limit the public's accessibility to the site. Both the physical and natural barriers found at a site are considered when evaluating this category. Site accessibility has three subcategories. These subcategories are presented in Table 4.3.

**Table 4.3 Site Accessibility Subcategories**

Subcategory	Accessibility Description	Qualitative Risk Level
No Restriction to Site	No man-made barriers, gently sloping terrain, no vegetation that restricts access, no water that restricts access	High
Limited Restriction to Access	Man-made barriers, vegetation that restricts access, water, and/or terrain restricts access	Moderate
Complete Restriction to Access	All points of entry are controlled	Low

4.2.2.3 **Site Stability.** This category relates to the probability of being exposed to OE by natural processes. These natural processes include recurring natural events (e.g., frost heave, sand movement, erosion) or extreme natural events (e.g., tornadoes, hurricanes). The local soil type, topography, climate, and vegetation affect stability of the site. The soil type and climate primarily affects the depth of penetration of the OE. Over time, the soil type and climate will also affect the degree of erosion that takes place at a site. Topography and vegetation in the area will also affect the rate of erosion that takes place in an area. Site stability has three subcategories. Table 4.4 describes these subcategories.

**Table 4.4 Site Stability Subcategories**

Subcategory	Stability Description	Qualitative Risk Level
Site Unstable	OE most likely will be exposed by natural events.	High
Moderately Stable Site	OE may be exposed by natural events	Moderate
Site Stable	OE should not be exposed by natural events	Low

### 4.2.3 Human Factors

4.2.3.1 There are two categories that are evaluated in the primary human risk factor. These include activities and population.

4.2.3.2 **Site Activity.** The types of activities conducted at a site affect the likelihood of encountering OE. This category examines whether the impact from an activity on OE is significant, moderate, or low. In order to assign such a score, the general guidelines presented in Table 4.5 were considered. First, the type of activity was identified. Then, the depth of the activity was also considered. For example, at a site where OE is at the surface, all activities that can impact OE at the surface are considered activities that have significant impact. Conversely, if all OE items are located at depths greater than one foot and only surface impact activities are being performed then the activities are considered as moderate or low impact. After the type of activity and depth of OE are identified, then a score of significant, moderate, or low may be assigned.

**Table 4.5 Activities OE Contact Probability Levels**

Examples of Activities	Actual Depth of OE	Contact Level
Child play, short cuts, hunting, hiking, off-road driving, mountain biking, motor biking	0-6" 6"-12" >12"	Significant Low Low
Picnicking, camping, ranching	0-6" 6"-12" >12"	Significant Moderate Low
Construction, firefighting, crop farming, gardening, landscaping, archaeology	0-6" 6"-12" >12"	Significant Significant Moderate

4.2.3.3 **Population.** This category refers to the number of people that potentially access the site on a daily basis. The number of people using the site affects the likelihood of encountering OE. A direct relationship exists between the number of people and the risk of exposure. An estimate of the number of people accessing the site on a daily basis was made using U.S. Census Bureau data from the year 2000 and best professional judgment based on knowledge of the type of site, land use, access restrictions, population, and other demographics.

## 4.3 RISK EVALUATION OF FORMER CAMP SWIFT

This risk evaluation for the former Camp Swift uses data collected from the EE/CA field investigation, documented reports of discovered OE, landowner reports of ordnance findings, current and future land uses, and the decision criteria discussed in Subchapter 4.2 to



qualitatively assess the overall OE hazard level in the AOIs shown in Figure 4.1. Table 4.6 summarizes for each risk evaluation area: total area evaluated, number of UXO and ordnance scrap items recovered during the EE/CA field investigation and previous investigations, UXO and ordnance scrap density, and comments. Because ROE was not granted to many properties, no data are available for 5 of the 23 areas; these include AOIs 2, 3-7, 5-3, 8, and 12-2. These AOIs are discussed in Subchapter 4.4.1.

**Table 4.6 Summary of Current and Historic UXO and Ordnance Scrap Findings**

OERIA Evaluation Area of Interest	Sector(s)	Total Area (Acres)	Total Area Surveyed (Acres)	UXO Items Identified during EE/CA	Estimated Number of UXO per acre in AOI	Ordnance Scrap Items Recovered during EE/CA	Estimated Number of Ordnance Scrap per acre in AOI
1	1	2,321	14.4	--	--	48	7.9
3-1	3A	4,297	18.8	--	--	14	2.8
3-2	3B, 3C, 3E	8,174	43.9	1 <sup>(a)</sup>	0.1	3	0.3
3-3	3C, 3E	4,190	22	2	0.5	2	0.5
3-4	3E, 11	5,275	38.4	5 <sup>(a)</sup>	0.6	23	2.8
3-5	3D	744	9.4	--	--	--	--
3-6	3E	1,157	5.5	--	--	--	--
3-8	3E, 11	589	3.1	--	--	3	3.3
4-1	4	884	7.8	4	1.4	132	46.4
4-2	4	767	2.7	1 <sup>(a)</sup>	0.8	98	78.5
4-3	4	864	2.2	1 <sup>(a)</sup>	0.7	285	189.2
5-1	5	1,169	8.4	1	1.1	23	23.8
5-2	5	777	3.4	--	--	--	--
6-1	6	1,331	5.4	2	0.7	6	2.0
6-2	6	1,496	11.1	--	--	1	0.3
7	7	20	0.9	--	--	--	--
9	9	20	0.2	--	--	1	6.2
10	10	69	2.6	1	1.0	6	6.2
12-1	12	113	0.3	--	--	1	3.5
<b>Total</b>				<b>18</b>	<b>N/A</b>	<b>646</b>	<b>N/A</b>

<sup>(a)</sup> Includes one or more item shown by landowner to Parsons UXOSO who confirmed it to be UXO during the EE/CA investigation. One landowner finding each in AOIs 3-2, 4-2, and 4-3 were UXO items, whereas two landowner findings were found to be UXO in AOI 3-4.

### 4.3.1 AOI 1 Risk Evaluation

AOI 1 is located in the northern apex of the former Camp Swift, north of the TARNG facility (Figure 4.1). AOI 1 consists of 2,321 acres and is a former range area. A discussion of each risk factor for AOI 1 is presented in the following subchapters.

#### 4.3.1.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)

**4.3.1.1.1 OE Type.** No UXO items were found during intrusive investigations at AOI 1. A total of 48 ordnance scrap items were recovered, nine of which could be identified. One of the ordnance scrap items was found on the ground surface during the geophysical survey. The nine identifiable items consisted of inert or expended 4.2-inch rocket ordnance scrap, 2.36-inch rocket ordnance scrap, 60mm mortar ordnance scrap, rifle grenade ordnance scrap, and 105mm projectile ordnance scrap. No landowners have reported finding OE items in AOI 1. Only ordnance scrap was found in AOI 1; therefore, a “no injury” OE type subcategory is assigned to AOI 1.

**4.3.1.1.2 OE Sensitivity.** Because the EE/CA findings consisted only of ordnance scrap items, an OE sensitivity subcategory of “inert” is assigned to AOI 1.

**4.3.1.1.3 OE Density.** No UXO was identified in AOI 1 during the EE/CA field investigation, and none has been reported in previous investigations or by private landowners. Although data were collected in all areas of AOI 1, the 48 ordnance scrap items recovered in this area were all found in the area identified by TEC as being “disturbed” in 1940s-era aerial photographs, or within former firing range areas.

**4.3.1.1.4 OE Depth.** There were no UXO items found in AOI 1. All except four of the 48 ordnance scrap items recovered in this area during the EE/CA field investigation were found within 6 inches of ground surface. Of the four deeper items, three were recovered from a depth of 7 inches, and one from a depth of 12 inches.

#### 4.3.1.2 Site Characteristics Factors (Site Accessibility, Site Stability)

**4.3.1.2.1 Site Accessibility.** There are no restrictions to AOI 1 accessibility. All of the land within AOI 1 is privately-owned and residential development is presently occurring. A subdivision with approximately 275 lots, the Arbor at Dogwood Creek, is currently being developed. The terrain is gently rolling, and the perimeter of this area is accessible from Highways 290 and 95, Christiansen Road, and FM Road 696. The interior portions of this area are accessible via several dirt and paved roads, including Whipperwill Lane, Spence Lane, Malcolm-Eddie Road, and roads within the Arbor at Dogwood Creek subdivision. Vegetation ranges from open grasslands to thick forests. Limited fencing does not preclude entry and residential homes in this area make it easily accessible to people living/visiting this area.

**4.3.1.2.2 Site Stability.** The ground surface at AOI 1 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this

area is generally more than 30 inches deep. AOI 1 is considered a stable area, and natural processes are not expected to expose OE, if present at depth.

#### **4.3.1.3 Human Factors (Site Activities, Site Population)**

**4.3.1.3.1 Site Activities.** Sabine Investment Company has already developed residential lots and housing in AOI 1, and construction continues. Current activities within this area include child play and construction. Other land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Hunting likely occurs on private land, and firefighting by a volunteer fire department occurs as necessary. Child play, hunting, farming/ranching, and firefighting likely occur at depths no greater than 12 inches bgs. Construction activities occur at depths greater than 12 inches bgs. All but one of the ordnance scrap items recovered in AOI 1 were found on the ground surface or within six inches of ground surface; therefore, the site activities risk level for AOI 1 is significant.

**4.3.1.3.2 Site Population.** Based on U.S. Census Bureau information (2000), it is estimated that approximately 500 people use the area on a daily basis. The site includes many private homes, a 275-lot subdivision where construction is currently taking place, and rural residential and agricultural areas. AOI 1 is located less than five miles from the town of Elgin, where population increased 18% between 1990 and 2000. Residents have access to the land, and construction crews utilize this area for development of planned residential parcels. However, there are no public attractions, such as parks, golf courses, or other tourist sites in this area.

#### **4.3.2 AOI 3-1 Risk Evaluation**

Due to the size of Sector 3 (approximately 28,000 acres), land use, and the locations of intrusive investigation data, the sector was divided into eight AOIs (AOI 3-1 through AOI 3-8) for risk evaluation purposes (Figure 4.1). AOI 3-1 consists of 4,297 acres and includes the majority of the Griffith League Ranch (Sector 3A). The area is adjacent to an impact buffer zone. AOI 3-1 has no history of ordnance-related activities and there have been no landowner reports of UXO or ordnance scrap in this area (USACE, 1994b). A discussion of each risk factor for AOI 3-1 is presented in the following subchapters.

##### **4.3.2.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.2.1.1 OE Type.** No UXO items were found during intrusive investigations at AOI 3-1. A total of 14 ordnance scrap items (inert and nonhazardous) were recovered, none of which could be identified. No landowners have reported finding ordnance-related items in AOI 3-1. A “no injury” OE type subcategory is assigned to AOI 3-1 since only ordnance scrap was found.

**4.3.2.1.2 OE Sensitivity.** The OE sensitivity subcategory of “inert” is assigned to AOI 3-1 because only ordnance scrap was recovered.

**4.3.2.1.3 OE Density.** No UXO was identified in AOI 3-1 during the EE/CA field investigation, and none has been reported in previous investigations or by private

landowners. Although data was collected throughout AOI 3-1, the 14 ordnance scrap items recovered in this area were all found in the area identified by TEC as being “disturbed” in 1940s-era aerial photographs. These areas are limited to the east side of the AOI, adjacent to AOI 5-1, part of the impact buffer zone.

**4.3.2.1.4 OE Depth.** There were no UXO items found in this area. Of the 14 ordnance scrap items recovered in this area during the EE/CA field investigation, two were found on the ground surface, eleven were found within 6 inches of ground surface, and one was recovered at a depth of 14 inches bgs.

#### **4.3.2.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.2.2.1 Site Accessibility.** Accessibility to land within AOI 3-1 is limited, but not completely restricted. All of the land within the area is within Griffith League Ranch, which is owned by the Boy Scouts of America. Currently, the land is fenced and undeveloped, and access is limited primarily to Boy Scouts personnel and researchers. The majority of the sector is heavily wooded. However, the Boy Scouts are planning to begin building a high adventure Scout camp, and the number of summer campers expected to visit the Scout camp is anticipated to be approximately 6,000 when the camp improvements have been completed.

**4.3.2.2.2 Site Stability.** The ground surface in AOI 3-1 is relatively flat with rolling hills, grasslands, and forests. The soil type in this area (Patilo-Demona-Silstid) is generally more than 30 inches deep. AOI 3-1 is considered a stable area, and natural processes are not expected to expose OE, if present at depth.

#### **4.3.2.3 Human Factors (Site Activities, Site Population)**

**4.3.2.3.1 Site Activities.** Although ordnance scrap has been found on the ground surface; no UXO has been found in this area. Currently, the amount of activity within the Griffith League Ranch property is limited; however, as described above, planning and fundraising for future Scout camp construction is currently underway. The property represents a large portion of remaining high quality Houston toad habitat, and the Boy Scouts received a federal grant to create the Griffith League Ranch Habitat Conservation Plan. The funds are being used to support the research and monitoring of the endangered Houston toad on the ranch. Researchers include biologists from Texas State University. Archaeologists from the Texas Archaeological Research Laboratory are currently conducting archaeological investigations within the area. Finally, Boy Scout groups occasionally participate in outdoor activities such as hiking in this area.

4.3.2.3.2 The Scout camp is anticipated to include three man-made lakes, a shooting sports area, 20 miles of hiking trails, a training and conference center, and habitat and wildlife preservation areas. Future activities within this area will include construction, child play, hiking, camping, and picnicking. Other land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Firefighting by a volunteer fire department occurs as necessary. When construction begins on the Boy



Scout camp (2003-2004 timeframe), the amount of activity in AOI 3-1 will increase. The fact that several ordnance scrap items were found on the ground surface or within 6 inches of ground surface suggests that someone will likely encounter OE in the future. Therefore, the site activities risk level for AOI 3-1 is significant.

**4.3.2.3.3 Site Population.** Current site population is low, with only one full-time resident who maintains the Griffith League Ranch. However, Boy Scout groups and scientific researchers occasionally visit the site. Development of the Scout camp will result in a much greater chance of OE exposure in this area.

### **4.3.3 AOI 3-2 Risk Evaluation**

AOI 3-2 consists of 8,174 acres and is located to the east of Lake Bastrop (Figure 4.1). AOI 3-2 includes a portion of Sectors 3E and 3C, and all of Sector 3B. This area has no history of ordnance-related activities (USACE, 1994b). A discussion of each risk factor for AOI 3-2 is presented in the following subchapters.

#### **4.3.3.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.3.1.1 OE Type.** Although no UXO was identified on transects in this area during the EE/CA field investigation, the OE type subcategory for AOI 3-2 is moderate severity due to findings by local landowners. An anti-tank mine discovered by a landowner was detonated by the Fort Sam EOD unit in February 2002 shortly before EE/CA field work began. In addition, in June 2002, another property owner discovered an expended anti-tank mine while digging a hole for a fence post. Three ordnance scrap items were identified in this sector during the EE/CA field investigation, two of which could be identified as expended 2.36-inch rocket ordnance scrap. Two were discovered during intrusive investigations and one was discovered during the geophysical survey.

**4.3.3.1.2 OE Sensitivity.** Practice anti-tank training mines, which are considered very sensitive, have been found in this area by private landowners.

**4.3.3.1.3 OE Density.** No UXO was identified in AOI 3-2 during the EE/CA field investigation, but one item was reported by a private landowner just before the EE/CA field work began. In addition, three ordnance scrap items were found during the EE/CA. Data was collected throughout AOI 3-2. The areas in which the items were found were identified by TEC as being “disturbed” in 1940s-era aerial photographs.

**4.3.3.1.4 OE Depth.** One 2.36-inch rocket motor was found at a depth of 8 inches bgs, one 2.36-inch rocket was found on the ground surface during the geophysical survey, and the other ordnance scrap item was found at a depth of 2 inches bgs. The two anti-tank mines were identified by private landowners in the subsurface, but exact depth is unknown.

#### **4.3.3.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.3.2.1 Site Accessibility.** There are no accessibility restrictions to the majority of AOI 3-2. Land within AOI 3-2 is privately-owned and residential development is presently occurring. Two large subdivisions, Circle D Country Acres and KC Estates, cover approximately 2,900 acres (over 1,100 lots) within the area. The Lost Pines Boy Scout Reservation is located within the area, as well as the LCRA Sim Gideon Power Plant. The terrain is gently rolling, and the perimeter of this area is accessible from Highway 21, and interior portions are accessible via FM 1441 and many paved and dirt roads. Vegetation ranges from open grasslands to heavily wooded. Limited fencing does not preclude entry and residential homes in this area make it easily accessible to people living/visiting this area. However, accessibility to the power plant and surrounding land is restricted.

**4.3.3.2.2 Site Stability.** The ground surface in AOI 3-2 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid) in this area is generally more than 30 inches deep. The water level in Lake Bastrop is kept relatively constant from power plant discharge; therefore, potential OE normally underwater is not exposed during drought conditions. AOI 3-2 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.3.3 Human Factors (Site Activities, Site Population)**

**4.3.3.3.1 Site Activities.** It is assumed that landowner-identified UXO was found within 6 inches of the ground surface. Site activities affect the ground surface at depths up to and including 12 inches bgs; therefore, the contact level is considered significant. Circle D Country Acres, KC Estates, and other subdivisions have already developed residential lots and housing in AOI 3-2, and construction continues. Activities within this area include child play and construction. Other land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Hunting likely occurs on private land, and firefighting by a volunteer fire department occurs as necessary. In addition, activities at the Boy Scouts Lost Pines Camp include camping, picnicking, and hiking.

**4.3.3.3.2 Site Population.** Based on U.S. Census Bureau data (2000), it is estimated that approximately 5,000 people use this area on a daily basis. In the summer, several hundred Boy Scouts also use the Lost Pines Scout Reservation. Residents have access to the land, and construction crews utilize this area for development of planned residential parcels.

#### **4.3.4 AOI 3-3 Risk Evaluation**

AOI 3-3 is located in the southern apex of the former Camp Swift, including parts of Sectors 3C and 3E (Figure 4.1). AOI 3-3 consists of 4,190 acres and has no history of ordnance-related activities (USACE, 1994b). A discussion of each risk factor for AOI 3-3 is presented in the following subchapters.

#### **4.3.4.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.4.1.1 OE Type.** The OE type subcategory for AOI 3-3 is moderate severity. Two anti-tank training mines (with energetic charge), one of which was booby-trapped with a mousetrap underneath it, were found in the central portion of this area. Three landowners have also reported finding land mines in this area; one of which was detonated by the Fort Sam EOD unit while the EE/CA field investigation was being conducted. This landowner found the mine while digging a hole for a plant adjacent to a house deck. In addition, the Bastrop Volunteer Fire Department Chief has encountered evidence of OE, including land mines, while fighting fires in this area, and has heard detonations during fires. Two ordnance scrap items were also recovered during the EE/CA field investigation, one of which could be identified as an inert anti-tank mine.

**4.3.4.1.2 OE Sensitivity.** Anti-tank land mines were found in AOI 3-3, including one with a booby trap. These items are very sensitive.

**4.3.4.1.3 OE Density.** Several anti-tank mines have been found over a large area south of the former cantonment area. Of the five anti-tank land mines found in the area, four were in areas that had not been indicated as “disturbed” in 1940s-era aerial photographs (ERDC, 2000). There is no apparent pattern to their distribution.

**4.3.4.1.4 OE Depth.** The two UXO items were found within one inch of the ground surface. Of the two ordnance scrap items recovered in AOI 3-3, one was recovered from a depth of 3 inches bgs and the other from a depth of 16 inches bgs.

#### **4.3.4.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.4.2.1 Site Accessibility.** There are no restrictions to AOI 3-3 accessibility. Land within the area is privately-owned and includes several subdivisions. The largest subdivision is Lake Bastrop Acres, which covers approximately 940 acres (over 1,600 lots) within the area. Also located within this area are two public parks (North Shore and South Shore) and the LCRA Wastewater Treatment Plant. The terrain is gently rolling, and the perimeter of this area is accessible from Highways 21 and 95, and interior portions are accessible via FM 1441 and many paved and dirt roads. Vegetation ranges from open grasslands to heavily wooded. Limited fencing does not preclude entry and residential homes in this area make it easily accessible to people living/visiting this area.

**4.3.4.2.2 Site Stability.** The ground surface in AOI 3-3 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid) in this area generally is more than 30 inches deep. The water level in Lake Bastrop is kept relatively constant from power plant discharge; therefore, potential OE normally underwater is not exposed during drought conditions. AOI 3-3 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.4.3 Human Factors (Site Activities, Site Population)**

**4.3.4.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. Lake Bastrop Acres, Green Valley, Green Oaks, and other subdivisions have already developed residential lots and housing in AOI 3-3, and construction continues. Activities within this area include child play and construction. In addition, two public parks operated by the LCRA, the North Shore and South Shore Parks, are located in this area. Activities in the parks include hiking, mountain biking, picnicking, and camping. The LCRA also maintains the wastewater treatment plant and conducts archaeological surveys on their property. Other land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Hunting likely occurs on private land, and firefighting by a volunteer fire department occurs as necessary.

**4.3.4.3.2 Site Population.** Based on U.S. Census Bureau data (2000), it is estimated that approximately 6,000 people use this area on a daily basis. Residents have access to the land, and construction crews utilize this area for development of planned residential parcels. In addition, there are public attractions (two public parks) in this area.

#### **4.3.5 AOI 3-4 Risk Evaluation**

AOI 3-4 is located in the west-central portion of the former Camp Swift, between Lake Bastrop and the TARNG Camp Swift (Figure 4.1). This area consists of 5,275 acres and includes a portion of Sector 3A and 3E. AOI 3-4 has no history of ordnance-related activities (USACE, 1994b). A discussion of each risk factor for AOI 3-4 is presented in the following subchapters.

##### **4.3.5.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.5.1.1 OE Type.** The OE type subcategory for AOI 3-4 is moderate severity due to the three fuzed anti-tank land mines found within the area. In addition, 23 ordnance scrap items were recovered, 10 of which could be identified. The identifiable ordnance scrap items included mine parts, three expended 60mm illumination mortars, a rifle grenade tailboom, a fuze, and a 2.36-inch rocket. One of the 60mm mortars was found on the ground surface during the geophysical survey. Several landowners have also reported finding ordnance items; however it cannot be determined from the information provided whether all of the items were UXO or not. One landowner reported finding “two unexploded rifle grenades” and burying them on his property. One landowner has collected several ordnance scrap items (including practice anti-tank land mines, dummy mine fuzes, practice 2.36-inch rockets, 37mm cartridges and projectiles, 81mm practice mortar, and a MkII grenade). Upon inspection by the Parsons UXOSO, the MkII grenade was found to be UXO. The item was subsequently removed by a Fort Sam Houston EOD unit.



**4.3.5.1.2 OE Sensitivity.** Anti-tank land mines (with energetic charge) were found in AOI 3-4. These items are very sensitive.

**4.3.5.1.3 OE Density.** Several anti-tank mines have been found over a large area east and north of the former cantonment area. Two of the mines were found in an area that was identified as the parade grounds on historic master plans of the former camp. There is no apparent pattern to the distribution of OE in the area.

**4.3.5.1.4 OE Depth.** The three UXO items recovered in this area during the EE/CA field investigation were found at depths of between 0 and 6 inches bgs. Of the 23 ordnance scrap items, seventeen were found between 0 and 6 inches bgs and six were found at depths greater than 6 inches bgs.

#### **4.3.5.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.5.2.1 Site Accessibility.** There are no restrictions to AOI 3-4 accessibility. All of the land within the area is privately-owned. The southwest portion of the site consists primarily of subdivided areas, while areas to the northeast consist primarily of larger rural residential and agricultural parcels. An industrial facility, Griffin Industries, is located in the northwest portion of the area. The terrain is gently rolling, and the perimeter of this area is accessible from Highway 95 and FM 2336. The interior portions of this area are accessible via many paved and dirt roads, including Pershing Drive. Vegetation ranges from open grasslands to heavily wooded. Limited fencing does not preclude entry and residential homes in this area make it easily accessible to people living/visiting this area.

**4.3.5.2.2 Site Stability.** The ground surface in AOI 3-4 is relatively flat with rolling hills, grasslands, and forests. The soil type (Axtell-Tabor Association) in this area is generally more than 32 inches deep. AOI 3-4 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.5.3 Human Factors (Site Activities, Site Population)**

**4.3.5.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. This region includes residential, rural residential, industrial, and agricultural areas. Activities within this area include child play, short cuts, gardening, construction, crop farming, and ranching. Hunting likely occurs on rural private land, and firefighting by a volunteer fire department occurs as necessary. These activities affect the ground surface at depths up to and including 12 inches bgs. UXO has been found within six inches of the ground surface in this area.

**4.3.5.3.2 Site Population.** Based on U.S. Census Bureau data (2000), it is estimated that approximately 5,000 people use this area on a daily basis. Residents have access to the land, and construction crews may work in this area. However, there are no public attractions, such as parks, golf courses, or other tourist sites in this area.

### 4.3.6 AOI 3-5 Risk Evaluation

AOI 3-5 is located along the west boundary of the former Camp Swift, immediately south of the TARNG (Figure 4.1). The area consists of 744 acres and has no history of ordnance-related activities (USACE, 1994b). A discussion of each risk factor for AOI 3-5 is presented in the following subchapters.

#### 4.3.6.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)

**4.3.6.1.1 OE Type.** No UXO or ordnance scrap items were identified during the EE/CA field investigation. However, an official from the Bastrop Federal Correctional Institute (BFCI) found an inert M21 practice grenade on the property. Because the landowner-found item was ordnance scrap, this area is assigned the “no injury” subcategory.

**4.3.6.1.2 OE Sensitivity.** There is no risk associated with OE sensitivity in this area because there were no UXO and only ordnance scrap recovered in AOI 3-5 during the EE/CA field investigation. AOI 3-5 is assigned the OE sensitivity subcategory of “inert.”

**4.3.6.1.3 OE Density.** There was no evidence of UXO or ordnance scrap item in this area during the EE/CA field investigation. Only one ordnance scrap item has been identified by an employee of BFCI.

**4.3.6.1.4 OE Depth.** It is assumed the one ordnance scrap item identified by a BFCI employee during the EE/CA investigation was found on the ground surface.

#### 4.3.6.2 Site Characteristics Factors (Site Accessibility, Site Stability)

**4.3.6.2.1 Site Accessibility.** Access to land is limited within AOI 3-5. Land within the area is owned by the BFCI, the University of Texas M.D. Anderson Cancer Research Center, and the LCRA. Land owned by the LCRA is leased to the M.D. Anderson Center. Points of entry to both M.D. Anderson Center and BFCI property are controlled. The terrain is gently rolling, and the perimeter of this area is accessible from Highway 95 and FM 2336. Vegetation ranges from open grasslands to heavily wooded.

**4.3.6.2.2 Site Stability.** The ground surface in AOI 3-5 is relatively flat with rolling hills, grasslands, and forests. The soil type (Axtell-Tabor Association) in this area is generally more than 32 inches deep. AOI 3-5 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### 4.3.6.3 Human Factors (Site Activities, Site Population)

**4.3.6.3.1 Site Activities.** This area includes the correctional institute and a cancer research center. Activities within this area include some crop farming and ranching at the research center. Some gardening and landscaping may occur at the correctional institute. Firefighting by a volunteer fire department occurs as necessary. Since the

ordnance scrap item identified at AOI 3-5 was presumably found on the ground surface, the site activities risk level is significant.

**4.3.6.3.2 Site Population.** Access to this land is limited to employees, inmates, and visitors to BFCI, and employees and visitors to the M.D. Anderson Research Center. Access to both is controlled. It is estimated that approximately 3,500 people use the area on a daily basis.

#### 4.3.7 AOI 3-6 Risk Evaluation

AOI 3-6 is located in the north-central portion of the former Camp Swift (Figure 4.1). AOI 3-6 consists of 1,157 acres and has no history of ordnance-related activities (USACE, 1994b). A discussion of each risk factor for AOI 3-6 is presented in the following subchapters.

##### 4.3.7.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)

**4.3.7.1.1 OE Type.** No UXO or ordnance scrap items were identified during the EE/CA field investigation. A landowner in the area reported finding “several small artillery rounds” several years ago near his barn. However, because no UXO or ordnance scrap was identified during the EE/CA investigation and because better identification of the “small arms” is not available, there are no applicable OE type categories for AOI 3-6.

**4.3.7.1.2 OE Sensitivity.** There is no applicable OE sensitivity subcategory associated with this area because there were no UXO or ordnance scrap recovered during the EE/CA field investigation.

**4.3.7.1.3 OE Density.** There was no evidence of UXO or ordnance scrap in this area during the EE/CA field investigation.

**4.3.7.1.4 OE Depth.** The depth of OE is not applicable as no UXO or ordnance scrap was recovered in AOI 3-6 during the EE/CA investigation.

##### 4.3.7.2 Site Characteristics Factors (Site Accessibility, Site Stability)

**4.3.7.2.1 Site Accessibility.** There are no restrictions to AOI 3-6 accessibility. All land within the area is privately-owned. The terrain is gently rolling, and the perimeter of this area is accessible from Highway 290. Vegetation consists primarily of open grasslands.

**4.3.7.2.2 Site Stability.** The ground surface in AOI 3-6 is relatively flat with rolling hills, grasslands, and forests. The soil type (Axtell-Tabor Association) in this area is generally more than 32 inches deep. AOI 3-6 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

### **4.3.7.3 Human Factors (Site Activities, Site Population)**

**4.3.7.3.1 Site Activities.** Because no UXO items have been identified in this area, the site activities risk level for AOI 3-6 is “not applicable”. Due to the presence of some residences this area, activities could include child play and some construction. The majority of the land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Hunting could occur on private land, and firefighting by a volunteer fire department occurs as necessary.

**4.3.7.3.2 Site Population.** Based on U.S. Census Bureau data (2000), it is estimated that approximately 300 people use this area on a daily basis. Residents and their guests and visitors have access to the land. However, there are no public attractions, such as parks, golf courses, or other tourist sites in this area.

### **4.3.8 AOI 3-8 Risk Evaluation**

AOI 3-8 is located north of Lake Bastrop, in a portion of Sector 3E that was part of the “Wake Island” tank destroyer training area (Figure 4.1). AOI 3-8 consists of 589 acres. A discussion of each risk factor for AOI 3-8 is presented in the following subchapters.

#### **4.3.8.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.8.1.1 OE Type.** Three ordnance scrap items were discovered during the EE/CA field investigation of AOI 3-8, all of which were 2.36-inch rocket ordnance scrap. Because ordnance scrap is inert and nonhazardous, an OE type subcategory of “no injury” is assigned to AOI 3-8. A landowner in this area also has reported finding several “rockets” on his property.

**4.3.8.1.2 OE Sensitivity.** An OE sensitivity subcategory of “inert” is assigned to AOI 3-8 because there were no UXO and only ordnance scrap recovered during the EE/CA field investigation.

**4.3.8.1.3 OE Density.** The 2.36-inch rockets were found in the northwest and eastern portions of the AOI. These areas are near the former “Wake Island” tank destroyer training area, and both areas were identified as “disturbed” in 1940s-era aerial photographs (ERDC, 2000).

**4.3.8.1.4 OE Depth.** All of the ordnance scrap items recovered in AOI 3-8 were found on the surface or within six inches bgs.

#### **4.3.8.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.8.2.1 Site Accessibility.** There are no restrictions to AOI 3-8 accessibility. Land within the area is privately-owned and includes numerous homes and an approximately 5-acre paintball and motorcross recreational area. In 2003, Bastrop Independent School District started construction of an elementary school in this area, as well. The school is scheduled to be completed by June 2004. The area is accessible from FM 1441 and numerous other paved roads. Vegetation includes open grasslands



and some heavily wooded areas. Limited fencing does not preclude entry and residential homes in this area make it easily accessible to people living/visiting this area.

**4.3.8.2.2 Site Stability.** The ground surface in AOI 3-8 is relatively flat with rolling hills, grasslands, and forests. The soil type (Axtell-Tabor Association) in this area is generally more than 32 inches deep. AOI 3-8 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth. However, soil stability may be compromised in the motorcross area. Ruts from motorcross vehicles and water erosion in this area could result in the exposure of UXO, though none has been reported to date.

### **4.3.8.3 Human Factors (Site Activities, Site Population)**

**4.3.8.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. A portion of Lake Bastrop Acres and Lake Bastrop Estates subdivisions are located within AOI 3-8, along with rural residential land, the motorcross park, and a cemetery. In 2004, an elementary school will be located within AOI 3-8. Activities within this area include child play and construction. Activities at the motorcross park include hiking and motor biking. Hunting may occur on private rural land, and firefighting by a volunteer fire department occurs as necessary.

**4.3.8.3.2 Site Population.** Based on U.S. Census Bureau data (2000), it is estimated that approximately 1,000 people use this area on a daily basis. Residents have access to the land, and construction crews utilize this area for development of planned residential parcels. In addition, there is a public attraction (motorcross park) in this area, and an elementary school is being built in the area.

## **4.3.9 AOI 4-1 Risk Evaluation**

Due to the size of Sector 4 and the locations of intrusive investigation data, the area was divided into three AOIs for risk evaluation purposes only. AOI 4-1 consists of 884 acres and includes the eastern portion of the Griffith Ranch and the surrounding rural land (Figure 4.1). This area was used by the military as the main artillery range and impact area (USACE, 1994b). A discussion of each risk factor for AOI 4-1 is presented in the following subchapters.

### **4.3.9.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.9.1.1 OE Type.** An OE type subcategory of “most severe” has been assigned to this area due to the EE/CA UXO findings. A total of four UXO items were identified during the EE/CA field investigation: two 4.2-inch mortars, a 105mm projectile, and a practice anti-tank land mine. Additionally, 132 ordnance scrap items were recovered in this area during the EE/CA field investigation, nine of which could be identified. The identifiable ordnance scrap items included 4.2-inch mortar ordnance scrap, 2.36-inch rocket ordnance scrap, and 81mm mortar ordnance scrap. The Boy Scouts also

reported finding an area with several practice anti-tank land mines visible on the ground surface.

**4.3.9.1.2 OE Sensitivity.** This area is assigned an OE sensitivity subcategory of “most sensitive.” Land mines are considered to be very sensitive and have the potential to detonate with simple touch and/or movement.

**4.3.9.1.3 OE Density.** This area was part of the former impact area. Consequently, a large number of UXO and ordnance scrap items were found in a small area. Nearly all of AOI 4-1 is identified as “disturbed” in 1940s-era aerial photographs of the former Camp Swift (ERDC, 2000). All of the items were recovered from disturbed areas. Impact craters are visible at AOI 4-1, and Boy Scouts personnel have identified additional OE items on the ground surface since EE/CA field work was completed.

**4.3.9.1.4 OE Depth.** The four UXO items identified in AOI 4-1 were found at depths of 6 inches bgs (105mm projectile), 20 inches bgs (4.2-inch mortar), 24 inches bgs (4.2-inch mortar), and 30 inches bgs (anti-tank land mine). Ordnance scrap was found at depths of up to 24 inches bgs, with the majority being 6 inches bgs or less.

#### **4.3.9.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.9.2.1 Site Accessibility.** Accessibility to approximately half of the land within AOI 4-1 is not restricted, but access to the land within Griffith League Ranch is limited. As described previously, Griffith League Ranch is owned by the Boy Scouts of America. Currently, the land is fenced and access is limited primarily to Boy Scouts personnel and researchers. The eastern corner of this area is open grasslands, with heavy vegetation increasing to the west. The Boy Scouts are planning to begin building a high adventure Scout camp, and the number of summer campers expected to visit the camp is anticipated to be approximately 6,000 when the camp improvements have been completed.

4.3.9.2.2 The portion of the area outside Griffith League Ranch includes rural residential and agricultural lands in a subdivided area known as Ponderosa Homestead. Approximately 25 lots are located within AOI 4-1. This area is accessible by a paved dead-end road (Cardinal Lane). Limited fencing does not preclude entry and residential homes in this region allow easy access to people living/visiting this area.

**4.3.9.2.3 Site Stability.** The ground surface in AOI 4-1 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. AOI 4-1 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

### **4.3.9.3 Human Factors (Site Activities, Site Population)**

**4.3.9.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. Currently, the amount of activity within the Griffith League Ranch property is limited; however, as described above, planning and fundraising for future Scout camp construction is underway. Researchers including biologists and archaeologists are currently conducting studies within the area. Although this Scout camp has not yet been constructed, Boy Scout groups occasionally participate in outdoor activities such as hiking in this area. According to the current plan for the Griffith League Ranch, this portion of the Boy Scout camp is anticipated to include an animal preserve, cattle trail, and a restroom/shower. Future activities within this area will include construction, child play, hiking, camping, and picnicking.

4.3.9.3.2 Other land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Because there are homes in the area, child play and construction could occur within the area. Hunting may occur in rural areas, and firefighting by a volunteer fire department occurs as necessary.

**4.3.9.3.3 Site Population.** Based on U.S. Census Bureau data (2000) and site knowledge, it is estimated that approximately 50 people use this area on a daily basis. Although there are no residents within the AOI 4-1 portion of Griffith League Ranch, there are several private residences in the area outside the ranch. Approximately 25 private lots are within AOI 4-1, some of which are undeveloped. Currently, Boy Scout groups and scientific researchers occasionally visit the ranch. With construction of the Scout camp, the number of visitors to the area will increase.

### **4.3.10 AOI 4-2 Risk Evaluation**

AOI 4-2 is located on the east side of the former Camp Swift and includes part of the former impact area (Figure 4.1). AOI 4-2 consists of 767 acres. A discussion of each risk factor for this area is presented in the following subchapters.

#### **4.3.10.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.10.1.1 OE Type.** An OE type subcategory of “most severe” has been assigned to this area. Although no UXO items were identified in transects investigated during the EE/CA field investigation, one item was BIP during the investigation. As described in Chapter 3, a landowner requested that three items he found on his property be inspected. With permission from USAESCH, Parsons detonated one item, a 105mm projectile, which was found to be UXO. (The other items, a 75mm projectile and a fuze, were found to be inert.) An unexploded 105mm projectile could kill or inflict serious injury to an individual if detonated by an individual’s activities. A total of 98 ordnance scrap items were recovered in this area during the EE/CA field investigation, 11 of which could be identified. The identifiable ordnance scrap items consisted of 4.2-inch mortar ordnance scrap and 81mm mortar ordnance scrap.

**4.3.10.1.2 OE Sensitivity.** The type of UXO recovered from AOI 4-2 was a 105mm projectile. The 105mm projectile is considered to be less sensitive because it has standard fuzing.

**4.3.10.1.3 OE Density.** This area was part of the former impact area. Consequently, a large number of ordnance scrap items were found in a small area. All of the area that comprises AOI 4-2 was identified as “disturbed” in 1940s-era aerial photographs of the former Camp Swift (ERDC, 2000). The 105mm projectile was located near the center of the former impact area, at the eastern boundary of the AOI.

**4.3.10.1.4 OE Depth.** The one UXO item identified in AOI 4-2 was found on the ground surface. Of the 98 ordnance scrap items recovered in this area, 17 were found on the ground surface, and the remaining 81 were recovered from depths up to 18 inches bgs.

#### **4.3.10.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.10.2.1 Site Accessibility.** There are no restrictions to AOI 4-2 accessibility. All of the land within the area is privately-owned. The area is accessible from dirt roads, including Schwantz Ranch Road and Old Potato Road. Vegetation is primarily open grasslands, with some heavily wooded areas. Limited fencing does not restrict entry and residential homes in this area make it easily accessible to people living/visiting this area.

**4.3.10.2.2 Site Stability.** The ground surface in AOI 4-2 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. The majority of AOI 4-2 is considered a stable area, and natural processes are not expected to expose OE in most areas, if any is present at depth. However, erosion does occur along dirt roads that pass through the area, such as Old Potato Road. According to a U.S. Army memorandum (U.S. Army, 1948), Old Potato Road “should be maintained with caution as artillery was fired on both sides of the said road.”

#### **4.3.10.3 Human Factors (Site Activities, Site Population)**

**4.3.10.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. There is a small number of private homes in the area; therefore, activities could include child play and some construction. However, the majority of land in the area is used for agricultural (crop farming and ranching) purposes. Hunting likely occurs on private land, and firefighting by a volunteer fire department occurs as necessary.

**4.3.10.3.2 Site Population.** Based on U.S. Census Bureau (2000) information and site knowledge, it is estimated that less than 50 people use the area on a daily basis. Residents and their guests and visitors have access to the land. However, there are very few homes in this area (estimated less than 10). In addition, there are no public attractions, such as parks, golf courses, or other tourist sites in this area.



### 4.3.11 AOI 4-3 Risk Evaluation

AOI 4-3 is located on the east side of the former Camp Swift and includes part of the former impact area (Figure 4.1). AOI 4-3 consists of 864 acres. A discussion of each risk factor for this area is presented in the following subchapters.

#### 4.3.11.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)

**4.3.11.1.1 OE Type.** An OE type subcategory of “most severe” has been assigned to this area. Although no UXO was recovered from AOI 4-3 during the EE/CA field investigation, an unexploded 75mm projectile was identified on the ground surface during the EE/CA site visit, and was later detonated by a Fort Sam Houston EOD unit. A total of 285 ordnance scrap items were also removed, nine of which were identifiable. Identifiable ordnance scrap items included inert fuzes, a 37mm projectile, 4.2-inch mortars, and 105mm projectiles.

**4.3.11.1.2 OE Sensitivity.** The type of UXO recovered from AOI 4-3 was a 75mm projectile. The 75mm projectile is considered to be less sensitive because it has standard fuzing.

**4.3.11.1.3 OE Density.** This area was part of the former impact area. Consequently, a large number of ordnance scrap items were found in a small area. Nearly all of AOI 4-3 is identified as “disturbed” in 1940s-era aerial photographs of the former Camp Swift (ERDC, 2000) and all of the items were recovered from the historically disturbed area. The 75mm projectile was found along the side of Old Potato Road, which passes through AOI 4-3.

**4.3.11.1.4 OE Depth.** The one UXO item identified in AOI 4-3 was found on the ground surface. Of the 285 ordnance scrap items recovered in this area, 191 were found within 6 inches bgs, and the remaining 94 were recovered from depths greater than 6 inches, with a maximum depth of 28 inches.

#### 4.3.11.2 Site Characteristics Factors (Site Accessibility, Site Stability)

**4.3.11.2.1 Site Accessibility.** There are no restrictions to AOI 4-3 accessibility. All of the land within the area is privately-owned. The area is accessible from dirt roads, including Old Potato Road. Vegetation is primarily open grasslands, with some heavily wooded areas. Limited fencing does not preclude entry and residential homes in this area make it easily accessible to people living/visiting this area. However, there are far fewer residences per acre in this area compared to other portions of the former Camp Swift.

**4.3.11.2.2 Site Stability.** The ground surface in AOI 4-3 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. The majority of AOI 4-3 is considered a stable area, and natural processes are not expected to expose OE in most areas, if any is present at depth. However, erosion does occur along dirt roads that pass through the

area, such as Old Potato Road. According to a U.S. Army memorandum (U.S. Army, 1948), Old Potato Road “should be maintained with caution as artillery was fired on both sides of the road.”

#### **4.3.11.3 Human Factors (Site Activities, Site Population)**

**4.3.11.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. There are a small number of private homes in the area; therefore, activities could include child play and some construction. However, the majority of land in the area is used for agricultural (crop farming and ranching) purposes. Hunting likely occurs on private land, and firefighting by a volunteer fire department occurs as necessary.

**4.3.11.3.2 Site Population.** Based on U.S. Census Bureau (2000) information and site knowledge, it is estimated that less than 50 people use the area on a daily basis. Residents and their guests and visitors have access to the land. However, there are very few homes in this area (estimated less than 10). In addition, there are no public attractions, such as parks, golf courses, or other tourist sites in this area.

#### **4.3.12 AOI 5-1 Risk Evaluation**

AOI 5-1 is located on the east side of the former Camp Swift and includes part of the former impact buffer zone. AOI 5-1 consists of 1,169 acres. A discussion of each risk factor for this area is presented in the following subchapters.

##### **4.3.12.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.12.1.1 OE Type.** An OE type subcategory of “most severe” has been assigned to this area due to the EE/CA UXO findings. One UXO item, a 105mm projectile, was identified in this area during the EE/CA field investigation. An unexploded 105mm projectile could kill or inflict serious injury to an individual if detonated by an individual’s activities. A total of 23 ordnance scrap items were discovered, none of which could be identified. In addition, a private landowner reported finding a “disintegrated” land mine within AOI 5-1.

**4.3.12.1.2 OE Sensitivity.** The type of UXO recovered from AOI 5-1 was a 105mm projectile. The 105mm projectile is considered to be less sensitive because it has standard fuzing.

**4.3.12.1.3 OE Density.** One UXO item and 23 ordnance scrap items were identified in the western portion of the area, which was formerly part of the impact zone buffer area. These items were found in the area which was identified as “disturbed” in 1940s-era aerial photographs (ERDC, 2000).

**4.3.12.1.4 OE Depth.** The one UXO item identified in AOI 5-1 was found at a depth of 27 inches bgs. Of the 23 ordnance scrap items recovered in this area, one was found on the ground surface, and the remaining were recovered from depths up to 20 inches bgs.

#### **4.3.12.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.12.2.1 Site Accessibility.** Accessibility to approximately half of the land within AOI 5-1 is not restricted, but access to the land within Griffith League Ranch is limited. As described previously, Griffith League Ranch is owned by the Boy Scouts of America. Currently, the land is fenced and access is limited primarily to Boy Scouts personnel and researchers. The eastern corner of this area is open grasslands, with heavy vegetation increasing to the west. As described previously, the Boy Scouts are planning to begin building a large Scout camp at Griffith League Ranch.

4.3.12.2.2 A portion of the area outside Griffith League Ranch is also within AOI 5-1. This area includes rural residential and agricultural lands, including part of the Ponderosa Homestead subdivision. This area is accessible by paved and dirt roads. Limited fencing does not preclude entry and residential homes in this region allow easy access to people living/visiting this area.

**4.3.12.2.3 Site Stability.** The ground surface in AOI 5-1 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. The majority of AOI 5-1 is considered a stable area, and natural processes are not expected to expose OE in most areas, if any is present at depth. However, erosion does occur along dirt roads that pass through the area, such as Old Potato Road. According to a U.S. Army memorandum (U.S. Army, 1948), Old Potato Road “should be maintained with caution as artillery was fired on both sides of the road.”

#### **4.3.12.3 Human Factors (Site Activities, Site Population)**

**4.3.12.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. Currently, the amount of activity within the Griffith League Ranch property is limited; however, as described previously, a Scout camp will be built there in the future. Biologists and archaeologists are currently conducting archaeological investigations within the area. Boy Scout groups occasionally participate in outdoor activities such as hiking in this area. According to the current plan for the Griffith League Ranch, this portion of the Boy Scout camp is anticipated to include an animal preserve, cattle trail, two observation towers, and some camping areas. Future activities within this area will include construction, child play, hiking, camping, and picnicking.

4.3.12.3.2 Other land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Hunting may occur in rural areas, and firefighting by a volunteer fire department occurs as necessary.

**4.3.12.3.3 Site Population.** Based on U.S. Census Bureau (2000) information and site knowledge, it is estimated that less than 50 people use the area on a daily basis. Although there are no residents within the AOI 5-1 portion of Griffith League Ranch, there are several private residences (estimated less than 20) in the area outside the ranch. Approximately 35 private lots are within AOI 5-1, many of which are undeveloped. Residents and their guests and visitors have access to the land. Boy Scout groups and scientific researchers occasionally visit the ranch. Once construction begins on the Scout camp, additional visitors (construction workers, then campers) will use the area.

### 4.3.13 AOI 5-2 Risk Evaluation

AOI 5-2 is located on the east side of the former Camp Swift and includes part of the former impact buffer zone (Figure 4.1). AOI 5-2 consists of 777 acres. A discussion of each risk factor for this area is presented in the following subchapters.

#### 4.3.13.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)

**4.3.13.1.1 OE Type.** No UXO or ordnance scrap items were found during intrusive investigations at AOI 5-2. No landowners have reported finding ordnance-related items in AOI 5-2. There is no applicable OE type subcategory for AOI 5-2.

**4.3.13.1.2 OE Sensitivity.** AOI 5-2 has no applicable OE sensitivity subcategory because no UXO or ordnance scrap was recovered in this area.

**4.3.13.1.3 OE Density.** There was no evidence of UXO or ordnance scrap in this area during the EE/CA field investigation.

**4.3.13.1.4 OE Depth.** No UXO or ordnance scrap items were recovered in this area during the EE/CA field investigation.

#### 4.3.13.2 Site Characteristics Factors (Site Accessibility, Site Stability)

**4.3.13.2.1 Site Accessibility.** There are no restrictions to AOI 5-2 accessibility. This area includes rural residential and agricultural lands. It is accessible by Highway 290 and several paved roads. Limited fencing does not preclude entry and residential homes in this region allow easy access to people living/visiting this area.

**4.3.13.2.2 Site Stability.** The ground surface in AOI 5-2 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. AOI 5-2 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### 4.3.13.3 Human Factors (Site Activities, Site Population)

**4.3.13.3.1 Site Activities.** Because no UXO or ordnance scrap items have been identified in this area, the site activities risk level for AOI 5-2 is “not applicable.” Land in the area is used for rural residential and agricultural (crop farming and



ranching) purposes. Because a small number of homes are located in the area, activities could include child play and construction. Hunting may occur in this area, and firefighting by a volunteer fire department occurs as necessary.

**4.3.13.3.2 Site Population.** Based on U.S. Census Bureau (2000) information and site knowledge, it is estimated that approximately 20 people use the area on a daily basis. This estimate does not include passengers in vehicles on Highway 290, which is a well-traveled highway between Austin and Houston. However, there are no attractions in this area, and passengers are not expected to typically stop or get out of their vehicles in this area. There are a small number of private residences (estimated less than 10) in AOI 5-2. Residents and their guests and visitors have access to the land.

#### **4.3.14 AOI 6-1 Risk Evaluation**

AOI 6-1 is located along the northeast boundary of the former Camp Swift (Figure 4.1). AOI 6-1 consists of 1,331 acres and is a former and was designated as an area with potential for OE contamination in the ASR (USACE, 1994b). A discussion of each risk factor for this area is presented in the following subchapters.

##### **4.3.14.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.14.1.1 OE Type.** AOI 6-1 is assigned the UXO type subcategory of “moderate severity.” Two UXO items, an anti-tank mine and a fuze, were identified during the EE/CA field investigation. A total of six ordnance scrap items were identified in the area, all of which consisted of anti-tank mine ordnance scrap. One of the ordnance scrap items was found on the ground surface during the geophysical survey. One landowner in AOI 6-1 has reported finding hand grenades, 81mm mortars, and craters on his property.

**4.3.14.1.2 OE Sensitivity.** The anti-tank mine is very sensitive and has the potential to detonate and cause injury with simple touch and/or movement.

**4.3.14.1.3 OE Density.** All of the UXO and ordnance scrap was found along the former Camp Swift boundary, north of Highway 290. However, this area was not “disturbed” in 1940s-era aerial photographs (ERDC, 2000), and there were no known training areas within this portion of the former Camp Swift.

**4.3.14.1.4 OE Depth.** Both UXO items were recovered at a depth of one inch bgs. Of the six ordnance scrap items found in the area, five were at depths of up to 6 inches bgs, and one item was found at a depth of 8 inches bgs.

##### **4.3.14.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.14.2.1 Site Accessibility.** There are no restrictions to AOI 6-1 accessibility. This area includes rural residential and agricultural lands. This area is accessible by Highway 290 and several paved roads. Limited fencing does not preclude entry and residential homes in this region allow easy access to people living/visiting this area.

**4.3.14.2.2 Site Stability.** The ground surface in AOI 6-1 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. AOI 6-1 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.14.3 Human Factors (Site Activities, Site Population)**

**4.3.14.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. Land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Because a small number of homes are located in the area, activities could include child play and construction. Hunting may occur in this area, and firefighting by a volunteer fire department occurs as necessary.

**4.3.14.3.2 Site Population.** Based on U.S. Census Bureau (2000) information and site knowledge, it is estimated that approximately 20 people use the area on a daily basis. This estimate does not include passengers in vehicles on Highway 290, which is a well-traveled highway between Austin and Houston. However, there are no attractions in this area, and passengers are not expected to typically stop or get out of their vehicles in this area. There are a small number of private residences (estimated less than 10) in AOI 6-1. Residents and their guests and visitors have access to the land.

#### **4.3.15 AOI 6-2 Risk Evaluation**

AOI 6-2 is located along the southeast boundary of the former Camp Swift (Figure 4.1). AOI 6-2 consists of 1,496 acres and was designated as an area with potential for OE contamination in the ASR (USACE, 1994b). A discussion of each risk factor for this area is presented in the following subchapters.

##### **4.3.15.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.15.1.1 OE Type.** No UXO or ordnance scrap items were identified during the EE/CA intrusive investigations. However, an expended M11 rifle grenade (ordnance scrap) was recovered from the ground surface during the geophysical survey. Because ordnance scrap is inert and nonhazardous, the OE type level of “no injury” is assigned to AOI 6-2.

**4.3.15.1.2 OE Sensitivity.** AOI 6-2 is assigned an OE sensitivity subcategory of “inert” because no UXO was recovered in this area.

**4.3.15.1.3 OE Density.** Only one ordnance scrap item was recovered from this area.

**4.3.15.1.4 OE Depth.** No UXO items were recovered in this area during the EE/CA field investigation. One ordnance scrap item was recovered from the ground surface.

#### **4.3.15.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.15.2.1 Site Accessibility.** There are no restrictions to AOI 6-2 accessibility. This area includes rural residential and agricultural lands. It is accessible by Highway 21 and several paved roads. Limited fencing does not preclude entry and residential homes in this region allow easy access to people living/visiting this area.

**4.3.15.2.2 Site Stability.** The ground surface in AOI 6-2 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. AOI 6-2 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.15.3 Human Factors (Site Activities, Site Population)**

**4.3.15.3.1 Site Activities.** Because one ordnance scrap item was identified on the ground surface in this area, the site activities risk level for AOI 6-2 is significant. Land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Because a small number of homes are located in the area, activities could include child play and construction. Hunting may occur in this area, and firefighting by a volunteer fire department occurs as necessary.

**4.3.15.3.2 Site Population.** Based on U.S. Census Bureau (2000) information and site knowledge, it is estimated that approximately 100 people use the area on a daily basis. There are a small number of private residences (estimated less than 30) in AOI 6-2. Residents and their guests and visitors have access to the land.

#### **4.3.16 AOI 7 Risk Evaluation**

AOI 7 is located within AOI 3-4 (Figure 4.1). AOI 7 consists of 20 acres and is a former ammunition storage area (USACE, 1994b). A discussion of each risk factor for AOI 7 is presented in the following subchapters.

##### **4.3.16.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.16.1.1 OE Type.** No UXO or ordnance scrap items were found during the EE/CA field investigation at AOI 7. Therefore, there is no applicable OE type. There are also no known historic or landowner OE findings.

**4.3.16.1.2 OE Sensitivity.** Because there were no UXO or ordnance scrap items recovered in AOI 7 during the EE/CA field investigation, there is no applicable OE sensitivity level.

**4.3.16.1.3 OE Density.** There was no evidence of UXO or ordnance scrap in this area.

**4.3.16.1.4 OE Depth.** The depth of OE is not applicable as no UXO or ordnance scrap was recovered.

#### **4.3.16.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.16.2.1 Site Accessibility.** There is limited accessibility to AOI 7, which can only be reached by a dirt road (Cody Lane). All of the land within AOI 7 is privately-owned. Vegetation ranges from open grasslands to thick forests.

**4.3.16.2.2 Site Stability.** The ground surface in AOI 7 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. AOI 7 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.16.3 Human Factors (Site Activities, Site Population)**

**4.3.16.3.1 Site Activities.** Because no ordnance items have been identified in this area, the site activities risk level for AOI 7 is “not applicable.” Due to a private residence within this area, activities could include child play and construction. However, the majority of the land is used for ranching purposes. Hunting may occur on private land, and firefighting by a volunteer fire department may occur as necessary.

**4.3.16.3.2 Site Population.** It is estimated that less than 10 people use this area on a daily basis. Portions of four parcels are located within the AOI 7 boundary, and there are no known residences in the area.

#### **4.3.17 AOI 9 Risk Evaluation**

AOI 9 is a small area located between AOI 3-1 and AOI 3-2 (Figure 4.1). AOI 9 consists of 20 acres and is a former gas area (USACE, 1994b). A discussion of each risk factor for AOI 9 is presented in the following subchapters.

##### **4.3.17.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.17.1.1 OE Type.** No UXO items were found during the EE/CA field investigation at AOI 9, and only one unidentifiable ordnance scrap item was found. In addition, an empty glass bottle from a gas test kit was found on the ground surface in this area during soil sampling activities. Because ordnance scrap is inert and nonhazardous, this area is assigned the OE type of “no injury.” There are no known historic or landowner OE findings in this area.

**4.3.17.1.2 OE Sensitivity.** Because only ordnance scrap was recovered from this area, it is assigned an OE sensitivity level of “inert.”

**4.3.17.1.3 OE Density.** Only one ordnance scrap item was recovered.



**4.3.17.1.4 OE Depth.** The one ordnance scrap item was recovered at a depth of 2 inches bgs.

#### **4.3.17.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.17.2.1 Site Accessibility.** Accessibility to AOI 9 is considered limited because there are no roads to the area. The area is forested, with most areas virtually impassable even on foot.

**4.3.17.2.2 Site Stability.** The ground surface in AOI 9 is relatively flat with rolling hills, grasslands, and forests. The soil type (Axtell-Tabor Association) in this area is generally more than 32 inches deep. AOI 9 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.17.3 Human Factors (Site Activities, Site Population)**

**4.3.17.3.1 Site Activities.** Because one ordnance scrap item was identified in this area at a depth of two inches bgs, the site activities risk level for AOI 9 is significant. Although this land is privately-owned, there are currently no known residences in this area. The land may be used for ranching and/or hunting purposes. Firefighting by a volunteer fire department may occur as necessary.

**4.3.17.3.2 Site Population.** This land is completely undeveloped, and nobody uses the area on a daily basis. The land is used for ranching, and the landowner may visit the area occasionally. Half of the area is located within the Griffith League Ranch, but is densely vegetated and nearly impassable on foot. The Boy Scouts plan to install a 187-acre lake near this area, within the next five to ten years.

### **4.3.18 AOI 10 Risk Evaluation**

AOI 10 is a small area located south of Lake Bastrop (Figure 4.1). AOI 10 consists of 69 acres and is a former demolition area (USACE, 1994b). A discussion of each risk factor for AOI 10 is presented in the following subchapters.

#### **4.3.18.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.18.1.1 OE Type.** AOI 10 is assigned the OE type of “moderate severity.” One UXO item, a practice anti-tank mine, was identified during the EE/CA field investigation. Six ordnance scrap items were also identified in the area, all of which were unidentifiable.

**4.3.18.1.2 OE Sensitivity.** The anti-tank mine is considered to be “very sensitive.”

**4.3.18.1.3 OE Density.** The UXO item and the majority of the ordnance scrap items were located in the southern half of AOI 10. All of the ordnance scrap items recovered from areas in, or next to, those identified as “disturbed” in 1940s-era aerial photographs (ERDC, 2000). However, the UXO item was located about 350 feet from the disturbed area.

**4.3.18.1.4 OE Depth.** The UXO item was recovered at a depth of four inches bgs, and all but one of the ordnance scrap items were recovered from depths of 6 inches or less. One item was recovered from a depth of 7 inches.

#### **4.3.18.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.18.2.1 Site Accessibility.** There are no restrictions to AOI 10 accessibility. Portions of only four properties are located within this area. Three are privately-owned and the third is owned by LCRA. The area is accessed by Southshore Road. The entrance road to the South Shore Park crosses through the northern end of this AOI. On private property, limited fencing does not preclude entry and residential homes in this region allow easy access to people living/visiting this area.

**4.3.18.2.2 Site Stability.** The ground surface in AOI 10 is relatively flat with rolling hills, grasslands, and forests. The soil type (Patilo-Demona-Silstid Association) in this area is generally more than 30 inches deep. AOI 10 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.18.3 Human Factors (Site Activities, Site Population)**

**4.3.18.3.1 Site Activities.** Site activities affect the ground surface at depths up to and greater than 12 inches bgs; therefore, the contact level is considered significant. The northern portion of AOI 10 is located within South Shore Park; this portion of the park is used for hiking. In addition, a park maintenance yard is located within the AOI 10 boundary. Private land in the area is used for rural residential and agricultural (crop farming and ranching) purposes. Because a small number of homes are located in the area, activities could include child play and construction. Hunting may occur in this area, and firefighting by a volunteer fire department occurs as necessary.

**4.3.18.3.2 Site Population.** There are no known residents in AOI 10. Site users include LCRA park maintenance workers, hikers at the park, and landowners. One of the landowners has a small house, which is used as a vacation cottage for family members. Population is therefore estimated at less than 10.

### **4.3.19 AOI 12-1 Risk Evaluation**

AOI 12-1 is located on the west side of Sector 12, the “Fortified Area.” It excludes the east side of Sector 12 for which no ROE was granted (Figure 4.1). AOI 12-1 consists of 113 acres and is a former fortified area (USACE, 1994b). A discussion of each risk factor for AOI 12-1 is presented in the following subchapters.

#### **4.3.19.1 OE Factors (OE Type, OE Sensitivity, OE Density, OE Depth Range)**

**4.3.19.1.1 OE Type.** No UXO items were found during intrusive investigations at AOI 12-1, and only one unidentifiable ordnance scrap item was recovered. No landowners have reported finding ordnance-related items in AOI 12-1. Because ordnance scrap is inert and nonhazardous, the OE type assigned to this AOI is “no injury.”

**4.3.19.1.2 OE Sensitivity.** Because only ordnance scrap was recovered in AOI 12-1, “inert” is the assigned OE sensitivity subcategory.

**4.3.19.1.3 OE Density.** Only one ordnance scrap item was recovered in the area. It was found near the boundary of the area.

**4.3.19.1.4 OE Depth.** The ordnance scrap item recovered in this area during the EE/CA field investigation was found at a depth of six inches bgs.

#### **4.3.19.2 Site Characteristics Factors (Site Accessibility, Site Stability)**

**4.3.19.2.1 Site Accessibility.** Accessibility to AOI 12-1 is limited. Although the land is privately-owned, there is only one road to the area, Herron Trail. The majority of the area is heavily wooded, though one parcel has open grasslands.

**4.3.19.2.2 Site Stability.** The ground surface in AOI 12-1 is relatively flat with rolling hills, grasslands, and forests. The soil type (Axtell-Tabor Association) in this area is generally more than 32 inches deep. AOI 12-1 is considered a stable area, and natural processes are not expected to expose OE, if any is present at depth.

#### **4.3.19.3 Human Factors (Site Activities, Site Population)**

**4.3.19.3.1 Site Activities.** Because one ordnance scrap item was identified in this area, the site activities risk level for AOI 12-1 is significant. Although this land is privately-owned, there are only two known residences in this area. The land may be used for ranching and/or hunting purposes. Firefighting by a volunteer fire department may occur as necessary.

**4.3.19.3.2 Site Population.** Based on U.S. Census Bureau information (2000) and site knowledge, it is estimated that less than 10 people use this area on a daily basis. Although landowners, their guests, and visitors have access to the land; there are only two known residences in the area.

## **4.4 RISK ASSESSMENT SUMMARY**

4.4.1 The risk to public safety associated with the presence of UXO were evaluated for each AOI. The explosive safety risk is due to a combination of each of the primary risk factors that are presented above. No UXO was detected in AOIs 1, 3-1, 3-2, 3-5, 3-6, 3-8, 5-2, 6-2, 7, 9, and 12-1; therefore, the explosive safety risk is considered to be minimal for these areas. Explosive safety risk is also considered to be minimal for AOIs 2, 3-7, 5-3, and 12-2. Neither UXO nor ordnance scrap findings have been reported by landowners in these areas. Furthermore, these AOIs are not located in a former impact or training area. However, further investigation of AOIs 2, 3-7, 5-3, and 12-2 may be warranted, provided landowners allow ROE. During the EE/CA field investigation, UXO was recovered from AOIs 3-3, 3-4, 4-1, 5-1, 6-1, and 10. In addition, UXO has been identified by landowners in AOIs 3-2, 3-4, 4-2, and 4-3. Ordnance scrap only was recovered from AOIs 1,

3-1, 3-5, 3-8, 6-2, 9, and 12-1. The findings of the risk evaluation for each AOI are presented in Table 4.7.

4.4.2 The most-concentrated OE findings were in the former impact area, including AOIs 4-1, 4-2, 4-3, and 5-1 (total of 3,684 acres). In these areas, UXO consisting of 105mm projectiles, 4.2-inch mortars, and a 75mm projectile have been recovered. These items may be lethal if detonated by an individual's activities. However, because these items have standard fuzes, they are placed in the "less sensitive" UXO sensitivity subcategory. A practice anti-tank mine was also recovered in AOI 4-1, which is more sensitive but severity of potential injury is considered moderate. Most of the items in this area were recovered from a depth of greater than 6 inches bgs (6-30 inches bgs). Population in these areas (estimated total of 200 people) is low in comparison to other areas of the former Camp Swift; however, a portion of this area will be part of a large Scout camp. The population in this area will likely increase in the future, but is not expected to grow dramatically.

4.4.3 UXO was also found in the former munitions demolition area (AOI 10). A practice anti-tank mine (with energetic charge) was recovered in this area. A 2.36-inch rocket was also found in unknown condition. The rocket was later determined to be a training round after it had been blown-in-place. The severity of practice anti-tank mines is considered to be moderate, but the pressure-actuated fuzes they contain can be very sensitive. AOI 10 includes approximately 69 acres of private property and parkland. The population (estimated total of 10) using this land on a daily basis is low.

4.4.4 A practice 2.36-inch rocket was also recovered from AOI 3-8, which is an area formerly used for training tank destroyers. Two additional 2.36-inch rocket ordnance scrap items were also recovered from this area. One of the 2.36-inch rockets was found in unknown condition and was BIP. A landowner in this area also reported finding several rockets on his property. Although only ordnance scrap items were found in AOI 3-8, these particular items, 2.36-inch rockets, generally exist in areas where UXO is likely to be found. In addition, 2.36-inch practice rockets are indistinguishable from 2.36-inch rockets with an explosive charge; therefore, these items must usually be BIP to determine whether the item contains an explosive charge. The population density in this 589-acre area is high (estimated total of 1,000 people), and construction of an elementary school began in 2003. Furthermore, a motorcross recreation area is also located within this area.

4.4.5 In addition to finding UXO in the training and demolition areas described above, a number of practice anti-tank mines were found within the areas described as "Other Remaining Lands" and "Other Artillery Lands" in the ASR. These mines were recovered from several properties in the southwestern portion of the former Camp Swift, as well as near the northeast boundary. The southwestern portion of the former Camp Swift is the most populated area (estimated total population of 16,000 people). Many residents have encountered practice mines and ordnance scrap on their property, and one resident has a collection of ordnance scrap on his property. In addition, volunteer firefighters have reported hearing spontaneous detonations on several occasions while fighting fires in this area. Although several mines were recovered during the EE/CA investigation, the density of UXO



within this area is less than in the impact area. The greater number of reported findings (OE exposures) in this area is attributed to the higher population and greater use of land in the area. As described above, the severity of practice anti-tank mines is considered to be moderate, but their pressure-actuated fuzes can be very sensitive.

4.4.6 The potential for future exposure to OE is considered likely in AOIs 3-3, 3-4, 4-1, 5-1, 6-1, and 10 due to the confirmed presence of UXO items during the EE/CA investigation. The potential for future exposure to OE is also considered likely in AOIs 3-8, 4-2, and 4-3. Potential exposure in AOI 3-8 is likely because the type of ordnance scrap found in this area is generally indicative of UXO presence and it is not possible to distinguish practice rounds from explosive rounds with this type of ordnance (2.36-inch rockets). Potential exposure in AOIs 4-2 and 4-3 is likely because they are in a former impact area and are adjacent to AOI 4-1, which was the most OE-contaminated area surveyed during the EE/CA investigation. UXO was also identified by landowners in this area. Other factors that contribute to potential exposure in all of the abovementioned AOIs is unrestricted access, the large number of people using the area, and future growth in the area.

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**Table 4.7 Summary of Former Camp Swift Risk Evaluation**

Area	Ordnance and Explosives Factors						Site Characteristics Factors		Human Factors		
	OE Type <sup>1</sup>	OE Sensitivity <sup>2</sup>	Estimated Number of OE per acre in AOI <sup>3</sup>	Estimated Number of UXO per acre in AOI <sup>3</sup>	Number of OE by Depth Found During EE/CA <sup>4</sup>	Number of UXO by Depth Found During EE/CA <sup>4</sup>	Accessibility	Stability	Contact Probability Level	Population	
AOI 1	<b>EE/CA:</b> (48) ordnance scrap items <b>OTHER:</b> none	No Injury	Inert	7.9	0	Surface-44 Subsurface-4	Surface-0 Subsurface-0	No Restriction	Stable	Significant	500
AOI 3-1	<b>EE/CA:</b> (14) ordnance scrap items <b>OTHER:</b> none	No Injury	Inert	2.8	0	Surface-13 Subsurface-1	Surface-0 Subsurface-0	Limited Restriction	Stable	Significant	10
AOI 3-2	<b>EE/CA:</b> (3) ordnance scrap items <b>OTHER:</b> (2) practice anti-tank mines	Moderate Severity	Very Sensitive	0.3	0.1	Surface-2 Subsurface-1	Surface-0 Subsurface-0	No Restriction	Stable	Significant	5,000
AOI 3-3	<b>EE/CA:</b> (2) practice anti-tank mines (incl. booby trap), (2) ordnance scrap items <b>OTHER:</b> (3) practice anti-tank mines	Moderate Severity	Very Sensitive	0.5	0.5	Surface-3 Subsurface-1	Surface-2 Subsurface-0	No Restriction	Stable	Significant	6,000
AOI 3-4	<b>EE/CA:</b> (3) practice anti-tank mines, (23) ordnance scrap items <b>OTHER:</b> (2) rifle grenades, (1) M21 grenade, practice anti-tank mines, fuzes, 37 mm projectiles, 2.36-inch rockets, 81 mm mortars	Moderate Severity	Very Sensitive	2.8	0.6	Surface-20 Subsurface-6	Surface-3 Subsurface-0	No Restriction	Stable	Significant	5,000
AOI 3-5	<b>EE/CA:</b> none <b>OTHER:</b> (1) M21 practice grenade	No Injury	Inert	0	0	Surface-0 Subsurface-0	Surface-0 Subsurface-0	Limited Restriction	Stable	Significant	3,500
AOI 3-6	<b>EE/CA:</b> none <b>OTHER:</b> small arms	Not Applicable	Not Applicable	0	0	Not Applicable	Not Applicable	No Restriction	Stable	Not Applicable	300
AOI 3-8	<b>EE/CA:</b> (3) ordnance scrap items <b>OTHER:</b> rockets	No Injury	Inert	3.3	0	Surface-3 Subsurface-0	Surface-0 Subsurface-0	No Restriction	Stable <sup>5</sup>	Significant	1,000

Area	Ordnance and Explosives Factors						Site Characteristics Factors		Human Factors		
	OE Type <sup>1</sup>	Severity	OE Sensitivity <sup>2</sup>	Estimated Number of OE per acre in AOI <sup>3</sup>	Estimated Number of UXO per acre in AOI <sup>3</sup>	Number of OE by Depth Found During EE/CA <sup>4</sup>	Number of UXO by Depth Found During EE/CA <sup>4</sup>	Accessibility	Stability	Contact Probability Level	Population
AOI 4-1	<b>EE/CA:</b> (2) 4.2-inch mortars, (1) 105mm projectile, (1) practice anti-tank mine, (132) ordnance scrap items <b>OTHER:</b> anti-tank mines	Most Severe	Most Sensitive	46.4	1.4	Surface – 91 Subsurface - 45	Surface – 1 Subsurface - 3	No Restriction/ Limited Restriction	Stable	Significant	50
AOI 4-2	<b>EE/CA:</b> (98) ordnance scrap items <b>OTHER:</b> (1) 105mm projectile, (1) 75mm projectile, (1) fuze	Most Severe	Less Sensitive	78.5	0.8	Surface - 81 Subsurface - 17	Surface – 0 Subsurface - 0	No Restriction	Stable <sup>5</sup>	Significant	50
AOI 4-3	<b>EE/CA:</b> (285) ordnance scrap items <b>OTHER:</b> (1) 75mm projectile	Most Severe	Less Sensitive	189.2	0.7	Surface – 191 Subsurface - 94	Surface – 0 Subsurface - 0	No Restriction	Stable <sup>5</sup>	Significant	50
AOI 5-1	<b>EE/CA:</b> (1) 105mm projectile, (23) ordnance scrap items <b>OTHER:</b> land mine	Most Severe	Less Sensitive	23.8	1.1	Surface – 18 Subsurface - 6	Surface – 0 Subsurface - 1	No Restriction/ Limited Restriction	Stable <sup>5</sup>	Significant	50
AOI 5-2	<b>EE/CA:</b> none <b>OTHER:</b> none	Not Applicable	Not Applicable	0	0	Surface – 0 Subsurface - 0	Surface – 0 Subsurface - 0	No Restriction	Stable	Not Applicable	20
AOI 6-1	<b>EE/CA:</b> (1) practice anti-tank mine, (1) fuze, (6) ordnance scrap items <b>OTHER:</b> (1) 81mm mortar, hand grenades	Moderate Severity	Very Sensitive	2.0	0.7	Surface – 7 Subsurface - 1	Surface – 2 Subsurface - 0	No Restriction	Stable	Significant	20
AOI 6-2	<b>EE/CA:</b> (1) ordnance scrap item <b>OTHER:</b> none	No Injury	Inert	0.3	0	Surface – 1 Subsurface - 0	Surface – 0 Subsurface - 0	No Restriction	Stable	Significant	100



Area	Ordnance and Explosives Factors							Site Characteristics Factors		Human Factors	
	OE Type <sup>1</sup>	OE Sensitivity <sup>2</sup>	Estimated Number of OE per acre in AOI <sup>3</sup>	Estimated Number of UXO per acre in AOI <sup>3</sup>	Number of OE by Depth Found During EE/CA <sup>4</sup>	Number of UXO by Depth Found During EE/CA <sup>4</sup>	Accessibility	Stability	Contact Probability Level	Population	
						0					
AOI 7	<b>EE/CA:</b> none <b>OTHER:</b> none	Not Applicable	Not Applicable	0	0	Surface – 0 Subsurface - 0	Surface – 0 Subsurface - 0	Limited Restriction	Stable	Not Applicable	10
AOI 9	<b>EE/CA:</b> (1) ordnance scrap item <b>OTHER:</b> none	No Injury	Inert	6.2	0	Surface – 1 Subsurface - 0	Surface – 0 Subsurface - 0	Limited Restriction	Stable	Significant	5
AOI 10	<b>EE/CA:</b> (1) anti-tank mine, (6) ordnance scrap items <b>OTHER:</b> none	Moderate Severity	Very Sensitive	6.2	1.0	Surface – 6 Subsurface - 1	Surface – 1 Subsurface - 0	No Restriction	Stable	Significant	10
AOI 12-1	<b>EE/CA:</b> (1) ordnance scrap item <b>OTHER:</b> none	No Injury	Inert	3.5	0	Surface – 1 Subsurface - 0	Surface – 0 Subsurface - 0	Limited Restriction	Stable	Significant	10

<sup>1</sup> Denotes items found during the EE/CA investigations, as indicated. "Other" denotes items found during the ASR investigations (1994) or by landowners.

<sup>2</sup> A UXO sensitivity subcategory of "less sensitive" was assigned for UXO items with standard fuzing. A UXO sensitivity subcategory of "inert" was used for ordnance scrap items. The UXO sensitivity subcategory of "very sensitive" was assigned for booby-trapped UXO items.

<sup>3</sup> Density is based on the number of ordnance-related items found in each sector per the number of anomalies investigated for each respective sector, and number of total anomalies per acres surveyed.

<sup>4</sup> Denotes the number of items found at the surface (0 to 6 inches deep) and in the subsurface (>6 inches deep) during the EE/CA field investigation. These values do not include ASR or landowner findings.

<sup>5</sup> The majority of the site is considered stable. Exceptions include trails in the motorcross area (AOI 3-8) and Old Potato Road (AOIs 4-2, 4-3, and 5-1).

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## CHAPTER 5 INSTITUTIONAL ANALYSIS

### 5.1 INTRODUCTION

This Institutional Analysis Report (IA) supports the development of removal action alternatives that are presented in Chapter 7. These strategies rely on the cooperation of local and state authorities and private interest to protect the public at large from potential ordnance-related risks. The detailed IA is included in this report as Appendix G. USAESCH would prepare the Institutional Control (IC) Plan subsequent to the public review period. This plan would provide details on the agreements relative to establishing, managing, and enforcing the specific IC recommendations presented in this EE/CA.

### 5.2 METHODOLOGY

The methodology used to analyze potential institutional control strategies for reducing the ordnance-related risk at the site included a review of government institutions and non-government stakeholders that have some form of jurisdiction or ownership of the property within the site. The governmental agency exercising control over the site is Bastrop County. Interviews with Bastrop County representatives were conducted to determine the capabilities and willingness of the county to support and enforce short and long-term institutional control measures. Other agencies contacted include: Bastrop ISD, LCRA, City of Bastrop, USFWS, Capital Area Council of Boy Scouts, TARNG, TPWD, Bastrop Economic Development Corporation, BFCI, and the Houston Toad Project. The information gathered during the discussions with these agencies was included in the development of the recommended institutional control strategies.

### 5.3 RECOMMENDATIONS

The recommended IC strategies have been selected as a result of discussions with the USACE, Bastrop County officials, and property owners and other stakeholders; Parsons' professional experience with institutional analysis; and overall knowledge of the site and site conditions. The recommendations are considered to be appropriate methods for reducing the risk of ordnance hazards to the public. They are intended to be an effective complement to the response action alternatives discussed later in this document. The following recommendations have been selected because they provide the opportunity to influence the largest number of people through the educational process.

#### 5.3.1 Signage

The posting of signs is recommended as a means of educating people in some of the potentially contaminated areas with public access to the site. The USACE could map the potential locations of signage in relation to schools, trails, camping, hunting, and fishing areas, and coordinate with LCRA, BFCI, the Capitol Area Council of Boy Scouts, and Bastrop ISD for input on type and location of signage.

### **5.3.2 Notification by Letter**

Notifying all current property owners and local agencies and businesses involved in property transfers in the area provides an excellent means of informing property owners about the possibility for ordnance to exist within the former camp. This letter, sent by certified mail, would notify all current landowners that the property was formerly a part of Camp Swift, and as such, there is a possibility that ordnance-related material may be present at the site.

### **5.3.3 Notification During Permitting**

The existing permitting procedures provide a means to inform property owners regarding the potential presence of ordnance on their property. The names and addresses of these property owners have already been collected and are maintained in digital format (spatial and tabular) by the Bastrop County Appraisal District. Bastrop County presently provides standard application forms that outline the procedures involved in the building permit process. The application for building permits on properties within the former camp could include an affidavit stating that the owner has been informed that ordnance may be present on their property. No applications within the former camp areas would be accepted unless accompanied by the signed affidavit. This process would assure the County that the applicant has been informed about the UXO that may be located on his/her property. This notification procedure would occur early in the permit process and no later than the issuance of certificates of occupancy. The proposed affidavit and information sheet would be distributed only to individuals applying for building permits and utility permits on parcels of land located within the former camp.

### **5.3.4 Notification on Tax Bills**

The insertion of notification of the potential for ordnance in all tax bills sent to property owners within the site is a very effective means of public education. Bastrop County currently sends tax forms through their tax offices; hence, very minimal addition to staffing will be required. This approach would inform property owners on a yearly basis of the potential for ordnance on their property. The similar procedure discussed for notification during permitting could also be utilized to identify the property owners and send ordnance warnings via tax bills.

### **5.3.5 Brochure/Fact Sheet**

Another means of educating the public is a brochure which could be distributed to property owners within the former camp where ordnance potentially exists. The USACE and Bastrop County could also distribute the brochure to the LCRA and Capitol Area Council of Boy Scouts who could place brochures at park entrances, fee stations, and trail heads to encourage visitors to be aware of the possible existence of ordnance in specific areas of the former camp. The USACE could prepare and distribute a fact sheet to local groups, property owners, civic associations, museums, libraries, parks, and recreational areas within the former camp where ordnance potentially exists. An updated fact sheet could be prepared as the project progresses, and when additional details are available on the amount and location of ordnance, plans for removal, and institutional controls.



### **5.3.6 Newspaper Articles/Interviews**

Newspaper articles in such publications as the *Bastrop Advertiser*, the *Elgin Courier*, the *Smithville Times*, or the nearby *Austin American-Statesman* would serve as an effective tool for educating the public at no cost to Bastrop County or the USACE. Interviews with the USACE, with local residents, and other institutions could also be included. Articles could be written about the existence of ordnance, the potential danger, and how that danger can be minimized through education. Regular coverage would result in a well-informed public regarding existence and types of ordnance hazards. Interviews with people who were involved in training at the former camp could add interest to these articles.

### **5.3.7 Information Packages to Public Officials**

Information packages which could contain project fact sheets, brochures, maps which show potential areas of concern, and all proposed project updates could be provided to public officials in Bastrop County. Local officials would be invited to the public presentations of the EE/CA. These presentations would provide the officials with information they require. Copies of the final version of the EE/CA would be made available to these individuals at the information repository, which is currently housed at the Bastrop Public Library.

### **5.3.8 Visual and Audio Media**

5.3.8.1 Two visual media programs, a 30-minute television special and a five to ten-minute videotape for television, classroom, and community groups are recommended. The target audience should be youth aged 10 to 18. Through television and classrooms, these programs could reach a majority of the people in the region.

5.3.8.2 The use of local radio programming is also recommended to inform and educate the public about the history, current status, and future information concerning the presence of ordnance on the former camp. Local radio stations include KGSR 107.1 FM in Austin, KELG 1440 AM (Spanish) or KKLK 92.5 FM in Elgin/Austin, and nearly a dozen more in Austin. Local talk shows can be taped as avenues for updates and discussions on ordnance safety. Public service announcements are recommended to be aired as the project progresses for youth-oriented radio stations, similar to non-smoking campaigns.

### **5.3.9 Classroom Education**

Short presentations and courses at the Bastrop ISD are also recommended strategies to disseminate information to youth. The USACE representative could use recommended institutional controls such as the short version of video prepared for community groups, the brochure, fact sheet, any existing maps, exhibits and displays for the school presentations. Inert items that are known to exist at the former camp could be displayed under the supervision of a USACE representative for students to understand and help identify the types of ordnance that could be found in portions of the former camp.

### **5.3.10 Exhibits/Displays**

Placing exhibits/displays in museums or other areas where the public will be exposed to educational information is another method of generating and preserving general awareness and educating the public on the possible risk associated with the ordnance on the former Camp Swift property.

### **5.3.11 Internet Web Site**

An Internet web site was developed for the EE/CA investigation and was an effective way of informing the public, especially landowners who do not reside in Bastrop County and do not have easy access to the Information Repository. A web site is relatively inexpensive to create and maintain, and can reach a large number of people. The web site should be registered with several popular search engines to make the site easy to find without the Uniform Resource Locator (URL), and updated with the most recent information. An e-mail contact list could also be developed to notify interested parties when new information has been added.

### **5.3.12 Ad Hoc Committee**

An Ad Hoc committee consists of community leaders and other interested citizens who oversee the process for educating the public about the existence and potential danger of ordnance. It will be the responsibility of this committee to see that the other recommendations for public education are instituted and maintained.

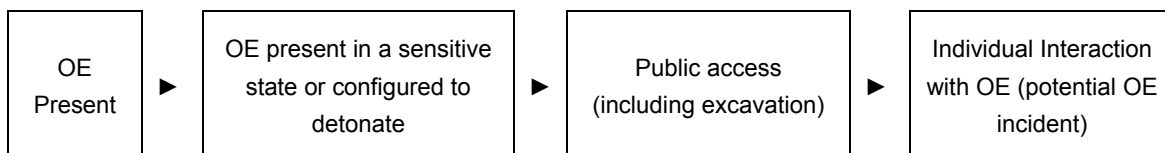
## CHAPTER 6 IDENTIFICATION OF RESPONSE ACTION OBJECTIVES

### 6.1 OVERVIEW

6.1.1 An EE/CA is a phase of an OE response action that must be completed for all non-time critical removal actions (NTCRA). The purpose of an EE/CA is to identify the most appropriate response action to address an OE risk at a project site. Determination of the recommended response alternative occurs after completion of a site characterization, risk assessment of OE hazards, and an evaluation of potential response action alternatives (USACE, 2000b). An EE/CA report documents the decision process by which the most applicable, technically feasible, and socially acceptable response alternatives (including the no DoD action indicated [NDAI] alternative) for remediating a site are evaluated for their effectiveness, implementability, and cost.

6.1.2 Removal of all OE is not considered practical, given technical limitations and cost considerations. However, permanent exclusion of the public from areas that have the potential to contain OE is not feasible, given private land ownership and future demands for use of the land. The purpose of the EE/CA is to evaluate potential ordnance risk and develop alternative plans of action.

6.1.3 The chain of events that could lead to a potential OE incident causing injury or death involves many steps and may be viewed as a process flow. The chain is:



6.1.4 Breaking or weakening this chain of events is a major focus for developing alternatives that limit public interaction with OE. The steps in this process are:

- Conduct a field investigation of the project site to characterize the nature and extent of OE contamination;
- Provide decision criteria for evaluating and recommending the most feasible removal alternatives; and
- Utilize proven removal technologies and management strategies (short and long-term) to manage OE in a manner that will break or weaken the chain of events identified above.

### 6.2 IDENTIFICATION OF STATUTORY LIMITS ON RESPONSE ACTIONS

6.2.1 One area within the former Camp Swift has been identified as warranting a time-critical removal action (TCRA). Due to construction of an elementary school within a known training area (the “Wake Island” tank destroyer training area, AOI 3-8), a TCRA was recommended for the school property (approximately 21 acres). Although the OE item found in this area was determined to be a practice 2.36-inch rocket, its presence establishes the

potential that other possibly unexploded rockets could also be in the area. Construction of the school began in 2003, and it is scheduled to be open for the school year beginning in August 2004. Due to the heavy use by children of this land within a former training area, removal was recommended before construction of the school began.

6.2.2 EOD Technology, Inc. (EODT) performed the TCRA at the school site during May and June 2003. Vegetation clearance was conducted during May 2003 to allow access to heavily vegetated portions of the property. The geophysical survey activities covered the entire 21 acre site area and identified 303 anomalies to be intrusively investigated. In addition, several trash pits were discovered on the property during the investigation. The intrusive investigation recovered 9,899 pounds of non-ordnance scrap and 14 ordnance scrap items. All of the ordnance scrap items consisted of inert 2.36-inch rockets. The total weight of the 14 rockets was 40 pounds. The ordnance scrap items were submitted to an approved metal-recycling facility, while the non-ordnance scrap was left stockpiled on the property at the owner's request.

6.2.3 NTCRAs were evaluated for applicability at the remaining AOIs and the remaining portion of AOI 3-8. The goal of a NTCRA is public safety, which can be achieved by reducing the explosive threat posed by the OE that potentially remains on the property. This goal was achieved by determining the appropriateness of a potential OE removal action for minimizing the public's exposure to OE.

### **6.3 IDENTIFICATION OF TECHNICAL LIMITS ON RESPONSE ACTIONS**

A number of factors were considered for establishing the specific objectives for a removal action. The objectives had to meet the requirements set forth in the applicable or relevant and appropriate requirements (ARAR) while still being realistic and achievable in terms of cost. To attain the goal of reducing the explosive threat posed by the potential for OE remaining within the former Camp Swift, potential OE response action alternatives were established. The criteria of effectiveness, implementability, and cost were used to evaluate the potential OE response action alternatives in accordance with USAESCH guidance.

### **6.4 DETERMINATION OF RESPONSE SCOPE**

The OE removal action objectives guided the development of alternatives for the former Camp Swift and focused the comparison of potential OE response action alternatives. These objectives also assisted in clarifying the goal of minimizing the explosive risk and achieving an acceptable level of protection to public safety and the human environment. These objectives included:

- Identifying the spatial distribution of OE present;
- Evaluating the effectiveness of various response alternatives;
- Determining the ability to implement various removal alternatives; and
- Determining the cost to implement the various removal alternatives.



## **6.5 DETERMINATION OF RESPONSE SCHEDULE**

The selected OE removal alternative will minimize the explosive risk and achieve an acceptable level of protection to public safety and the human environment within a reasonable time frame. Factors such as property entry rights may influence the removal schedule and will be dealt with in the most efficient manner possible.

## **6.6 POST-RESPONSE ACTIVITIES**

Post-removal activities include the implementation of institutional controls to educate the population within the former Camp Swift of the land use history and the associated risks that those land uses may still pose. These institutional control activities should follow from the methods described in Chapter 5.

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## **CHAPTER 7**

# **IDENTIFICATION AND ANALYSIS OF RESPONSE ACTION ALTERNATIVES**

### **7.1 INTRODUCTION**

7.1.1 In this chapter, OE response action alternatives are identified and analyzed for each of the AOIs at the former Camp Swift. The alternatives are selected to achieve the OE removal action objectives discussed in Chapter 6. The identification of alternatives for the former Camp Swift included two principal groups: intrusive and non-intrusive. Non-intrusive alternatives included the NDAI and IC alternatives; while intrusive approaches included surface and subsurface OE removal activities. This chapter provides a brief, general description of OE removal technologies. From this general description, six specific OE removal action alternatives for each area are introduced and developed.

7.1.2 For each of the OE response action alternatives identified, an analysis and screening was conducted against the three general categories of effectiveness, implementability, and cost to ensure that they met the minimum standards within each of the three categories. This screening was performed on OE response action alternatives where OE risk was identified. The purpose of this screening was to ensure that only viable OE removal alternatives were ranked against each other. Once this screening was completed, the remaining alternatives were compared against each other to identify the most appropriate OE response action for each area.

### **7.2 DESCRIPTION OF OE REMOVAL TECHNOLOGIES**

Various technologies and approaches exist for the removal of OE. An OE removal operation falls into three distinct areas: detection, recovery, and disposal. A discussion of the techniques used in each of these areas is presented in the following paragraphs.

#### **7.2.1 OE Detection**

7.2.1.1 The detection of OE includes those methods and instruments that can be used to locate OE. The selection of the best technology depends on the properties of the OE to be located, including whether the ordnance is likely to be found on the surface or below the surface, and the characteristics of the location where the OE is located, such as topography, vegetation, and geology.

7.2.1.2 Detection technologies have two basic forms. One form, visual searching, has been successfully used on a number of sites where OE is located on the ground surface. When performing a visual search of a site, the area to be searched is divided into five-foot lanes that are then systematically inspected for OE. A metal detector is sometimes used to supplement the visual search in areas where ground vegetation may conceal OE. Typically, any OE found during these searches is flagged or marked on a grid sheet for later removal.

7.2.1.3 The other form of OE detection, geophysics, includes a family of detection instruments designed to locate OE. This family of instruments includes magnetic instruments, electromagnetic instruments, and ground-penetrating radar. Each piece of equipment has its own inherent advantages and disadvantages based on its operating characteristics, making the selection of the type of geophysical instrument to be used on an OE survey key to the success of the project. The equipment designed for OE geophysical surveys is lightweight, easily maintained, and very effective. However, there are limitations to geophysics. Geophysical equipment cannot usually distinguish OE items from other metallic objects located below the surface. "Cultural interference," such as underground utility lines, construction debris, or ferrous rock can result in a similar signature as OE. Therefore, it is necessary for the geophysical survey team to carefully document any known cultural interference while in the survey area. Another limitation to the equipment is that metallic objects have to be much larger when at greater depths so that the geophysical equipment can obtain a reading.

7.2.1.4 Geophysical equipment used during the EE/CA field investigation of the former Camp Swift includes the Geometrics<sup>®</sup> G-858G Cesium Vapor Magnetic Gradiometer and Schonstedt<sup>®</sup> magnetometer (intrusive activities). While the technical characteristics and operating parameters of each piece of equipment varied, each was found to be effective in its respective field application.

## 7.2.2 OE Recovery

7.2.2.1 Once a site has been surveyed by either visual or geophysical means, the recovery of OE can begin. Recovery operations can take the form of a surface-only removal of OE, an intrusive (subsurface) removal of OE, or a combination of the two. The decision on the degree of removal operation (depth and lateral extent) to engage in is based on the nature and extent of the OE presence as well as the future use of the site.

7.2.2.2 During a surface removal operation, exposed OE or suspected OE to a depth of six inches (USACE, 2000a) is identified during the detection phase. Then the OE are inspected, identified, and transported to a designated area for cataloging and eventual disposal. If it is determined during the inspection that the item cannot be safely moved, it is destroyed in place.

7.2.2.3 During a subsurface removal operation, buried OE or suspected OE identified by the geophysical survey or other detection methods requires excavation for removal. Because the actual nature of the buried OE item cannot be determined without it being uncovered, non-essential personnel evacuations are necessary and engineering controls may also be used to ensure the safety of the operation. The excavation of the OE item then takes place with either hand tools or mechanical equipment depending on the suspected depth of the object. Once the OE item has been exposed, it is then inspected, identified, and transported to a designated area for cataloging and eventual disposal. If it is determined during the OE inspection that the item cannot be safely moved, it is destroyed in place.

7.2.2.4 Evacuations are sometimes necessary when conducting intrusive investigations to minimize the risk of the operation. The evacuation area will be within a



predetermined minimum separation distance (MSD) to ensure the safety of the operation. The MSD is initially based on the anticipated type of OE that may be encountered and is adjusted for the actual identified OE item prior to demolition activities. All non-essential/non-UXO personnel and the general public must be evacuated from and maintain their distance beyond the MSD during intrusive operations. The MSD may be reduced if appropriate engineering controls are applied, such as sandbag mounds and sandbag walls over and around the potential OE item. However, evacuations may be required if excavations take place close to inhabited areas and engineering controls cannot reduce the MSD to preclude the need to evacuate. Available options will be explored, as appropriate, to minimize potential evacuations with the exception of compromising public safety.

### **7.2.3 OE Disposal**

7.2.3.1 Disposal of recovered OE can take one of three different forms: off-site demolition and disposal; remote, on-site demolition and disposal; and in-place demolition and disposal. The decision regarding which of these techniques to use is based on the risk involved in employing the disposal option, as determined by the specific area's characteristics and the nature of the OE recovered.

7.2.3.2 If an OE item is transported off-site for destruction, the OE would be transported by either Army personnel or by a qualified UXO subcontractor, and it would typically be transported to an active military installation where it can be safely destroyed. The transportation of OE is performed in accordance with the provisions of 49 Code of Federal Regulations (CFR) 100-199, Technical Manual (TM) 9-1300-206, and applicable state and local laws. A Transportation Plan detailing the route and procedures used during the transportation is prepared and approved prior to engaging in any off-site OE transport to ensure all safety aspects of the movement have been addressed. Off-site transportation of OE for destruction was not necessary during this investigation as all items were designated as UXO and destroyed in place or in a remote location on-site.

7.2.3.3 If OE is discovered in proximity to occupied buildings it may not be possible to safely destroy the OE item in place without the use of engineering controls. If an OE item is safe to move, it can be moved to a remote part of the project site where demolition and disposal can safely take place. A countercharge can be used to destroy the OE item.

7.2.3.4 Finally, an OE item may be destroyed in place. This technique is typically employed when the OE item cannot be safely moved to a remote location or if the OE items are located in an area that is sufficiently remote. When employing this technique, procedures similar to those described above are used that will detonate the OE item. When this technique is employed, engineering controls such as sandbag mounds and sandbag walls over and around the OE item, are often used to minimize the blast effects.

## **7.3 DESCRIPTION OF OE RESPONSE ACTION ALTERNATIVES**

### **7.3.1 Introduction**

7.3.1.1 The alternatives identified for evaluation were selected based on the results of the characterization activities performed at the former Camp Swift. Six alternatives were developed to address the explosive safety risk that remains at the site. These alternatives are as follows:

- Alternative 1 – No DoD Action Indicated (NDAI);
- Alternative 2 – Institutional Controls (ICs);
- Alternative 3 – Surface Removal of OE;
- Alternative 4 – Surface Removal of OE with ICs;
- Alternative 5 – Removal of OE to Depth; and
- Alternative 6 – Removal of OE to Depth with ICs.

7.3.1.2 Implementation of a recurring review program (see Chapter 10) was not evaluated as a separate alternative, but it will be an integral part of any alternative. The recurring review program will be used in conjunction with the OE removal alternatives. As part of this program, visual surveys will be performed on a proposed schedule to ensure that the appropriate site safety and security measures remain in place and the integrity of site controls is maintained. These visual surveys will also include inspection of areas within AOIs to determine the effectiveness of the OE response action alternative implemented. During the periodic inspections, changes in land use will be assessed. The visual inspections will occur yearly for the first five years after the selected OE response action has been implemented. After five years, the inspections will continue at a five-year frequency beginning at the end of the first five-year duration and continuing every five years, up to 25 years from the completion of OE response action. If the results of these inspections indicate that the AOI conditions have changed significantly, additional actions may be taken to address the public safety associated with the presence of residual OE. Chapter 10 of this document provides additional details regarding the recurring review process.

7.3.1.3 Each of the six OE response action alternatives listed above was developed for the former Camp Swift as a whole and also evaluated independently for each of the AOIs investigated in this EE/CA. This approach has been taken to ensure that a tailored OE response action alternative suitable for each AOI was developed based on the identified receptors and varying results of the OE investigation.

### **7.3.2 Alternative 1: No DoD Action Indicated**

Alternative 1 is for the government to take no action in regards to locating, removing, and disposing of any potential OE present within a specific AOI at the former Camp Swift. The NDAI alternative assumes continued use of the AOI in its present state. If the potential exposure and hazards associated with the AOI are compatible with current and future development in the area as well as the OE response action objectives, then NDAI may be

warranted. AOIs 3-6, 5-2, and 7 are candidates for NDAI consideration since no OE items were recovered in these areas during the EE/CA, by landowners, or during other prior investigations. No conclusion can be made regarding AOIs 2, 3-7, 5-3, and 12-2 because no ROE was granted in these areas. It is important to note that the government will respond to any future UXO discovery at the former Camp Swift regardless of whether the affected parcel was designated for NDAI. Since OE items were present in AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-8, 4-1, 4-2, 4-3, 5-1, 6-1, 9, 10, and 12-1, development of OE response action alternatives is required.

### **7.3.3 Alternative 2: Institutional Controls**

7.3.3.1 Alternative 2, Institutional Controls, would provide a means for the DoD and their representatives to reduce OE exposure risk to the public through behavior modification resulting from public awareness programs and administrative restrictions, as summarized in Chapter 5 of this report. The IC alternative can be used in combination with other OE response actions or in cases where it may not be possible or practical to physically clear OE from the AOI. Successful implementation of ICs is contingent on the cooperation and active participation of the existing powers and authorities of other government agencies to protect the public from OE risks.

7.3.3.2 IC strategies such as access control, public awareness programs, or a combination of strategies can be used to complement OE response actions and manage risk. It is important to understand that the OE risk is associated with three causative factors. If any of these three factors is completely avoided, an OE-related accident cannot occur. These three factors are: presence, access, and behavior. If there is no presence of ordnance within the AOI, then there is no possibility of an OE-related accident. If ordnance exists within the AOI, but people do not have access, then there will be no OE accident. Even if ordnance exists within the AOI and people have access to the ordnance, if their behavior is appropriate, then there will be no OE accident. An accident requires all three events or circumstances to be present. No OE accident can happen if any one causative factor is missing. Each factor provides the basis for a separate implementation strategy.

7.3.3.3 Behavior modification is an IC that relies on the personal responsibility of the property user. Even if the OE exists and there is open access to it, there is no risk if the behavior is appropriate. For behavior to be appropriate, one must understand the situation and voluntarily react in a responsible manner. The power of the federal government is limited in any situation where local enforcement is available. Therefore, the local authorities must be convinced that the risks are sufficient to warrant their participation. The concept of behavior modification through public awareness extends to agencies that have jurisdiction over the property within the former Camp Swift. Some behaviors that must be modified may belong to the local government. The full Institutional Analysis Plan for the former Camp Swift is provided in Appendix G.

### **7.3.4 Alternative 3: Surface Removal of OE**

7.3.4.1 Alternative 3 entails implementation of a surface removal of OE (including the first six inches below the ground surface, as defined by USACE Engineer Pamphlet [EP]

1110-1-18, 2000). Surface removal would be completed by experienced UXO-qualified personnel who would visually search the ground surface for any OE. In addition, UXO-qualified personnel would also use metal detection devices for screening to ensure that any OE items that may be present under the existing ground cover (leaves and vegetation) are located during the sweep. The UXO-qualified personnel would perform the sweep in fixed-width intervals depending on the sweep reach of the type of metal detection equipment used, to ensure complete surface coverage. All metallic contacts on the ground surface (or within the top 6 inches per EP 1110-1-18, 2000) would then be visually identified.

7.3.4.2 Any OE located during the sweep would be inspected to ensure its stability. During this inspection, a determination would be made whether the uncovered OE item could be moved. If a determination is made that the item is UXO, then it would be destroyed in place. Otherwise, removal of the item to a remote location for onsite destruction and disposal may be considered. If necessary, engineering controls would be used to minimize the need for evacuation of the public. All inert ordnance scrap would be removed from the area and transported offsite for disposal.

7.3.4.3 As stated previously, many of the OE items (UXO and ordnance scrap) recovered during this EE/CA were identified at depths greater than six inches bgs. Of the thirteen UXO items found during the EE/CA field investigation, nine were located within 0 and 6 inches bgs and four were located greater than six inches bgs. These four UXO items (all from the impact area, AOI 4-1, and impact buffer zone, AOI 5-1) were found at depths between 20 and 30 inches bgs. Two UXO items found by landowners and confirmed by the Parsons UXOSO were discovered on the ground surface.

### **7.3.5 Alternative 4: Surface Removal of OE with Institutional Controls**

Alternative 4 includes the surface removal of OE (including the first six inches bgs), as described in Subchapter 7.3.4, in combination with ICs, as described in Subchapter 7.3.3.

### **7.3.6 Alternative 5: Removal of OE to Depth**

7.3.6.1 Alternative 5 includes removal of OE to depth. This alternative would include the surface removal of OE as described in Subchapter 7.3.4. In addition, a geophysical survey would be performed over the entire area and each anomaly would be intrusively investigated until the anomaly is identified or until a specified depth has been reached.

7.3.6.2 For implementation of this alternative, land surveying and brush clearing operations would be necessary. A land surveyor (aided by a UXO-qualified individual performing visual OE avoidance) would establish control points for the areas that require removal action. Brush clearing crews would clear enough undergrowth so that the removal crews could adequately perform their work. A metal detection device capable of performing both the surface sweep and the subsurface survey would be used. In this way, both the surface and subsurface surveys would be performed simultaneously.



7.3.6.3 This alternative includes the intrusive investigation of all surface and subsurface metallic anomalies identified during the metal detection survey to determine their exact nature. Engineering controls may have to be used to decrease the evacuation distance that would be required during these investigations. Evacuation distances are determined by USAESCH based on the Most Probable Munition (MPM) or worst-case scenario for the potential detonation of an ordnance item that could be found in the area. All non-essential personnel are evacuated based on this distance to maximize the safety of the operation. Engineering controls that can decrease this distance can be used during the OE removal operations. During the intrusive investigation, each anomaly is excavated until the source of the geophysical instrument reading is identified or until a predetermined removal depth (based on the future land use as described in DoD guidance [DoD, 1999]) has been reached. Once the OE item is identified, the MSD may be adjusted accordingly for demolition operations.

7.3.6.4 As described above, of the thirteen UXO items identified during EE/CA field investigations, four were recovered from a depth greater than six inches. The four items were all found in the former impact area/buffer zone (AOIs 4-1 and 5-1), and were found at depths ranging from 20 to 30 inches bgs.

### **7.3.7 Alternative 6: Removal of OE to Depth with Institutional Controls**

Alternative 6 includes removal of OE to depth, as described in Subchapter 7.3.6, in combination with institutional controls, as described in Subchapter 7.3.3.

## **7.4 INTRODUCTION OF SCREENING CRITERIA**

### **7.4.1 Overview**

7.4.1.1 In the EE/CA process, the alternatives described above are analyzed and screened against the three general categories of effectiveness, implementability, and cost to ensure that they meet the minimum standards of the criteria within each category. The three general categories are described below along with the specific evaluation criteria contained within each of the categories.

7.4.1.2 The effectiveness of an alternative refers to its ability to meet the clean-up objective within the scope of the OE response action. The effectiveness category is divided into four evaluation criteria. These include Overall Protection of Public Safety and the Human Environment; Compliance with ARARs; Long-Term Effectiveness; and Short-Term Effectiveness.

7.4.1.3 The implementability category includes the technical and administrative feasibility of implementing an alternative, the availability of various services and materials required during its implementation, and the acceptance of local residents and agencies. The implementability category is divided into six evaluation criteria including: Technical Feasibility; Administrative Feasibility; Availability of Services and Materials; Property Owner Acceptance; Local Agency Acceptance; and Community Acceptance.

7.4.1.4 Finally, each alternative is evaluated to estimate the overall implementation cost. Included in the cost calculation is an estimate as to the amount of time that will be necessary to complete the proposed alternative. Each of the evaluation criteria introduced above will be discussed in greater detail in the following paragraphs.

## 7.4.2 Effectiveness

7.4.2.1 **Overall Protection of Public Safety and the Human Environment:** Alternatives are evaluated under this criterion on how well they achieve and maintain protection of public safety and the human environment. A qualitative risk assessment process known as OERIA is applied in evaluating this criterion, as described in Chapter 4. At this stage of the EE/CA, the OERIA analysis consists of a qualitative evaluation of whether the alternative will have an impact on the potential for harm and the level of protectiveness at the site if the alternative is implemented, as compared to the existing or baseline condition. The evaluation is based on the ten factors used in the OERIA presented in Chapter 4.

7.4.2.2 **Compliance with ARARs:** Evaluation under this criterion ensures that all requirements can be met without regulatory problems. The assessment may also include the to-be-considered (TBC) criteria. The applications of ARARs for each alternative will primarily focus on what ARARs apply as well as how they will be met.

7.4.2.3 Section 121(d)(1) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA), requires that remedial actions must attain a degree of cleanup that assures protection of human health and the environment. Moreover, all potential ARARs must be outlined. ARARs include federal standards, requirements, criteria, and limitations under state environmental or facility siting regulations that are more stringent than federal standards.

7.4.2.4 Although the requirements of CERCLA Section 121 generally apply as a matter of law only to remedial actions, USEPA's policy for response actions is that ARARs will be identified and attained to the extent practicable. Three factors were applied to determine whether identifying and attaining ARARs at the former Camp Swift was practical in a particular removal situation. These factors included:

- The exigencies of the situation;
- The scope of the potential OE response action to be taken; and
- The effect of ARAR attainment on the statutory limits for potential response action duration and cost.

7.4.2.5 ARARs were identified on a site-specific basis and involved a two-part analysis: first, a determination was made whether a given requirement was applicable; then if it was not applicable, a determination was made of whether it was nevertheless both relevant and appropriate. When this analysis resulted in a determination that a requirement was both relevant and appropriate, such a requirement was complied with to the same degree as if it were applicable.

7.4.2.6 "Applicable" requirements are those cleanup standards, control standards, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant or contaminant, remedial action, location, or other circumstance at a remedial action site. "Relevant and appropriate" requirements are cleanup standards and control standards, and the substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that, while not "applicable" to ordinance, a remedial action, the location, or other circumstance at a remedial action site, address problems or situations sufficiently similar to those encountered at a site to where their use is well-suited.

7.4.2.7 Three categories of ARARs have generally been used in ordnance projects: chemical-specific, location-specific, and action-specific. According to the NCP, chemical-specific ARARs are usually health or risk-based numerical values that establish the acceptable amount or concentration of a chemical that may remain in, or be discharged to, the ambient environment. Location-specific ARARs generally are restrictions placed upon the concentration of hazardous substance or the conduct of activities solely because they are in special locations. Some examples of special locations include flood plains, wetlands, historic places, and sensitive ecosystems or habitats. Action-specific ARARs are usually technology or activity-based requirements or limitations placed on actions taken with respect to hazardous wastes, or requirements to conduct certain actions to address particular circumstances at a site. Table 7.1 summarizes the ARARs identified for the former Camp Swift.

7.4.2.8 Non-promulgated advisories or guidance documents issued by federal or state governments do not have the status of potential ARARs. However, these TBCs may be used in determining the necessary level of cleanup for protection of public safety and the human environment. Potential ARARs and TBCs for each of the three categories (i.e., chemical-specific, location-specific, and action-specific) are listed in Table 7.1 and discussed in the following paragraphs.

7.4.2.9 No chemical-specific ARARs or TBCs were identified for the potential OE response actions that may be applicable at the former Camp Swift. Removal of UXO is the primary concern of this EE/CA. All relevant munitions were used for their intended purpose, and are now subject to recovery, collection, and on-range destruction on an inactive military range of unexploded ordnance and munitions fragments. These munitions are therefore exempt from RCRA solid waste and hazardous waste requirements under 40 CFR §266.202(a).

7.4.2.10 A soil sampling program was conducted in selected areas considered to have high probability for residual contamination. These areas included the demolition area, the impact area, and detonation locations. Results, provided in detail in Chapter 3, do not show evidence of contamination resulting from former camp activities. Several landowners reported buried waste disposal areas potentially related to former camp activities. After selected OE response actions are implemented, further evaluation of potential chemical contamination, if warranted, can be conducted as part of an environmental investigation.

7.4.2.11 The EE/CA investigation at the former Camp Swift has been managed pursuant to CERCLA and the NCP. The NCP regulations require that all response actions or investigations on the site comply with the substantive requirements of federal, state, and local regulations. However, administrative permitting procedures are not required.

7.4.2.12 There are four potential location-specific ARARs that have been identified for review prior to implementation of an OE response action at an AOI within the former Camp Swift. These include the National Historic Preservation Act, Endangered Species Act, Protection of Archaeological Resources, and Preservation of American Antiquities.

**Table 7.1 Potential ARARs for OE Removal, Camp Swift, Texas**

Activity	ARAR/TBC	Citation	Applicability or Relevance
<b>Chemical-Specific</b> None			
<b>Location-Specific</b> Location of an action within an area where it may cause irreparable harm, loss, or destruction of significant artifacts or historic landmarks	National Historic Preservation Act  Protection of Wetlands  Endangered Species Act  Protection of Archaeological Resources  Preservation of American Antiquities	36 CFR Part 65 and 800  33 CFR 320 <i>et. seq.</i> E.O. 11988  16 U.S.C. § 1531 <i>et. seq.</i>  43 CFR Part 7 (also: 36 CFR Part 296, 32 CFR Part 229, and 18 CFR Part 1312 – same regulations) 43 CFR Part 3	During response action, any material that may be considered historical will be reported pursuant to requirements. Requires action to be taken to minimize loss or degradation of wetlands.  Requires that authorized actions do not jeopardize the continued existence of endangered or threatened species, or their habitats. Requires a permit to excavate, remove, or otherwise alter any archaeological resource.  Requires a permit for the examination of ruins, excavation of archaeological sites, and gathering of objects of antiquities.
<b>Action-Specific</b> Handling of Explosive Ordnance	Army Regulation	AR 385-64	Requires that safety measures be taken when handling explosive ordnance.
Excavation	Department of Defense Ordnance Safety Standards	DoD 6055.9-STD	Requires specialized personnel be employed in the detection, removal, and disposal of OE.
Transportation	Department of Transportation (DOT) Hazardous Material Transportation Regulations USEPA Hazardous Materials Manifesting Requirements	49 CFR 107, 171-177, 100-199  40 CFR 262, 263	Regulates transportation of hazardous materials such as ordnance.  Manifesting for transportation of ordnance items may be required pursuant to RCRA.
Disposal	Disposal of Ordnance Items DOT Hazardous Material Transportation Regulations	40 CFR 264, Subpart X 40 CFR 107, 171-177	Established ordnance disposal requirements. Regulates transportation of hazardous materials such as ordnance.

Acronyms: CFR = Code of Federal Regulations  
 DoD = Department of Defense  
 DOT = Department of Transportation  
 E.O. = Executive Order  
 RCRA = Resource Conservation and Recovery Act  
 TAC = Texas Administrative Code  
 U.S.C. = United States Code  
 USEPA = U. S. Environmental Protection Agency

7.4.2.13 Several historic and prehistoric archaeological sites are located within former Camp Swift. Prior to conducting the EE/CA field investigation, CESWF coordinated with THC to ensure compliance with all relevant state and/or local historic preservation legislation. During the EE/CA, known archaeological sites were avoided so that they would not be disturbed by excavation. However, for areas where a response action is warranted,

these sites may be impacted. Prior to implementation of an UXO/OE response action at former Camp Swift, THC should be coordinated with to determine requirements.

7.4.2.14 Several species in the area are considered endangered or threatened. Critical habitat for the Houston toad is located within the former Camp Swift boundary. A list of threatened and endangered species (both state and federal listed) potentially within the area is provided in Chapter 2.

7.4.2.15 The action-specific TBC, AR 385-64 requires that safety measures be taken for the handling of explosive ordnance. Moreover, DoD 6055.9-STD requires that specialized personnel be employed to detect, remove, and dispose of ordnance. This standard also defines safety precautions and procedures for detonation or disposal of ordnance. These TBCs and ARARs that define excavation, disposal, and transportation requirements of OE are summarized in Table 7.1.

7.4.2.16 **Long-Term Effectiveness:** This criterion measures how an alternative maintains the protection of human health and the environment after the OE response action objective has been met. The long-term effectiveness focuses on:

- the permanence of the OE response action alternative;
- the magnitude of residual risk following completion of the OE response action; and
- the adequacy and reliability of controls, if any, used to manage the treated residuals or untreated wastes that remain at the site following the OE response action.

7.4.2.17 **Short-Term Effectiveness:** This criterion addresses the effects of an alternative during the implementation phase. Alternatives are evaluated for their effects on human health and the environment prior to the OE response action objectives being met. More specifically, each alternative will be examined for:

- protection of the community and workers during the OE response action;
- adverse impacts resulting from construction and implementation; and
- the time required to meet the OE removal objectives.

### 7.4.3 Implementability

7.4.3.1 **Technical Feasibility:** This criterion evaluates the ease of implementing a specific alternative. The analysis of the technical feasibility for each course of action focuses on difficulties in:

- the operation and construction of the OE response action;
- the reliability of the OE response action in relation to implementation; and



- the need and ease of conducting future OE response actions/requirements following the initial undertaking.

7.4.3.2 **Administrative Feasibility:** This criterion focuses on the planning for a course of action. The evaluation of this criterion considers difficulties in:

- obtaining permits applicable to a proposed alternative;
- coordinating services needed to carry out an alternative; and
- arranging the delivery of services in a timely manner.

7.4.3.3 **Availability of Services and Materials:** This criterion primarily deals with the availability of services needed to carry out an alternative. Two issues are of primary importance under this criterion:

- can the services and materials be delivered conveniently; and
- are the quantities needed to implement the OE response action available in a timely manner.

7.4.3.4 **Property Owner Acceptance:** Each of the alternatives will have a varying degree of impact on the future use of the area. As a result, each alternative is rated based on the degree of acceptance expressed by the current property owner, as identified during the IA (Appendix G). For the former Camp Swift, the property is largely rural agricultural and residential, with some subdivisions, municipal property, recreational areas, and industrial areas.

7.4.3.5 **Local Agency Acceptance:** Each alternative is rated based on the degree of acceptance expressed by local county and state environmental government agencies towards the various alternatives examined in the analysis, as identified during the IA (Appendix G).

7.4.3.6 **Community Acceptance:** Each alternative is rated based on the degree of acceptance expressed by local community members toward each of the OE response actions that are being analyzed, as identified during the IA (Appendix G).

#### 7.4.4 Cost

As the scope of work for each alternative is developed, a cost estimate is calculated for costs associated with the implementation of each response action alternative. These costs include the direct and indirect capital costs incurred in implementing the OE response action alternative. The cost estimates are presented in Chapter 8. As part of this assessment, a time frame for completion of each of the proposed alternatives was also developed.

## **7.5 ANALYSIS OF SITE-WIDE IC OE RESPONSE ACTION ALTERNATIVE COMPONENTS**

This subchapter provides an analysis of the IC OE response action alternatives that are described in Subchapter 5.3. This analysis will determine the most appropriate IC that can be implemented site-wide at the former Camp Swift. Individual IC components were evaluated on a “site-wide” basis because many of the components within the IC Alternative (Alternative 2) would be effective for all sectors. All of the IC components identified in Subchapter 5.3 could be implemented for the proposed future land use scenario in a manner that would be protective of public safety and the human environment, and be in compliance with the identified ARARs. The following subchapters provide an analysis of each component with respect to effectiveness, implementability, and cost. Because ordnance will not be removed as a result of implementation of the IC Alternative, the reduction in the predicted annual exposure risks over the NDAI Alternative cannot be quantified. The inherent goal of IC is to favorably modify the public’s behavior, thereby decreasing the risk. However, IC alone will not eliminate the risk.

### **7.5.1 Access Control**

#### **7.5.1.1 Types of Access Control**

7.5.1.1.1 Access Controls limit the use of properties that may contain ordnance hazards. This can be accomplished by implementing various restrictions or dedicating the property to limited allowable uses. The target strategy is to remove the human element from the chain of events that could lead to an accident. Access Control can be facilitated in the form of signage, fencing, land-use restrictions, and/or regulatory control.

7.5.1.1.2 Sign posting is typically completed to inform people that entry is prohibited or that activities within the property are restricted in some manner. Defiance of these restrictions may be subject to disciplinary legal action. The use of signage is based upon the concept of respect for property rights. Trespass laws are the key element of enforcement together with cooperation between landholders, law enforcement, and the general public. These laws are encouraged by other elements of the plan. The link between not trespassing and explosive safety must be made. Signs informing the public of potential dangers would be created and posted around the area to prevent or discourage entry and discourage physical contact with ordnance. Signage is only effective if the signs are well placed and maintained.

7.5.1.1.3 As with signage, fencing is typically one element of a plan that is dependent upon the concept of respect for property rights. Trespass laws are the key element of enforcement. As with signage, the plan must include other elements that reinforce the link between not trespassing and explosive safety. Fences provide a physical barrier to inadvertent entry. Therefore, it may be easier to enforce trespass restrictions if fencing is present.

7.5.1.1.4 Land Use Restriction and Regulatory Controls provide the Access Control that can be exercised over areas where ordnance is present. Through these controls, local government can dictate the type of development that will occur on a site, and the methods in which that development occurs.

### **7.5.1.2 Effectiveness**

7.5.1.2.1 Signs and fencing are considered effective institutional controls. They are valid for use only in reducing the risk of exposure to potential accidents involving ordnance through restraint and provision of information based on the concept of property rights. However, fencing does not keep out those who are determined to enter the property from cutting through or going under or the fence.

7.5.1.2.2 Because of the size of the former Camp Swift, the placement of fencing to restrict access to various areas would be difficult and cost-prohibitive to implement. The use of signage is still recommended. The signage should inform individuals that they are entering an area previously occupied by a former military facility and that the potential for ordnance-related hazards is high.

7.5.1.2.3 The posting of signs along the perimeter and within the interior of the property provides “on the spot” warnings of the potential presence of ordnance and the hazards of physical contact. Signs however, become convenient targets for vandalism and must be maintained to be effective. Despite this concern, posting of warning signs along trails and at strategic locations is recommended.

### **7.5.1.3 Implementation**

Signage should be installed in commonly used public areas and high traffic areas to warn the visitors and residents of potential UXO hazards.

### **7.5.1.4 Cost**

The posting of signs is recommended as a means of educating people in some of the potentially contaminated areas with public access to the site. The USACE could map the potential locations of signage in relation to schools, trails, camping, hunting, and fishing areas, and coordinate with LCRA, BFCI, the Capitol Area Council of Boy Scouts, and Bastrop ISD for input on type and location of signage. Cost of the signage is estimated to be \$5,000.

### **7.5.1.5 Management, Execution, and Support Roles**

There would be no additional management, execution, or support roles required.

## **7.5.2 Public Awareness Program**

Behavior modification is dependent upon the awareness and personal responsibility of the site user. If ordnance exists and there is open access to it, there is no risk if the behavior is appropriate. For behavior to be appropriate, one must understand the situation and voluntarily react in a responsible manner. The concept of behavior modification through public awareness extends to agencies that have jurisdiction over the site. Raising public awareness for the hazards that exist within the site can be facilitated in a variety of ways. Modification of behavior through public awareness is essentially an education/information process. Various techniques considered as institutional controls are listed below.

- Notice – Notifications during deed notifications/restrictions, tax bill distribution, property transfers, certified letters, and permitting;
- General Printed Media - Including brochures and news articles;
- Visual and Audio Media - Including videotapes and announcements on local television programs;
- Education Classes - Including ordnance identification, safety presentations to various audiences, preparation of packages for administrative and public officials;
- Exhibits/displays;
- Internet Website; and
- Ad hoc Committee.

#### 7.5.2.1 Notice

Appropriate notice can exert a strong influence on individual behavior. When notice of ordnance hazards is given, it can affect the expectations of potential users. Appropriate uses can be sought, and the land may still be used for economic gain. However, the hazard must be considered in the design and use of any site improvements or activities. Notices can be placed on a property in the following ways:

##### 7.5.2.1.1 Types of Notice

7.5.2.1.1.1 **Deed Notifications/Restrictions.** Some land within the former Camp Swift was used as firing and artillery ranges during WWII. Notice of the use of land was conveyed to the first property owners and deed restrictions permitted surface use only on portions of the property (Figure 2.7). Notice of the use of the former Camp Swift has not been a required part of the deed for following property owners and the deed restrictions have not been enforced.

7.5.2.1.1.2 **Notification During Property Transfers.** Property owners have a responsibility to protect themselves and the public from dangers associated with their property. This should extend to informing buyers of all or portions of the property about the possibility of ordnance hazards. There are no records that would indicate that successive purchasers of land within the site have received any notification concerning the potential presence of ordnance.

7.5.2.1.1.3 **Notification by Letter.** Certified letters to inform all current property owners and local agencies involved in land transfers of the potential for ordnance is an effective means of public education.

7.5.2.1.1.4 **Notification During Permitting.** Typically controls are in place to protect property owners and their neighbors through permits for certain developments to be carried out. Permit approvals generally ensure that proper notice is given, reasonable plans have been prepared, and the land is being developed for an appropriate use. Bastrop County has a development permit process that requires application for and receipt of a permit for new

subdivisions. The application and review process could include notification to the property owner or contractor as to the potential of ordnance hazards on a property. It can also include a requirement for landowners to inform end users (lessees and tenants) of the properties on the potential hazards of ordnance.

7.5.2.1.1.5 **Notification by Tax Bill.** All property owners within Bastrop County receive annual tax bills. Notification to the property owner of the potential for ordnance hazards on his/her property could be included as an insert to the tax bills of all property owners within the site.

#### 7.5.2.1.2 **Effectiveness**

7.5.2.1.2.1 **Deed Notifications/Restrictions.** When the former Camp Swift was declared surplus and sold, the original deeds included notification of the possibility of unexploded ordnance and restrictions requiring partial surface use only (Figure 2.7). Since then, deeds have not included notifications or restrictions. The addition of deed restrictions/notifications would be an effective way of informing and protecting current and future land owners, providing this notification is enforced.

7.5.2.1.2.2 **Notification During Property Transfers.** There are no records to indicate that there has been notification of the possibility of ordnance hazards during property transfers subsequent to the original transfer from the government when the camp closed. The USACE could file a document describing the past history of the site. This document could include a statement indicating where a potential for ordnance is present. The document would be filed in the Bastrop County Deed Records under the name of all individuals who currently own property within the former Camp Swift. When title searches are conducted pending the sale of property, information on the history of the property and the potential for ordnance would be obtained. This would be a way of informing prospective buyers before purchasing the property. This is an effective approach of informing individuals about the potential existence of ordnance.

7.5.2.1.2.3 **Notification by Letter.** A letter could be sent via certified mail to all individuals who currently own property within the former Camp Swift. The Bastrop County Deed Records could be used to identify all current owners of property within the former Camp Swift boundary. In addition, a certified letter could be sent to all local businesses and agencies involved in property transfers, including real estate agents, title companies, and Bastrop County officials. This would be an effective approach to notifying all current landowners and entities involved in area property transfers of the potential for ordnance in the area.

7.5.2.1.2.4 **Notification During Permitting.** Permit applications for properties within the former Camp Swift could include an affidavit and information sheet to be provided to property owners. A signed affidavit would attest to the property owner's knowledge of the potential for unexploded ordnance on their property. This process would be an effective way of assuring that the applicant has been informed that unexploded ordnance may be located on his/her property.



7.5.2.1.2.5 **Notification by Tax Bill.** The insertion of notification of the potential for ordnance in all tax bills sent to property owners is a very effective means of public education. This approach would inform landowners of the potential for ordnance on their property on an annual basis.

### 7.5.2.1.3 **Implementation**

7.5.2.1.3.1 **Deed Notifications/Restrictions.** In order to effectively implement deed notifications and restrictions, the Bastrop County GIS would first identify all land located within the former Camp Swift. Each parcel within the former Camp Swift would be marked/identified as such. Once identified, all deeds filed in the Bastrop County Deed Records would be updated to include notification of the possibility of unexploded ordnance and restrictions requiring surface use of the property only. At this time, it is not feasible to recommend deed restrictions due to the lack of any planning or zoning enforcement authority in Bastrop County. It is recommended that implementation of deed restrictions in impact areas be further investigated in the future.

7.5.2.1.3.2 **Notification During Property Transfer.** As described above, all deeds for lands located within the former Camp Swift that are registered in the Bastrop County Deed Records should first be identified and marked through the County GIS. A document describing the past history of the former Camp Swift could be filed with the deeds of all parcels identified, and potential purchasers of properties within the former Camp Swift could be notified of the potential of ordnance. The document could be filed under all current owners' names. When title searches are being conducted pending the sales of properties, information on the site history could be obtained.

7.5.2.1.3.3 **Notification by Letter.** As described above, all deeds for lands located within the former Camp Swift that are registered in the Bastrop County Deed Records should first be identified and marked through the County GIS. A letter describing the past history of the former Camp Swift could be sent by certified U. S. mail to all current owners of property within the former camp boundary. This letter, and an accompanying map of the entire camp, could be sent by certified U.S. mail to local real estate agencies, title companies, and Bastrop County officials.

7.5.2.1.3.4 **Notification During Permitting.** When an applicant applies for a subdivision development or a building permit request for lands located within the former Camp Swift, information about the possibility of ordnance hazards would be given to them. A one-page information document could be included with permit applications that would describe how to recognize ordnance, and what procedures should be followed if ordnance is found on site. A large map indicating the areas of potential contamination within the former Camp Swift could be displayed in the Subdivisions and Permits Office, informing applicants of potential OE areas. When a parcel number (that has been identified through GIS) that is located within the former Camp Swift is input by a clerk for a permit application, the clerk would provide the applicant an affidavit and the information on ordnance recognition. The property owners would be required to sign an affidavit to confirm that they have been provided the information and have understood. No certificates of occupancy related to areas

within the site would be approved unless accompanied by the signed affidavit. Partnership with the Bastrop Economic Development Corporation (EDC) and the Bastrop Chamber of Commerce is encouraged. These organizations support the community to promote development and economic growth throughout Bastrop County and could cooperate with the USACE to help educate potential permit applicants and developers about the former Camp Swift property. Bastrop EDC feels the former Camp Swift property is important for the advancement of Bastrop and would likely collaborate with the USACE on public safety and outreach efforts in conjunction with development of the area (Newman, 2002).

**7.5.2.1.3.5 Notification by Tax Bill.** The Bastrop County Tax Assessor's Office is responsible for sending out tax bills each year. The tax statements could include a statement such as: "This property is located within the boundaries of the former Camp Swift and may contain unexploded ordnance. If ordnance or unidentified material is found, do not handle. Call the Bastrop County Sheriff Department immediately." It is recommended that partnership with the Tax Assessor's office be pursued.

#### **7.5.2.1.4 Cost**

**7.5.2.1.4.1** The proposed affidavit and information sheet can be prepared by the USACE and provided at no charge to the County. The cost for the initial documents would be approximately \$500.00 to the USACE. They would then be photocopied as needed and included as a part of permit information packets.

**7.5.2.1.4.2** The proposed affidavit and information sheets would be distributed to individuals applying for subdivision development permits on parcels of land located within the site. The County should have the capability of identifying these parcels via GIS capabilities in the Department of Subdivisions and Permits. The cost to document all properties by legal description, input this information into the county system, and train county employees to call up and provide the information is estimated to be between approximately \$10,000 and \$15,000. This is generally a component of the existing County GIS.

**7.5.2.1.4.3** The identification capability installed in the computer system could also be utilized to add information concerning the potential presence of ordnance to the tax bill for properties within the former Camp Swift. Those owners within the area would receive a tax bill that would include the information about the potential presence of ordnance discussed above.

**7.5.2.1.4.4** Information obtained from the county computer system would provide a listing of current property owners within the former Camp Swift. Minimal additional funding would be required to draw up a document for filing in the Deed Records, or to send certified letters. The cost is estimated to be approximately \$2,500 to \$5,000 for filing with the county, and approximately \$23,000 for sending certified letters (including U.S. postal service charges).

### **7.5.2.1.5 Management, Execution, and Support Roles**

Bastrop County can implement the above recommendations through their normal staff procedures, with assistance from the USACE.

### **7.5.2.2 Printed Media Awareness Program**

Ordnance awareness, acknowledgement of the risk involved, and reinforcement of the message are keys to minimizing the hazards associated with ordnance. Another avenue to facilitate this awareness and understanding is through printed media, in the form of brochures, fact sheets, newspaper articles, and other information packages. The opportunity to disseminate information through the printed media is readily available and can be easily facilitated. Through the use of printed media, property owners and residents within and outside the former Camp Swift can be informed about the possible presence of ordnance contamination.

#### **7.5.2.2.1 Types of Printed Media**

**7.5.2.2.1.1 Brochures/Fact Sheets.** Brochures and fact sheets describing the history of the former Camp Swift and an explanation of ordnance hazards should be produced and periodically updated. Text and graphics are instrumental when used to educate the public on how to identify ordnance, to avoid physical contact with ordnance, how to deal with ordnance if encountered, and how to report ordnance sightings. It is recommended that the brochure continue to be updated to include the latest information from the EE/CA investigation and other pertinent ordnance-related data. Distribution is recommended as follows:

- Provided by mail to all property owners within the site,
- Provided by mail to all businesses within the site,
- Enclosed as a flyer in local newspapers,
- Provided to all professional and civic/community groups,
- Provided through schools to all students in the region.

**7.5.2.2.1.2 Newspaper Articles/Interviews.** Newspaper articles and interviews provide another means of informing the public about the potential presence of ordnance. News articles can be supplied as press releases from the USACE. Interviews with USACE, local residents, and other institutions can be included. Continued regular coverage is recommended and should result in better information and understanding of the actual existence and hazards of ordnance. Interviews with people who lived in and around the area during ordnance activities or who were involved in training activities at the former Camp Swift would add interest to these articles.

**7.5.2.2.1.3 Information Packages for Public Officials.** Public officials are already aware of the ordnance hazard at the former Camp Swift. However, it is recommended that USACE provide more detailed information on the concept of institutional controls and on

the extent of the ordnance hazard. An information package produced by USACE, including maps defining primary areas of concern (following any OE response actions) is recommended for presentation to public officials. These maps will include the boundary of potential hazard sites and an abstract of studies completed to date. It should also include a brief history of the site, areas of greatest concern, types and potential danger of the ordnance discovered, and USACE and other relevant organization's contact information.

#### **7.5.2.2.2 Effectiveness**

7.5.2.2.2.1 Production and dissemination of brochures/fact sheets, newspaper articles and interviews, and the production and distribution of information packages for public officials would be effective institutional controls and is recommended for implementation at the former Camp Swift.

7.5.2.2.2.2 Newspaper articles and articles placed in group-newsletters can be informative, and can be presented in a positive manner. This kind of participation by local press can effectively reduce the risk associated with improper handling of ordnance. The distribution of the existing fact sheet has also been shown to be an effective way to educate the public.

7.5.2.2.2.3 Ongoing exposure to information about ordnance hazards should result in more enlightened public. The information dissemination should be targeted to visitors and area residents currently not aware of the ordnance hazard. The addition, reinforcement, and augmentation of current knowledge will be helpful in maintaining constant awareness of ordnance hazards.

#### **7.5.2.2.3 Implementation**

7.5.2.2.3.1 The USACE could prepare a fact sheet/brochure to promote awareness of the former Camp Swift and minimize the risk of potential ordnance hazards. The fact sheet would describe the history of the former Camp Swift, how to identify ordnance, safety procedures associated with the proper handling/avoidance of ordnance items, instructions for dealing with ordnance if encountered, and telephone numbers to contact if ordnance is encountered or if questions need to be answered. A second fact sheet and press release could be prepared by the USACE, describing the findings of the EE/CA and the proposed plans for removal and institutional controls for the former Camp Swift.

7.5.2.2.3.2 It is recommended that the fact sheets be mailed to all property owners/residents and businesses within the former Camp Swift. The names and addresses of all owners have been compiled for the EE/CA Study and are available from the USACE. In addition, the fact sheet could be distributed as follows:

- Enclosed in tax or power bills;
- Provided to local libraries and museums;
- Enclosed as flyer in local newspaper;
- Provided through schools to all students in the area; and

- Provided to all professional and civic/community groups.

7.5.2.2.3.3 The press release would be published in local newspapers in the area, the *Bastrop Advertiser*, *Elgin Courier* and *Smithville Times*, and in the nearby *Austin American-Statesman*. Information packages to local officials could also be prepared and funded by the USACE. Bastrop County would be responsible for the distribution of this information.

#### 7.5.2.2.4 Cost

7.5.2.2.4.1 **Brochures/Fact Sheets.** The estimated cost to produce an original professional quality, multi-color one page fact sheet on an 8 ½ x 11 format suitable as a mailer or handout is approximately \$2,000.00. The fact sheet would be prepared to include primarily graphics with minimal text description to provide information about the presence of ordnance, plans for removal and institutional controls, as well as information on the identification, handling, and reporting of ordnance. The cost to print and distribute the fact sheet is based on the assumption that 10,000 fact sheets are to be printed and mailed (\$0.46 each), and 5,000 fact sheets are to be printed and distributed by local institutions (\$.09 each). The total cost for design and preparation of the brochure (printing 15,000 copies and mailing 10,000 copies) will be \$7,050.00. Revision of the fact sheet is anticipated to be done only once.

7.5.2.2.4.2 **Newspaper Articles/Interviews.** There would be no foreseen cost for this type of public education.

7.5.2.2.4.3 **Information Packages for Public Officials.** The proposed brochure/fact sheet would be utilized together with abstracts of additional information on ordnance cleanup, mapping, and proposed removal, and institutional analysis plans can be provided to local officials. The production cost for these information packages is already included in the production cost of the brochure/fact sheet.

#### 7.5.2.2.5 Management, Execution, and Support Roles

Production and distribution of fact sheets can be executed directly by the USACE or through a contractor with experience in the production of printed media for public education. Distribution can be facilitated by mailing directly to all property owners and residents within the site and through dissemination by local institutions. Distribution of news releases and distribution of information to government officials will also be done by the USACE. Although most distribution will be done directly by the USACE, other media distribution to community groups would necessitate coordination with local government offices. Copies of the final version of the EE/CA would be made available to these individuals at the former Camp Swift information repository, which is located at the Bastrop Public Library.

### 7.5.2.3 Visual and Audio Media Awareness Program

In addition to printed media, another available avenue to facilitate awareness and understanding of ordnance hazards is audio and visual media, such as video programs,



segments on local television stations, and radio news and talk shows. The opportunity to disseminate information through visual and audio media is readily available and can be easily facilitated.

### **7.5.2.3.1 Types of Visual and Audio Media**

7.5.2.3.1.1 **Videotapes.** Professional quality videos that contain information similar to that described in the printed materials can be produced. The videos can be produced by USACE for distribution to local libraries and museums, for use as part of classroom education, or for broadcast on local television stations. For television broadcast, the length of the video would be approximately 30 minutes. A shorter version (10 minutes) could be produced for smaller group instruction.

7.5.2.3.1.2 **Television.** The 30-minute professional quality video could be aired on local public television as a public service program on how to identify and deal with ordnance. Local contact information on ordnance handling and emergencies can be provided. Local news broadcasts could also include interviews with USACE personnel, local residents, and others who have knowledge of the history of the former Camp Swift.

7.5.2.3.1.3 **Radio.** Local radio stations are a potential medium to publicize the ordnance situation within the site, the EE/CA, removal plans, and institutional controls. Talks shows or news reports are both possible formats for the radio programs. Programs could be repeated as more information about the former Camp Swift and the incidence of ordnance becomes available. The USACE could also air regular public service announcements.

### **7.5.2.3.2 Effectiveness**

The provision of information using both visual and audio media would be an effective method of modifying behavior and educating the public. Production and dissemination of videotapes and presentation of the message over local television and radio would be effective institutional controls with the ability to reach a large audience. However, the message must be reinforced. Regular re-broadcasts of the original television and radio presentations is recommended.

### **7.5.2.3.3 Implementation**

Local radio stations include KGSR (107.1 FM) in Austin, KELG (1440 AM) and KKLB (92.5 FM) in Elgin, and many more in Austin. Local television stations include KEYE-TV 42 (CBS), KLRU-18 (PBS), KTBC-7 (FOX), KVUE-TV 24 (ABC), and KXAN-TV 36 (NBC) in Austin. With USACE producing the videotapes and providing the information, local television and radio stations would likely agree to assist in distribution of the information. Educational channels such as PBS, would be options in providing free airtime for public service announcements.

#### **7.5.2.3.4 Cost**

The estimated cost to produce a professional quality 30-minute videotape for television broadcast and a 10-minute videotape for distribution to the local institutions and the community is approximately \$25,000. The estimated cost to copy and distribute videotapes to various institutions and to television stations would depend on the number of copies needed. Assuming 50 copies of videotapes are required, at \$20 each (including the cost of the videotape, dubbing, and postage) the cost would be approximately \$1,000. The estimated total cost to implement visual media programs would be \$26,000.

#### **7.5.2.3.5 Management, Execution, and Support Roles**

USACE will be responsible for the production of the videotapes. This can be executed directly by USACE or through a contract professional with experience in the production of public information and education programs. Support from the local television stations and other organizations and institutions will be needed for broadcast of the videotapes and to make them readily available to the public.

#### **7.5.2.4 Classroom Education**

Public awareness can be facilitated through the classroom. The students need to understand the nature of ordnance hazards and be able to properly identify and avoid ordnance if encountered. By asking students to share information with parents, the network of information will be amplified. A properly educated public is more likely to make correct decisions related to the safe and proper precautions of found ordnance. Classroom education can be offered in two major categories:

- Ordnance Identification, and
- Ordnance Safety.

##### **7.5.2.4.1 Categories of Classroom Education**

**7.5.2.4.1.1 Ordnance Identification.** Because access to different parts of the site cannot be fully controlled, it may be necessary to have public training in ordnance identification. The basic message should be to not touch anything that looks like ordnance, shrapnel, or any other unidentified material. Ordnance identification classes may be conducted through assistance from the Bastrop ISD and all private schools to educate students and citizens on how to identify, avoid, and report potential OE items.

**7.5.2.4.1.2 Ordnance Safety.** The affected public should be educated about the potential dangers associated with ordnance and should understand the safety procedures to follow if they encounter any suspected ordnance item. Safety presentations should be made as a part of the ordnance identification classes.

#### **7.5.2.4.2 Effectiveness**

Providing education through the classroom would be a very effective method of modifying behavior. Hands-on, realistic visual aids should be used to maximize the effectiveness of the education experience. However, to be fully effective over a period of time, the message must be reinforced. Ordnance identification classes should be conducted on a regular basis and ordnance safety should be incorporated as a regular part of the current classes.

#### **7.5.2.4.3 Implementation**

Ordnance identification and safety presentations should be made to the public and private primary and secondary schools in the area, particularly to the Bastrop ISD schools located on the former Camp Swift property. Providing classroom education should be easily implementable. With the USACE providing the funding and resources, local institutions would likely agree to participate and support the program. The USACE could provide professionals and experts to conduct ordnance identification and safety lectures. Presentation materials could consist of the already developed brochure/fact sheet, video, and exhibit/display, as well as various inert ordnance items potentially located on the former Camp Swift. In addition, dialogue between current landowners and local agencies is recommended since these agencies may have contact with former landowners.

#### **7.5.2.4.4 Cost**

The ordnance expert presentations to local schools would be sponsored by the USACE with no cost to the county school system or private schools. The cost for travel for a USACE employee or contractor to make presentations to local schools for one week is approximately \$1,000.00. Costs of presentation materials (video, fact sheet, exhibit) are discussed in other chapters. Costs for ongoing presentations every other year are estimated at \$1,000.00 annually.

#### **7.5.2.4.5 Management, Execution, and Support Roles**

To facilitate the classroom education alternative, the USACE must first contact all institutions that are willing to assist in the ordnance safety education process and make information available to them.

#### **7.5.2.5 Exhibits/Displays**

Placing exhibits/displays in museums or other areas where the public will be exposed to educational information is another method of generating and preserving general awareness and educating the public on the possible risk associated with the ordnance on the former Camp Swift property.

##### **7.5.2.5.1 Effectiveness**

The presentation of information through exhibits/displays is considered an effective approach to modifying the public's behavior concerning the presence of ordnance. Producing

exhibits that are visually appealing in areas of high public access would reinforce the message throughout the community.

#### **7.5.2.5.2 Implementation**

Displays could be developed by the USACE or as a project for classroom education and provided to the local museums, libraries, and schools. The displays could be in the form of large laminated posters and could include information on the history of the former Camp Swift, images and descriptions of all of the possible types of ordnance that were used at the former Camp Swift that could potentially be encountered by the public, and safety procedures and emergency contact information. The displays would raise awareness concerning the presence of ordnance and educate visitors to the facilities of the potential dangers if an ordnance item is encountered. The displays could also be used as visual aids for the classroom education presentations.

#### **7.5.2.5.3 Cost**

The estimated cost of producing 36 displays (48"x72" laminated posters) for the various institutions would be \$5,500.00.

#### **7.5.2.5.4 Management, Execution, and Support Roles**

The USACE or a contractor would design and produce the displays and provide them to the museums and other locations. Maintenance and preservation of the displays would be the responsibility of the facilities where the displays are located.

#### **7.5.2.6 Internet Website Awareness Program**

The creation of a website on the Internet or the update and use of the existing Parsons UXO project website ([www.projecthost.com](http://www.projecthost.com)), could be used in raising and preserving general awareness and educating the public about the presence of ordnance on the site. The website could be designed to include the history of the former Camp Swift, a background on ordnance finds and cleanup, ordnance identification, safe procedures if ordnance is encountered, and links to related websites.

##### **7.5.2.6.1 Effectiveness**

The existing Parsons UXO project website contains updated project-related documents, maps, links to additional websites, and contact information. The creation of a former Camp Swift specific website would be very effective in terms of presenting in-depth and updated information about ordnance contamination on the site to a broad cross-section of the region. A website could provide unlimited access to those that have Internet capabilities. If the USACE decides to enhance website awareness, it would be necessary to update the website as additional studies are implemented that pertain to the presence of ordnance.

##### **7.5.2.6.2 Implementation**

7.5.2.6.2.1 Creation and maintenance of the former Camp Swift ordnance awareness website can be done by the USACE, by Bastrop County, or jointly linked.

Information to be included in the website would come from the USACE studies and other sources. The following information could be included on the website:

- Links to studies completed at the former Camp Swift by the USACE and other sources;
- Links to existing websites, such as the Parsons UXO project website [www.projecthost.com](http://www.projecthost.com);
- History of the former Camp Swift, a background on ordnance finds and cleanup, and ordnance identification;
- Aerial maps and photographs of the former Camp Swift;
- Photographs of ordnance typical at the former Camp Swift;
- USACE contact information; and
- Emergency contact information.

7.5.2.6.2.2 The website could also include historical perspectives from local residents associated with the former Camp Swift, and current land use. The website address would be presented in the brochure/fact sheet, in classroom education, in television and radio coverage, and in the exhibit/displays discussed in the previous chapters. The web site would be registered with several popular search engines to make the site easy to find without the URL.

#### **7.5.2.6.3 Cost**

The cost to design a website varies from \$50 to \$100 per hour. Assuming that the design would require 50 hours at \$75 per hour (including review, revisions, and placing the site on the web), the total cost would be \$3,750.

#### **7.5.2.6.4 Management, Execution, and Support Roles**

To create a website, USACE should coordinate with a contractor to prepare the site and publish it on the Internet. The website could provide links to other important government agencies relevant to ordnance safety and identification. Similarly, local government and community organizations could also include a link to the website.

#### **7.5.2.7 Ad Hoc Committee Awareness Program**

Creation of an Ad Hoc committee comprised of community leaders, representatives from civic associations and businesses within the former Camp Swift, and a representative from the USACE would serve as a mechanism for facilitating meetings and implementing the recommendations of the EE/CA. This committee would serve as the primary proponent for public awareness of the ordnance contamination issue, and would work to ensure the successful implementation of each of the recommended institutional control awareness programs. The committee would be responsible for analyzing the effectiveness of the different programs on a regular basis and recommending changes as necessary to bring the message to the largest sector of the public.



#### **7.5.2.7.1 Effectiveness**

The Ad Hoc committee would be very effective in providing a proponent for public awareness. This group would provide a direct and flexible administration over information dissemination programs. With the committee's regular evaluation, more effective alternatives could be enhanced and less effective ones could be discontinued. This type of committee is most effective for ensuring the implementation of institutional control programs.

#### **7.5.2.7.2 Implementation**

The USACE should invite Bastrop County officials to jointly appoint members to the partnership. Community leaders, veterans, agency representatives, and civic associations should be contacted and invited to join.

#### **7.5.2.7.3 Cost**

Joining and serving within the ad hoc committee will be by invitation and be voluntary. The members will not be paid for their time. To implement Ad Hoc committees as a mechanism for information dissemination will cost approximately \$2,000 for the first year and \$1,000 for each subsequent year. The costs would include retaining services of a stenographer to record meeting minutes, overhead administrative costs, and other miscellaneous expenses.

#### **7.5.2.7.4 Management, Execution, and Support Roles**

The USACE must contact and invite community leaders to join the committee. Meeting rooms and a stenographer must be secured. It is suggested that a minimum of two meetings be conducted the first year and at least one per year thereafter.

### **7.5.2.8 Reverse 911® System**

Reverse 911® is an interactive community notification system which can be used to quickly contact citizens in a very specific geographic area to communicate urgent information. The installation of a Reverse 911® computer system could be used in notifying the public about ordnance issues which arise within their community.

#### **7.5.2.8.1 Effectiveness**

A Reverse 911® system is not considered an effective institutional control for the former Camp Swift. Ordnance-related accidents are typically isolated; sending a recorded message to hundreds of homes in the event of an ordnance related emergency would cause more alarm than necessary.

#### **7.5.2.8.2 Implementation**

The purchase and installation of a Reverse 911® system could be accomplished through funding received through grants and other sources. However, the implementation of a reverse 911 system is not recommended.

#### **7.5.2.8.3 Cost**

The cost of a basic eight line system is \$25,000. However, the implementation of a Reverse 911<sup>®</sup> system is not recommended.

#### **7.5.2.8.4 Management, Execution, and Support Roles**

No management would be required because the implementation of a Reverse 911<sup>®</sup> system is not recommended.

### **7.5.3 Site-Wide IC Summary**

Several IC components identified for implementation site-wide at the former Camp Swift that were considered effective, implementable, and cost-effective. Signage; notification during property transfer, during permitting, and by tax bill; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an Internet website, and establishment of an Ad Hoc committee are all recommended.

## **7.6 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR OE-FREE AOIS OUTSIDE FORMER FIRING RANGES**

No OE items were discovered in AOIs 3-7, 5-2, 7, and 12-2 during the EE/CA investigation or by landowners. Furthermore, firing ranges were not located within these areas at former Camp Swift. The following paragraphs describe the effectiveness, implementability, and cost of the six alternatives in these areas. Although further investigation of AOIs 3-7 and 12-2 may be warranted due to the lack of ROE during the EE/CA, these AOIs have been included in this discussion because no UXO or OE items have been found in these areas.

### **7.6.1 Alternative 1: No DoD Action Indicated**

#### **7.6.1.1 Effectiveness**

7.6.1.1.1 During the EE/CA investigation of AOIs 5-2 and 7, no OE items were discovered. There were also no landowner UXO findings. Of the 70 anomalies investigated within these areas, none were caused by ordnance scrap.

7.6.1.1.2 The NDAI alternative does comply with ARARs since no OE items were recovered in these AOIs during the EE/CA investigation. Therefore, OE response action alternatives will not be developed for these areas. The NDAI alternative is also acceptable because no former firing ranges were located within these areas. The short-term and long-term effectiveness criteria are met for the NDAI alternative, although the risk is not reduced (see Table 7.2). It is important to note that the government will respond to any future UXO discovery within any of these sectors, regardless of whether the affected parcel was designated for NDAI.

**Table 7.2 Impact Analysis for AOIs 3-7, 5-2, 7, and 12-2**

Alternative	Ordnance and Explosive Factors				Site Characteristics Factors		Human Factors	
	Type <sup>1</sup>	Sensitivity	Number of UXO Found	Number of UXO by Depth <sup>2</sup>	Accessibility	Stability	Activities	Population
Existing Condition	<u>AOIs 3-7, 5-2, 7, and 12-2:</u> EE/CA: none <sup>3</sup> OTHER: none	Not applicable	0	0	No Restriction	Stable	Significant	350
NDAI	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Institutional Controls	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Surface Removal	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Surface Removal With ICs	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Removal to Depth	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Removal to Depth with ICs	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact

<sup>1</sup> Denotes items found during the EE/CA investigation. "Other" denotes items found during the ASR (1994), EE/CA site visit, and local property owners.

<sup>2</sup> Denotes the number of UXO found at the surface (0 to 6 inches deep) and in the subsurface (>6 inches deep) during the EE/CA field investigation.

<sup>3</sup> Applies to AOIs 5-2 and 7 only. AOIs 3-7 and 12-2 were not investigated during the EE/CA.

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7.6.1.1.3 Although there are no historic OE findings in these areas, no landowner findings, and no UXO was recovered during the EE/CA investigation, AOIs 3-7 and 12-2 were not investigated during the EE/CA. Investigation of these areas is recommended, provided right-of-entry is granted. The NDAI conclusion is not appropriate for these sectors at this time because they have not been investigated due to lack of ROE.

#### **7.6.1.2 Implementability**

The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

#### **7.6.1.3 Cost**

The NDAI alternative is a no-cost alternative. However, for all areas that NDAI is employed, a recurring review process will be implemented, as described in Chapter 10, to ensure the recommended alternative remains appropriate. The cost for the recurring review process will be developed as part of a Recurring Review Plan to be developed after completion of the EE/CA process.

### **7.6.2 Alternative 2: Institutional Controls**

#### **7.6.2.1 Effectiveness**

The exposure risks associated with the IC alternative (those IC components over and above the site-wide IC) are the same as for the NDAI alternative because no ordnance will be removed. However, no OE items were discovered during the EE/CA investigation of AOIs 3-7, 5-2, 7, and 12-2. Based on the probable future land uses for these AOIs, no additional IC components (above the site-wide recommended components) were considered effective (see Table 7.2). As a result, neither the short-term nor long-term Effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the IC alternative does not satisfy the Effectiveness criteria and further analysis of this alternative will not be performed.

### **7.6.3 Alternative 3: Surface Removal of OE**

#### **7.6.3.1 Effectiveness**

This alternative would clear 5,241 acres (total acreage within AOIs) within AOIs 3-7, 5-2, 7, and 12-2 of ordnance-related items identified between the surface and a depth of 6-inches bgs, as described in Subchapter 7.3.4. No OE items were discovered during the EE/CA investigation of each of these areas. Since the findings do not indicate a public safety risk is present in these areas, implementation of a Surface Removal alternative is not warranted as it would not meet the Effectiveness criteria. Therefore, further analysis of this alternative will not be performed (Table 7.2).

### **7.6.4 Alternative 4: Surface Removal of OE with Institutional Controls**

#### **7.6.4.1 Effectiveness**

As described above in Subchapters 7.6.2 and 7.6.3, neither the Surface Removal or IC alternatives would be effective individually for implementation at AOIs 3-7, 5-2, 7, and 12-2.



The combination of the two alternatives would also not be effective for similar reasons. No OE items were discovered during the EE/CA investigation of these areas. Since the findings do not indicate a public OE safety risk is present, implementation of a Surface Removal alternative in conjunction with IC (above site-wide IC) is not warranted since it would not meet the Effectiveness criteria. Therefore, further analysis of this alternative will not be performed (Table 7.2).

## **7.6.5 Alternative 5: Removal of OE to Depth**

### **7.6.5.1 Effectiveness**

This alternative would clear 5,241 acres within AOIs 3-7, 5-2, 7, and 12-2 of ordnance-related items identified between the surface and a predetermined depth based on future land use, as described in Subchapter 7.3.5 and in accordance with DoD guidance (DoD, 1999). No OE items were discovered during the EE/CA investigation of these areas. The findings do not indicate a public OE safety risk is present in AOIs 3-7, 5-2, 7, and 12-2. Implementation of a Removal to Depth alternative is not warranted as it would not meet the Effectiveness criteria. Therefore, further analysis of this alternative will not be performed.

## **7.6.6 Alternative 6: Removal of OE to Depth with Institutional Controls**

### **7.6.6.1 Effectiveness**

As described above in Subchapters 7.6.2 and 7.6.5, neither the Removal to Depth or IC alternative would be effective individually for implementation at AOIs 3-7, 5-2, 7, and 12-2. The combination of the two alternatives would also not be effective for similar reasons. No OE items were discovered during the EE/CA investigation of these sectors, and there were no firing ranges located in these areas at former Camp Swift. Since the EE/CA findings and historical land uses in these AOIs do not indicate a public OE safety risk is present, implementation of a Removal to Depth alternative in conjunction with IC (above site-wide IC) is not warranted since it would not meet the Effectiveness criteria. Therefore, further analysis of this alternative will not be performed (Table 7.2).

## **7.7 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AOIs WITH UXO IN FORMER IMPACT AND BUFFER AREAS AND DEMOLITION AREA**

### **7.7.1 Alternative 1: No DoD Action Indicated**

#### **7.7.1.2 Effectiveness**

The former impact area and impact area buffer zone and the former ordnance demolition area includes AOIs 4-1, 4-2, 4-3, 5-1, 5-2, 5-3, and 10. However, UXO and OE items were only discovered in AOIs 4-1, 4-2, 4-3, 5-1, and 10. Based on analysis of the EE/CA data, these five areas are anticipated to have the highest density of remaining OE items. The NDAI alternative does not have an impact on the overall protection of public safety and the human environment in any of these areas (see Table 7.3). As this alternative fails the Effectiveness category, no further analysis of this alternative will be performed.

**Table 7.3 Impact Analysis for AOIs 4-1, 4-2, 4-3, 5-1, and 10**

Alternative	Ordnance and Explosive Factors				Site Characteristics Factors		Human Factors	
	Type <sup>1</sup>	Sensitivity	Number of UXO Found	Number of UXO by Depth <sup>2</sup>	Accessibility	Stability	Activities	Population
Existing Condition	AOIs 4-1, 4-2, 4-3, 5-1, and 10: EE/CA: (2) 4.2-inch mortars, (2) 105mm projectiles, (2) anti-tank mines, (544) ordnance scrap items OTHER: (1) 105mm projectile, (2) 75mm projectiles, (1) fuze, anti-tank mines	Very Sensitive	EE/CA: 6 in 24 acres Other: 1	Surface: (2) UXO, (384) ordnance scrap items Subsurface: (4) UXO, (159) ordnance scrap items	No Restriction/ Limited restriction	Stable (except along dirt roads)	Significant	200
NDAI	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Institutional Controls	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	<b>Impact</b>	No Impact
Surface Removal	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	No Impact	No Impact
Surface Removal With ICs	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	<b>Impact</b>	No Impact
Removal to Depth	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	No Impact	No Impact
Removal to Depth with ICs	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	<b>Impact</b>	No Impact

<sup>1</sup> Denotes items found during the EE/CA investigation. "Other" denotes items found during the ASR (1994), EE/CA site visit, and local property owners.

<sup>2</sup> Denotes the number of UXO found at the surface (0 to 6 inches deep) and in the subsurface (>6 inches deep) during the EE/CA field investigation.

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**7.7.2 Alternative 2: Institutional Controls**

**7.7.2.1 Effectiveness**

The exposure risks associated with the IC alternative is assumed to be the same as for the NDAI alternative because ordnance will not be removed. However, although unquantifiable, some reduction in the number of exposures will result. Signage; notification during permitting, by tax bill; and by certified letter; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an Internet website, and establishment of an Ad Hoc committee are all recommended.

**7.7.2.2 Implementability**

Signage; notification during property transfer, during permitting, and by tax bill; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an Internet website, and establishment of an Ad Hoc committee are all technically and administratively feasible and the services and materials necessary to implement such are readily available.

**7.7.2.3 Cost**

The actual cost to implement the previous institutional control measures may be less than the estimated cost because a large part of the necessary system needed for implementation is already in place at the county level, or is funded through this EE/CA. The estimated initial cost for recommended ICs is \$88,800, with annual projected costs of \$2,000. The estimated cost for each of the ICs is provided in Table 7.4.

**Table 7.4 Projected Costs for Recommended Institutional Control Alternatives**

Institutional Control	Initial Cost	Annual Cost
Signage (Assume 50 signs at \$100/each)	\$5,000	Minimal
Notification During Permitting Notification by Tax Bill Notification by certified letter	\$38,500	None
Brochures and Fact Sheets	\$7,050	Minimal
Newspaper Articles	Minimal	Minimal
Information Packages to Public Officials	Minimal	Minimal
Audio/Visual Media	\$26,000	None
Classroom Education	\$1,000	\$1,000
Exhibits/Displays	\$5,500	None
Internet Website	\$3,750	Minimal
Ad hoc Committee	\$2,000	\$1,000
<b>TOTAL</b>	<b>\$88,800</b>	<b>\$2,000</b>

**7.7.3 Alternative 3: Surface Removal of OE**

**7.7.3.1 Effectiveness**

7.7.3.1.1 Implementation of the Surface Removal alternative for AOIs 4-1, 4-2, 4-3, 5-1, and 10 would provide significant protection to public safety and the human environment. The land in these areas is privately-owned, and includes residential subdivisions, rural residential areas, Boy Scouts and LCRA recreational areas, and agricultural areas. In

addition, residential developments in the area are increasing. As of 2001, Bastrop County was the eighth fastest growing county in Texas and the thirtieth fastest growing county in the United States (Bastrop Economic Development Corporation, 2002).

7.7.3.1.2 During the EE/CA investigation of AOIs 4-1, 4-2, 4-3, 5-1, and 10, six UXO items were recovered from 759 investigated anomalies. The UXO items consisted of two 4.2-inch mortars, two 105mm projectiles, and two anti-tank mines. One 105mm projectile and one anti-tank mine were found within 6 inches of the ground surface. The remaining four items were found at 20-inches, 24-inches, 27-inches, and 30-inches bgs. For this alternative, UXO-qualified removal personnel would perform a one-time surface removal of ordnance-related items to a depth of six inches bgs for the estimated 3,752 accessible (grade <45 degrees and right-of-entry allowed) acres present in AOIs 4-1, 4-2, 4-3, 5-1, and 10 (see also Subchapter 7.3.4). If the source of the magnetic reading is not identified within the first six inches below the surface, the excavation will cease and the location will be restored to its original condition. Overall, only 33% of UXO and 70% of ordnance scrap recovered in these areas during the EE/CA field investigation were located within six inches of the ground surface.

7.7.3.1.3 This alternative will be effective long-term because it should permanently reduce residual OE from AOIs 4-1, 4-2, 4-3, 5-1, and 10. However, the EE/CA investigation results suggest that surface removal would not remove most of the remaining UXO. Surface removal cannot assure complete removal of all OE. Implementation of this alternative will provide increased overall protection of public safety and the human environment. Thus, the Surface Removal alternative meets the criteria in the Effectiveness category and further analysis will be performed.

### **7.7.3.2 Implementability**

This type of OE removal activity is both technically and administratively feasible and the services and materials necessary to implement such a removal are readily accessible. The alternative will be implemented as described in subchapter 7.3.4. Generally, removal alternatives are acceptable to local agencies, property owners, and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report will be incorporated into the final report and may affect this evaluation.

### **7.7.3.3 Cost**

The cost to perform this alternative is presented in Chapter 8. The duration is dependent on the number of removal teams utilized and the amount of government funding available.



## **7.7.4 Alternative 4: Surface Removal of OE with Institutional Controls**

### **7.7.4.1 Effectiveness**

As described in Subchapter 7.7.3.1, implementation of this surface removal of OE items will not sufficiently increase overall protection of public safety and the human environment. Adding ICs to surface removal would still not address UXO items at depths greater than 6 inches. The Surface Removal with ICs alternative meets the criteria in the Effectiveness category and further analysis will be performed (Table 7.3).

### **7.7.4.2 Implementability**

This alternative is both technically and administratively feasible and the materials and services necessary to implement this alternative are readily available. The alternative will be implemented as described in Subchapter 7.3.5. Generally, removal alternatives are acceptable to local agencies, property owners, and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report will be incorporated into the final report and may affect this evaluation.

### **7.7.4.3 Cost**

The cost to perform this alternative is presented in Chapter 8.

## **7.7.5 Alternative 5: Removal of OE to Depth**

### **7.7.5.1 Effectiveness**

During the EE/CA investigation of AOIs 4-1, 4-2, 4-3, 5-1, and 10, six UXO items were recovered from the 759 anomalies investigated. Four of the six UXO were found at depths greater than 6 inches bgs. In addition, 30% of the ordnance scrap recovered in these areas was found at a depth greater than 6 inches. The Removal to Depth alternative would clear 3,752 acres within AOIs 4-1, 4-2, 4-3, 5-1, and 10 (total acreage of these AOIs) of the majority of ordnance-related items identified between the surface and a predetermined depth based on future land use, as described in Subchapter 7.3.4 and in accordance with DoD guidance (DoD, 1999). Based on the current residential land use and probable future development of many of the remaining open agricultural lands at the former Camp Swift, the Removal to Depth of OE alternative will provide significant additional protection of public safety and the human environment from OE exposure. As a result, the Removal to Depth alternative does satisfy the Effectiveness category and further analysis of this alternative will be performed.

### **7.7.5.2 Implementability**

This alternative is both technically and administratively feasible and the materials and services necessary to implement this alternative are readily available. The alternative will be implemented as described in Subchapter 7.3.6. Generally, removal alternatives are acceptable to local agencies, property owners and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report will be incorporated into the final report and may affect this evaluation.

### **7.7.5.3 Cost**

The cost to perform this alternative is presented in Chapter 8.

## **7.7.6 Alternative 6: Removal of OE to Depth with Institutional Controls**

### **7.7.6.1 Effectiveness**

This alternative is a combination of Alternatives 2 and 5. Therefore, the detailed discussions contained in Subchapters 7.7.2 and 7.7.5 apply to this alternative as well. Based on the current residential land use and probable future development of many of the remaining open agricultural lands at the former Camp Swift, the Removal to Depth of OE alternative will provide significant additional protection of public safety and the human environment from OE exposure. As a result, the Removal to Depth with ICs alternative also satisfies the Effectiveness category and further analysis of this alternative will be performed.

### **7.7.6.2 Implementability**

This alternative is both technically and administratively feasible and the materials and services necessary to implement this alternative are readily available. The alternative will be implemented as described in Subchapter 7.3.7. Generally, removal alternatives are acceptable to local agencies, property owners and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report will be incorporated into the final report and may affect this evaluation.

### **7.7.6.3 Cost**

The cost to perform this alternative is presented in Chapter 8.

## **7.8 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR OTHER AOIs WITH OE OR WITH FORMER FIRING RANGES**

### **7.8.1 Alternative 1: No DoD Action Indicated**

#### **7.8.1.1 Effectiveness**

UXO and OE items were recovered from several AOIs located outside the impact/buffer area and demolition area. These areas include AOIs 1, 3-1, 3-3, 3-4, 3-8, 6-1, 6-2, 9, and 12-1. Landowners have reported finding OE in AOIs 3-2, 3-5, and 3-6. In addition, former firing ranges, which are anticipated to have a higher likelihood of containing OE, were located within portions of AOIs 1, 2, 3-4, 5-2, 5-3, 6-1, and 6-2. Based on analysis of the EE/CA data, UXO items could remain in these areas; however, the density of remaining items is expected to be less than in the former impact/buffer area and demolition area. For portions of these AOIs, the NDAI alternative does comply with ARARs since limited OE items were recovered during the EE/CA investigation. For the portions of these AOIs that are outside of former firing ranges or not within the vicinity of OE findings, the NDAI alternative meets the Effectiveness category. Further analysis of this alternative will be performed.

### **7.8.1.2 Implementability**

The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

### **7.8.1.3 Cost**

The NDAI alternative is a no-cost alternative. However, for all areas that NDAI is employed, a recurring review process will be implemented, as described in Chapter 10, to ensure the recommended alternative remains appropriate. The cost for the recurring review process will be developed as part of a Recurring Review Plan to be developed after completion of the EE/CA process.

## **7.8.2 Alternative 2: Institutional Controls**

### **7.8.2.1 Effectiveness**

The exposure risks associated with the IC alternative is assumed to be the same as for the NDAI alternative because ordnance will not be removed. However, although unquantifiable, some reduction in the number of exposures will result. Signage; notification during property transfer, during permitting, and by tax bill; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an Internet website, and establishment of an Ad Hoc committee are all recommended.

### **7.8.2.2 Implementability**

Signage; notification during property transfer, during permitting, and by tax bill; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an Internet website, and establishment of an Ad Hoc committee are all technically and administratively feasible and the services and materials necessary to implement such are readily available.

### **7.8.2.3 Cost**

The actual cost to implement the previous institutional control measures may be less than the estimated cost because a large part of the necessary system needed for implementation is already in place at the county level, or is funded through this EE/CA. The estimated initial cost for recommended ICs is \$88,800, with annual projected costs of \$2,000. The estimated cost for each of the ICs is provided in Table 7.4.

## **7.8.3 Alternative 3: Surface Removal of OE**

### **7.8.3.1 Effectiveness**

7.8.3.1.1 Implementation of the Surface Removal alternative for AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 will provide protection to public safety and the human environment in the vicinity of former OE findings, and in former firing ranges. Because limited OE was found in these AOIs, Surface Removal in portions of these AOIs

where OE was not found or a firing range was not formerly located is not considered to provide additional protection to public safety and the human environment. The land in these areas is largely privately-owned, and includes residential subdivisions, rural residential areas, a future elementary school property, a motorcross recreational area, North Shore Park, BFCI, and agricultural areas. In addition, residential developments in the area are increasing. As of 2001, Bastrop County was the eighth fastest growing county in Texas and the thirtieth fastest growing county in the United States (Bastrop EDC, 2002).

7.8.3.1.2 During the EE/CA investigation of AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 6-1, 6-2, 9, and 12-1, seven UXO items were recovered from 2,287 investigated anomalies. The UXO items consisted of six anti-tank mines (with energetic charge) and one fuze. All seven UXO items were found within 6 inches of the ground surface. In addition, 100 ordnance scrap items were identified in these areas during the EE/CA. As shown in Figure 4.1, UXO, ordnance scrap, and landowner-reported OE in these AOIs is generally scattered throughout these areas, with few concentrated findings.

7.8.3.1.3 Most of the UXO were practice anti-tank mines. EE/CA findings show that the density of practice anti-tank mines in these areas is sporadic relative to that of projectiles and mortars, as would be expected for this type of ordnance. Designated impact areas were used for training of artillery use, but anti-tank mine training could be done in any location. It is reasonably expected that remote areas of the former camp would be selected for this type of training. Minefields could include any number of mines, and units at former Camp Swift may have trained in placement of different types of minefields, such as protective minefields, tactical minefields, nuisance minefields, and phony minefields. These types of minefields can be irregular in shape and size, and they can be in a group or a series of mined areas. With the EE/CA investigation and landowner-reported findings, no discernible pattern to the mine placement can be identified at former Camp Swift. However, evidence of one practice anti-tank mine in an area may indicate that additional practice mines are nearby.

7.8.3.1.4 Therefore, for these AOIs, it is recommended that the response action be conducted in minimum 500-foot radius areas from each of the EE/CA UXO locations, EE/CA ordnance scrap locations, and landowner-reported OE findings. The response action may be extended across AOI boundaries if needed. In addition to the areas in which OE was found, removal action is recommended for the portions of these AOIs which were formerly firing ranges. Firing ranges were located in AOIs 1, 2, 3-4, 5-3, 6-1, and 6-2. For this alternative, UXO-qualified removal personnel would perform a one-time surface removal of ordnance-related items to a depth of six inches bgs for the estimated 3,312 acres in these 500-ft radius areas in AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 6-1, 6-2, 9, and 12-1 (see also Subchapter 7.3.4), and the former firing range areas of AOIs 1, 2, 3-4, 5-3, 6-1, and 6-2. If the source of the magnetic reading is not identified within the first six inches below the surface, the excavation will cease and the location will be restored to its original condition. Overall, 100% of UXO and 88% of ordnance scrap recovered in these AOIs during the EE/CA field investigation were located within six inches of the ground surface.

7.8.3.1.5 This alternative will not be effective long-term because it does not remove residual OE from depth in. None of the UXO and 12% of the ordnance scrap was discovered

at depths greater than 6 inches bgs. This ordnance scrap is an indication that UXO may be found at depth. The EE/CA investigation results suggest that surface removal would remove most of the remaining UXO. However, surface removal cannot assure complete removal of all OE. Implementation of this alternative will provide increased overall protection of public safety and the human environment but residual risk would remain. Thus, the Surface Removal alternative does not meet the criteria in the Effectiveness category and further analysis will not be performed.

#### **7.8.3.2 Implementability**

This type of OE removal activity is both technically and administratively feasible and the services and materials necessary to implement such a removal are readily accessible. The alternative will be implemented as described in subchapter 7.3.4. Generally, removal alternatives are acceptable to local agencies, property owners, and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report will be incorporated into the final report and may affect this evaluation.

#### **7.8.3.3 Cost**

The cost to perform this alternative is presented in Chapter 8. The duration is dependent on the number of removal teams utilized and the amount of government funding available.

### **7.8.4 Alternative 4: Surface Removal of OE with Institutional Controls**

#### **7.8.4.1 Effectiveness**

As described in Subchapter 7.8.3.1, implementation of this surface removal of OE items will have increased overall protection of public safety and the human environment but residual risk remains. Adding ICs to surface removal increases the effectiveness since the ICs provide public awareness, but risk still remains. The Surface Removal with ICs alternative does not meet the criteria in the Effectiveness category and further analysis will not be performed (Table 7.5).

#### **7.8.4.2 Implementability**

This alternative is both technically and administratively feasible and the materials and services necessary to implement this alternative are readily available. The alternative will be implemented as described in Subchapter 7.3.5. Generally, removal alternatives are acceptable to local agencies, property owners, and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report will be incorporated into the final report and may affect this evaluation.

#### **7.8.4.3 Cost**

The cost to perform this alternative is presented in Chapter 8.



## **7.8.5 Alternative 5: Removal of OE to Depth**

### **7.8.5.1 Effectiveness**

During the EE/CA investigation of AOIs 1, 3-1, 3-3, 3-4, 3-8, 6-1, 6-2, 9, and 12-1, seven UXO items were recovered from the 2,287 anomalies investigated. None of the UXO were found at depths greater than 6 inches bgs. A total of 12% of the ordnance scrap recovered in these AOIs was found at a depth greater than 6 inches. In addition, landowners found OE in AOIs 3-2, 3-5, and 3-6, and former firing ranges were located within AOIs 1, 2, 3-4, 5-3, 6-1, and 6-2. The Removal to Depth alternative would clear 3,312 acres within the 500-ft radius areas of OE findings in AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 6-1, 6-2, 9, and 12-1; and within the former firing ranges in AOIs 1, 2, 3-4, 5-3, 6-1, and 6-2 (total acreage of all areas) of the majority of ordnance-related items identified between the surface and a predetermined depth based on future land use, as described in Subchapter 7.3.4 and in accordance with DoD guidance (DoD, 1999). Based on the current residential land use and probable future development of many of the remaining open agricultural lands at the former Camp Swift, the Removal to Depth of OE alternative will provide additional protection of public safety and the human environment from OE exposure. As a result, the Removal to Depth alternative does satisfy the Effectiveness category and further analysis of this alternative will be performed.

### **7.8.5.2 Implementability**

This alternative is both technically and administratively feasible and the materials and services necessary to implement this alternative are readily available. The alternative will be implemented as described in Subchapter 7.3.6. Generally, removal alternatives are acceptable to local agencies, property owners and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report will be incorporated into the final report and may affect this evaluation.

### **7.8.5.3 Cost**

The cost to perform this alternative is presented in Chapter 8.

## **7.8.6 Alternative 6: Removal of OE to Depth with Institutional Controls**

### **7.8.6.1 Effectiveness**

This alternative is a combination of Alternatives 2 and 5. Therefore, the detailed discussions contained in Subchapters 7.8.2 and 7.8.5 apply to this alternative as well. Based on the current residential land use and probable future development of many of the remaining open agricultural lands at the former Camp Swift, the Removal to Depth of OE alternative will provide appreciable additional protection of public safety and the human environment from OE exposure. As a result, the Removal to Depth with ICs alternative also satisfies the Effectiveness category and further analysis of this alternative will be performed.

**Table 7.5 Impact Analysis for AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1**

Alternative	Ordnance and Explosive Factors				Site Characteristics Factors		Human Factors	
	Type <sup>1</sup>	Sensitivity	Number of UXO Found	Number of UXO by Depth <sup>2</sup>	Accessibility	Stability	Activities	Population
<b>Existing Condition</b>	<u>AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, &amp; 12-1:</u> EE/CA: (6) anti-tank mines (one with booby trap), (1) fuze, (102) ordnance scrap items OTHER: (5) practice anti-tank mines, (1) M21 grenade, (2) rifle grenades, (1) M21 grenade, practice anti-tank mines, fuzes, 37 mm projectiles, 2.36-inch rockets, 81 mm mortars, (1) 81 mm mortar, hand grenades, anti-tank mines	Very Sensitive	EE/CA: 7 in 172 acres	Surface: (7) UXO, (88) ordnance scrap items Subsurface: (12) ordnance scrap items	No Restriction/ Limited restriction	Stable (except along dirt roads and motorcross area)	Significant	21,500
NDAI	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact
Institutional Controls	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	<b>Impact</b>	No Impact
Surface Removal	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	No Impact	No Impact
Surface Removal With ICs	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	<b>Impact</b>	No Impact
Removal to Depth	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	No Impact	No Impact
Removal to Depth with ICs	No Impact	No Impact	<b>Impact</b>	<b>Impact</b>	No Impact	No Impact	<b>Impact</b>	No Impact

<sup>1</sup> Denotes items found during the EE/CA investigation. "Other" denotes items found during the ASR (1994), EE/CA site visit, and local property owners.

<sup>2</sup> Denotes the number of UXO found at the surface (0 to 6 inches deep) and in the subsurface (>6 inches deep) during the EE/CA field investigation.

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### 7.8.6.2 Implementability

This alternative is both technically and administratively feasible and the materials and services necessary to implement this alternative are readily available. The alternative will be implemented as described in Subchapter 7.3.7. Generally, removal alternatives are acceptable to local agencies, property owners, and the local community as a means to reduce the residual OE risk. Input received from these stakeholders as a part of the public response period for this EE/CA report has been incorporated into this final report.

### 7.8.6.3 Cost

The cost to perform this alternative is presented in Chapter 8.

## 7.9 SUMMARY OF REMAINING OE RESPONSE ACTION ALTERNATIVES

The OE response action alternatives for the former Camp Swift that remained after the initial screening of the six response action alternatives against the three general categories of effectiveness, implementability, and cost include:

- Alternative 1 – No DoD Action Indicated at all of AOIs 5-2 and 7; and portions of AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 6-1, 6-2, 9, and 12-1; and
- Alternative 2 – Institutional Controls at AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 4-1, 4-2, 4-3, 5-1, 5-3, 6-1, 6-2, 9, 10, and 12-1; and
- Alternative 3 – Surface Removal of OE at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1; and
- Alternative 4 – Surface Removal of OE with IC at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1; and
- Alternative 5 – Removal to Depth of OE at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1; and
- Alternative 6 – Removal to Depth of OE with IC at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1.

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## CHAPTER 8

# COMPARATIVE ANALYSIS OF RESPONSE ACTION ALTERNATIVES

### 8.1 INTRODUCTION

8.1.1 The six response action alternatives identified for the former Camp Swift were analyzed in Chapter 7 with three evaluation criteria: effectiveness, implementability, and cost. The analysis was performed to screen the alternatives based on their compliance with the minimum requirements of the evaluation criteria. The alternatives retained for comparative analysis for the sectors included:

- Alternative 1 – No DoD Action Indicated at all of AOIs 5-2 and 7; and portions of AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 6-1, 6-2, 9, and 12-1; and
- Alternative 2 – Institutional Controls at AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 4-1, 4-2, 4-3, 5-1, 5-3, 6-1, 6-2, 9, 10, and 12-1; and
- Alternative 3 – Surface Removal of OE at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1; and
- Alternative 4 – Surface Removal of OE with IC at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1; and
- Alternative 5 – Removal to Depth of OE at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1; and
- Alternative 6 – Removal to Depth of OE with IC at AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1.

Each of the above six alternatives met the minimum requirements of the evaluation criteria for at least one area. As discussed in Chapter 7, the criteria for NDAI is met for all of AOIs 5-2 and 7; and portions of AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 6-1, 6-2, 9, and 12-1. Therefore, no further analysis is warranted for those areas. No conclusions can be made regarding AOIs 2, 3-7, 5-3, and 12-2 which were not investigated due to lack of ROE. For AOIs 4-1, 4-2, 4-3, 5-1, and 10; and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1, a comparative analysis of the five retained OE removal action alternatives was conducted. These nineteen areas were divided into two groups, those within the impact/buffer area and demolition area with higher density OE findings (AOIs 4-1, 4-2, 4-3, 5-1, and 10), and those outside (AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1). For AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1, the alternatives were evaluated for 500-ft radius areas around each OE finding within these AOIs, and within former firing ranges in these areas. The areas are analyzed separately.

8.1.2 A comparative analysis is presented in this chapter to determine the relative performance of the retained alternatives for each of the evaluation criteria. The purpose of this comparison was to determine the advantages and disadvantages of each of the alternatives relative to one another. This comparison was used to support the selection of the most appropriate OE removal actions for each sector. Similar to the initial alternative screening conducted in Chapter 7, the comparative analysis was performed by ranking each alternative relative to the other alternatives for effectiveness, implementability, and cost. However, each of the evaluation criteria were further analyzed by subcomponents.

8.1.3 For each of the subcomponents of an evaluation criterion, a ranking value was assigned for each of the retained alternatives, with “1” representing the best choice. In the case of two or more alternatives being equal for a criterion, an average ranking value was used for each alternative that is of equal value in the criterion. Ranking values were totaled for each alternative within the three evaluation criteria of effectiveness, implementability, and cost. However, not all subcomponents within each of the three evaluation criteria were weighted equally. The rankings for each evaluation criterion were combined and the alternative with the lowest overall score was selected as the preferred alternative for the sector.

## **8.2 EFFECTIVENESS**

### **8.2.1 Introduction**

The retained alternatives for each area were ranked under the effectiveness category. The results of this ranking process are outlined in Table 8.1. Based on this analysis, the Removal to Depth of OE with IC alternative ranked the highest in the effectiveness category for all AOIs that had OE findings or former firing range areas. The logic behind the rankings for the evaluation criteria is provided in the following paragraphs.

### **8.2.2 Overall Protection of Public Safety and Human Environment**

The OERIA process as described in “Interim Guidance, OE Risk Impact Assessment (USASCE, 2001b)” was used to evaluate each alternative for overall protection of public safety and the human environment. This process provided a qualitative indication of the change in the potential for harm and level of protectiveness at the sectors for each of the remaining alternatives. The impact of each of the remaining alternatives was evaluated by assigning an impact evaluation score of ‘No Impact’ or an alphabetical rank of ‘A’, ‘B’, or ‘C’ – with ‘A’ being the highest impact in reducing the potential for harm and increasing the level of protectiveness at the AOI and a rank ‘C’ was used to notate the lowest impact. This evaluation included three primary OE risk factors that were used in the risk assessment presented in Chapter 4 and the screening of the alternatives presented in Chapter 7. This evaluation is illustrated in Tables 8.2 and 8.3.

**Table 8.1 Effectiveness Criteria Application**

AREAS EVALUATED	ALTERNATIVE	EFFECTIVENESS				SCORE	RANK
		Overall Protection of Public Safety & Human Environment	Compliance with ARARs	Long-Term Effectiveness	Short-Term Effectiveness		
AOIs 4-1, 4-2, 4-3, 5-1, and 10 (AOIs in Former Impact/Buffer Area and Demolition Area)	Institutional Controls	5	3	5	3	16	5
	Surface Removal of OE	4	3	4	1	12	4
	Surface Removal of OE with ICs	3	3	3	1	10	3
	Removal to Depth of OE	2	3	2	2	9	2
	Removal to Depth of OE with ICs	1	3	1	2	7	1
Portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 (AOIs in Other Areas)	Institutional Controls	5	3	5	3	16	5
	Surface Removal of OE	4	3	4	1	12	4
	Surface Removal of OE with ICs	3	3	3	1	10	3
	Removal to Depth of OE	2	3	2	2	9	2
	Removal to Depth of OE with ICs	1	3	1	2	7	1

Note: Ranking from best to worst; best = 1, worst = 5

**Table 8.2 OE Risk Impact Analysis for AOIs 4-1, 4-2, 4-3, 5-1, and 10**

Alternative	Ordnance and Explosive Factors				Site Characteristics Factors		Human Factors		Overall Rank <sup>3</sup>
	Type <sup>1</sup>	Sensitivity	Number of UXO Found	Number of UXO by Depth <sup>2</sup>	Accessibility	Stability	Activities	Population	
<b>Existing Condition</b>	<u>AOIs 4-1, 4-2, 4-3, 5-1, and 10:</u> EE/CA: (2) 4.2-inch mortars, (2) 105mm projectiles, (2) anti-tank mines, (544) ordnance scrap items OTHER: (1) 105mm projectile, (2) 75mm projectiles, (1) fuze, anti-tank mines	Very Sensitive	EE/CA: 6 in 24 acres	Surface: 20% UXO, 70% ordnance scrap items Subsurface: 80% UXO, 30% ordnance scrap items	No Restriction/ Limited restriction	Stable (except along dirt roads)	Significant	210	
Institutional Controls	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	<b>A</b>	No Impact	<b>E</b>
Surface Removal	No Impact	No Impact	<b>B</b>	<b>B</b>	No Impact	No Impact	No Impact	No Impact	<b>D</b>
Surface Removal With ICs	No Impact	No Impact	<b>B</b>	<b>B</b>	No Impact	No Impact	<b>A</b>	No Impact	<b>C</b>
Removal to Depth	No Impact	No Impact	<b>A</b>	<b>A</b>	No Impact	No Impact	No Impact	No Impact	<b>B</b>
Removal to Depth with ICs	No Impact	No Impact	<b>A</b>	<b>A</b>	No Impact	No Impact	<b>A</b>	No Impact	<b>A</b>

<sup>1</sup> Denotes items found during the EE/CA investigation, as indicated. "Other" denotes items found during the ASR (1994) and by local property owners.

<sup>2</sup> Denotes the percentage of UXO and ordnance scrap found at the surface (0 to 6 inches deep) and in the subsurface (>6 inches deep) during the EE/CA field investigation.

<sup>3</sup> Overall Rank 'A' being the alternative with most significant impact in reducing the safety risk within the sector and Rank 'E' indicating the least impact.

**Table 8.3 OE Risk Impact Analysis for AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1**

Alternative	Ordnance and Explosive Factors				Site Characteristics Factors		Human Factors		Overall Rank <sup>13</sup>
	Type <sup>11</sup>	Sensitivity	Number of UXO Found	Number of UXO by Depth <sup>12</sup>	Accessibility	Stability	Activities	Population	
<b>Existing Condition</b>	<u>AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, &amp; 12-1:</u> EE/CA: (6) anti-tank mines (one with booby trap), (1) fuze, (102) ordnance scrap items OTHER: (5) practice anti-tank mines, (1) M21 grenade, (2) rifle grenades, (1) M21 grenade, practice anti-tank mines, fuzes, 37 mm projectiles, 2.36-inch rockets, 81 mm mortars, (1) 81 mm mortar, hand grenades, anti-tank mines	Very Sensitive	EE/CA: 7 in 172 acres	Surface: 100% UXO, 88% ordnance scrap items Subsurface: 0% UXO 12% ordnance scrap items	No Restriction/ Limited restriction	Stable (except along dirt roads and motorcross area)	Significant	21,500	
Institutional Controls	No Impact	No Impact	No Impact	No Impact	No Impact	No Impact	<b>A</b>	No Impact	<b>E</b>
Surface Removal	No Impact	No Impact	<b>B</b>	<b>B</b>	No Impact	No Impact	No Impact	No Impact	<b>D</b>
Surface Removal With ICs	No Impact	No Impact	<b>B</b>	<b>B</b>	No Impact	No Impact	<b>A</b>	No Impact	<b>C</b>
Removal to Depth	No Impact	No Impact	<b>A</b>	<b>A</b>	No Impact	No Impact	No Impact	No Impact	<b>B</b>
Removal to Depth with ICs	No Impact	No Impact	<b>A</b>	<b>A</b>	No Impact	No Impact	<b>A</b>	No Impact	<b>A</b>

<sup>11</sup> Denotes items found during the EE/CA investigation, as indicated. "Other" denotes items found during the ASR (1994) and by local property owners.

<sup>12</sup> Denotes the percentage of UXO and ordnance scrap found at the surface (0 to 6 inches deep) and in the subsurface (>6 inches deep) during the EE/CA field investigation.

<sup>13</sup> Overall Rank 'A' being the alternative with most significant impact in reducing the safety risk within the sector and Rank 'E' indicating the least impact.



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### 8.2.2.1 Institutional Controls

8.2.2.1.1 The implementation of sitewide ICs, as described in Chapter 7, would modify the behavior of the public and the activities they perform at the former Camp Swift.

8.2.2.1.2 For all AOIs, an overall rank of 'E' (least impact) was assigned to this alternative because ICs such as warning signs and notifications will only provide knowledge of OE safety concerns to the public but will not by itself eliminate the potential for harm from OE present. Implementation of this alternative will not reduce the risk to the public from residual OE since it does not include any removal activity.

### 8.2.2.2 Surface Removal of OE

8.2.2.2.1 The Surface Removal of OE alternative would remove OE items located at depths up to 6-inches bgs in the subject AOIs, as described in Chapter 7 (DoD, 1999).

8.2.2.2.1 For AOIs 4-1, 4-2, 4-3, 5-1, and 10, the Surface Removal alternative was ranked 'B' for density and depth categories because, although it will decrease the density of OE items remaining in the areas, 30% of the UXO items recovered during the EE/CA in these AOIs were found at depths greater than 6 inches (Table 8.2). The Surface Removal alternative will provide an increase in the level of protection to the public in AOIs 4-1, 4-2, 4-3, 5-1, and 10 because 70% of the UXO recovered during the EE/CA was at depths of 6 inches or less. This alternative would provide an increase in the level of protection to the public, Boy Scouts, researchers on the Boy Scouts property, construction workers, and volunteer firefighters. However, because the land is privately-owned and population in the area is increasing rapidly, it is not possible to effectively restrict land uses to surface use only in the area. Much of the land within this area had surface-use only recommendations when the camp was closed, yet development continues to occur in this area. The remaining ordnance will likely be encountered given the likelihood for future development of property in these areas. The Surface Removal of OE alternative was given an overall rank of 'B' for AOIs 4-1, 4-2, 4-3, 5-1, and 10 because it will result in reduced risk to the public from no removal alternatives, but does not provide as much risk reduction as Removal to Depth alternatives, discussed below.

8.2.2.2.1 For the portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 that lie within former firing ranges or within 500-ft of former ordnance findings, the Surface Removal alternative was also ranked 'B' for density and depth categories. Although the Surface Removal alternative will provide a significant increase in the level of protection to the public in these AOIs, it will not provide as great of an increase in protection as the Removal to Depth alternative. This Surface Removal alternative would provide an increase in the level of protection to the public, park users, construction workers, and volunteer firefighters. However, because the land is privately-owned and population in the area is increasing rapidly, it is not possible to effectively restrict land uses to surface use only in the area. Furthermore, most of the land within these AOIs was not restricted to surface use only when the camp closed. If any OE remains at depth, it will likely be encountered given the likelihood for future development of property in these areas. The Surface Removal of OE

alternative was given an overall rank of 'B' for these areas because it will result in reduced risk to the public from no removal alternatives, but does not provide as much risk reduction as Removal to Depth alternatives, discussed below.

### 8.2.2.3 Surface Removal of OE with ICs

8.2.2.3.1 The combination of IC (signs and notifications) with the Surface Removal of OE alternative will not only remove some of the OE safety risk (based on the EE/CA density distribution) but will also provide information to the former Camp Swift population to affect behavior modification. The signage and notifications will inform the public of the presence of OE within the former Camp Swift.

8.2.2.3.2 The surface removal of OE alternative will reduce the depth distribution of residual ordnance-related items within both groups of AOIs, and; coupled with IC (above sitewide IC), increase the level of public protection. However, because the majority of OE was discovered at depths greater than 6 inches in AOIs 4-1, 4-2, 4-3, 5-1, and 10, the surface removal of OE with ICs was assigned an overall rank of 'B' (Table 8.2). For AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1, the surface removal of OE with ICs was also assigned an overall rank of 'B' (Table 8.3) because land use in the area cannot be restricted to surface use only.

### 8.2.2.4 Removal to Depth of OE

8.2.2.4.1 The Removal to Depth of OE alternative will provide a substantial increase in the level of protection to the public in AOIs 4-1, 4-2, 4-3, 5-1, and 10. This alternative would provide an increase in the level of protection to the public, Boy Scouts, researchers at the Boy Scouts property, and firefighters. As discussed above, 30% of the UXO items recovered during the EE/CA investigation were found more than 6 inches bgs. Ordnance items located 6 or more inches bgs will probably be encountered given the likelihood for future development of property in these sectors. **Current subsurface land uses expose the public to risk during construction and underground utility line maintenance activities, excavations conducted during archaeological and biological research, crop farming, and use and maintenance of dirt roads, such as Old Potato Road.** In addition, the upcoming construction of camp facilities at the Boy Scouts Griffith League Ranch will also result in potential for exposure. A removal to depth will not achieve 100 percent removal of UXO, but will provide a significant increase in the level of protection provided to the public. The Removal to Depth of OE alternative was given an overall rank of 'A' because it will result in significant reduced risk to the public. However, because 100 percent of UXO may not be removed (due to site inaccessibility), residual risk remains.

8.2.2.4.2 The Removal to Depth of OE alternative will provide a substantial increase in the level of protection to the public in the portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 that lie within former firing ranges or within 500-ft of former ordnance findings. This alternative would provide an increase in the level of protection to the public, recreationists, construction workers, and firefighters. Although 100% of the UXO recovered during the EE/CA in these AOIs was found at a depth of 6 inches or less, land use in these areas is privately-owned, and land use cannot be restricted to surface uses only. The

Removal to Depth of OE alternative will provide appreciable additional protection of public safety and the human environment from OE exposure than that achieved by Alternative 3; therefore, it is given the same ranking as the Surface Removal alternative, an 'A.'

### **8.2.2.5 Removal to Depth of OE with ICs**

8.2.2.5.1 The combination of IC (signs and notifications) with the removal to depth of OE alternative will not only almost completely remove the OE safety risk (based on the EE/CA density distribution) but will also provide information to the former Camp Swift population to affect behavior modification. The signage and notifications will inform the public of the presence of OE within the former Camp Swift.

8.2.2.5.2 For both groups of AOIs, the removal to depth of OE alternative will nearly eliminate residual ordnance-related items within the areas, and; coupled with ICs, increase the level of public protection. Therefore, the removal to depth of OE with ICs was assigned an overall rank of 'A' for both groups of AOIs (Tables 8.2 and 8.3).

### **8.2.3 Compliance with ARARs**

As described in Chapter 7, special consideration of ARARs that address activities within critical habitat of the Houston Toad and in areas of known or potential archaeological significance may be necessary for the removal to depth of OE alternative. For the purpose of this evaluation it is assumed that steps necessary to comply with these ARARs would be addressed for implementation of the Removal to Depth alternative for both groups of AOIs. Therefore, since all the alternatives would comply with ARARs, they have been ranked equally.

### **8.2.4 Long-Term Effectiveness**

8.2.4.1 The Removal to Depth of OE with IC alternative provides the best long-term effectiveness at AOIs 4-1, 4-2, 4-3, 5-1, and 10, with evaluation of each of the other alternatives resulting in a decreasing degree of long-term effectiveness. Therefore, for AOIs 4-1, 4-2, 4-3, 5-1, and 10, the five alternatives were ranked from one to five with removal to depth of OE with ICs alternatives ranked highest.

8.2.4.2 The Removal to Depth of OE with IC alternative provides the best long-term effectiveness at the portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 that lie within former firing ranges or within 500-ft of former ordnance findings, with evaluation of each of the other alternatives resulting in a decreasing degree of long-term effectiveness. Therefore, for these areas, the five alternatives were ranked from one to five with removal to depth of OE with ICs alternatives ranked highest.

### **8.2.5 Short-Term Effectiveness**

8.2.5.1 This criterion addresses the effects of an alternative during the implementation phase. Alternatives are evaluated for their effects on human health and the environment prior to the OE response action objectives being met. This includes protection of the community and workers during the OE response action; adverse impacts resulting from

construction and implementation; and the time required to meet the OE response objectives. This criterion evaluates two factors that are at odds. While removal actions will result in increased protection of the community, it also causes increased risk to workers conducting the removal action.

8.2.5.2 For both groups of AOIs, the IC component (signage and notifications) does not provide any additional protection to the public with regards to effectiveness. However, it also results in the least adverse impacts from brush clearing and excavation activities, the most protection of workers, and the least amount of time required. Therefore, institutional controls received a rank of '3.' The Surface Removal alternative and Surface Removal of OE with IC alternative provide increased protection of the community, with moderate effects from brush clearing and excavation activities, and a moderate amount of time. Therefore, it received a rank of '1.' Both the Removal to Depth and Removal to Depth with ICs alternatives received ranks of '2' because the increased protection of the community is outweighed by the increased adverse impacts to the workers and the increased amount of time to conduct the action.

## **8.3 IMPLEMENTABILITY**

### **8.3.1 Introduction**

The alternatives for AOIs 4-1, 4-2, 4-3, 5-1, and 10, and the portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 that lie within former firing ranges or within 500-ft of former ordnance findings were ranked within each of the six criteria within the implementability category based on a subjective analysis of the merits of each alternative. The results of this analysis are presented in Table 8.4. Based on this comparative analysis, the IC alternative was ranked highest. The logic behind the rankings for the evaluation criteria is provided in the following paragraphs.

### **8.3.2 Technical Feasibility**

In this criterion, the alternatives for both groups of AOIs were ranked with the IC alternative being the easiest to implement from a technical standpoint and the removal to depth of OE with IC alternative being most difficult to implement.

### **8.3.3 Administrative Feasibility**

The IC alternative requires coordination between the agencies associated with the former Camp Swift area. This alternative also requires a long-term commitment from these agencies, including continued annual support and sign repair. Administratively, the removal alternatives will likely be somewhat more difficult to implement than the IC alternative (Table 8.4). Similarly, the removal of OE alternatives will be less difficult to implement administratively than the removal of OE with ICs alternatives. The surface removal and removal to depth alternatives are considered to be equal with regards to administrative feasibility.



**Table 8.4 Implementability Criteria Application**

AREAS EVALUATED	ALTERNATIVE	IMPLEMENTABILITY						SCORE	RANK
		Technical Feasibility	Administrative Feasibility	Availability of Services & Materials	Property Owner Acceptance <sup>1,2</sup>	Local Agency Acceptance <sup>1</sup>	Community Acceptance <sup>1</sup>		
AOIs 4-1, 4-2, 4-3, 5-1, and 10 (AOIs in Former Impact/Buffer Area and Demolition Area)	Institutional Controls	1	1	1	10	5	5	23	5
	Surface Removal of OE	2	2	2	8	4	4	22	4
	Surface Removal of OE with ICs	3	3	2	6	3	3	20	3
	Removal to Depth of OE	4	2	3	4	2	2	17	2
	Removal to Depth of OE with ICs	5	3	3	2	1	1	15	1
Portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 (AOIs in Other Areas)	Institutional Controls	1	1	1	10	5	5	23	5
	Surface Removal of OE	2	2	2	8	4	4	22	4
	Surface Removal of OE with ICs	3	3	2	6	3	3	20	3
	Removal to Depth of OE	4	2	3	4	2	2	17	2
	Removal to Depth of OE with ICs	5	3	3	2	1	1	15	1

Note: Ranking from best to worst; best = 1, worst = 5

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### **8.3.4 Availability of Services and Materials**

The IC alternative, consisting of signage and notifications for the former Camp Swift area, requires a moderate amount of readily available services and materials. Implementation of removal alternatives would be more difficult due to securing sufficient qualified labor resources. The combination of the two alternatives was ranked equal to removal alone alternatives given the services and materials associated with the IC component (signs and notifications) are believed to be readily available (Table 8.4).

### **8.3.5 Property Owner Acceptance**

Each alternative was rated based on the degree of acceptance anticipated by the property owners. This criterion is weighted in importance by a factor of two. Based on project team correspondence and meetings, the former Camp Swift property owners are mostly amenable to the OE response alternatives being considered. Their primary concern is the safety of their families and visitors. Vegetation removal is a concern but a secondary concern. Brush cutting efforts associated with a OE removal action would be as sympathetic to the natural beauty of the area as possible without negatively impacting the integrity of the action. The removal to depth with IC alternative was ranked above the removal to depth alternative alone due to the perceived additional public safety afforded. The IC alternative alone was ranked lowest given it would not directly provide any additional safety to former Camp Swift property owners (Table 8.4).

### **8.3.6 Local Agency Acceptance**

Each alternative is rated based on the degree of acceptance expressed by local agencies. The local agency acceptance of the remaining alternatives is unknown at this time, however generally local agencies prefer the most ambitious removal alternative. Local agencies did not comment on this EE/CA Report. For both groups of AOIs, the removal to depth of OE with IC alternative was ranked as the preferred alternative from the local agencies' perspective and the IC alternative alone was ranked as the least preferred.

### **8.3.7 Community Acceptance**

Each alternative is rated based on the degree of acceptance expressed by the local community. Through public meetings and IA interviews, the community places public safety as the primary goal. It is anticipated that the community will generally support the most ambitious alternative based on input gathered to date. Input received from the community as part of the public comment period for this EE/CA report has been incorporated into this final report.

## **8.4 COST**

The IA performed for the former Camp Swift (Appendix G) indicated the initial capital cost to implement the recommended sitewide institutional controls (as described in Subchapter 7.5) is approximately \$88,500 with an estimated \$3,000 annual cost. Table 8.5 presents the estimated cost for the Removal to Depth of OE alternative. The recommended

NDAI alternative for both groups of AOIs has no initial cost. Recurring review costs are discussed in Chapter 10.

**Table 8.5 Removal to Depth of OE Cost Estimate, Camp Swift EE/CA AOIs 4-1, 4-2, 4-3, 5-1, and 10, and Portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1**

Item	Cost per acre	Acreage <sup>1</sup>	Total Costs
UXO Removal Sub <sup>1</sup>	\$5,230	6,817	\$35,652,910
A-E Field Oversight <sup>2</sup>	\$785	6,817	\$5,351,345
A-E Project Management <sup>3</sup>	\$260	6,817	\$1,772,420
Land Survey <sup>4</sup>	\$75	6,817	\$511,275
Brush Cut <sup>5</sup>	\$250	1,704 <sup>7</sup>	\$426,000
		<b>Subtotal</b>	<b>\$43,713,950</b>
USAESCH Costs Contracting & Oversight <sup>6</sup>			\$6,557,093
		<b>Total Cost Estimate:</b>	<b>\$50,271,043</b>
		<b>Contingency (15%):</b>	<b>\$7,540,656</b>
			<b>\$57,811,699</b>

**Approximate Cost per Acre \$8,480**

**Notes:**

<sup>1</sup>Cost for UXO Removal Subcontractor includes mobilization, 350-week field effort, demobilization, and all field equipment/ODCs. Estimates are based on the following assumptions:

Area includes approx. 7,064 acres, with 3.5% of the area as inaccessible land with grade >45°. Therefore, effective area for removal is approximately 6,817 acres.

Onsite storage magazine to be established.

<sup>2</sup>A-E Field Oversight estimated at 15% of UXO removal costs. Includes documentation and reporting.

<sup>3</sup>A-E Project Management estimated at 5% of UXO removal costs.

<sup>4</sup>Land survey will consist of marking sector boundary and establishing grid system within the sector for removal.

<sup>5</sup>Brush cutting will be inclusive of all onsite saplings and disposal and will be coordinated with local agencies.

<sup>6</sup>USAESCH Costs for Contracting and Oversight estimated at 5% of UXO removal costs.

<sup>7</sup>Assumes that 25% of the area will require brush clearing.

Geophysical instruments will be used.

**8.5 OVERALL RANKING**

8.5.1 The overall ranking of the alternatives for both groups of AOIs are presented in Table 8.6. Using the same methodology used in the previous categories, the preferred alternative is the one with the lowest overall score. Based on this analysis, the Removal to Depth of OE with IC alternative is the preferred alternative for AOIs 4-1, 4-2, 4-3, 5-1, and 10 and portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 within former firing ranges or within 500 feet of former ordnance findings.

**Table 8.6 Selection Criteria Application**

Areas Evaluated	Alternatives	Effective-ness	Implement-ability	Cost	Total	Rank
AOIs 4-1, 4-2, 4-3, 51, and 10	Institutional Controls	5	5	1	11	5
	Surface Removal of OE	4	4	2	10	4
	Surface Removal of OE with ICs	3	3	3	9	3
	Removal to Depth of OE	2	2	4	8	2
	Removal to Depth of OE with ICs	1	1	5	7	1
Portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1	Institutional Controls	5	5	1	11	5
	Surface Removal of OE	4	4	2	10	4
	Surface Removal of OE with ICs	3	3	3	9	3
	Removal to Depth of OE	2	2	4	8	2
	Removal to Depth of OE with ICs	1	1	5	7	1

Note: Ranking from best to worst; best = 1, worst = 5



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## CHAPTER 9 RECOMMENDED RESPONSE ACTION ALTERNATIVE

### 9.1 INTRODUCTION

9.1.1 OE response action alternatives were evaluated for each of the 23 AOIs within the former Camp Swift that were investigated during this EE/CA investigation. An RI/FS investigation will be conducted to fill data gaps that were identified in the EE/CA investigation. Specifically, the RI/FS will include characterization of 40,491 acres of the former Camp Swift for Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC). The RI/FS will utilize current guidance and methodology in the investigation. In addition, the RI/FS investigation contractor will hold multiple stakeholder meetings to determine if additional AOIs can be investigated that were not included in the EE/CA. The combined data from the EE/CA investigation and the RI/FS investigation will be used to determine appropriate response actions.

9.1.2 Each potential alternative was initially screened against the general evaluation criteria of effectiveness, implementability, and cost, as determined in the EE/CA. The screening of alternatives detailed in Chapter 7 was used to identify candidate OE response alternatives for further qualitative evaluation as tabulated in Chapter 8. Site-wide IC components were evaluated and selected as presented in Subchapter 7.5 and Appendix G. As a result of the comprehensive evaluation of alternatives by AOIs, the following paragraphs present the recommendations for implementation.

9.1.3 In addition, this chapter presents the recommended prioritization for the response action. The total estimated cost for the recommended response action is \$57,900,199, as shown in Table 9.1 below. The methodology used to prioritize the removal is also described in this chapter.

**Table 9.1 Summary of Total Estimated Response Action Costs**

Task	Acres	Estimated Cost per Acre	Total Estimated Cost
Removal to Depth of OE in entire area of AOIs 4-1, 4-2, 4-3, 5-1, and 10, and portions of AOIs 1, 2, 3-1, 3-2, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1.	6,817	\$8,480	\$57,811,699
Institutional Controls, Initial Cost	N/A	N/A	\$88,500
	6,817	<b>\$8,480*</b>	<b>\$57,900,199</b>

\* Average per acre cost does not include initial or recurring costs for Institutional Controls.

### 9.2 RECOMMENDED RESPONSE ACTIONS

#### 9.2.1 AOIs 5-2 and 7

The current land uses for AOIs 5-2 and 7 are primarily residential and agricultural. The future land use is anticipated to be similar. During the EE/CA investigation, no OE was recovered within AOIs 5-2 or 7. There have been no landowner-reported or other historic OE findings in these areas. *Therefore, the NDAI alternative is recommended as the OE response alternative for implementation at AOIs 5-2 and 7.* For those AOIs not investigated (AOIs 2, 3-7, 5-3, and 12-2), there is no conclusion based on available data. However, if

additional ROE is granted in the future, further investigation should be carried out in these areas.

### **9.2.2 AOIs 4-1, 4-2, 4-3, 5-1, and 10**

9.2.2.1 AOIs 4-1, 4-2, and 4-3 are located within one of former Camp Swift's impact areas, AOI 5-1 is located within the former impact area buffer zone, and AOI 10 is located in the former demolition area. Numerous impact craters were identified in these areas in historical aerial photographs (ERDC, 2000). The current land uses for these areas are residential, recreational, and agricultural. South Shore Park is located within AOI 10, and, in the near future, the Boy Scouts of America will be constructing a camp on a portion of the land within these areas (east corner of Griffith League Ranch). Residential, agricultural, and recreational uses are anticipated to continue in the future.

9.2.2.2 Recovered items from the EE/CA intrusive investigation of AOIs 4-1, 4-2, 4-3, 5-1, and 10 included UXO and ordnance scrap. Six UXO items were recovered during the EE/CA investigation. The UXO items consisted of two practice anti-tank mines with energetic charge, two 4.2-inch mortars, and two 105mm projectiles. Four of the UXO items were found between 20 and 30 inches bgs, and two items were found within 6 inches bgs. In addition, a landowner in the area reported an unexploded 105mm projectile, and a 75mm projectile was discovered during the EE/CA site visit. The EE/CA investigation results confirm the risk of UXO explosive hazards within AOIs 4-1, 4-2, 4-3, 5-1, and 10. ***Therefore, Removal to Depth of OE with Institutional Controls as described in Subchapter 7.7.6 is recommended as the OE response alternative for AOIs 4-1, 4-2, 4-3, 5-1, and 10. IC components are recommended to help inform visitors and residents of UXO hazards and keep them from encountering UXO, and they include signage; notification during permitting by tax bill and by certified letter; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an Internet website, and establishment of an Ad Hoc committee.***

### **9.2.3 Portions of AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1**

9.2.3.1 AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-1 include several different types of areas within former Camp Swift. AOI 1 included firing ranges; AOI 2 was designated as "Remaining Lands" but contained firing ranges; AOIs 3-1, 3-2, 3-3, 3-4, 3-5, and 3-6 were part of "Other Remaining Lands;" AOI 3-8 includes the "Wake Island" tank destroyer training area; AOI 5-3 is part of the former impact area buffer zone and firing ranges crossed it; AOIs 6-1 and 6-2 were identified as "Other Artillery Lands" in the ASR (USACE, 1994a); AOI 9 is the former "Gas Area;" and AOI 12-1 is part of the former "Fortified Area." The current land uses for these areas are primarily residential, recreational, and agricultural. These AOIs include North Shore Park, a future elementary school location (to be completed in summer 2004), a motorcross recreational area, Griffin Industries, agricultural lands, and several residential subdivisions. All of these land uses are anticipated to continue in the future, and population is anticipated to increase due to the land's proximity to Bastrop and Austin.

9.2.3.2 Recovered items from the EE/CA intrusive investigation of these AOIs included UXO and ordnance scrap. Seven UXO items were recovered during the EE/CA investigation. The UXO items consisted of six anti-tank mines (with energetic charge) and

one fuze. All seven items were found within 6 inches bgs. In addition, the majority of the ordnance scrap recovered from these areas was found at depths of 6 inches or less. Several landowners and volunteer firefighters in the area have reported finding anti-tank mines, and hearing them detonate during grass fires. EE/CA findings show that the density of practice anti-tank mines in these areas is sporadic relative to that of projectiles and mortars, as would be expected for this type of ordnance. Evidence of one practice anti-tank mine in an area may indicate that additional practice mines are nearby. The EE/CA investigation results confirm the risk of UXO explosive hazards in portions of these areas. ***Removal to Depth of OE with Institutional Controls as described in Subchapter 7.8.6 is recommended as the OE response alternative for 500-ft radius areas around past OE findings in AOIs 1, 2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-8, 5-3, 6-1, 6-2, 9, and 12-2. AOIs 1, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6 and 3-8 will be investigated further during the RI/FS phase of the project. In addition, Removal to Depth of OE with Institutional Controls is also recommended for the land within these AOIs that was formerly part of a firing range. IC components are recommended to help inform visitors and residents of UXO hazards and keep them from encountering UXO, and they include signage; notification during permitting by tax bill and by certified letter; preparation and distribution of printed media; classroom education; audio/visual media; establishment of exhibits/displays, creation of an internet Website, and establishment of an Ad Hoc committee. In addition, because heavy vegetation precluded investigation in much of AOI 3-1, pre-construction removal actions are recommended in camping areas at the Boy Scouts Griffith Ranch. Planning for these camping areas is currently underway, and the number of acres they will include is currently unknown.***

9.2.3.3 The areas recommended for removal action have been prioritized based on risk factors as described in subchapter 9.3.2, and each area is considered to be an operable unit (OU). The approach for implementing the subsurface clearance of OE to depth of detection will involve an incremental approach beginning in the center of the OU. A grid, typically measuring 100 feet (ft) by 100 ft, will be placed in the center of the OU. The step-out process will proceed in 200-ft intervals (typically delineated in 100-ft by 100-ft grids) using 100-percent surface clearance, geophysical mapping and removal of subsurface anomalies until no further ordnance items or ordnance-related scrap are located. If no ordnance or ordnance-related scrap is located in a 2-grid (200-ft) row/column, sampling grids will be randomly place between that row/column and the outer boundary of the OU to verify/confirm the absence of ordnance or ordnance-related scrap to the outer boundary. If no ordnance or ordnance-related scrap is located in the sampling grids, the removal action for that area to the outer boundary will be considered complete. If ordnance or ordnance-related scrap is located in the 2-grid (200-ft) row/column or any of the sampling grids, the operations will continue into the next 200-ft row/column and beyond the sampling grid if ordnance or ordnance-related scrap was located during confirmation/verification sampling.

9.2.3.4 This recommendation does not address the possibility of CWM in AOI 9, which was not within the scope of this investigation. A geophysical survey and surface sweep of the entire AOI should be conducted prior to any further intrusive investigations.

### 9.3 RECOMMENDED PRIORITIZATION OF RESPONSE ACTIONS

As described in Subchapter 9.2, the recommended response actions for the site will take many years to complete due to funding, manpower, and other resource limitations. A total of approximately 6,800 acres are recommended for removal to depth of OE with ICs. These areas must be prioritized so that removal proceeds in a manner that addresses areas according to the risk of OE exposure. Highest risk areas will be addressed first. As described in Chapter 10, the relative risk levels will be reviewed every five years during the recurring review, and relative risk levels and removal prioritization will be refined, if necessary. The following paragraphs describe the methodology used to prioritize the recommended response action at former Camp Swift.

#### 9.3.1 Assumptions

The recommended response action for former Camp Swift is prioritized based on the relative risk level per removal area. Based on the total estimated cost for the removal action of over \$57 million, it is estimated that the removal action will take more than 10 years to complete. The prioritization is based on the assumptions described below:

- **ROE will be granted to all 6,800 acres within the areas recommended for response action.** During the EE/CA investigation, ROE was granted for approximately 43% of the area within the former camp. Although it is unlikely that ROE will be granted to all areas recommended for removal, more property owners may allow ROE as additional UXO items are identified.
- **Current estimated costs per acre for surface removal and removal to depth of OE will be adjusted for inflation throughout the response action.** Due to the longevity of the project, inflationary funding adjustments are subject to occur throughout the project's duration. Increases in the per-acre cost will affect the number of years that the response action will take to complete.
- **Future OE findings are consistent with findings to date.** As the response action generates additional data regarding OE distribution, areas identified for response action will be refined, potentially resulting in revisions to the total acreage receiving response action. Refinements to the response action model will be made every five years as part of the recurring review.

#### 9.3.2 Prioritization Methodology

##### 9.3.2.1 Overview

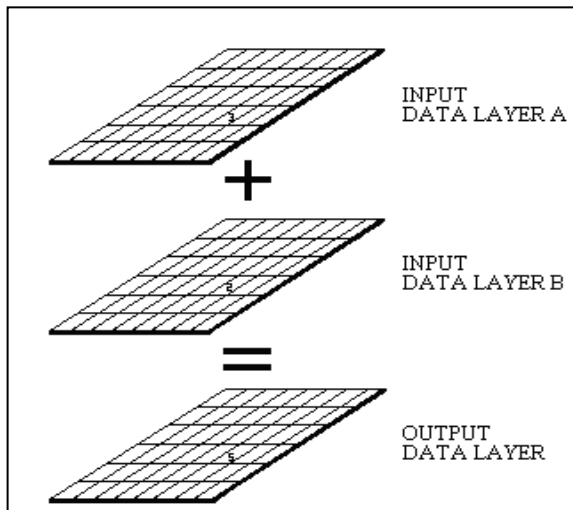
9.3.2.1.1 Prioritization of response action areas is based on several factors related to risk levels. As described in Chapter 6, the chain of events that could lead to a potential OE incident causing injury or death requires each of the following conditions:

1. OE is present;
2. OE is present in a sensitive state or configured to detonate;
3. Public has access to the OE;
4. Individual interaction with the OE occurs.



Based on EE/CA findings, in AOIs where either OE is not present or OE is not present in a sensitive state or configured to detonate in other AOIs, no response action is recommended. As described in Chapter 7, these AOIs include AOIs 3-7, 5-2, 7, and 12-2.

9.3.2.1.2 For the remaining AOIs, the recommended response action has been based on three groups of factors: historic camp use information, current demographic information, and OE information from the EE/CA investigation and reported by landowners. Each of these groups consisted of several factors. For instance, historic camp use information includes locations of training areas, firing fans, impact craters identified in historic aerial photographs of the former camp, and areas which received surface-use only restrictions on parcel deeds. Each factor was assigned points, as described in detail in Subchapter 9.3.2.2. Some factors were assigned higher points, depending on their importance in resulting in the four conditions listed above. For example, factors associated with UXO presence were assigned a relatively higher number of points because it is the first condition necessary for a potential OE incident.



9.3.2.1.3 The Camp Swift GIS allows analysis of spatial data, such as the data provided from the three information groups described above. Data from the three groups, historic camp use, current demographics, and OE information, were analyzed using cell-based raster data sets, or grids. A grid size of 20 ft by 20 ft was selected due to the high variability of certain data sets, such as land use and population density. The total points for each of the factors were summed to assign a relative risk level to each 20 feet by 20 ft area within the AOIs recommended for response action.

### 9.3.2.2 Prioritization Methodology

9.3.2.2.1 **Historic Camp Use Information.** Historic camp use information is helpful in identifying areas with the highest potential for OE within the former camp. Available sources of information regarding historic camp use include master plans of the former camp dated 1944-1945 (U.S. Army, 1945) and 1946 (U.S. Army, 1946), the ASR (USACE, 1994a) and ASR Supplement (USACE, 1994b), the GIS-Based Historical Aerial Photograph Analysis conducted by TEC (ERDC, 2000), and locations of land which received surface-use only deed recommendations in the late 1940s. This information was presented in Chapter 2. The prioritization point system for the historic camp use factors is summarized in Table 9.2, and shown graphically in Figure 9.1.

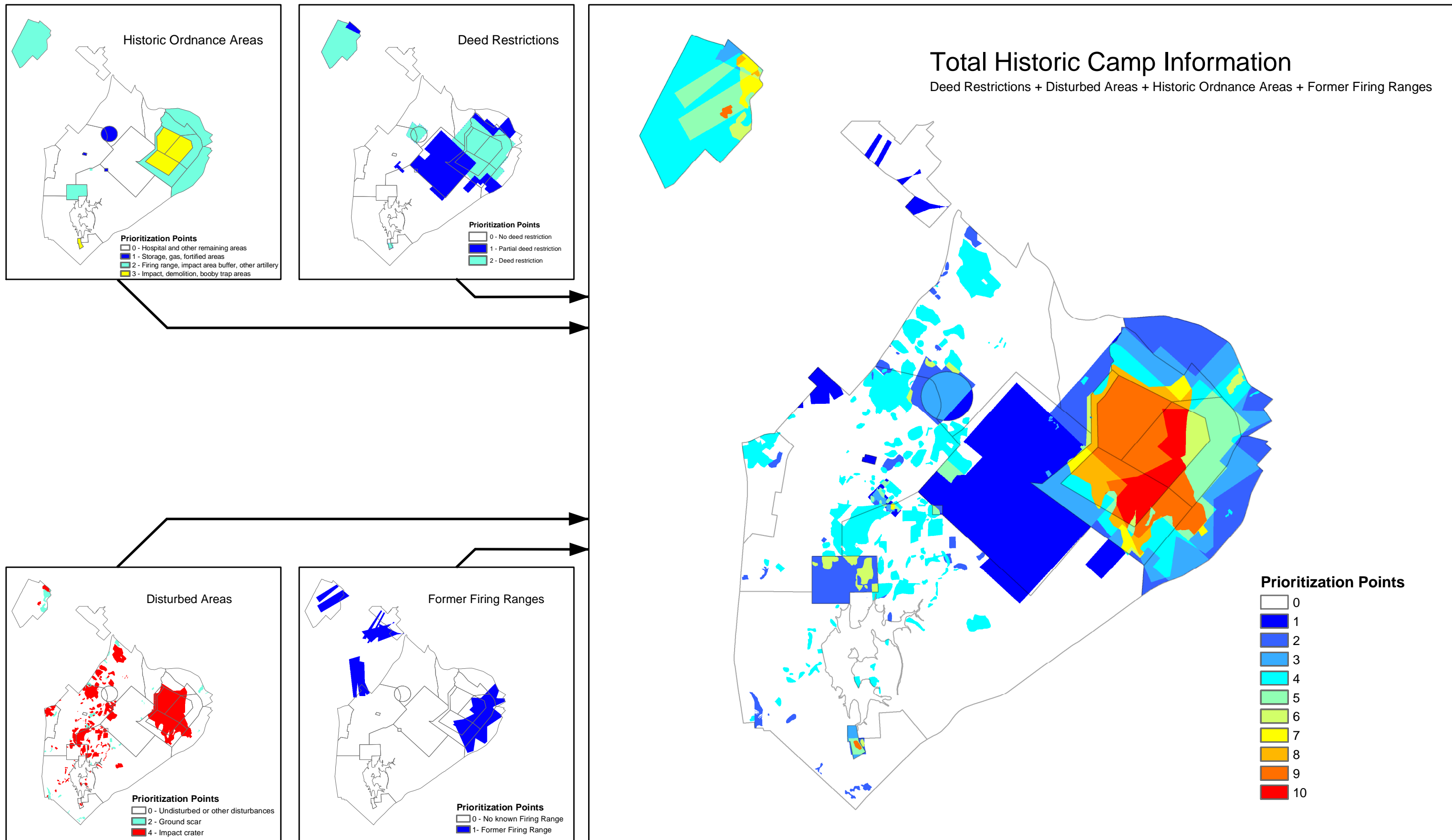
**Table 9.2 Prioritization Points for Historic Camp Use Factors**

Factors	Prioritization Points				
	4 Points	3 Points	2 Points	1 Point	0 Points
Historic Ordnance Area (see also Figures 2.5, 2.6, 2.11, and 2.12)	Not applied	Impact Area, Booby Trap Area, Demolition Area	Firing Range, Impact Buffer Zone, Other Artillery Lands, Wake Island Tank Destroyer Training Area	Ammunition Storage Area, Gas Area, Fortified Area	Hospital Area and all Other Remaining Land
Disturbed Areas on Historic Aerial Photos (see also Figure 2.13)	Impact Craters	Not applied	Ground Scars	Not applied	Undisturbed Areas, Berms, Depressions, Excavations, Heavily Tracked Areas, Mounded Material, Pits, Trenches
Areas with Surface-Use Only Deed Recommendations (see also Figure 2.7)	Not applied	Not applied	Entire Parcel Recommended for Surface-Use Only	Part of Parcel Recommended for Surface Use Only (specific area within parcel is not available)	No Use Recommendation
Former Firing Ranges	Not applied	Not applied	Not applied	Former Firing Range Location	No Known Firing Range

9.3.2.2.2 Based on this point system, a 20x20-ft grid within the former impact area (3 points) firing range (1 point) in an area identified from historic aerial photograph analysis as having impact craters (4 points) on a parcel that had a surface-use only recommendation on the deed (2 points) would receive the maximum of 10 points. Conversely, a grid within an undisturbed portion of the Hospital Area which did not have a limited use recommendation would receive 0 points. As shown in Figure 9.1, most of the former impact area on the east side of the former camp is assigned 10 points, and areas showing no evidence of ordnance use throughout the central and southern portions of the former camp are assigned 0 points in this category.

9.3.2.2.3 **Current Demographics Information.** Current demographics information identifies areas where the public has access to OE, and areas where interaction is most likely to occur based on land use and population. Available sources of information regarding demographics include land use data from USGS (USGS, 1980) augmented with current site knowledge, U.S. Census Bureau data (U.S. Census Bureau, 2000), site accessibility based on site knowledge and communication with landowners, and property improvement information from the Bastrop County Appraisal District (2002). Property improvements were used as a more up-to-date way to determine if land is being used, since USGS data is somewhat dated. It is assumed that an improved property would have a building or buildings on it that are potentially being used. Much of the current demographics information was presented in Chapter 2. The prioritization point system for the current demographics factors is summarized in Table 9.3, and shown graphically in Figure 9.2.

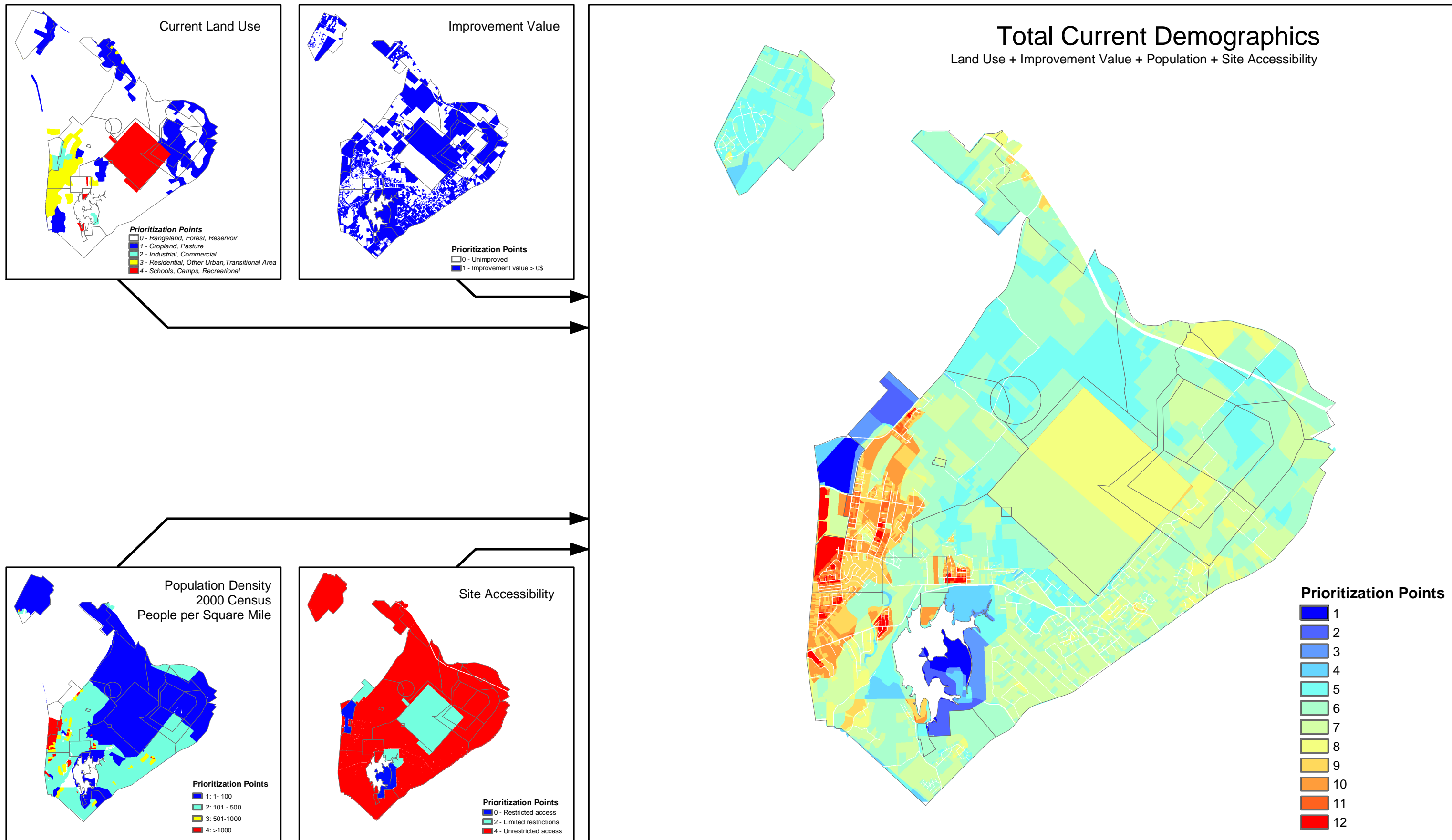
Figure 9.1 Contributing Values for Prioritization - Historic Camp Information



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Figure 9.2 Contributing Values for Prioritization - Current Demographics



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**Table 9.3 Prioritization Points for Current Demographics Factors**

Factors	Prioritization Points				
	4 Points	3 Points	2 Points	1 Point	0 Points
Current Land Use (see also Figure 2.10)	Schools, Camps, Recreational Areas	Residential, Other Urban Areas, Transitional Areas	Industrial, Commercial	Cropland, Pasture	Rangeland, Forest, Reservoir
Current Population Density (see also Figure 2.8)	>1,000 people per square mile	501-1000 people per square mile	101-500 people per square mile	1-100 people per square mile	Unpopulated
Site Accessibility	Unrestricted Access	Not applied	Limited Restriction to Access	Not applied	Restricted Access
Improvement Value	Not applied	Not applied	Not applied	Greater than \$0	Unimproved

9.3.2.2.4 Based on this point system, a 20x20-ft grid within a residential area where the population is greater than 1,000 people per square mile, access is unrestricted, and the parcel has an improvement value greater than \$0 would receive 12 points. Conversely, a grid within an unimproved property in an unpopulated restricted-access forested area (such as the area north of the Sim Gideon Power Plant) would receive 0 points. As shown in Figure 9.2, densely-populated residential areas are located largely on the west side of the former camp.

9.3.2.2.5 **OE Information.** Information regarding the location of OE is the most important in prioritizing response actions, and therefore is weighted more heavily than the other factors. This group of factors takes into account factors evaluated in Chapter 4 during the OERIA, including OE type, OE sensitivity, OE density, and OE depth. These factors were applied to the entire AOI in which the OE was found. As described in Chapter 4, if more than one type of OE was identified in an area, that area was assigned the highest of the associated values. These four factors were evaluated for UXO recovered during the EE/CA investigation, ordnance scrap recovered during the EE/CA investigation, and OE reported by landowners or identified during previous investigations (such as the EE/CA site visit). All of these data for these factors have been derived from the Camp Swift GIS-database created for the EE/CA investigation. The prioritization point system for the OE factors is summarized in Table 9.4, and shown graphically in Figure 9.3 for UXO, Figure 9.4 for ordnance scrap, and Figure 9.5 for landowner and previous investigation reported information.

**Table 9.4 Prioritization Points for OE Factors**

Factors	Prioritization Points				
	4 Points	3 Points	2 Points	1 Point	0 Points
OE Type	Most Sensitive (105mm projectile, 4.2-inch mortar)	Moderately Severe (Anti-tank Mine)	Less Severe	No Injury	No UXO or OE in area
OE Sensitivity	Very Sensitive (i.e., anti-tank mine)	Less sensitive (i.e., 105mm projectile, 4.2-inch mortar)	Insensitive	Inert	No UXO or OE in area
OE Depth	Not applied	Less than 6 inches	Between 6 and 12 inches	Greater than 12 inches	No UXO or OE in area
UXO Density	>1.1-1.4 UXO per acre, >80-189 Ordnance Scrap per acre, >1.07-1.35 Landowner-reported per 1,000 acres	>0.8-1.1 UXO per acre, >8-80 Ordnance Scrap per acre, >0.8-1.07 Landowner-reported per 1,000 acres	>0.5-0.8 UXO per acre >3-8 Ordnance Scrap per acre >0.5-0.8 Landowner-reported per 1,000 acres	>0-0.5 UXO per acre >0-3 Ordnance Scrap per acre >0-0.5 Landowner-reported per 1,000 acres	No UXO or OE in area

9.3.2.2.6 Because UXO was only identified in AOIs 3-3, 3-4, 4-1, 5-1, 6-1, and 10 during the EE/CA investigation, only these areas were assigned points for this factor (see Figure 9.3). Based on the OE point system, in AOI 4-1, where four UXO items were identified, including an unexploded 105mm projectile and an anti-tank mine with energetic charge, one of which was found at a depth of 6 inches, a total of 14 points were assigned to the entire AOI. AOIs 3-3 and 3-4 were each assigned 11 points for UXO because anti-tank mines were recovered from these areas, but the UXO density was less than that in the other AOIs with UXO. Because of the higher population density on the west side of the former camp, landowner reported findings have also been high in these areas. In the former impact area, although the population is far less dense, it is presumed that the UXO density is greater.

9.3.2.2.7 For the ordnance scrap results, all areas in which ordnance scrap was recovered were assigned 1 point for sensitivity (insensitive) and 1 point for severity (inert), and different points were assigned based on depth and density. As shown in Figure 9.4, ordnance scrap results are similar to the UXO results, except that several additional AOIs are also assigned points due to ordnance scrap found in these areas. In fact, the highest density of ordnance scrap was recovered from AOI 4-3.

9.3.2.2.8 Finally, the landowner reported results show high points for AOIs 3-3 and 3-4 where several OE findings have been reported. In these two sectors, several anti-tank mines have been reported. In addition, Figure 9.5 takes into account the 105mm projectile identified in AOI 4-2 and detonated during EE/CA investigation, as well as the 75mm projectile identified in AOI 4-3 during the EE/CA site visit. This item was detonated by the Fort Sam Houston EOD unit.

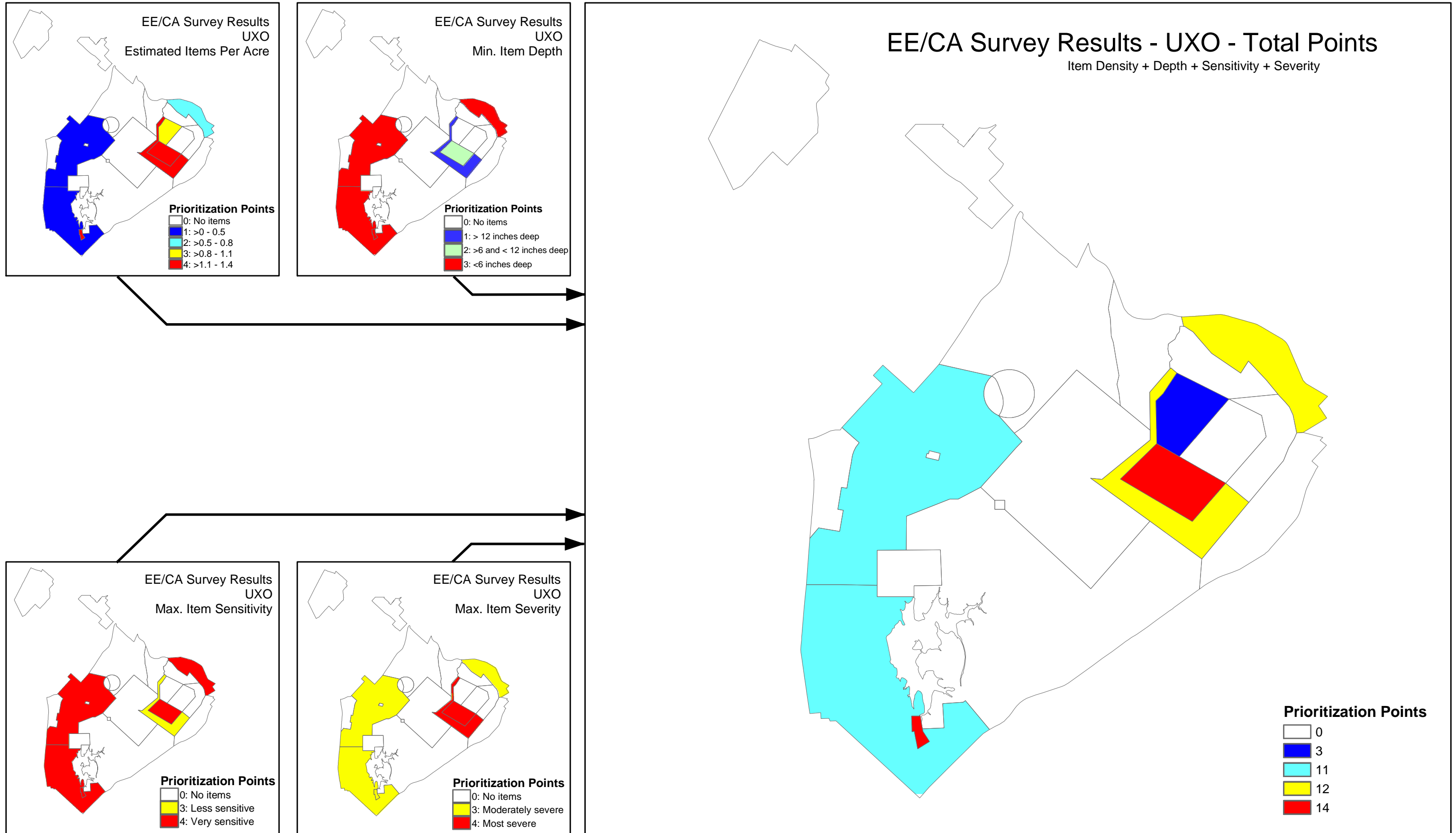
9.3.2.2.9 The three OE subgroups, including UXO identified during the EE/CA, ordnance scrap recovered during the EE/CA, and landowner/historic OE reports, are combined as shown in Figure 9.6.

### **9.3.2.3 Prioritization Results**

9.3.2.3.1 Prioritization points from each of the three data sets were combined in Figure 9.7. UXO and ordnance scrap findings were multiplied by a factor of 2. The areas with the highest points represent the areas with the highest risk of an OE incident. As shown in Figure 9.7, AOIs 4-1 and 5-1 are the highest priorities for removal action. These areas received more than 62 prioritization points.

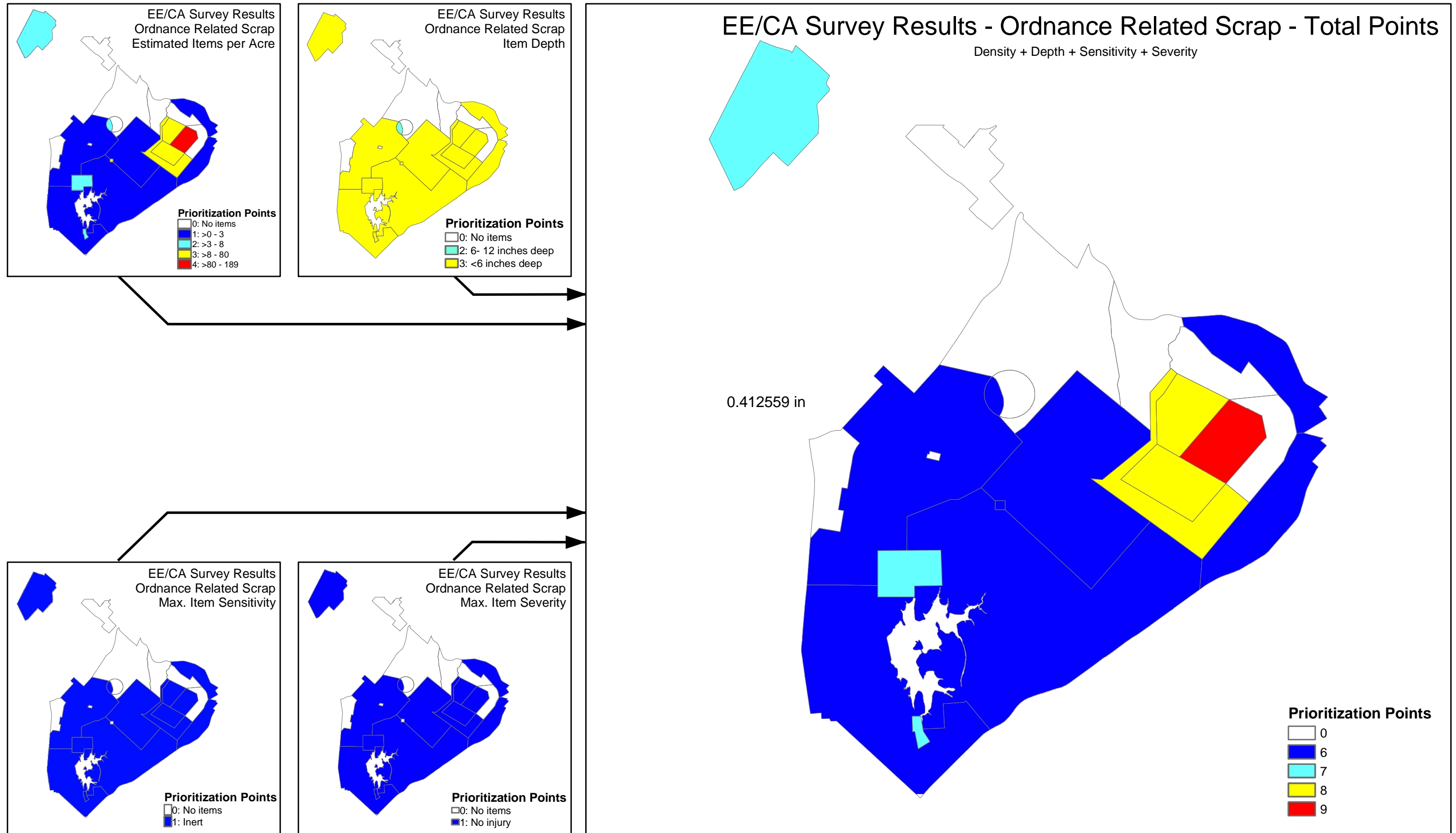
9.3.2.3.2 Recommended removal areas have been divided into OUs. The OUs divide the site into areas that are both physically practical and manageable for the removal action, and the prioritization is based on the point system described above. The OUs are shown in Figure 9.7, and the recommended order of response action is provided in Table 9.5. As described in Chapter 10, prioritization should be updated at least every 5 years to address land use changes, population increases, and additional UXO findings.

Figure 9.3 Contributing Values for Prioritization - EE/CA Survey Results - UXO



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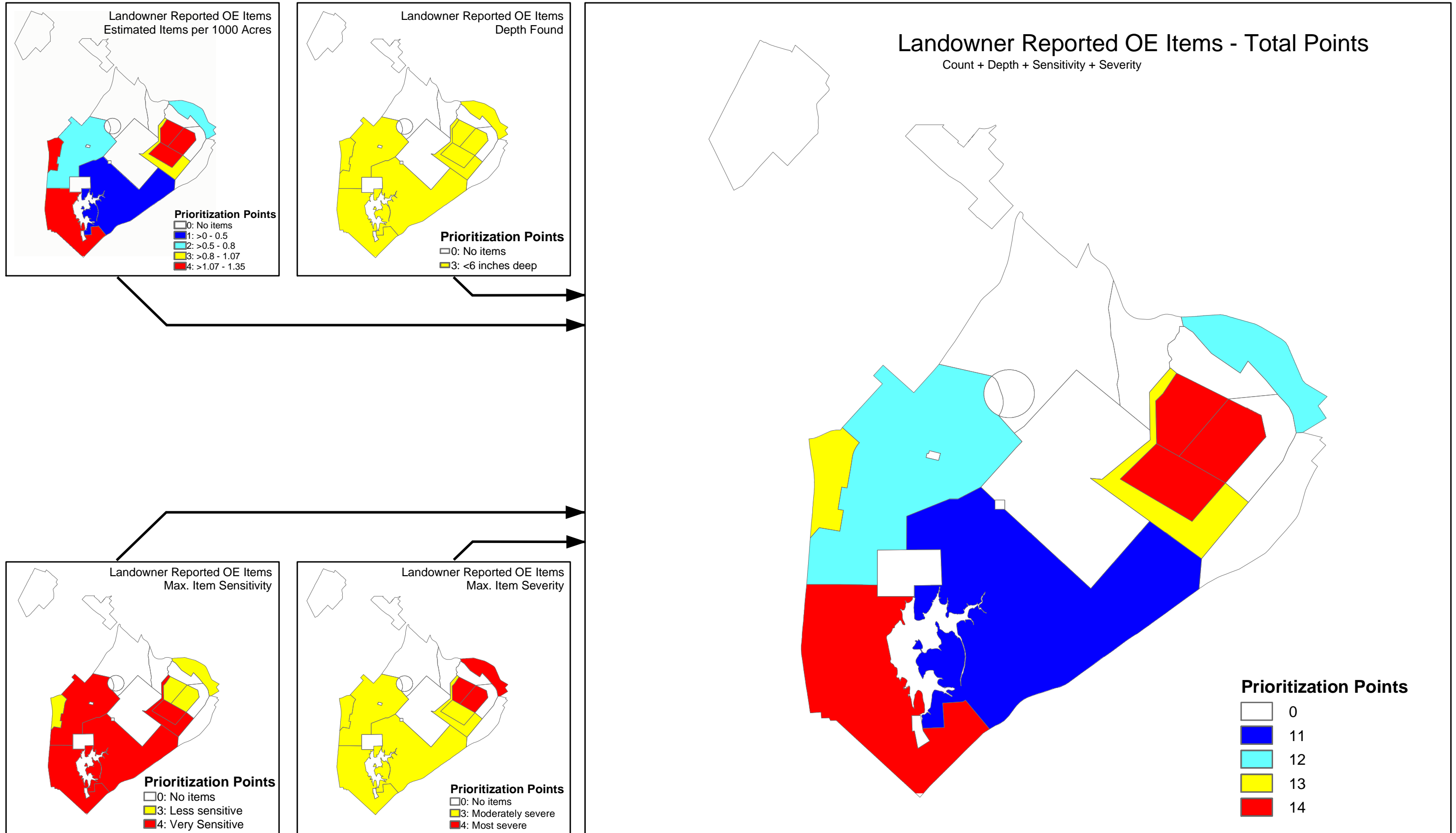
Figure 9.4 Contributing Values for Prioritization - EE/CA Survey Results - Ordnance Related Scrap





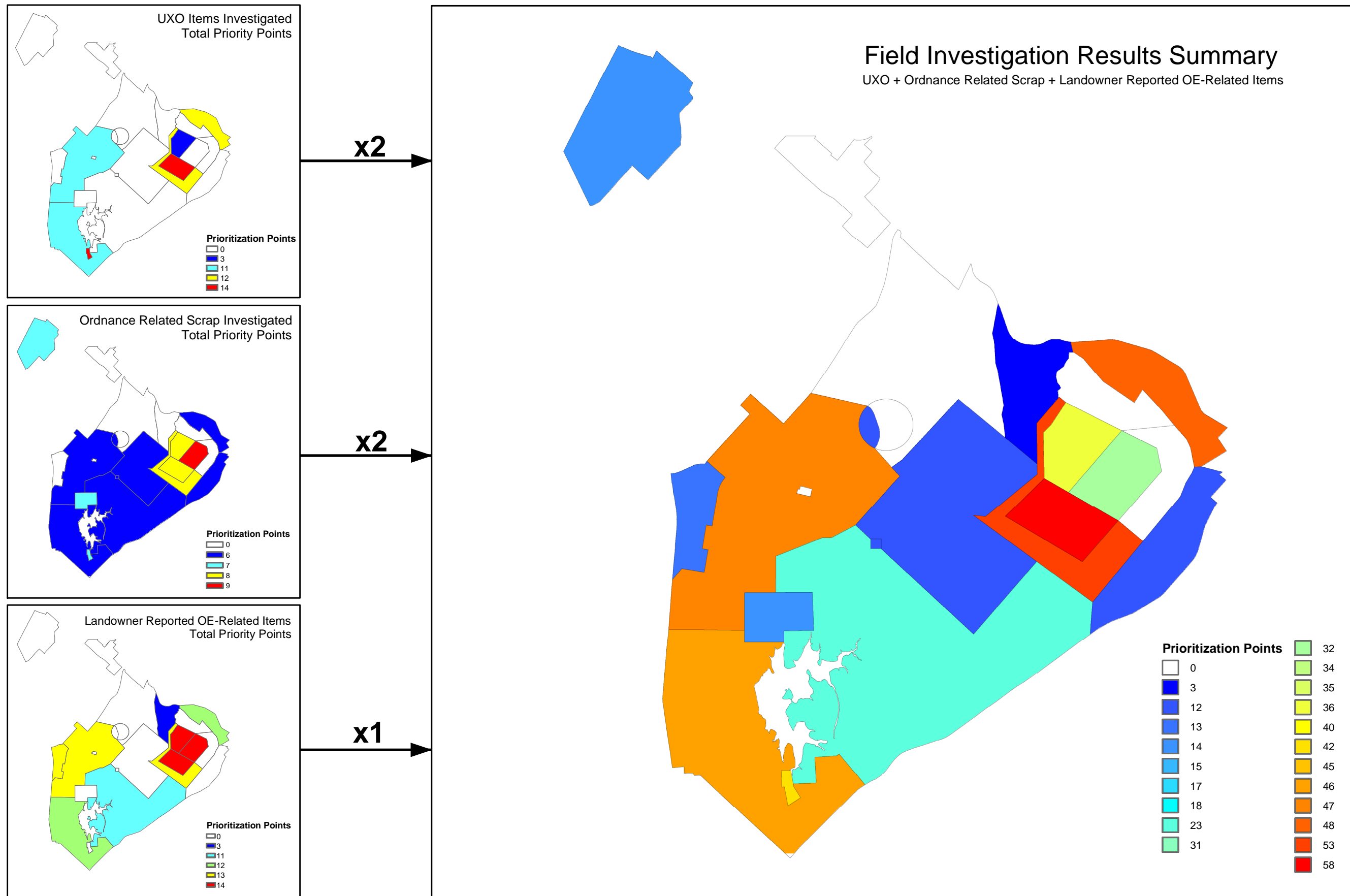
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Figure 9.5 Contributing Values for Prioritization - OE Related Items Reported by Landowners

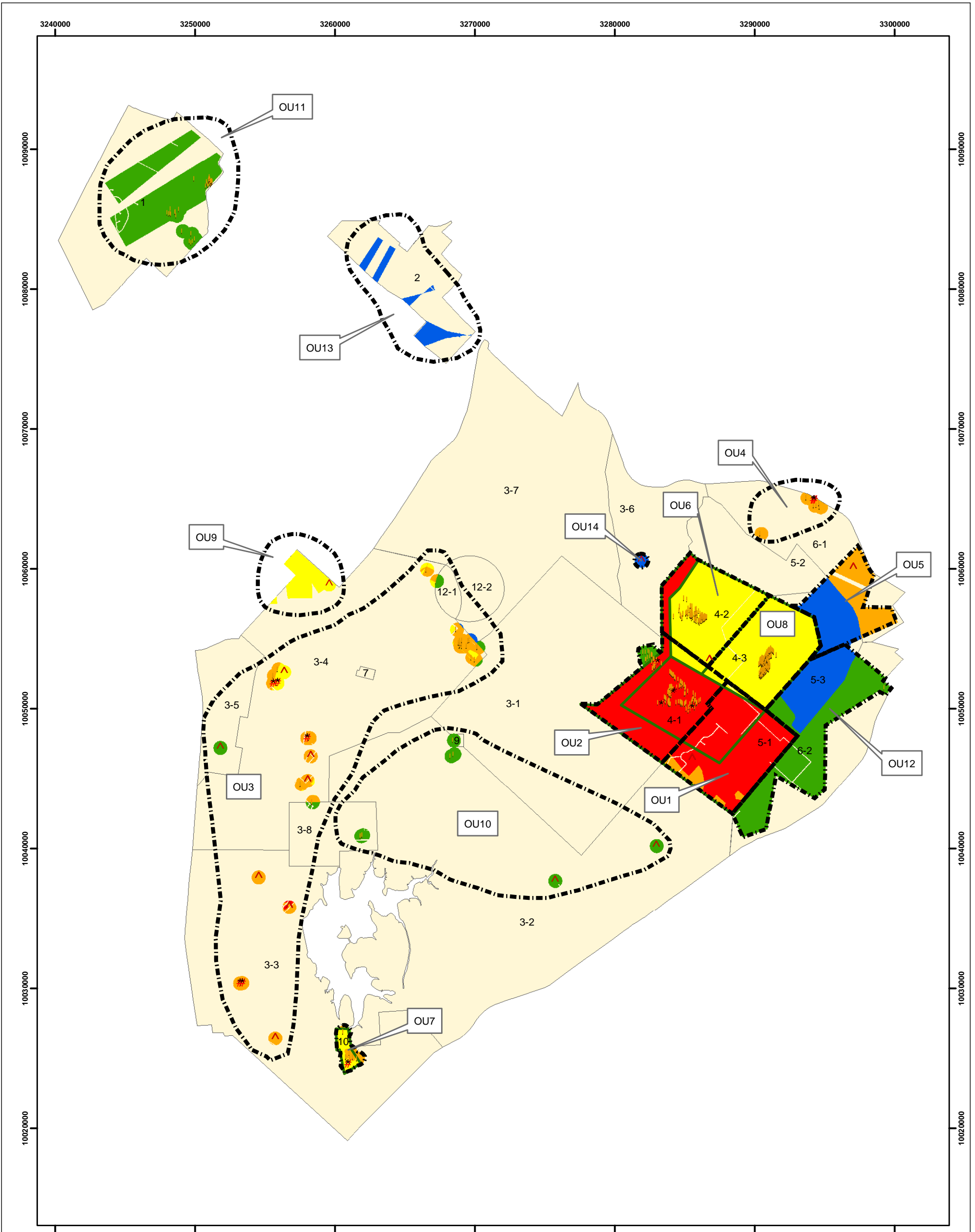


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Figure 9.6 Contributing Values for Prioritization - Field Investigation Results Summary



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**Legend**

	Ordnance found during EE/CA	<b>Prioritization*</b>		1 (4-15 points)
	UXO found during EE/CA		2 (16-37 points)	
	Ordnance Finding Reported by Landowner		3 (38-53 points)	
	AOI (Areas of Interest)		4 (54-62 points)	
	Ordnance Item and Surrounding Prioritized Response Action Area		5 (>62 points)	
	Operable Units			

\* Total points from Historic Camp Use, Current Demographics and UXO/OE Information. High points = High priority

**N**

0      1      2  
Miles

Map Units: NAD 1983 Texas Central State Plane (Feet)

**Figure 9.7**  
Prioritized Response Action Areas divided into Operable Units

PARSONS		U.S. ARMY CORPS OF ENGINEERS	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:80,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: March, 2004	PAGE NUMBER	
SUBMITTED BY: JB	FILE: J:\737805\GIS\EECA\ArcGIS9\Fig9-7_prioritized_areas_ous.mxd		



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**Table 9.5 Recommended and Prioritized Response Action Operable Units**

Operable Unit	AOIs Included	Description	Total Acres
1	AOI 4-1, 5-1, 3-1	Southern quarter of Impact Area and Buffer Zone	1,044
2	AOI 4-1, 5-1, 3-1	Western quarter of Impact Area and Buffer Zone, and adjoining 500-ft radius areas in AOI 3-1. Includes Griffith Ranch and lands to the southeast of Griffith Ranch	1,025
3	AOI 3-3, 3-4, 3-5, 12-1	500-ft Radius Areas in AOIs 3-3, 3-4, 3-5, and 12-1	375
4	AOI 6-1	500-ft Radius Areas in AOI 6-1	56
5	AOI 6-1, 5-3	Former Firing Range Fans	586
6	AOI 4-2, 5-1	Northern quarter of Impact Area and Buffer Zone	816
7	AOI 10	Demolition Area and adjoining 500-ft radius areas	86
8	AOI 4-3	Eastern quarter of Impact Area	821
9	AOI 3-4	Portion of Former Firing Range Fans	168
10	AOI 3-2, 9	500-ft Radius Areas in AOIs 3-2 and 9	98
11	AOI 1	500-ft Radius Areas and Former Firing Ranges in AOI 1	735
12	AOI 6-2, 5-3	Former Firing Range Fans	1,173
13	AOI 2	Former Firing Range Fans	140
14	AOI 3-6	500-ft Radius Area in AOI 3-6	17

## 9.4 OTHER CONSIDERATIONS

### 9.4.1 Geophysical Prove-Out

A robust geophysical prove-out will be completed before removal actions begin at the former Camp Swift. The prove-out for the EE/CA was focused on identifying the most appropriate geophysical equipment to use for a meandering path survey. Since the removal actions will require intensive subsurface data collection, the geophysical instrumentation and methods should be reevaluated before removal action work commences. In addition, due to the differences in soil types across the site (sand and clay), a prove-out should be conducted in both a sandy soil area and a clayey soil area. Soil types are shown in Figure 2.2. The Axtell-Tabor soil association consists of sandy soils, and the Patilo-Demona-Silstid soil association consists of a clayey soil.

### 9.4.2 Houston Toad Habitat

Since the recommended removal actions at the former Camp Swift will cover almost 7,000 acres, the work will likely intersect Houston Toad habitat. Preservation of Houston toads and their habitat must be an integral part of the removal action activities. The Corps

will consult with USFWS pursuant to Section 7 of the Endangered Species Act before conducting removal actions in Houston Toad habitat.

### **9.4.3 Archaeological Sites**

9.4.3.1 Prior to beginning the EE/CA field investigation, all known archaeological sites were identified and an evaluation to identify areas having high potential for archaeological sites was conducted. During the EE/CA field investigation, soil excavated in areas having high potential for archaeological sites was sifted to identify any disturbed artifacts. These procedures were in accordance with THC requirements. Several archaeological sites were identified at the former Camp Swift during the EE/CA investigation.

9.4.3.2 The same procedures will be employed during the removal action to insure that any historical artifacts are identified and preserved. Any discovered artifacts that are not claimed by the landowner will be donated to the Texas Archaeological Research Laboratory or other appropriate preservation facility, upon receipt of a signed release from the landowner.

### **9.4.4 Other Waste Sites**

9.4.4.1 Several possible non-ordnance waste sites were identified during the EE/CA investigation. These sites may be disposal sites for solid wastes that were generated during Camp Swift operations, or they may pre- or post-date the camp. The locations of the possible waste disposal sites identified during the EE/CA are shown in Figure 9.8.

9.4.4.2 Investigation of these sites will be conducted in accordance with the FUDS process. First, an INPR will be opened to investigate them. Each site will be addressed according to the nature of the waste. If evidence of hazardous or toxic waste disposal associated with the former camp is identified, further investigation and remediation will be conducted.

9.4.4.3 If evidence of hazardous or toxic waste disposal by the U.S. Army at the former Camp is identified, recommendations for future soil sampling efforts will be developed in consultation with regulatory agencies and the project team.

### **9.4.5 Remedial Investigation/Feasibility Study**

A remedial investigation/feasibility study (RI/FS) will be conducted in accordance with CERCLA Sections 104 and 121; Executive Order 12580; and the National Oil and Hazardous Waste Contingency Plan. The overall objectives of the RI/FS will be to:

- Identify the most appropriate response action to address munitions and explosives of concern (MEC) or munitions constituent (MC) risk at the site;
- Complete site characterization in which the area, depth, and density of MEC/MC contamination is estimated;
- Complete a risk assessment of hazards present at the site; and
- Complete an evaluation of potential response alternatives.

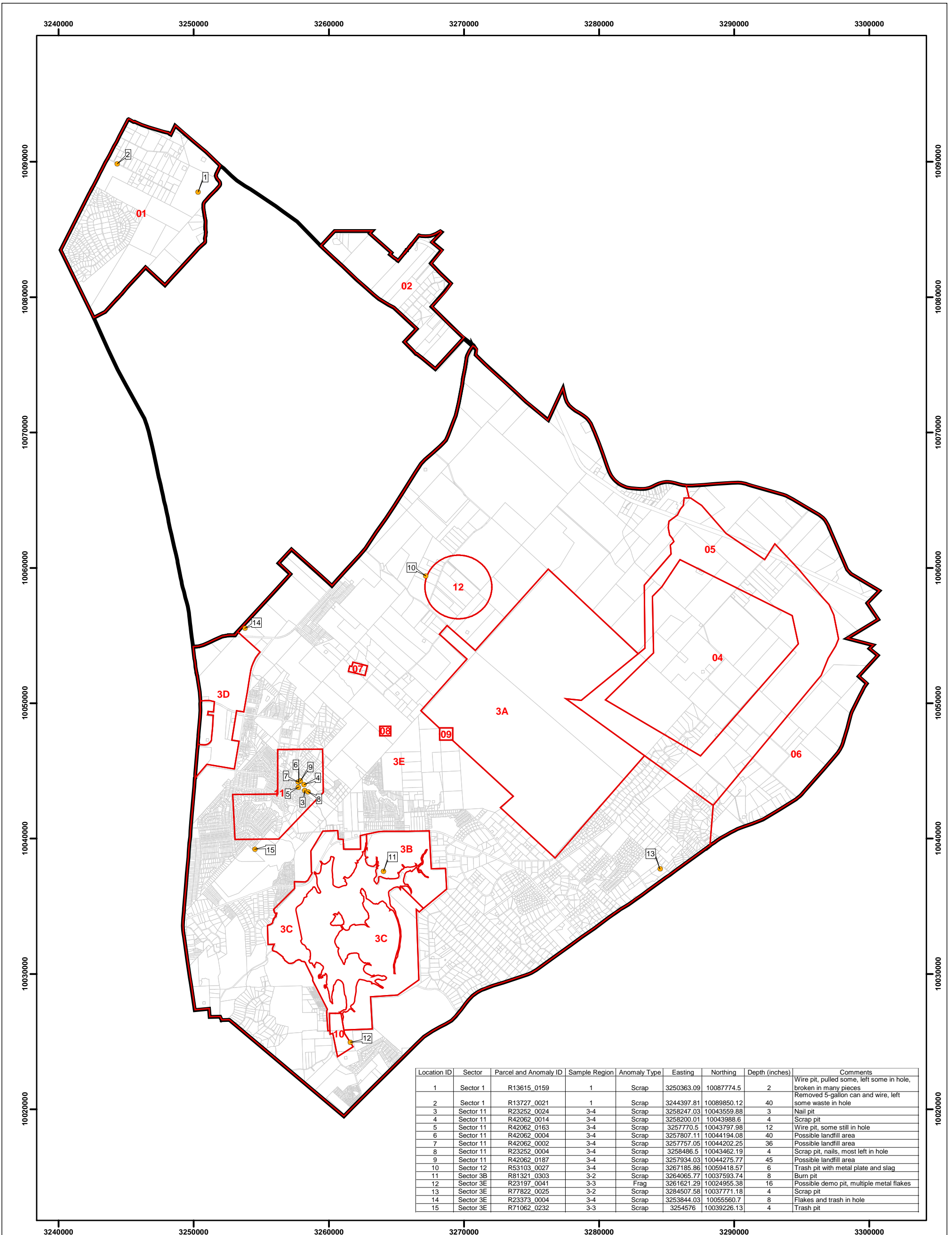
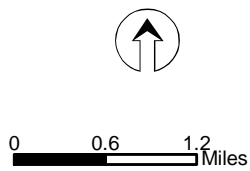


Figure 9.8  
Possible Waste Disposal Locations  
Identified during EE/CA Investigations, 2002

**Legend**

- Waste Disposal Sites
- Sector Boundaries
- Parcel Boundary
- Camp Swift Boundary



Map Units: NAD 1983 Texas Central  
State Plane (Feet)

PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: ARH	CAMP SWIFT, TEXAS		
DRAWN BY: PDS	SCALE: 1:80,000	PROJECT NUMBER: 737805	
CHECKED BY: EN	DATE: April, 2003	PAGE NUMBER:	
SUBMITTED BY: JB	FILE: J:\737805\GIS\EECA\Waste_Disposal_Sites.mxd	PAGE NUMBER:	

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## CHAPTER 10 RECURRING REVIEW PLAN

### 10.1 INTRODUCTION

#### 10.1.1 EE/CA Follow-on Activities

Once the EE/CA is approved by the USACE, follow-on activities will be implemented. These activities will include the following:

- **Action Memorandum.** Following the Final EE/CA Report, an Action Memorandum will be prepared to document the decision by the government regarding the selected OE response action(s) for former Camp Swift. Multiple action memoranda will be prepared for the former Camp Swift site, in the order of the prioritized response action areas described in Chapter 9.
- **Removal Design.** A removal design will be prepared consistent with the Action Memorandum. An Explosives Safety Submission (ESS) must be prepared and submitted to, and approved by the Department of Defense Explosives Safety Board (DDESB) prior to implementation.
- **Removal Action.** The selected Removal Action will be implemented based on the approved design. For removal actions, a removal report must be prepared to document the removal activities, OE items that are recovered and disposed of, and OE exposure data. A removal certificate will also be prepared.
- **Residual Risk Management Activities.** Once the OE response actions have been completed, it is possible that additional OE may be encountered. If the public encounters potential OE, the local law enforcement agency (e.g., Bastrop County Sheriff) must initially respond. The Department of the Army EOD Units, stationed throughout the United States, are responsible for responding to incidents involving military ordnance on public/private property. The Army responds at the request of the local law enforcement authority. If numerous OE items are found in a particular area or recurring responses to OE are occurring, the USACE (Fort Worth District) should be contacted to determine if further action is necessary to review the EE/CA selected OE response action(s) and prioritization.

#### 10.1.2 Purpose of Recurring Review Plan

10.1.2.1 The purpose of the Recurring Review Plan is to monitor the effectiveness of the implemented response actions at a project site. The USACE (Fort Worth District) will maintain its responsibilities for the residual risk that remains once the recommended OE response actions (as discussed in Chapter 9) have been implemented. Recurring reviews will be conducted at the former Camp Swift to:

- Ensure that public health, safety, and the environment are being protected by the removal actions that were implemented.



- Verify the integrity of site controls.
- Determine if new information has become available that was not available for consideration during the EE/CA and may show that further action is warranted.
- Determine if there is an immediate threat to the public or environment that may require an Accelerated Response.
- Review decision for Technical Impracticability to determine if new technology will address explosives safety risk.

10.1.2.2 Recurring review provides the opportunity to respond to problems that develop over time, renew the communities understanding of the ordnance problem, refresh commitments necessary to effectively protect the communities from ordnance hazards, re-evaluate the effectiveness of the institutional control program, and to ensure productive use of the land resources.

## 10.2 SITE DESCRIPTION

10.2.1 In 1942, the U.S. Government acquired 52,191 acres in Bastrop County, Texas for a U.S. Army infantry training camp, which would become Camp Swift. In addition to normal infantry training, artillery, tank destroyer, and engineer units carried out operations with various munitions and explosives at the former Camp Swift. The ASR indicates that ordnance used at the former Camp Swift included rockets, grenades, artillery rounds, mortars, small arms munitions, mines, simulators, and dynamite. A detailed description of the site and its historical use is presented in Chapter 2 of this report.

10.2.2 The Camp Swift property was declared excess to the WAA on May 5, 1947. Camp Swift subsequently performed a surface clearance and the government sold most of the property to private individuals. The only land that was retained by the government is the 11,700-acre portion that is currently a TARNG training facility. Much of the land that was sold to the public was restricted to surface use since a subsurface clearance was not performed by the Army prior to selling the land.

10.2.3 The Camp Swift EE/CA investigation was conducted from February to June 2002. The former camp was divided into sixteen sectors for investigation purposes, based on former land use. Geophysical crews generally collected geophysical data in random transects across the former camp; however, field crews also tried to bias data collection to areas that were identified as “disturbed areas” on historical aerial photographs. After data collection was complete and the findings compiled, the former camp was divided into 23 AOIs for recommendation purposes.

10.2.4 The Camp Swift EE/CA investigation discovered a total of 13 UXO items within the former camp area. These items were destroyed by means of explosive demolition. In addition to the UXO items found by the EE/CA investigation, landowners in the area have reported finding ordnance scrap, including a 75mm projectile and 105mm projectile which were confirmed to be UXO by the UXOSO during the EE/CA. An in-depth description of EE/CA findings is provided in Chapter 3.

10.2.5 Based on the findings at the former camp, a combination of response action alternatives are to be implemented. These alternatives consist of one or a combination of removal to depth for an entire area (such as the former impact area), removal to depth within a 500-foot radius around OE findings (such as around anti-tank mine findings in the area identified as “Other Remaining Land”), ICs, and NDAI. ICs will be implemented for the majority of the former camp, regardless of whether OE items were found during the EE/CA.

### **10.3 RECURRING REVIEW SCHEDULE**

10.3.1 The recurring review process is consistent with Section 121(c) of CERCLA, as amended by SARA, and Section 300.430(f)(4)(ii) of the NCP. Recurring review, as outlined by these statutes, require that periodic (at least every five years) reviews be conducted for sites where hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure following the completion of all remedial actions. After the initial review has been conducted, recurring reviews will be performed at five-year intervals. If no changes have occurred, the AOIs will continue to be monitored at the specified intervals. The need for recurring reviews will be coordinated with regulators and stakeholders and justified in each recurring review report. Due to the size and complexity of the former Camp Swift site, a five-year review cycle is reasonable based on the anticipated multi-year duration of the response actions for the former camp. The first recurring review will be conducted five years after the EE/CA recommended response actions have begun to be implemented, and reviews will continue at 5-year intervals throughout the years that the response actions are being implemented, and will continue until deemed unnecessary.

10.3.2 The primary objective of the recurring review process will be to ensure that the OE response actions implemented as a result of the EE/CA have remained effective and continue to provide protection against OE. Data gathered during the review process will be used to determine if further action needs to be taken to protect public safety and the human environment. At the completion of the review, a Recurring Review Report will be prepared, a public notice will be placed in local newspapers concerning the continued effectiveness of the OE response action, and a formal Decision Document referencing any actions taken will be prepared. During the recurring reviews, the USACE will also implement and fund the maintenance, repair, and/or replacement of the implemented institutional controls (*i.e.*, information pamphlets, notification letters, and OE safety awareness training video). Long-term implementation of institutional controls will be the responsibility of landowners and local agencies.

### **10.4 DOCUMENTS INCLUDED IN RECURRING REVIEW PROCESS**

10.4.1 The recurring review team will gather data to determine if any changes within AOIs are relevant and may affect the prior recommendations of the EE/CA. The team will also identify existing project documentation to be reviewed during the execution of the recurring review, identify and review and new information, and conduct a site visit. The recurring review process will include, but not be limited to the following actions:

- Evaluate if changes have occurred in current or future land uses/accessibility and their effect, if any, on selected OE response actions.
- Update the Camp Swift prioritization model in Chapter 9 with current population density and land use information, as well as any updated OE findings.
- Investigate reported OE encounters that may have occurred since completion of the OE response actions (e.g., removal actions), or in areas that have not yet been completed.
- Conduct visual spot inspections in the former camp to identify changes in the physical condition of the AOIs.
- Conduct interviews with local agencies regarding the effectiveness of community awareness outreach programs and educational media.
- Visit public outreach displays to determine the status of supplies and effectiveness of outreach programs and educational media.
- Identify new technology or techniques that have become available and may warrant reconsideration or the EE/CA recommendations.

10.4.2 Specific documents to be reviewed for the Camp Swift recurring reviews include, but are not limited to:

- *GIS-Based Historical Photographic Analyses (1938-1995) of Camp Swift, Texas* (ERDC, 2000);
- *Engineering Evaluation and Cost Analysis Report for Camp Swift, Texas* (this document);
- *Archives Search Report, Camp Swift, Bastrop, Texas* (USACE, 1994a);
- *Archives Search Report (Supplement to Rock Island District Report), Camp Swift, Bastrop, Texas* (USACE, 1994b);
- Master Plan, Camp Swift, Texas (U.S. Army, 1945); and
- Master Plan, Camp Swift, Texas (U.S. Army, 1946).

10.4.3 In addition, reports which are subject to change with time, such as those regarding population, land use, community planning, endangered species, and additional ordnance findings, should also be reviewed.

## 10.5 PROCESSES USED TO GATHER NEW SITE INFORMATION

10.5.1 Response actions recommended in this EE/CA are based on OE findings (density, type, sensitivity, and depth), land use, population density, site accessibility, and site stability. Therefore, the recurring review process should include an update of information in each of these categories. The following steps are recommended:

1. Establish interdisciplinary project team, determine if required real estate functions have been completed (e.g., rights of entry have been obtained), identify Public Affairs Office support requirements including review of the Community Relations Plan for updating as appropriate, determine education requirements, if any, for the stakeholders.
2. Review existing documents (ASRs, EE/CA, Explosives Safety Submissions for any continuing response action requirements, decision documents, removal action reports, etc.).
  - a. Determine what actions are proposed or were completed at the site.
  - b. Determine what the existing conditions are at the site.
  - c. Determine where UXO items are suspected or were located and document the rationale for this determination.
3. Obtain new data. Gather readily available data telephonically or electronically, through news articles or releases, public records, local authorities, etc.).
  - a. Record all contacts/interviews.
  - b. Review changes in site conditions, including construction, erosion, recreational or other activities, littoral processes, storm damage (uprooted trees, etc.), and changes in land use. Information and resources that may be helpful in evaluating current and future land use include: zoning laws; zoning maps; comprehensive community master plans; population growth patterns and projections (e.g., Bureau of Census projections); accessibility of site to existing infrastructure (e.g., transportation and public utilities); site location in relation to urban, residential, commercial, industrial, agricultural, and recreational areas; federal/state land use designation (e.g., state recreational areas, governmental facilities providing extensive site access restrictions, such as LCRA); historical or recent development patterns; cultural factors (e.g., historical sites, archaeological sites); natural resources information; environmental justice issues; location of on-site or nearby wetlands; proximity of site to a floodplain; proximity of site to critical habitats or endangered or threatened species; and geographic and geologic information.
  - c. UXO incidents.
  - d. Institutional Controls.
4. Prepare site analysis and work plans.
  - a. Conduct preliminary site analysis, which includes preparation of preliminary analysis of response effectiveness and determination of further data gathering requirements.
  - b. Develop field work plan based upon preliminary site analysis.
5. Perform field work for recurring review.

- a. Conduct public information forum or media day.
  - b. Interview property owners, local authorities, etc.
  - c. Conduct site visit evaluation.
6. Prepare final report (substantiate that the response action that was, or is being, implemented is still protective of human health and the environment, or recommend that additional response actions are warranted, or that prioritization of recommended response actions should be revised). The final report should include data gathered or relied upon to reach conclusions, final site analysis, and conclusions and recommendations. The basic text of the final report should be limited to 5 to 10 pages with liberal use of appendices as required.

10.5.2 Data gathered during the review process will be used to determine if further action needs to be taken to protect public safety and the human environment. If no changes have taken place, the AOIs will continue to be monitored at the specified intervals. All new information will be used to update recommended response actions, and to re-prioritize the recommended actions.

## **10.6 NUMBER OF RECURRING REVIEWS REQUIRED**

10.6.1 Recurring reviews should be tentatively scheduled to end after 25 years, or five recurring reviews. If the response actions have remained applicable, land uses have not changed, and additional ordnance findings have not warranted any changes to the site recommendations through several recurring reviews, the reviews may be discontinued.

10.6.2 Although recurring reviews may be discontinued at a future date, it is important to note that the government will continue to respond to any OE discoveries at any FUDS property, including former Camp Swift.

## **10.7 RECURRING REVIEW COST ESTIMATE**

The initial recurring review will be scheduled by the government after the first five years of the removal action phase have been conducted to address the issues and evaluate the data as described above. The estimated cost for the site visit and review procedures is expected to be \$35,000.

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**APPENDIX A**  
**STATEMENT OF WORK**

**APPENDIX B**  
**BIOLOGICAL OPINION**  
**(USFWS, 2002)**

**APPENDIX C**  
**ARCHAEOLOGICAL SURVEY REPORT**



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**APPENDIX J**  
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**FINAL EE/CA REPORT**