

Draft Final
Engineering Evaluation / Cost Analysis
Former Camp Gordon Johnston
Franklin County, Florida

Volume 1



U.S. Army Corps of Engineers
Jacksonville District
and
U.S. Army Corps of Engineers
Huntsville Center

Contract No. DACA87-95-D-0018
Delivery Order 0049
FUDS Project Number I04FL011004

Prepared by

PARSONS ENGINEERING SCIENCE, INC.

Atlanta, Georgia

July 2001
736121



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June 5, 2001

U.S. Army Engineering & Support Center
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Subject: Contract DACA87-95-D-0018, Delivery Order 0049
Draft-Final (Revision 2) EE/CA Report Deliverable
Former Camp Hero, Montauk, New York

Dear Mr. Blankinship:

Enclosed please find three (3) copies of the Draft-Final (Revision 2) EE/CA Report (Volume I) and one (1) copy of Volume II for the former Camp Gordon Johnston Engineering Evaluation/Cost Analysis Project. Five copies of the OECert Report are also included under separate cover as previously discussed.

If you have any questions regarding this letter or need additional information, please contact me at (678) 969-2384 or (404) 606-0346 (cell).

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.



Don Silkebakken, P.E.
Project Manager

cc: Project File (736121)



**Draft Final
Engineering Evaluation / Cost Analysis
Former Camp Gordon Johnston
Franklin County, Florida**

Volume 1

Prepared for

**U.S. Army Corps of Engineers
Jacksonville District
and
U.S. Army Corps of Engineers
Huntsville Center**

**Contract No. DACA87 - 95 - D - 0018
Delivery Order 0049
FUDS Project Number I04FL011004**

Prepared by

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 *6/5/01*

Don Silkebakken, P.E.

June 2001

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LIST OF ACRONYMS AND ABBREVIATIONS

AFB	Air Force Base
AN	Army/Navy approved ordnance
AOI	areas of interest
AR	army regulation
ARAR	applicable or relevant and appropriate requirement
ASR	Archives Search Report
ATC	Amphibious Training Center
BIP	blow in place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAJ	Corps of Engineers, Jacksonville District
CFR	Code of Federal Regulations
CS	choking smoke
CWM	chemical warfare material
DERP	Defense Environmental Restoration Program
DGPS	differential global positioning system
DID	data item description
DoD	U.S. Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EM	electromagnetics
EOD	explosive ordnance disposal
FDEP	Florida Department of Environmental Protection
FDES	Findings of Fact and Determination of Eligibility Study
FSU	Florida State University
FUDS	Formerly Used Defense Site
GPR	ground penetrating radar
GPS	global positioning system
HE	high explosive

HE-AT	high explosive anti-tank
IC	Institutional Controls
INPR	Inventory Project Report
lb	pound
M	Army ordnance ID mark
Mk	Navy ordnance 'Mark' number
mm	millimeter
Mod	Navy ordnance 'Model' number
MPM	most probable munition
MSD	minimum separation distance
NCP	National Contingency Plan
NDAI	no DoD action indicated (formerly NOFA)
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
OE	ordnance and explosives
OE <i>Cert</i>	OE Cost-Effectiveness Risk Tool
OS	ordnance scrap
PA	Preliminary Assessment
Parsons ES	Parsons Engineering Science, Inc.
PD	point detonation
PM	project manager
POW	prisoner of war
PSD	personnel separation distance
PWD	public withdrawal distance
QuantiTech	QuantiTech, Inc.
RAC	Risk Assessment Code
ROE	right-of-entry
S/A	selective ability
SARA	Superfund Amendments and Reauthorization Act

SHPO	State Historic Preservation Officer
TBC	to be considered
TDMD	time domain metal detector
the Association	The Camp Gordon Johnston Association
the Camp	the former Camp Gordon Johnston
USA	USA Environmental
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UXO	unexploded ordnance
WP	work plan

EXECUTIVE SUMMARY

ES1 The former Camp Gordon Johnston is a 159,348-acre site located in Franklin, County Florida that was utilized during World War II by the Department of the Army and the Navy for amphibious training and other military exercises. The majority of the inland property is undeveloped and used for timber production. The Camp consists of significant waterfront areas; some of which are residential developments while others are dedicated for natural conservation.

ES2 Training at the Camp consisted of boat discipline, including boat formations and control of landing craft; organization and control of troops during loading and unloading operations; and organization, tactical operation, and supply of combat teams. Seizure of the beachhead and the inland advance to the division objective included training in crossing beach obstacles and defensive works, clearing the beach of obstacles, demolitions, and the subsequent beach organization to support the operation. Other training activities included the use of high explosives (HE), smoke for screening, chemicals for contamination purposes, air-ground support, anti-aircraft defense, battle firing, automatic weapons firing from landing craft, and combat in cities. In addition to the amphibious training, the site also contained special training areas containing obstacle courses; grenade and bayonet courses; judo, knife and bayonet fighting; hand-to-hand fighting; and demolitions training. Other training sites involved the use of live ammunition. These sites included the street fighting course, infiltration course, battle firing, and firing from simulated landing crafts.

ES3 The Archives Search Report initially subdivided the Camp into seventeen Areas of Interest (AOIs) based on physical attributes, homogeneity, and current and historical land use. These AOIs are identified in the ASR as Area A through Area Q. The ASR evaluated each AOI to determine whether the presence of Ordnance and Explosives and Unexploded Ordnance was "confirmed" or "potential" or the AOI was considered "uncontaminated". Confirmed ordnance contamination was based on verifiable historical evidence, direct witness of ordnance items, or reliable indirect witness accounts. Potential ordnance contamination was based on inferred presence of OE/UXO from records or indirect witness accounts when the presence of ordnance was not confirmed. For AOIs where there was no reasonable evidence, either direct or inferred, to suggest the presence of residual ordnance contamination, the AOI was designated as uncontaminated.

ES4 The ASR classified three of the seventeen areas (Areas M, N, and O) as uncontaminated. Area M (Clearings 1 and 3) was considered uncontaminated based on a report that indicated amphibious training activities that occurred in this area, such as climbing down cargo nets and disembarking from simulated boats did not involve

weaponry. Area N (Small Arms Ranges) was considered uncontaminated (in regards to OE) based on the absence of OE items observed during the ASR site visit, common military practice for firing on similar ranges, historical maps, and numerous interviews. All of the available information concerning Area N indicated that only small arms (.50 caliber and smaller) were used at these ranges and only .50 caliber fired bullets (projectiles) have been discovered. Area O (All Other Land) was considered uncontaminated based on the absence of any evidence (visual or otherwise) that weapons training was conducted in this area. Area O includes the airfield, the cantonment areas, the ammunition storage areas, beaches, and forest areas. As a result, these three areas were not further investigated during this EE/CA and are not described further below. A fourth area excluded from investigation, Area Q (United States Air Force Radar Site) is still under Department of Defense (DoD) ownership and is not eligible for DERP-FUDS. No EE/CA investigation was conducted for Area Q. Therefore, thirteen AOIs were evaluated during this EE/CA.

ES5 Data collected during the EE/CA were used to estimate the density of ordnance (if present) in different AOIs. If OE was identified, statistical public risk was calculated based on current and future activities and anticipated users of the AOI. Data collected from this characterization project were also used to develop alternatives designed to reduce the anticipated public exposure to UXO within the AOIs. These alternatives were then evaluated to determine their effectiveness, implementability, and cost.

ES6 Results of this comparison indicate that there are portions of the Camp where alternatives requiring removal of UXO will be necessary to ensure public safety. The results also indicate that implementation of site-wide institutional controls (IC) will be necessary to modify behavior. Several AOIs within the Camp were considered safe in their current state and therefore do not require any OE response actions.

ES7 OE response action alternatives were evaluated for each of the AOIs within the Camp that were investigated during this EE/CA investigation. Two AOIs, Area D and Area P were deleted from EE/CA investigation based on information obtained during the Site Visit and other post-ASR review. For the eleven remaining AOIs, each potential alternative was initially screened against the general evaluation criteria of effectiveness, implementability, and cost. The screening of alternatives was used to identify candidate OE response alternatives for further qualitative evaluation. Site-wide IC components were evaluated and selected. As a result of the comprehensive evaluation of alternatives by AOI, six AOIs were designated for "No DoD Action Indicated" including Area C, E, I, K, and L, and P. Portions of Area J (J2, J3) and G (Nature Conservancy) were also included in this group. Institutional controls were selected, in addition to those proposed on a site-wide basis, for Area J consisting of UXO escorts for timber harvesting (J1, J2, J3) and construction support for residential development (J4). Surface removal actions are recommended for a portion of Area G and all of Area F, Area H, and Area I. Surface clearance is also recommended for Area J (J1 and J4). Subsurface removal actions are recommended for Area A and both portions of Area B.

SECTION 1 INTRODUCTION

1.1 BACKGROUND

1.1.1 The former Camp Gordon Johnston (the Camp) is a 159,348-acre site located in Franklin County Florida. The Camp was established as an Army Amphibious Training Center (ATC) in 1942, transferred to the Navy in June 1943 for amphibious training, redesignated as an Army Service Forces Training Center in September 1943, and officially closed on May 1, 1946.

1.1.2 Training at the Camp consisted of boat discipline, including boat formations and control of landing craft; organization and control of troops during loading and unloading operations; and organization, tactical operation, and supply of combat teams. Seizure of the beachhead and the inland advance to the division objective included training in crossing beach obstacles and defensive works, clearing the beach of obstacles, demolitions, and the subsequent beach organization to support the operation. Other training activities included the use of high explosives (HE), smoke for screening, chemicals for contamination purposes, air-ground support, anti-aircraft defense, battle firing, automatic weapons firing from landing craft, and combat in cities. In addition to the amphibious training, the site also contained special training areas containing obstacle courses; grenade and bayonet courses; judo, knife and bayonet fighting; hand-to-hand fighting; and demolitions training. Other training sites involved the use of live ammunition. These sites included the street fighting course, infiltration course, battle firing, and firing from simulated landing crafts.

1.1.3 In 1995, the U. S. Army Corps of Engineers (USACE) conducted a site visit and historical data collection effort. The findings are documented in the Archives Search Report (ASR). Based on the findings, portions of the property within the former facility boundary were recommended for an ordnance and explosives (OE) investigation (USACE, 1995). Based on the ASR recommendations, an Engineering Evaluation/Cost Analysis (EE/CA) was conducted at the site. The EE/CA focused on characterizing OE contamination, analyzing risk management alternatives, and recommending feasible OE exposure reduction alternatives for eleven areas of interest (AOIs). This report presents the findings and recommendations of the EE/CA investigation.

1.1.4 Ordnance used at the former Camp included rockets, grenades, artillery rounds, mortars, and various initiating and priming material used as obstacles and mine field clearing devices. Unexploded ordnance (UXO) that may be encountered at the former Camp include: 2.36-inch rockets (HE and practice), 4.5-inch rockets, HE grenades, 105-155mm HE artillery rounds, 4.2-inch HE mortars, 4.2-inch smoke and

white phosphorous mortars, 81mm mortars (HE and practice), 60mm mortars (HE, white phosphorous, smoke, illuminating, practice), 37mm HE projectiles, practice antipersonnel mines, and practice antitank mines. Demolition materials used as obstacles and mine field clearing devices may include: various shaped charges and TNT Blocks, cratering charges (40-pound), dynamite sticks, Block M3 explosive, detonating cord, blasting caps, various firing devices, and bangalore torpedoes.

1.2 PROJECT AUTHORIZATION

Parsons Engineering Science, Inc. (Parsons ES) received Contract No. DACA87-95-D-0018, Delivery Order No. 0049, from the U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville (USAESCH) to conduct an EE/CA at the Camp (Appendix A). This EE/CA implemented OE risk management actions consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Contingency Plan (NCP). In accordance with the NCP, on-site actions did not require Federal, State, or local permits; however, substantive permit requirements were fulfilled. The EE/CA adhered to the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS) and relevant U.S. Army regulations (AR) and guidance for OE programs.

1.3 PURPOSE AND SCOPE

The purpose of this EE/CA was to characterize OE concentrations and locations, identify potential safety problems associated with the OE, study risk management alternatives, recommend proposed alternatives, and document the selected alternative for various AOIs. The objective of this EE/CA was to select the most appropriate response action to reduce public safety risk associated with OE/UXO that may exist within the Camp.

1.4 PROJECT TEAM

The technical project team consisted of USAESCH, USACE Jacksonville District (CESAJ), Parsons ES, and USA Environmental, Inc. (USA), and QuantiTech, Inc. The roles of these team members are described below and depicted in Figure 1.1. A detailed description of the project team members can be found in Section 2 of the approved project Work Plan (WP).

1.4.1 U.S. Army Corps of Engineers, Jacksonville District

The USACE, Jacksonville District, (CESAJ) was the overall project manager (PM) and funding agency for the EE/CA delivery order. The CESAJ worked in tandem with the USAESCH by reviewing project plans and documents and was responsible for obtaining rights-of-entry (ROE), working with the news media and the public, coordination with the Florida Department of Environmental Protection (FDEP), and addressing environmental issues regarding protection of ecological and cultural resources.

1.4.2 U.S. Army Corps of Engineers, Huntsville Center

The USAESCH provided technical expertise and day-to-day project management for the EE/CA delivery order. The USAESCH was responsible for the review and approval of all project plans and documents. The USAESCH was also responsible for approving requests for scope and budget amendments.

1.4.3 Parsons Engineering Science, Inc.

Parsons ES was the prime contractor to USAESCH to provide overall engineering support and services for the EE/CA. Parsons ES was responsible for routine day-to-day performance of the scope of work. Parsons ES was also responsible for schedule and budget control.

1.4.4 USA Environmental, Inc.

USA, under contract to Parsons ES, provided UXO-qualified escort to geophysical teams, limited brush clearance, and intrusive investigation services. USA provided properly trained UXO experts for the handling, transportation, and disposal of UXO.

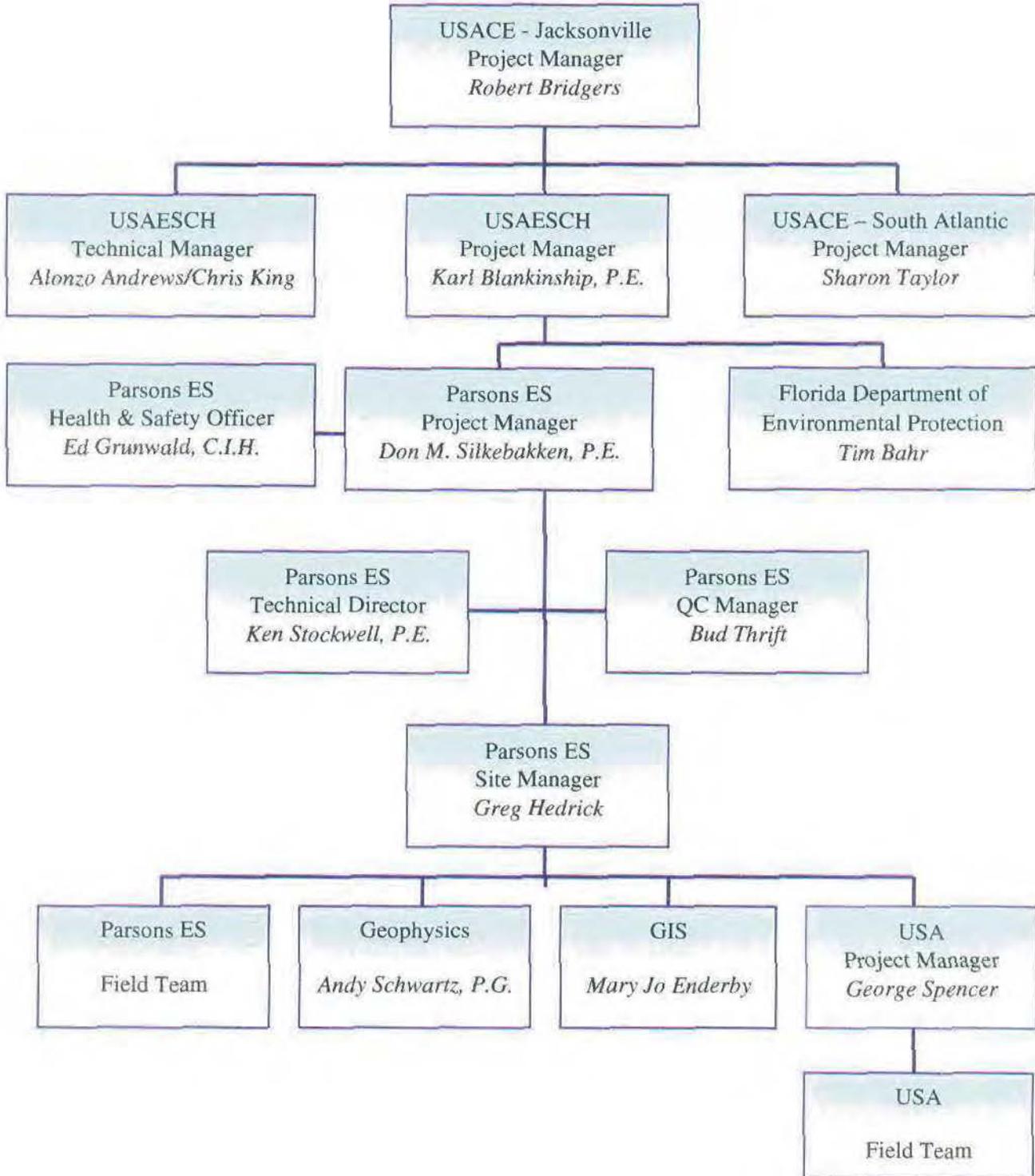
1.4.5 QuantiTech, Inc.

QuantiTech, under contract to Parsons ES, supported the distribution of "meandering path" geophysical sampling locations and participated in anomaly selection efforts during the EE/CA field investigation. QuantiTech utilized the data collected by Parsons ES to perform modeling of OE risk to the public based on the government furnished OE Cost-Effectiveness Risk Tool (OECert), as defined in the SOW (QuantiTech, 2000). This document was submitted under separate cover and has been placed in the Administrative Record for this project.

1.5 PROJECT OBJECTIVES

The objective of this project was to prepare an EE/CA that recommends and justifies appropriate OE response alternatives for identified AOIs at the Camp. This objective was accomplished by characterizing OE contamination, analyzing risk management alternatives, and recommending feasible OE risk reduction alternatives.

**FIGURE 1.1
ORGANIZATIONAL STRUCTURE FOR
FORMER CAMP GORDON JOHNSTON EE/CA**



SECTION 2

SITE DESCRIPTION AND HISTORY

2.1 LOCATION

The Camp is located in Franklin County Florida, approximately 60 miles southwest of Tallahassee, Florida (Figure 2.1). The Camp is bordered to the north by the Apalachicola National Forest, to the south and east by the Gulf of Mexico, and to the west by Tates Hell Swamp (excluding the City of Carrabelle). The Camp includes Dog Island, which is part of the Gulf Barrier Chain, located approximately three miles south of Carrabelle, Florida.

2.2 PHYSICAL DESCRIPTION

The Camp is comprised of primarily uninhabited forest intermixed with residential areas. These residential areas are located on or near the coast, many of which are occupied on a seasonal basis. The property comprising the Camp now belongs to over 500 different landowners. The largest landowner is the St. Joe Timber Land Company, which currently owns approximately 60,000 acres.

2.2.1 Topography

2.2.1.1 The area of the former Camp is generally flat with the elevation gradually increasing eastward away from the coast. The highest elevation in the county is 52 feet above sea level on a ridge east of the City of Carrabelle. Northwest of Carrabelle, the area is primarily level, swampy plain. The balance of the Camp is flat, wooded land approximately 25 feet above sea level.

2.2.1.2 The residential areas are located primarily on or near the coast and consist of Lanark Village, St. Teresa, Dog Island, and Alligator Point. Most of the residences along the coastline are inhabited only seasonally. Although several large tracts are owned by single private or government entities, more than 500 different landowners own property within the Camp. Much of the empty shoreline areas are currently for sale, though large-scale development seems unlikely at this time due to a lack of area infrastructure.

2.2.1.3 Dog Island, located approximately 3 miles south of Carrabelle, is part of the Gulf Barrier Chain; a series of elongated quartz sand islands in the Gulf Coastal Lagoon. The average elevation of the island is approximately 6 feet above sea level with a maximum elevation of 18 feet above sea level in the southern (Oceanside) dunes.

2.2.1.4 The average depth of the Gulf of Mexico near the Camp is approximately 14 feet within two miles of the coastline. There are several reefs and shoals that are

visible at low tide, including Lanark Reef and the Turkey Point Shoal. South of Dog Island, the average water depth increases to about 25 feet.

2.2.2 Climate

2.2.2.1 The climate of Franklin County, Florida is characterized by mild winters and long, warm and humid summers. Summer temperatures are moderated by breezes from the Gulf of Mexico and scattered cloud cover, which frequently shades portions of the area without completely obscuring the sun. The average temperature in June, July, August, and September is 80°F. Temperatures above 90°F occur May through September, but temperatures exceeding 100°F rarely occur. In July and August, the warmest months, the average maximum temperature is approximately 88°F. The highest temperature recorded in the area was 102°F on July 14, 1932, and the lowest temperature recorded was 9°F on January 21, 1985.

2.2.2.2 The average relative humidity in the mid-afternoon is approximately 65 percent. Humidity is generally higher at night with an average relative humidity at dawn of 85 percent. The sun shines in the region approximately 65 percent of the time possible in the summer and 60 percent in the winter. The prevailing wind direction in the region is from the north during the winter months and from the south during the summer. The highest average monthly windspeed, 9 miles per hour (mph), occurs in March. The lowest average monthly windspeed of 6.5 mph occurs in July and August. The highest windspeed recorded in the region was 85 mph during Hurricane Kate in November 1985.

2.2.2.3 The total annual precipitation in the area is approximately 56 inches. Of this, approximately 30 inches fall during the summer rainy season months between July and September. Approximately 16 inches of precipitation falls during the winter rainy season, December through April. May, October, and April are generally the driest months in the region. Thunderstorms occur approximately 4 days per week during the summer months and may drop as much as 3 inches of rain within 1 to 2 hours. The heaviest one-day rainfall amount was 11.7 inches in September 1932.

2.2.3 ASR Sectorization

2.2.3.1 The ASR initially subdivided the Camp into seventeen AOIs based on physical attributes, homogeneity, and current and historical land use. These AOIs are identified in the ASR as Area A through Area Q (Figure 2.2). The ASR evaluated each AOI to determine whether the presence of OE/UXO was “confirmed” or “potential” or the AOI was considered “uncontaminated”. Confirmed ordnance contamination was based on verifiable historical evidence, direct witness of ordnance items, or reliable indirect witness accounts. Potential ordnance contamination was based on inferred presence of OE/UXO from records or indirect witness accounts when the presence of ordnance was not confirmed. For AOIs where there was no reasonable evidence, either direct or inferred, to suggest the presence of residual ordnance contamination, the AOI was designated as uncontaminated. Due to geophysical survey limitations and the lack of identified exposure pathways, water ranges such as the Aerial Gunnery Danger Area and the Turkey Point Known Distance Range (both depicted on Figure 2.3) were not

considered for evaluation during this EE/CA study. However, if conditions change these ranges may be evaluated during future investigations of the project site.

2.2.3.2 The ASR classified three of the areas (Areas M, N, and O) as uncontaminated. Area M (Clearings 1 and 3) was considered uncontaminated based on a report that indicated amphibious training activities that occurred in this area, such as climbing down cargo nets and disembarking from simulated boats did not involve weaponry. Area N (Small Arms Ranges) was considered uncontaminated (in regards to OE) based on the absence of OE items observed during the ASR site visit, common military practice for firing on similar ranges, historical maps, and numerous interviews. All of the available information concerning Area N indicated that only small arms (.50 caliber and smaller) were used at these ranges and only .50 caliber fired bullets (projectiles) have been discovered. Area O (All Other Land) was considered uncontaminated based on the absence of any evidence (visual or otherwise) that weapons training was conducted in this area. Area O includes the airfield, the cantonment areas, the ammunition storage areas, beaches, and forest areas (Figure 2.3). As a result, these three areas were not further investigated during this EE/CA and are not described in detail below. A fourth area, Area Q (United States Air Force Radar Site) is still under Department of Defense (DoD) ownership and is not eligible for DERP-FUDS. No EE/CA investigation was conducted for Area Q.

2.2.3.1 Area A - Bazooka Range

2.2.3.1.1 The Bazooka Range (Area A) is currently owned entirely by the St. Joe Timber Land Company and pedestrian access is basically unrestricted. Signs present along the area boundary indicate hunting is conducted on the property. Area A was originally described as an approximately 105-acre tract in the ASR and EE/CA WP. However, the delineation (as confirmed from the project GIS) actually only encompasses 50 acres. The ASR identified this area as a "practice and HE bazooka range" during the time the Camp was operational. Area A is located approximately 2.5 to 3 miles northeast of the City of Carrabelle near Lanark Village (Figure 2.2 and 2.4). Most of Area A is forested with immature pine planted in evenly-spaced rows. The white sandy soil characteristic of Florida coastal areas is visible and there is minimal understory. No current on-site or adjacent residential component is present; however, residential dwellings are present within 0.5 mile to the immediate northeast in Lanark Village. A small fresh water lake (Duck Lake) is located approximately 0.25 mile to the north. The timber within Area A has been clear-cut on at least one occasion (and likely twice) since the Camp closed in 1946.

2.2.3.1.2 Primarily as a result of historic OE findings of 2.36-inch rockets by the public and the ASR reconnaissance team, Area A received a relatively high Risk Assessment Code (RAC) score of 2 (on a scale of 1 to 5 with 1 being the highest) as part of the ASR evaluation. Two of the five rockets discovered in 1995 required destruction by U.S. Air Force explosive ordnance disposal (EOD) personnel. Interviews and historical site maps were cited as further confirmation of former area use. The ASR concluded that OE potential within the entire area was "confirmed" and recommended EE/CA investigation (USACE, 1995).

2.2.3.1.3 Parsons ES conducted a Site Visit of Area A on January 13, 1999 (Parsons ES, 1999a). Area A was accessed during the Site Visit from Lanark Village by driving less than 1 mile north from U.S. Highway 98/State Highway 30. Area A is located to the immediate southeast of Area J1 (Figure 2.2) on the Pickett Bay and Carrabelle 7.5-minute Quadrangles in Sections 11 and 14, Township 7 South, Range 4 West.

2.2.3.1.4 Additional reconnaissance of Area A was conducted on September 16, 1999 in an effort to refine proposed geophysical sampling locations. Construction of a new prison was observed at the intersection of Lake Morality Road and County Road 67, approximately 1.5 miles to the northwest. No other development was observed. The future land use for Area A and the immediate surrounding area cited in the 1991 County Comprehensive Plan (the most current version available), did not anticipate any development in the foreseeable future. The Future Land Use Map accompanying the Plan identified Area A as remaining zoned for agricultural use (Franklin County, 1991). Access to Area A by vehicle is primarily via the intersection of Lake Morality Road and the former Seaboard Airline Railroad tracks, now a sandy powerline easement.

2.2.3.2 Area B - Grenade Court

2.2.3.2.1 The Grenade Court (Area B) is located just east of the intersection of State Highway 319/377 and U.S. Highway 98 and pedestrian access is basically unrestricted (Figure 2.2 and 2.5). The western half of the property is currently owned by St. Joe Timber Land Company with the balance owned by Florida State University (FSU). No current on-site or adjacent residential component is present; however, the FSU Marine Laboratory is located within 0.25 mile to the immediate south. Much of the previously forested portion of the St. Joe Timber Land parcel was harvested and disked in 1994 with new seedlings planted shortly thereafter. According to a representative of FSU, the timber was removed from the southern portion of the FSU parcel within the last few years to accommodate a backfilling operation for several on-site settling ponds. Seedlings have not been planted and scrub vegetation has been allowed to take hold. The northeastern FSU property, unlike the relatively flat and dry conditions present throughout Area B, is characterized by sloping topography and wetland conditions. This area is heavily forested and significant understory is present.

2.2.3.2.2 Area B was designated as "potentially contaminated" in the ASR and received a relatively high RAC score of 2 primarily as a result of numerous reports of findings of HE grenade shrapnel and observances of same by the ASR field team (USACE, 1995). Area B was delineated as a 98-acre tract across the highway from Area D (Boat Dock). The western portion of the property contains a large asphalt area previously used as a parade ground for the Camp. A historic 1946 range clearance map identified the area as a grenade range and a Camp layout map refers to the area as the live grenade court at Clearing #2. Since the asphalt area for the parade ground is not visible on early historic aerial photographs, the grenade range may have been moved within the area at one time.

2.2.3.2.3 Parsons ES conducted a Site Visit of Area B on January 13, 1999 (Parsons ES, 1999a). Area B was accessed during the Site Visit from Area D along U.S. Highway 319/State Route 377. A reconnaissance was conducted during which numerous grenade

fragments and other OE items were observed. Signs present on the St. Joe Timber Land Company parcel indicated hunting is conducted on the property. Area B is located on the McIntyre 7.5-minute Quadrangle in Section 26, Township 6 South, Range 3 West.

2.2.3.2.4 Additional reconnaissance of Area B was conducted on September 15, 1999 in an effort to confirm property ownership boundaries and refine proposed geophysical sampling locations. No new development was observed consistent with the future land use cited in the 1991 County Comprehensive Plan. The Future Land Use Map accompanying the Plan identified Area B as remaining zoned for agricultural use for the foreseeable future (Franklin County, 1991). For the EE/CA field investigation, access to Area B was gained from the numerous small sandy roads near the intersection of U.S. Highway 319/State Route 377 and U.S. Highway 98/State Route 30.

2.2.3.3 Area C - Barracks and Dump

2.2.3.3.1 The Barracks and Dump (Area C) is located within a residential community on the outer edge of Lanark Village (Figure 2.2 and 2.6). Area C is approximately one acre in size and consists of several grassed residential yards and small, undeveloped wooded areas containing moderate to dense brush. Pedestrian access is basically unrestricted, as neither the residential properties nor the undeveloped parcel are fenced. Historical photographs and maps indicate only the former presence of barracks in this location; however, a home owner (the White's) reportedly dug up a practice 2.36-inch rocket, bottles and other trash in their backyard garden in 1994 indicating the presence of a military dump. A neighbor (the Yancey's) found a practice mine in 1985 on a nearby unpaved road but this incident is likely unrelated as the object was probably moved from some other location.

2.2.3.3.2 Based on the recovery of a practice rocket in the area boundary and a practice mine from the surrounding area, the ASR concluded that OE potential within Area C was "confirmed contaminated" (USACE, 1995). However, Area C received a relatively low RAC score of 4 tempered by the questionable origination of the mine and the practice designation of the rocket. No OE was observed during the ASR reconnaissance.

2.2.3.3.3 Parsons ES conducted a Site Visit of Area C on January 13, 1999 (Parsons ES, 1999a). A brief drive-by reconnaissance was conducted since the property owners had not been notified of the visit. The vegetative cover was observed as garden and grass on the White's property while portions of the adjacent undeveloped lot were heavily vegetated with underbrush. The area was generally flat and no visual evidence of a dump was observed. An EE/CA investigation was not initially planned for Area C since the geophysical investigation of a dump will not yield useable data for the location of individual OE/UXO. However, based upon concerns expressed during the public meeting, a geophysical survey was proposed within the Area C boundaries in an effort to confirm the presence of a dump. Area C was accessed during the Site Visit from Lanark Village by driving from State Highway 30 less that 0.25 mile north on Arizona Street. The site is located on the Dog Island and McIntyre 7.5-minute Quadrangles in Section 14, Township 7 South, Range 4 West.

2.2.3.3.4 During the EE/CA investigation, no new construction was observed in the undeveloped portion of the Area C or in the immediate surrounding area. The 1991 County Development Plan identified the area as zoned for residential, public, and commercial land use (Franklin County, 1991).

2.2.3.4 Area D - Boat Dock

2.2.3.4.1 The Boat Dock (Area D) consist of the immediate shoreline associated with the location of three long docks that formerly extended from the beach into the Gulf of Mexico (Figure 2.2). These docks were utilized by the ATC for amphibious vehicle storage, loading, and unloading. Pedestrian access is basically unrestricted as the property is not fenced and abuts residential beachfront. Area D was delineated as an approximately one-acre tract currently owned by the St. Joe Timber Land Company. The docks no longer exist although some of the original pilings are visible. Area D is south of Area B – Grenade Court and west of the FSU Marine Laboratory.

2.2.3.4.2 Area D was designated as “confirmed contaminated” in the ASR and received a RAC score of 2 primarily as a result of a single OE finding of a case of 155mm projectiles several years ago (USACE, 1995). The responding EOD team informed the representative of the St. Joe Timber Land Company that the projectiles were live HE rounds, most likely dropped in the water during loading and unloading activities associated with amphibious operations and subsequently exposed by erosion. No OE was observed during the ASR reconnaissance. The ASR noted the ordnance presence was likely the result of a one-time incident.

2.2.3.4.3 Parsons ES conducted a Site Visit of Area D on January 13, 1999 (Parsons ES, 1999a). The vegetative cover observed was minimal as most of Area D is frequently underwater or exposed to wave action. The surrounding area is moderately pine forested with limited understory. A very low concentration residential component exists on adjacent parcels. Area D was accessed during the Site Visit from State Highway 30 (also known as U.S. Highway 319 and 98 at this location) less than one mile east of the intersection with State Route 377. Area D is immediately south of the highway and is accessible from an old paved road and is located on the McIntyre 7.5-minute Quadrangle in Section 35, Township 6 South, Range 3 West.

2.2.3.4.4 An EE/CA investigation was initially planned for Area D based on the ASR recommendations and area RAC score. However, the ASR stated that deleting the area from further investigation should also be considered due to the isolated nature of the OE incident. Although prime coastal property, the 1991 County Development Plan identified the area as zoned for agricultural land use (Franklin County, 1991).

2.2.3.4.5 As a result of additional archival research conducted prior to the EE/CA investigation, Parsons ES and USAESCH agreed that further investigation of Area D was not warranted (Parsons ES, 1999a,b,c). The area is primarily underwater except at very low seasonal tides and much of the original beachfront has eroded inland due to several major storms within the last ten years. Therefore, Area D will not be further discussed in this report.

2.2.3.5 Area E - Artillery Impact Zone

2.2.3.5.1 The Artillery Impact Zone (Area E) is located approximately seven miles north/northeast of the City of Carrabelle (Figure 2.2). County Road 67 subdivides the area into an eastern and western tract (Figure 2.7). The entire area is owned by several State government entities including FSU, Florida Department of Environmental Protection (FDEP), TIITF/AG Forestry and operated as Tates Hell State Forest. Access to the area is basically unrestricted to the public although there are no significant improvements such as camping areas, hiking trails, or picnic tables to stimulate public visitation. Hunting and fishing is permitted but controlled. No current on-site or adjacent residential component is present. The closest residence is associated with the Riverbend Plantation residential development near Area I – Harbeson City and located approximately 2.5 miles to the southwest of Area E. Area E was delineated as an approximately 1730-acre tract used for heavy artillery training while the Camp was operational.

2.2.3.5.2 Area E was designated as “potentially contaminated” in the ASR and received a RAC score of 3 primarily as a result of historical documentation of use as a 105mm and 155mm artillery impact area (USACE, 1995). The ASR obtained historical documentation of two visual OE clearances conducted within Area E in the late 1940’s although no details of the findings were present. After the first clearance the property within Area E was designated for grazing only. After the second clearance, this restriction was removed. One local individual described old craters in the vicinity and claimed to have found projectiles in the past. This finding could not be confirmed by any other source. No OE was observed during the ASR reconnaissance.

2.2.3.5.3 Parsons ES conducted a Site Visit of Area E on January 12, 1999 (Parsons ES, 1999a). Area E was accessed during the Site Visit from Area I by driving approximately 3 miles further north on County Road 67. A day permit was arranged through the Park Ranger who stated that during her tenure she had not observed any OE. She also stated that timber is harvested periodically from the forest at the Park’s discretion. Forest cover within Area A was observed to range between thick mature pine to small immature saplings, depending on the last harvest. Wetland conditions were present in some areas characterized by thick vegetation. A number of dirt roads and firebreaks (all running east-west) were also present. No craters indicative of an impact range and as previously reported were observed by the Site Visit Team. No public visitors were present at the time of the Site Visit. Area E is located on the Pickett Bay 7.5-minute Quadrangle in portions of Sections 1, 2, 11, and 12, Township 6 South, Range 4 West.

2.2.3.5.4 Additional reconnaissance of Area E was conducted on September 16, 1999 in an effort to confirm property ownership and refine proposed geophysical sampling locations. The northern extent of Area E along County Road 67 was confirmed as Bar Pit Road. The southern extent was found to be less definitive but approximated as just south of Bantam Road at Power Pole #GBC119. Some of the roads were gated by a single wire and posted. As before, no public visitors were observed and no depressions indicative of impact craters were observed. Additional archival research was conducted prior to the EE/CA investigation to ensure that the former impact range was properly located on project maps

(Parsons ES, 1999a,b,c). No discrepancies were identified. The 1991 County Development Plan did not indicate anticipated future development within Area E. However, a State Forest was established after the publication date (Franklin County, 1991). The Future Land Use Map identified Area E as being zoned for agricultural use associated with timber production. With the designation as a State Forest, no significant development is likely.

2.2.3.6 Area F - Dog Island

2.2.3.6.1 Dog Island (Area F) is located approximately 5 miles south of the City of Carrabelle (Figures 2.2 and 2.8). The island is approximately 1,923 acres in size and is accessible only by boat or airplane. As part of training at the Camp, the island was periodically used for amphibious beach landings using live ammunition as well as other types of training. Nearly 80 percent of Area F is owned by the Nature Conservancy, a private company that protects properties from development. Numerous individuals own small tracts, mostly on the coast, and have modest homes they occupy only on a part time basis. There are very few full time residents, no paved roads, and no stores. Access to the island is basically unrestricted although minimal tourism takes place as a result of the isolated conditions. The island consists of primarily beach and minimally vegetated sand dunes, although some pockets of light forest are present inland.

2.2.3.6.2 Area F was designated as "potentially contaminated" in the ASR and received a RAC score of 1 (USACE, 1995). The RAC score was primarily the result of the presence of residences and beaches, no record of any post-use clearance, an interview indicating usage of HE projectiles, and shrapnel findings. In addition, historical records indicate the experimental firing of 4.2-inch HE and white phosphorous mortars and 4.5-inch rockets from landing crafts at the Camp at an unspecified location similar to Dog Island. The ASR recommended unspecified general field investigation and OE disposal. Issues noted included inaccessibility, other than by boat or airplane, and OE destruction considerations due to the proximity of residences. No OE was observed during the ASR reconnaissance.

2.2.3.6.3 Parsons ES conducted a Site Visit of Area F on January 13, 1999 (Parsons ES, 1999a). The island was nearly uninhabited due to the offseason. Reconnaissance of a large portion of the island was conducted but no OE was observed. Area F was accessed during the Site Visit from Carrabelle via Florida Marine Patrol boat. The island is located on the Carrabelle and Dog Island 7.5-minute Quadrangles in multiple Sections, Township 8 South, Range 4 West.

2.2.3.6.4 Additional archival research was conducted prior to the EE/CA investigation to reduce the size of the potentially affected area (Parsons ES, 1999a,b,c). Some information was collected that indicated that primarily the northern beaches, especially Cannonball Point (Figure 2.8), were generally used for training. As a result, a geophysical sampling during the EE/CA investigation was focused on this portion of the island. Significant erosion and redeposition of the island has also occurred in the past 50 years based on a comparison of historical and current topographic maps. Therefore, some of the suspected amphibious landing areas are no longer present.

2.2.3.6.5 The 1991 County Development Plan does not indicated significant new development of Area F (Franklin County, 1991). The Plan identified Area F as being zoned for conservation and residential. The isolated and uncommercialized nature of the island is the reason many owners have purchased property on the island. This fact coupled with the large Nature Conservancy ownership suggests Area F will likely remain in its present state for the foreseeable future.

2.2.3.7 Area G - Alligator Point Gunnery Range

2.2.3.7.1 The Alligator Point Gunnery Range (Area G) is located at the west end of the Alligator Point peninsula (Figure 2.2). The peninsula itself is located in the extreme southeastern portion of the Camp (Figure 2.9). Area G is approximately 5 miles long and approximately one-half mile wide at its widest location. Area G was designated as approximately 250 acres that were utilized intermittently by the Camp for both amphibious landing exercises and aerial assault on fixed targets. The majority of Area G is currently owned by numerous private individuals and is completely developed for residential use. A small commercial component is also present consisting of a boat marina and related services. Most of the houses are seasonally rented for short durations but are regularly occupied. Approximately 63 acres of the western tip are completely undeveloped and are owned by the Nature Conservancy. The Nature Conservancy is a private company that protects properties from development. Various protected bird species breed and nest in the undeveloped portion of the area. Access to the area is basically unrestricted with the exception of the fenced Nature Conservancy property, which can be accessed by water.

2.2.3.7.2 Area G was designated as "potentially contaminated" in the ASR and received a RAC score of 1 primarily as a result of potential use of the area for firing 37mm cannon and HE rockets from aircraft as well as documented OE findings during visual OE clearance (USACE, 1995). In addition, experimental firing of 4.2-inch HE and white phosphorous mortars and 4.5-inch rockets from landing craft at Camp Gordon Johnston at an unspecified location similar to Alligator Point has been documented. The ASR described the area as being used as an air-to-ground strafing gunnery range as well as for amphibious training and rocket firing. Numerous interviews, several documents and newsclippings, and a historical OE clearance map depicting the area were cited as confirmation of former use. No OE was observed during the ASR reconnaissance.

2.2.3.7.3 Parsons ES conducted a Site Visit of Area G on January 13, 1999 (Parsons ES, 1999a). Area G was accessed during the Site Visit from County Road 370. Most of the peninsula is treeless with minimally vegetated sand dunes. Few of the individual homeowners have landscaped yards. The only forested area is Nature Conservancy property and several residential parcels to the immediate east. Extensive erosion from recent major storms have reshaped portions of the island and caused some homes to be condemned. Area G is due south of Area L across Alligator Harbor (Figure 2.2) and is located in Section 36, Township 7 South, Ranges 1 and 2 West.

2.2.3.7.4 During the 1999 Camp Gordon Johnston Reunion, veterans were interviewed regarding past utilization of Alligator Point (Parsons ES, 1999b). One

interviewee recalled small planes towing targets to Dog Island (Area F) from Alligator Point (Area G) while fired on from Turkey Point. Parsons ES conducted additional archives review of Area G to evaluate applicability of an EE/CA investigation (Parsons ES, 1999c). Sufficient evidence of OE contamination was collected during the post-ASR archive research on Area G to support EE/CA investigation.

2.2.3.7.5 Additional reconnaissance of Area G was conducted on September 14, 1999 in an effort to confirm property ownership and refine proposed geophysical survey locations. The eastern extent of the area was confirmed as the intersection of County Road 370 and Seashell Avenue. No new development was observed within the Area G although some new residential construction was evident several miles to the east/northeast. The 1991 County Development Plan identified Area G as continued residential (with light commercial) for the foreseeable future. The Future Land Use Map identified Area G as being zoned for residential and commercial use (Franklin County, 1991).

2.2.3.8 Area H - Red, White, and Green Beaches

2.2.3.8.1 Red, White, and Green Beaches (Area H) were three separate training beaches located east of Alligator Point (Figures 2.2 and 2.10). Area H is one contiguous beach area consisting of approximately 53 acres that were used for amphibious training and landing operations by the Camp. Moving from west to east the landing areas were designated as Red Beach, White Beach, and Green Beach, respectively. The majority of Area H and adjacent tracts have been subdivided to accommodate extensive residential development. The subdivisions have been designated as Bald Point Estates, South Dunes, Peninsular Point, and Holiday Beach but construction has not been initiated. A large cumulative portion of Area H is owned by the Trust for Public Land, a private company (similar to the Nature Conservancy) that protects properties from development. The Trust for Public Land purchased many of these subdivision properties. One parcel has been designated as a public park and includes parking, picnic facilities, beach access, and a boardwalk. Numerous private individuals own the remainder of the subdivision parcels with only the northern and southern extent of the area developed. Small residential dwellings are rented seasonally similar to those on nearby Alligator Point (Area G). Most of Area H is treeless with small amounts of beach vegetation. The white sandy soil characteristic of Florida coastal areas is present in the form of dunes and beaches. Access to the area is basically unrestricted, especially via the public park.

2.2.3.8.2 Area H was designated as "potentially contaminated" in the ASR and received a RAC score of 1 primarily as a result of documented training exercises with mines, bangalore torpedoes, and dynamite sticks (USACE, 1995). Historical references also describe training exercises with mines and demolition materials on beaches near Lighthouse Point (Figure 2.2). The ASR described the area as used for a variety of amphibious training. Numerous interviews, several documents, and historical photographs were cited as confirmation of former area use. No OE was observed during the ASR reconnaissance.

2.2.3.8.3 Parsons ES conducted a Site Visit of Area H on January 13, 1999 (Parsons ES, 1999a). Area H was accessed during the Site Visit from County Road 370 and is due

east of Area L. The Site Visit Team performed a brief reconnaissance of the beach area. No new construction was observed in any of the designated subdivisions within Area H or on the western side of County Road 370. A significant portion of the beach area is often underwater except at very low seasonal tides. Furthermore, much of the original beachfront present when the Camp was active has significantly eroded inland based on a comparison of historical and current topographic maps. Area H is located in Sections 28 and 33, Township 6 South, Range 1 West.

2.2.3.8.4 During the 1999 Camp Gordon Johnston Reunion veterans were interviewed regarding past utilization of Red, White, and Green Beaches (Parsons ES, 1999b). Few additional facts regarding military practices were gathered. Parsons ES conducted additional archives review of Area H to evaluate applicability of an EE/CA investigation (Parsons ES, 1999c). Sufficient evidence of OE contamination was collected during the post-ASR archive research on Area H to support EE/CA investigation.

2.2.3.8.5 Additional reconnaissance of Area H was conducted on September 14, 1999 in an effort to confirm property ownership and refine proposed geophysical survey locations. The northern extent of the Area H was confirmed as Grouper Street. The southern/western extent of Area H was confirmed as Holiday Beach, Lot 11. The 1991 County Development Plan identified the area adjacent to Area H for significant residential development (Franklin County, 1991). The Future Land Use Map identified Area H as being zoned for residential and commercial use.

2.2.3.9 Area I - Harbeson City

2.2.3.9.1 Harbeson City (Area I), also known as Special Training Area #5, consists of approximately 347 acres and is located between the Crooked River and State Route 67 (Figures 2.2 and 2.11). Area I is heavily wooded with many areas of extremely dense vegetation. St. Joe Timber Land Company owns the southern third (approximately 100 acres) of Area I with the remainder owned by private individuals and realty companies. Many of the parcels have access to the Crooked River making them desirable for residential development. Several residential dwellings are present in the northwestern extent of the property. Access to the property is limited by 3-strand barbed wire perimeter fencing in some areas but several unpaved roads provide easy vehicular access to the river. The adjacent properties are all forested and undeveloped.

2.2.3.9.2 The area was used for various live-fire training activities including a battle-firing course and boat firing course, both utilizing small arms. An infiltration course, where troops crawled under live machine gun fire while dynamite sticks exploded nearby to simulate artillery shells, was established in Area I. In addition to these activities, the old buildings of the abandoned mill town of Harbeson City were used to simulate a German village. During training conducted at the mock German village, live ammunition, hand grenades, and booby traps were used. Although only the infiltration course and the mock German village are believed to have used HE items, their exact locations within this area are unknown.

2.2.3.9.3 Area I was designated as “potentially contaminated” in the ASR and received a RAC score of 2 primarily as a result of documented use of dynamite and HE grenades for booby traps (USACE, 1995). During the ASR site visit, the team searched for remnants of Harbeson City but the extremely thick underbrush made it difficult to see the ground and the location was not confirmed. Two interviews, a 1946 Amphibious Training Study, and a historical map depicting the training area were cited as confirmation of former area use. The initial development of a residential housing area was also noted. The ASR recommended “Area I should be the highest priority even though it is a RAC 2. The northern 200 acres of this area are being developed for a new housing area and construction is expected to begin in the near future”. No OE was observed during the ASR reconnaissance.

2.2.3.9.4 Parsons ES conducted a Site Visit of Area I on January 12, 1999 (Parsons ES, 1999a). Area I was accessed during the Site Visit from the City of Carrabelle by driving approximately 2.5 miles north on County Road 67, turning west on one of several gated unpaved roads, and proceeding approximately 0.5 mile to Crooked Creek. An east-west dirt road near the center of the property provided direct access to Crooked Creek from County Road 67. The road was gated but open and a sign advertised the new residential development of Riverbend Plantation at the entrance. The remains of numerous wooden pilings along the riverbank were readily visible at the end of the road. These were speculated to either have been associated with the Harbeson City or the boat-firing course documented in the ASR. Due to the extremely dense vegetation, minimal ground reconnaissance was possible and no evidence of the mock German village or any other historical facilities were observed. Several residential dwellings were present on large otherwise undeveloped parcels but no new construction was in progress. Area I is located on the Pickett Bay 7.5-minute Quadrangle in Section 4, Township 7 South, Range 4 West.

2.2.3.9.5 During the 1999 Camp Gordon Johnston Reunion, veterans were interviewed regarding past utilization of Area I (Parsons ES, 1999b). The use of 2.36-inch rifle and MkII fragmentation grenades was confirmed by the interviewees although the exact location could not be ascertained. Parsons ES conducted additional archives review of Area I in an effort to refine the area for EE/CA investigation (Parsons ES, 1999c). Although the location of Harbeson City (mock German village) was identified, all of Area I was retained for EE/CA investigation because of conflicting historical information as to other training areas where live ordnance was used. The southern 100 acres of Area I was considered least likely to have been utilized for significant training exercises based on detailed review of historical photographs, significant groundtruthing reconnaissance efforts, and lack of OE findings during timber harvest.

2.2.3.9.6 Additional reconnaissance of Area I was conducted on September 16, 1999 in an effort to confirm new property ownership associated with Riverbend Plantation and refine proposed geophysical survey locations. Mark Bane Realty, the agency involved in residential sales, confirmed that over half of the twenty parcels of the low density residential development, Riverbend Plantation, had been sold. New construction was also observed. Riverbend Plantation is located several hundred feet north of the mock German village location. The representative of the real estate agency was not aware of any OE findings as a

result of recent construction. The mock German village location remained completely within a large undeveloped tract owned by a single private individual.

2.2.3.9.7 Construction of a new prison was observed at the intersection of Lake Morality Road and County Road 67, within 0.25 mile to the south of Area I. The future land use for Area I and the immediate surrounding area cited in the 1991 County Comprehensive Plan did not anticipate any development in the foreseeable future. The Future Land Use Map accompanying the Plan identified Area I as remaining zoned for agricultural and rural residential (Franklin County, 1991).

2.2.3.10 Area J - Special Training Areas 1, 2, 3, and 4

2.2.3.10.1 The Special Training Areas 1, 2, 3, and 4 (Area J) are located throughout various locations at the Camp (Figure 2.2). The four unfenced subareas comprise a combined total of approximately 460 noncontiguous acres and, aside from Subarea J4, are currently entirely owned by the St. Joe Timber Land Company. Subarea J4 is approximately 125 acres and is privately owned by two individuals with a small portion owned by a Catholic Church (Figure 2.15). Subareas J1 through J3 are all forested in support of timber harvesting (Figures 2.12, 2.13, and 2.14). The forest cover maturity and density varies throughout the areas. Subarea J4 is moderately forested but is characterized by extremely dense underbrush. The only structure present on these areas is a small Catholic Church located within Subarea J4 (Special Training Area #4). Vehicular traffic to the St. Joe Timber Land Company property is limited by wire gates across dirt access roads. However, pedestrian traffic is only tempered by the presence of no trespassing signs. Access to Subarea J4 is entirely unrestricted.

2.2.3.10.2 The ASR grouped the four training areas together for evaluation due to similarities of suspected use and uncertainty as to specific training activities. Area J was designated as "potentially contaminated" in the ASR and received a RAC score of 2 primarily as a result of inferred grenade and other OE usage extrapolated from historical documents (USACE, 1995). Historical records indicate that these areas were used for live grenade and demolition training as well as for other non-explosive training such as bayonet and self-defense training. No records or interviews confirmed any OE findings. A 1946 Amphibious Training Study and several historical maps depicting the subarea were cited as the only confirmation of former military use. No OE was observed during the ASR reconnaissance.

2.2.3.10.3 Parsons ES conducted a Site Visit of several of the subareas comprising Area J on January 13, 1999 (Parsons ES, 1999a). Subarea J1 is approximately 1.5 miles northeast of the City of Carrabelle and was accessible via sandy trails from Lake Morality Road, a small road north of the City of Carrabelle. The subarea was noted to be moderately forested with immature pine and partially forested with less than 6-foot pine saplings mixed with other brush. Neither the subarea nor the surrounding area supports a residential component within approximately 0.5 mile. Timber harvesting of adjacent parcels was in progress during the Site Visit. Subarea J1 is located on the Pickett Bay and Carrabelle 7.5-minute Quadrangles in Section 15, Township 7 South, Range 4 West. Subarea J2 was not visited during the 1999 Site Visit due to the presence of a gated access road but is located 1.1 miles

north of the intersection of U.S. Highway 319/State Route 377 and U.S. Highway 98/State Route 30. Reconnaissance of Subareas J3 and J4 did not identify conditions significantly different than identified in the ASR. Subarea J3 is accessible via gated dirt road along U.S. Highway 98 near Combat Team 3 (see Figure 2.3). Subarea J4 is located east of Lanark Village along U.S. Highway 98 and can be accessed from Crooked Creek Road (eastern boundary) or through Lanark Village along Putnal Street to Third Street. Third Street dead ends near the ammunition storage magazines, which are located just north of the subarea boundary.

2.2.3.10.4 During the 1999 Camp Gordon Johnston Reunion, veterans were interviewed regarding past utilization of Area J (Parsons ES, 1999b). Parsons ES also conducted additional archives review of Area J to evaluate the applicability of EE/CA investigation (Parsons ES, 1999c). Sufficient evidence of OE contamination was collected during the post-ASR archive research on Area J to support EE/CA investigation.

2.2.3.10.5 Additional reconnaissance of Area J was conducted on September 16, 1999 in an effort to confirm property ownership and refine proposed geophysical survey locations. Subareas J1, J2, and J3 were all confirmed to remain as holdings of the St. Joe Timber Land Company and no residential development of adjacent parcels was observed. Construction of a new prison was observed at the intersection of Lake Morality Road and County Road 67, located within one mile to the northwest of Subarea J1. The future land use for Area J and the immediate surrounding area cited in the 1991 County Comprehensive Plan did not anticipate any development in the foreseeable future. The Future Land Use Map accompanying the Plan identified Area J, with the exception of Subarea J4, as remaining zoned for agricultural (Franklin County, 1991). Subarea J4 was zoned for future agricultural, public, and residential use. Subarea J4 has the potential for residential and/or commercial development due its proximity to the residential community of Lanark Village.

2.2.3.11 Area K - Dump

2.2.3.11.1 The Dump (Area K) consists of approximately 160 acres located within several hundred feet of the residential community of Lanark Village (Figures 2.2 and 2.16). Area K is currently entirely owned by St. Joe Timber Land Company. Several former paved military roads are passable within the area and some building foundations are present.

2.2.3.11.2 Area K was designated as "potentially contaminated" in the ASR and received a RAC score of 1 primarily as a result of an interview documenting an eyewitness account (a former soldier and local resident) of large scale trenching and burial in 1946 at Camp closure. The account includes burial of jeeps, oil drums, and numerous other materials inclusive of ordnance. No other confirmation of this activity was documented in the ASR.

2.2.3.11.3 Parsons ES conducted a Site Visit of Area K on January 13, 1999 (Parsons ES, 1999a). Area K was accessed during the Site Visit from a small paved road north of Lanark Village. The property has not been systematically forested for timber production as with other St. Joe Timber Land Company properties within the Camp. Significant surface debris consisting of tree limbs and white goods (washers, refrigerators, hot water heaters, etc.) are present indicative of an active community dump. The property is sporadically forested with thick underbrush throughout. An EE/CA investigation was not initially planned for Area K since the geophysical investigation of a dump will not yield useable data for the location of individual OE/UXO. However, based upon concerns expressed by FDEP during review of the project WP, a geophysical survey was proposed within the Area K boundaries in an effort to confirm the presence of a dump. Area K is located on the McIntyre 7.5-minute Quadrangle in multiple Sections, Township 7 South, Range 3 and 4 West.

2.2.3.11.4 During the EE/CA investigation, no new construction was observed in the area. The future land use for Area K and the immediate surrounding area cited in the 1991 County Comprehensive Plan did not anticipate any development in the foreseeable future. The Future Land Use Map accompanying the Plan identified Area K as remaining zoned for agricultural use (Franklin County, 1991). However, due to the proximity to the residential community of Lanark Village, future residential development may be possible.

2.2.3.12 Area L - Eastern EOD Cleared Sites

2.2.3.12.1 The Eastern EOD Cleared Sites (Area L) consist of four noncontiguous tracts in the eastern region of the Camp (Figures 2.2 and 2.17). The approximately 3,692 combined acres are currently owned by the St. Joe Timber Land Company. The property is completely undeveloped and is comprised of forest, marshland, Metcalf Lake, and part of the shoreline of the Ochlockonee River and Bay. Access to the property is basically unrestricted but the adverse conditions would deter most potential visitors.

2.2.3.12.2 Area L was designated as "potentially contaminated" in the ASR and received a RAC score of 1 primarily as a result of inferred contamination associated with a documented visual OE clearance in 1946 (USACE, 1995). No other documentation or interviews were obtained to confirm area usage. The ASR stated the specific use of the individual areas by the military could not be ascertained. OE Clearance activities were conducted on these parcels in 1946, according to a 1946 OE clearance map. The clearance locations depicted do not coincide with known training areas shown on other maps and available references do not provide any information on their potential use. No documentation or interview accounts of OE are known to exist for Area L. The ASR speculated that one of the Area L subareas, a 1090-acre triangular parcel of land, might have been cleared of prematurely fired ordnance meant for the Alligator Point Gunnery Range (Area G).

2.2.3.12.3 Parsons ES conducted a Site Visit of Area L on January 13, 1999 (Parsons ES, 1999a). Each portion of Area L was accessed during the Site Visit. The first subarea visited was designated Subarea L1 (1,090 acres) for convenience. Subarea L1 is a large

triangular tract adjacent to Alligator Harbor and bounded by State Highway 30 on the west and County Road 370 on the east. The area is accessible via numerous sandy trails. This portion of Area L is heavily forested with extremely dense vegetation and some wetland conditions. The area is located in multiple Sections, Townships 6 and 7 South, Ranges 1 and 2 West. Subarea L2 is located to the immediate north and west of Subarea L1 on the west side of State Highway 30 (also U.S. Highway 98). The subarea is located in multiple Sections, Township 6 South, Range 2 West. The third subarea visited was designated Subarea L3 (2082 acres). Subarea L3 is a large tract bordering the Ochlocknee River and east of State Highway 377. The area is accessible via numerous sandy trails. The subarea is located in multiple Sections, Township 6 South, Ranges 2 and 3 West.

2.2.3.12.4 During the 1999 Camp Gordon Johnston Reunion, veterans were interviewed regarding past utilization of Area L (Parsons ES, 1999b). No additional facts regarding military practices were collected. Parsons ES conducted additional archives review of Area L to determine if an EE/CA investigation was warranted (Parsons ES, 1999c). Evidence collected was not sufficient to confirm the use of live ammunition within any portions of Area L. As suggested in the ASR, it was concluded that the 1946 OE clearance map (the only evidence suggesting use of ordnance in Area L) may have been incorrectly transcribed.

2.2.3.12.5 An EE/CA investigation was not initially planned for Area L due to the lack of evidence regarding the potential presence of OE/UXO. However, based upon concerns expressed by FDEP during review of the project WP, a limited geophysical survey was proposed within the Area L boundaries in an effort to confirm the absence of OE. No new development was observed during the EE/CA investigation, consistent with the future land use cited in the 1991 County Comprehensive Plan. The Future Land Use Map accompanying the Plan identified Area L as remaining zoned for agricultural and residential use for the foreseeable future (Franklin County, 1991).

2.2.3.13 Area P - Off-Post EOD Cleared Sites

2.2.3.13.1 The Off-Post EOD Cleared Sites (Area P) consist of multiple subareas (similar to Area L) that extend off of the official Camp boundary and into Wakulla County and part of the St. Marks National Wildlife Refuge (Figures 2.2 and 2.3). The 1,733 acres making up Area P only differs from Area L in that it is outside the Camp boundary. Area P is characterized as mostly marshland with a small residential component located along the northeast shoreline. As with Area L, a 1946 clearance map depicted OE clearance activities in this area. No information concerning the military usage of this area could be located and there are no records or reports of any OE items or military artifacts being found in this area. Access to the property is basically unrestricted but the adverse conditions would deter most potential visitors.

2.2.3.13.2 Area P was designated as "potentially contaminated" in the ASR and received a RAC score of 1 primarily as a result of the documented visual OE clearance in 1946 (USACE, 1995). The ASR was unable to confirm the usage of the area that led to the clearance.

2.2.3.13.3 Parsons ES did not conduct a Site Visit of Area P in 1999 since the tracts were considered to be comparable to the conditions observed at Area L (Parsons ES, 1999a). During the 1999 Camp Gordon Johnston Reunion, veterans were interviewed regarding past utilization of Area P (Parsons ES, 1999b). No additional facts regarding military practices were collected. Parsons ES conducted additional archives review of Area P to determine if EE/CA investigation was warranted (Parsons ES, 1999c). Sufficient evidence was not collected to confirm the use of live ammunition within any portions of Area P. As suggested in the ASR, it was concluded that the 1946 OE clearance map (the only evidence suggesting use of ordnance in Area P) may have been incorrectly transcribed.

2.2.3.13.4 An EE/CA investigation was not initially planned for Area P due to the lack of evidence regarding the potential presence of OE/UXO. However, based upon concerns expressed by FDEP during review of the project WP, a limited geophysical survey was proposed within the Area L boundaries in an effort to confirm the absence of OE. Because of the similarity between Area P and Area L, the results of the survey will be extrapolated to the uninvestigated tracts. No new development was observed during area reconnaissance during the EE/CA investigation, consistent with the future land use cited in the 1991 County Comprehensive Plan. The Future Land Use Map accompanying the Plan identified Area P as remaining zoned for conservation for the foreseeable future (Franklin County, 1991).

2.3 HISTORY

2.3.1 In April of 1942, Franklin County, Florida was selected by the War Department as the site of an Army ATC. The land acquired to make up the facility consisted of 159,348 acres. This acreage consisted of approximately 2,894 acres in fee, 156,355 acres in leasehold, 1 acre in easement, and 98 acres in permit acquired by condemnation, purchase and lease. This acreage included 820 acres in Leon and Wakulla Counties acquired as a right-of-way for a now-abandoned railroad from the Camp to Tallahassee. Site clearing began on July 8, 1942 and construction of the facility, originally known as Camp Carrabelle, commenced two weeks later.

2.3.2 The first soldiers arrived at the Camp on September 10, 1942 from Camp Rucker, Alabama. These support troops began preparing the Camp for the arrival of the instructor cadre from the Engineer Amphibian Command at Camp Edwards, Massachusetts, which were relocating their operations to Camp Carrabelle. The mission of the ATC was to teach, by academic and practical means, all phases of amphibious operations involving a shore-to-shore movement and to outline the basic principles of ship-to-shore movements by lectures and conferences. The objective to be attained by each student division was the formation of a highly efficient, well-coordinated, hard-hitting, and fast-moving amphibious force, thoroughly qualified to act independently or in conjunction with other army troops and naval forces in a combined operation. The objective also included the mental and physical hardening of all officers and enlisted men for arduous field service and battle.

2.3.3 The instruction provided by the new training program emphasized loading and unloading landing crafts quickly and quietly by day and night. This training consisted of boat discipline, including boat formations and control of landing craft, organization and control of troops during loading and unloading operations, and organization, tactical operation, and supply of combat teams. Seizure of the beachhead and the inland advance to the division objective included training in crossing beach obstacles and defensive works, clearing the beach of obstacles, demolitions, and the subsequent beach organization to support the operation. Other training activities included the use of smoke for screening, chemicals for contamination purposes, air-ground support, anti-aircraft defense, battle firing, automatic weapons firing from landing craft, and combat in cities. The 38th Infantry Division was the first unit scheduled for training, arriving in late November 1942 and completing their training on December 30, 1942.

2.3.4 In addition to the amphibious training conducted at the Camp, the site also contained special training areas containing obstacle courses, grenade and bayonet courses, areas for judo, knife and bayonet fighting, hand-to-hand fighting, and demolitions training sites. Other training sites involved the use of live ammunition including the street fighting course, the infiltration course, battle firing, and firing from simulated landing craft.

2.3.5 The 38th Infantry Division was the first unit scheduled for training, arriving in late November 1942 and completing their training on December 30, 1942. In November 1942, tests were also conducted using the 4.2" chemical mortars mounted in landing craft firing HE and white phosphorus projectiles onto the shore. This work was done under the direction of the Chemical Warfare Amphibious Project. Companies of the 2nd and 3rd Chemical Battalions were rotated through the center from November 1942 to March 1943. On January 13, 1943, the post was officially renamed Camp Gordon Johnston to honor a distinguished cavalry officer. Also in January 1943, the 28th Infantry Division arrived to begin amphibious training. Other smaller units also received amphibious training at the Camp in early 1943. These units consisted of the 6th Communications Squadron, the 79th Smoke Generator Company, and the 377th Coast Artillery Battalion.

2.3.6 In June 1943, as a result of an agreement between the U.S. Army and the U.S. Navy that transferred the amphibious training mission to the Navy, the Amphibious Training Center was officially disbanded. In November of 1943, the 4th Infantry Division received amphibious training at the Camp under the supervision of the Navy.

2.3.7 In September of 1943, Camp Gordon Johnston was redesignated as an Army Service Forces Training Center providing basic and unit training for small boat crews, amphibian truck companies, and port construction units. In 1944, a prisoner of war (POW) camp was established for Germans and Italians captured in Africa and Europe. In late 1944 and early 1945, 50,000 acres west of the New River were released as activities at the Camp diminished.

2.3.8 After the end of World War II in September 1945, the number of troops at the Camp quickly declined. The Navy had plans to keep the property as an amphibious

base, but these plans never developed and the post officially closed on May 1, 1946. The 100,000 remaining acres of leased land were returned to the original owners and the War Assets Administration began selling the purchased land and approximately 1,000 buildings located throughout the Camp. In 1948 the last property was transferred and the Army's role ended.

2.3.9 In 1958, the Air Force reacquired part of the former Camp Gordon Johnston land in Carrabelle and built a gap-filler radar site to detect low-flying enemy aircraft. This site was later expanded to 32 acres, and now serves as a tracking station supporting the Tyndall Air Force Base air-to-air range in the Gulf of Mexico.

2.3.10 Ordnance used at the former Camp included rockets, grenades, artillery rounds, mortars, and various initiating and priming material used as obstacles and mine field clearing devices. OE/UXO that may be encountered at the former Camp include: 2.36-inch rockets (HE and practice), 4.5-inch rockets, HE grenades, 105-155mm HE artillery rounds, 4.2-inch HE mortars, 4.2-inch smoke and white phosphorous mortars, 81mm mortars (HE and practice), 60mm mortars (HE, white phosphorous, smoke, illuminating, practice), 37mm HE projectiles, practice antipersonnel mines, and practice antitank mines. Demolition materials used as obstacles and mine field clearing devices may include: various shape charges and TNT Blocks, cratering charges (40 lb.), dynamite sticks, Block M3 explosive, detonating cord, blasting caps, various firing devices, and bangalore torpedoes.

2.3.11 No known usage or storage of chemical warfare materiel (CWM) has been identified in association with the former Camp (USACE, 1995). The ASR refers to documents that mention the use of tear gas during some of the landing exercises. Building lists from the former Camp show structure T-R-1 as a gas chamber, but this building does not appear on any of the maps depicting Camp Gordon Johnston. A former soldier that trained at the Camp in 1942 indicated in an interview that he recalled going through a tear gas chamber near the magazine area (USACE, 1995). Several other interviewees recalled a tear gas chamber but could not identify the location (Parsons ES, 1999b).

2.4 DEMOGRAPHIC PROFILE

2.4.1 A large portion of the Camp is basically undeveloped with no residential component (Areas A, B, D, E, part of I, J, K, L, and P). The St. Joe Timber Land Company currently owns over 60,000 of the total 159,348 acres, mostly inland, and almost exclusively utilizes the property for timber production. The Tate's Hell State Forest encompasses all of the 1,730 acres of Area E as well as other portions of the Camp and is therefore basically left naturally forested.

2.4.2 U.S. Highway 98 traverses the southern extent of the Camp along the Gulf of Mexico coast. Many of the approximately 500 private owners have residential properties along this primary road, along the Crooked River, on Dog Island (Area F), and on Alligator Point (Area G) and the beaches of Area H.

2.4.3 The 1990 Census estimates the population of Carrabelle, Florida at 1,200 persons. The City is designated as approximately 3.2 square miles in size with an estimated 371.4 persons per square mile. Minimal growth was observed in the region during the EE/CA field investigation. This stagnation is evidenced by the nearly 125 person reduction in the population estimate for the entire Franklin County between July 1999 (9,978) and July 1998 (10,100). The 1990 census for the County indicates that the ratio of men to women is nearly equal, white is the predominant race, average household size is two persons, and the majority of the population is between 25 and 74 years of age. Half the population has a high school education or less. Agriculture, forestry, fisheries, and construction account for most of the industry in the area, with the median household income being \$17,247

2.5 CURRENT AND FUTURE SITE USE

The Comprehensive Plan for Franklin County, Florida (April 1991) was reviewed along with accompanying future land use maps. The Plan stated that, "The area south of U.S. Highway 98 shall be left undisturbed". No other indication of future land development was addressed in the Plan (Franklin County, 1991). The maps were used to identify the zoning areas and foreseeable future land use for the AOIs within the Camp, as described in Subsection 2.2.3.

2.6 ANALYSIS OF HISTORICAL RECORDS

Existing historical records were reviewed in support of the ASR and Technical Report of Findings (Parsons ES, 1999c).

2.7 PREVIOUS INVESTIGATIONS

2.7.1 1994 Preliminary Assessment

A Preliminary Assessment (PA) of the Camp was conducted by CESAJ between December 1993 and March 1994. An Inventory Project Report (INPR) was prepared on August 31, 1994 that presented the Findings of Fact and Determination of Eligibility (FDE). The report qualified 159,348 acres as FUDS-eligible and recommended referral to USAESCH for an evaluation of potential OE contamination. The RAC score assigned to the entire site was a 1, signifying the need for additional investigation.

2.7.2 1995 OE Archives Search Report

In 1995, the USACE Rock Island District conducted a site inspection and archives search of the Camp (USACE, 1995). The final report, dated September 1995, outlined the nature and degree of OE/UXO contamination to be found at the Camp. The ASR concluded that the presence of ordnance was "confirmed" in three areas: the Bazooka Range (Area A), the Barracks and Dump (Area C), and the Boat Dock (Area D). In addition, ten additional AOIs were identified as having the "potential" for ordnance to be present. These AOIs are: the Grenade Court (Area B); the Artillery Impact Zone (Area E); Dog Island (Area F); the Alligator Point Gunnery Range (Area G); the Red Beach, White Beach, and Green Beach (Area H); Harbeson City (Area I); Special Training Areas 1, 2, 3, and 4 (Area J); the Dump (Area K); the EOD Cleared Sites (Area L); and the Off-

Post EOD Cleared Sites (Area P). Three areas were identified as not contaminated. These areas are Clearings 1 and 3 (Area M), the Small Arms Ranges (Area N), and All Other Land (Area O). The ASR report stated that no historical recorded evidence was located to suggest the presence of CWM at the site.

2.7.3 1999 Site Visit

During the period of January 12 through 14, 1999, a Site Visit was conducted by Parsons ES at the Camp (Parsons ES, 1999a). Site reconnaissance of most of the AOIs designated in the ASR was conducted in an effort to evaluate applicability of an EE/CA investigation as well as determine potential geophysical methodology.

2.7.4 1999 Reunion Site Visit

Parsons ES attended an annual Camp Gordon Johnston Reunion held in Carrabelle, Florida, on March 12 through 14, 1999. A data gathering effort was conducted that included interviewing consenting former Camp trainees as well as other local citizens. The results of the study are documented in the Reunion Site Visit Report (Parsons ES, 1999b).

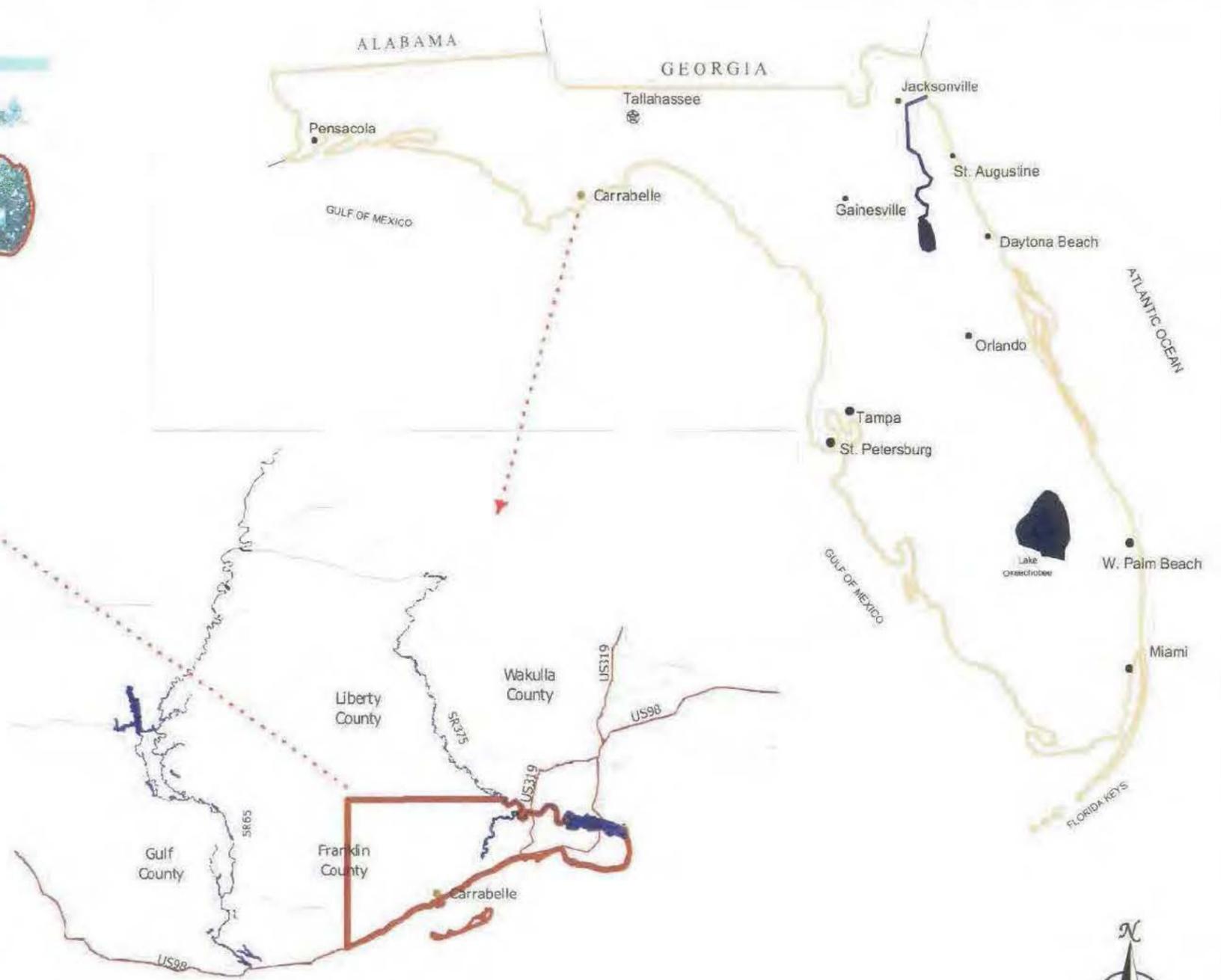
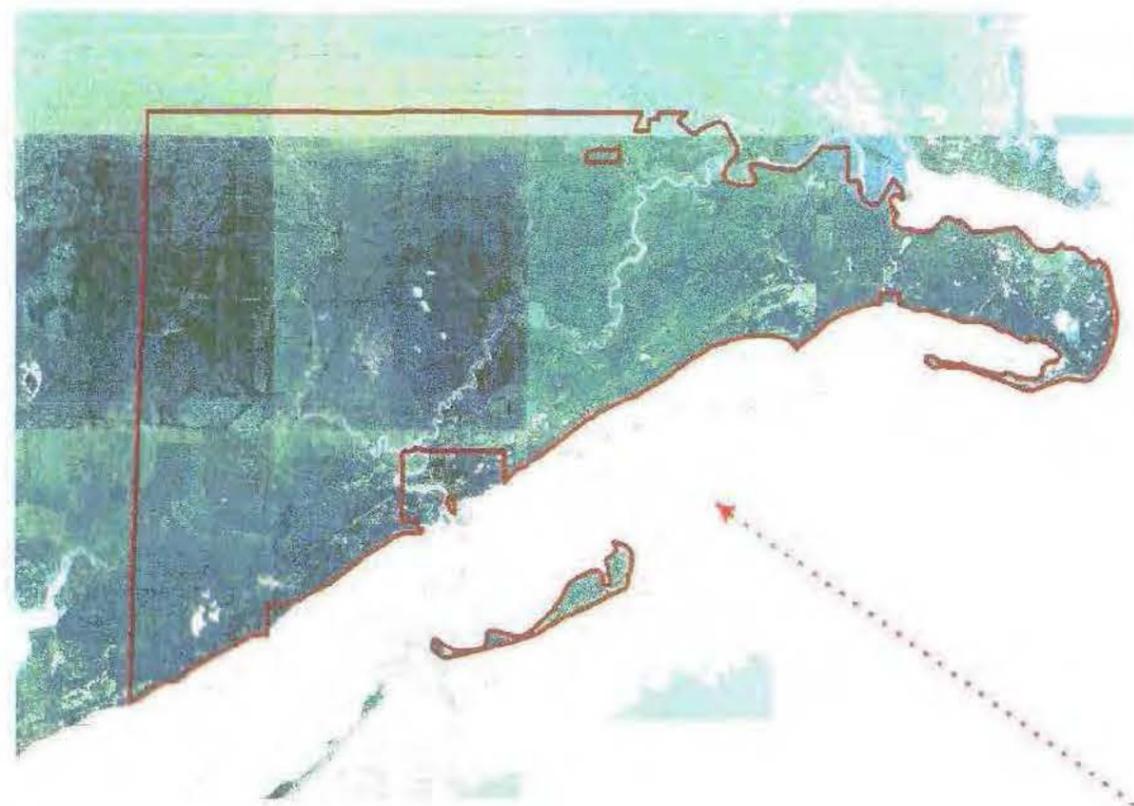
2.7.5 1999 Technical Report of Findings

Parsons ES conducted additional archive research in an effort to supplement the ASR findings and fill data gaps. On April 6 and 7, 1999 the University of Florida and the Florida State University Map Libraries, respectively, were visited. Reference material obtained included a set of 1953 aerial photographs covering the entire extent of the Camp (with the exception of Dog Island), 1940's topographic maps, various historical facility maps, and copies of the Camp newspapers entitled The Amphibian. The State Archives, also located in Tallahassee, was not visited because it had been previously visited as part of the ASR (USACE, 1995). A document was also obtained via mail entitled "Archaeological Survey of Dog Island". This document included some discussion of Camp training areas on the island as well as other historical sites. Parsons ES also obtained several local newspaper and magazine articles collected by a local resident referencing Alligator Point (Area G) and its utilization as part of the Camp. Lastly, the reference documentation collected and used to prepare the ASR was obtained from USAESCH on April 29, 1999 and reviewed. Included were numerous site maps, topographic maps, correspondence, and some vintage aerial photographs from the 1940s. The results of the study are documented in the Technical Report of Findings (Parsons ES, 1999c).

2.8 PREVIOUS REMOVAL ACTIONS

No formal removal actions, aside from responses by EOD personnel to individual OE recoveries since closure of the Camp, have been conducted.

Figure 2.1
General Location Map
 Former Camp Gordon Johnston
 Franklin County, Florida



Source: Topo- Horizon Technologies
 State and County Maps -
 ESRI Data & Maps CD, 1998

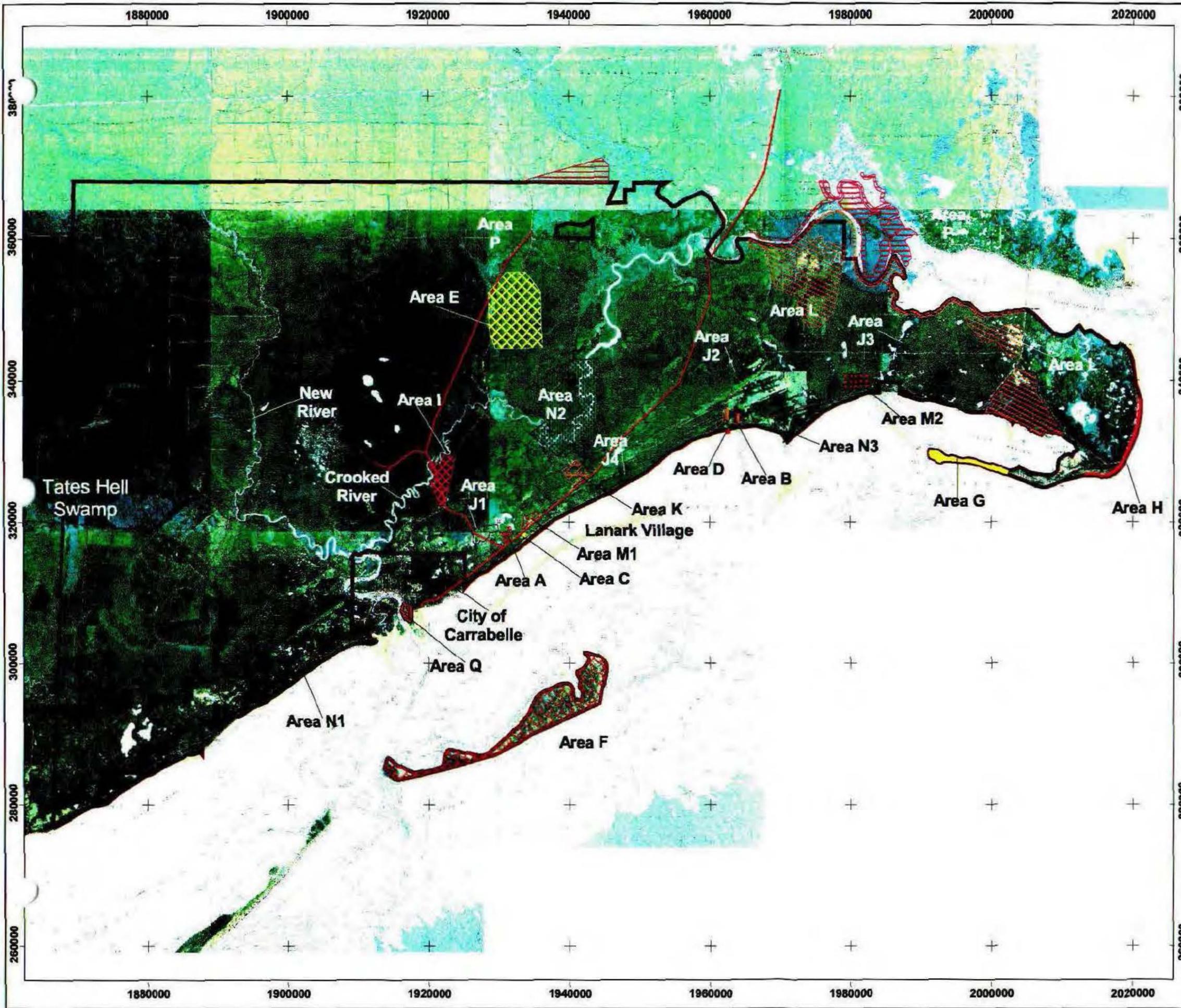


Figure 2.2
Project Areas Location Map

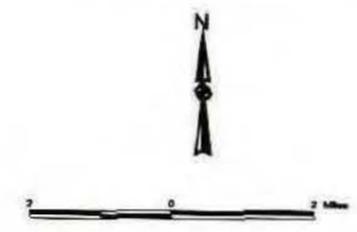
Camp Gordon Johnston
 Franklin County, Florida

LEGEND
 PROJECT AREAS

- Area A BAZOOKA RANGE
- Area B GRENADE COURT
- Area C BARBACKS AND DUMP
- Area D BOAT DOCK
- Area E ARTILLERY IMPACT ZONE
- Area F DOG ISLAND
- Area G ALLIGATOR PT. GUNNERY RANGE
- Area H RED, WHITE, & GREEN BEACHES
- Area I HARBESON CITY (SPECIAL TRAINING AREA #5)
- Area J SPECIAL TRAINING AREAS 1, 2, 3, 4
- Area K DUMP
- Area L EASTERN EOD CLEARED SITES
- Area M CLEARINGS 1 & 3
- Area N SMALL ARMS RANGES
- Area P OFF-POST EOD CLEARED SITES
- Area Q USAF RADAR SITE

CAMP GORDON JOHNSTON BOUNDARY

Area O is designated as all parcels within Camp Gordon Johnston boundary not specified above.



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Figure 2.3

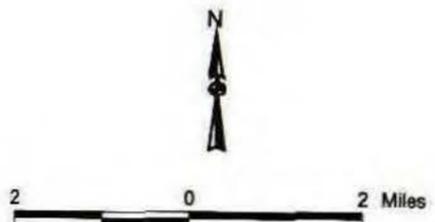
Historical Military Land Use

Former Camp Gordon Johnston Franklin County, Florida



LEGEND

- HISTORICAL MILITARY SITES
- FORMER CAMP GORDON JOHNSTON BOUNDARY
- RAILROADS



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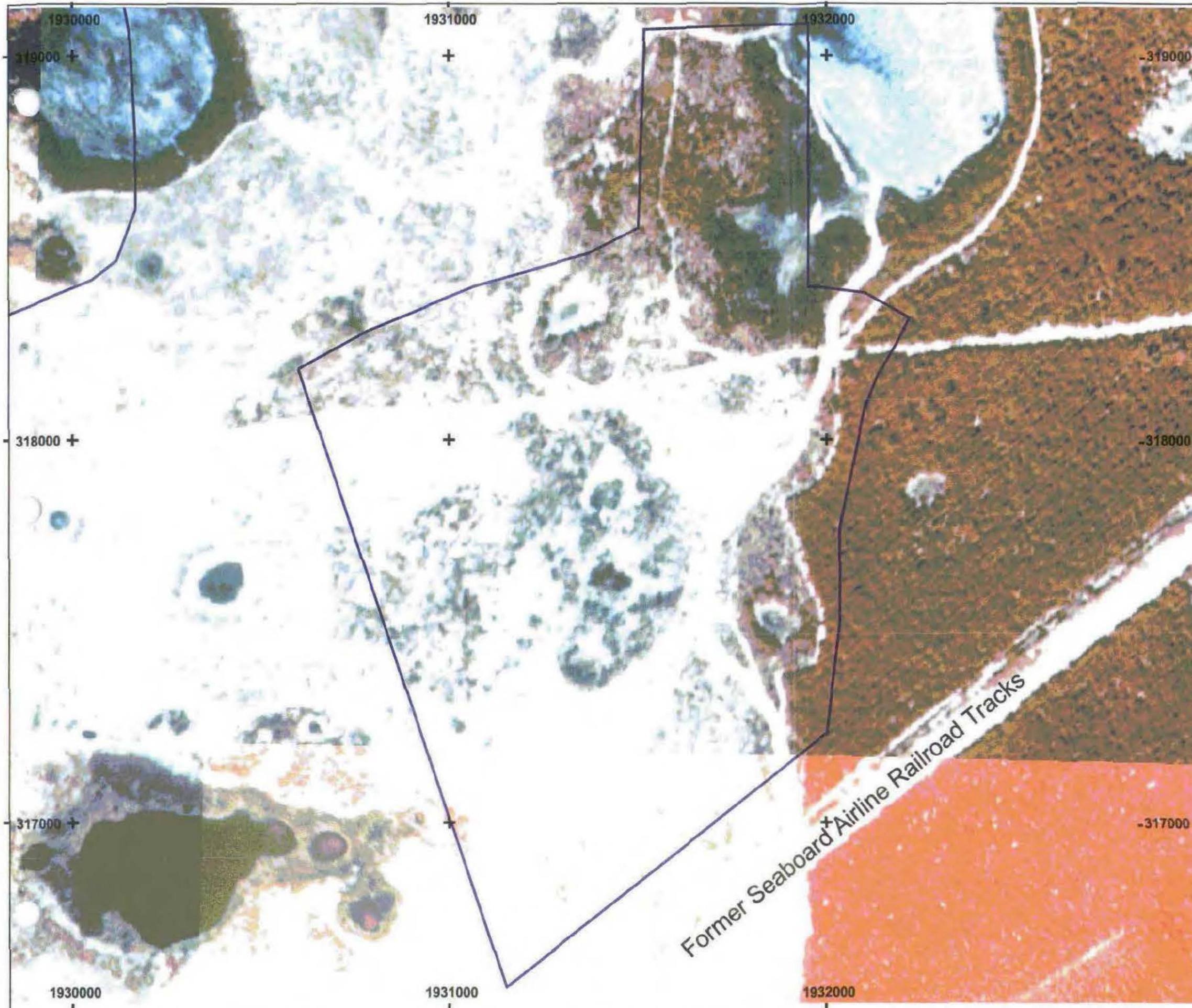


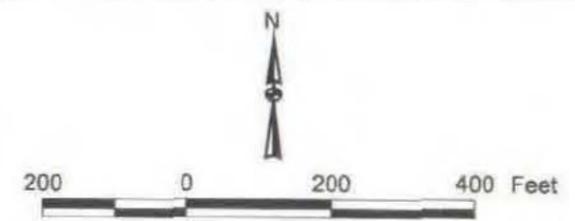
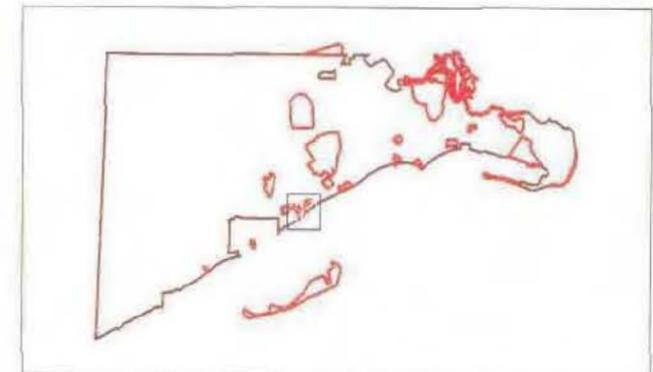
Figure 2.4

Area A Bazooka Range

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 1000' Grid Markers



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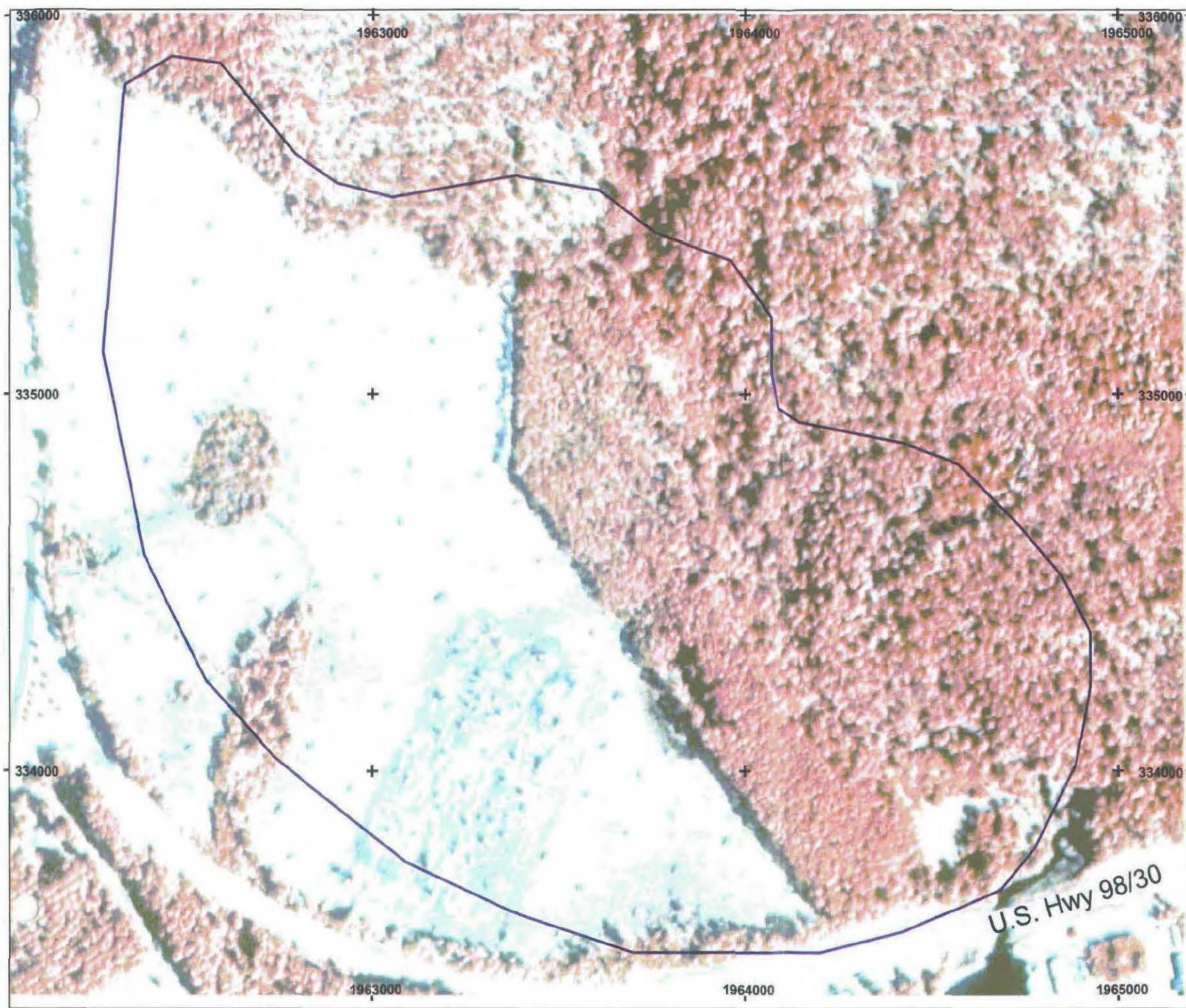


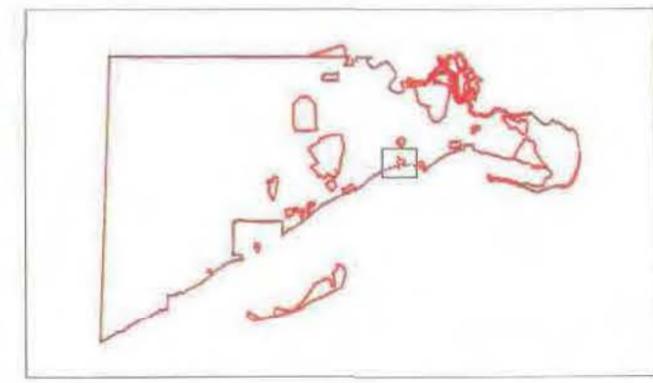
Figure 2.5

Area B Grenade Court

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 1000' Grid Markers



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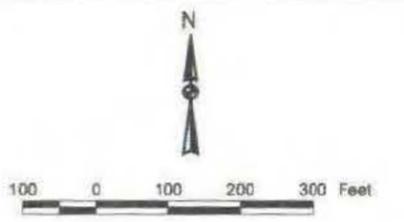
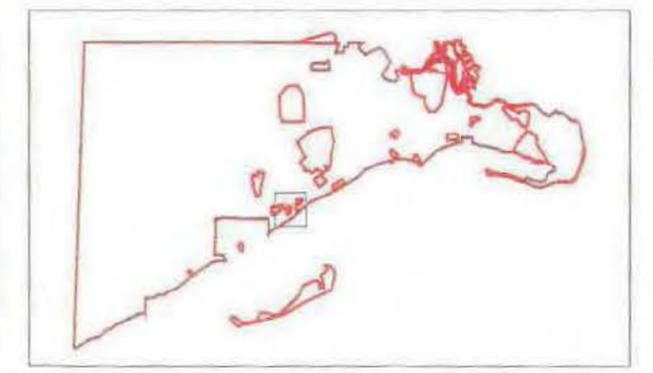
Figure 2.6

Area C Barracks and Dump

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 1000' Grid Markers



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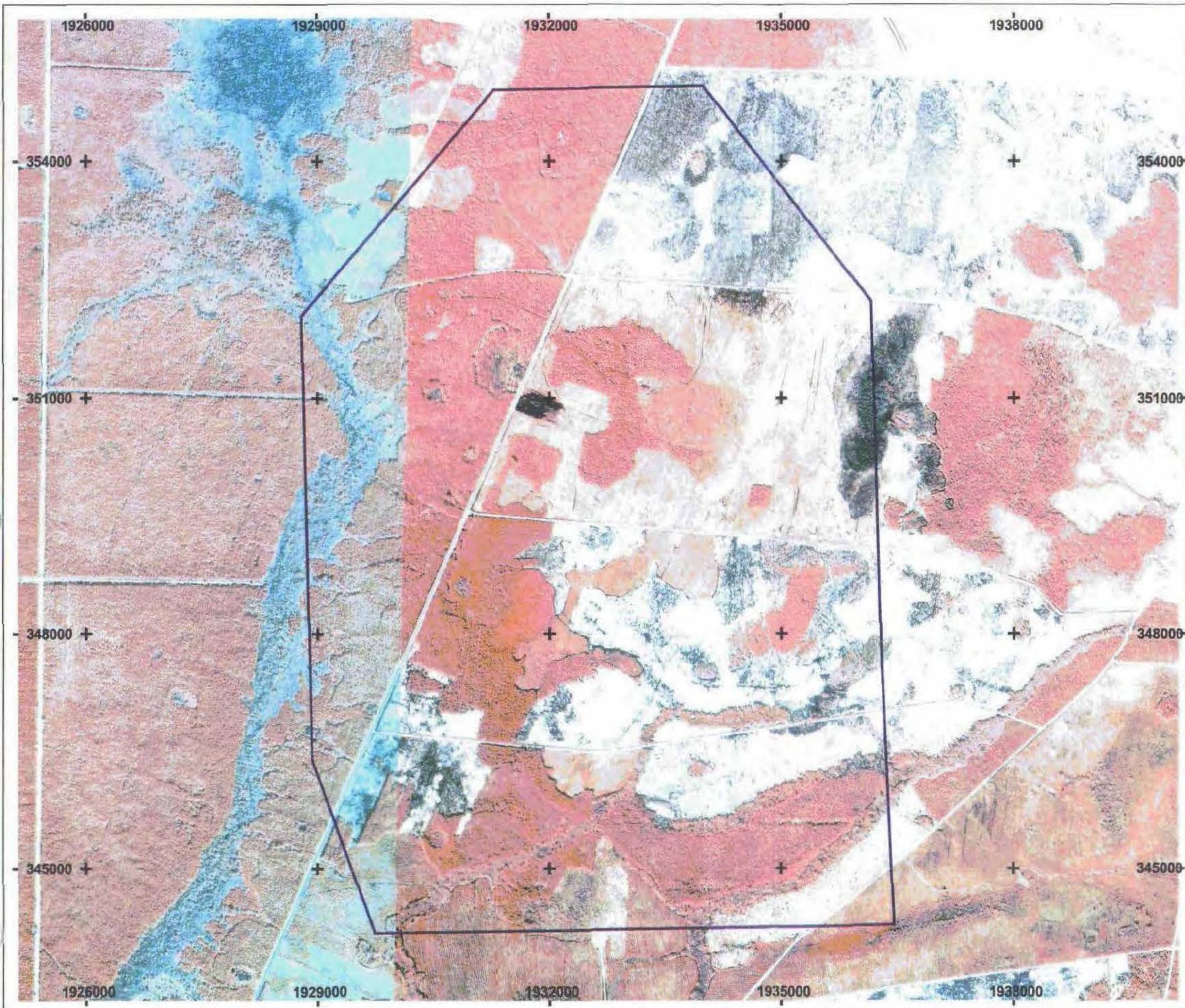


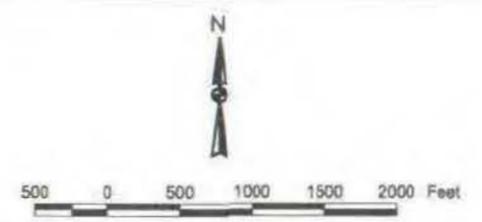
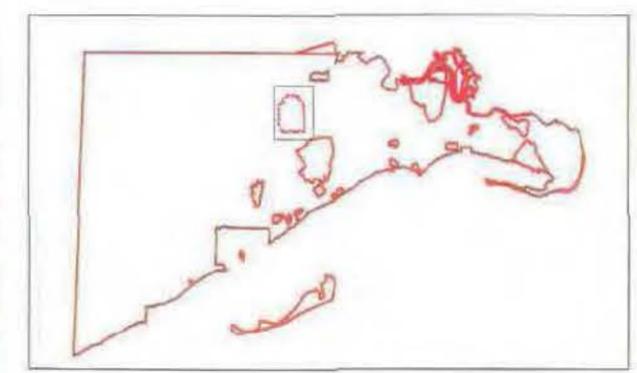
Figure 2.7

Area E Artillery Impact Zone

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 2000' Grid Markers



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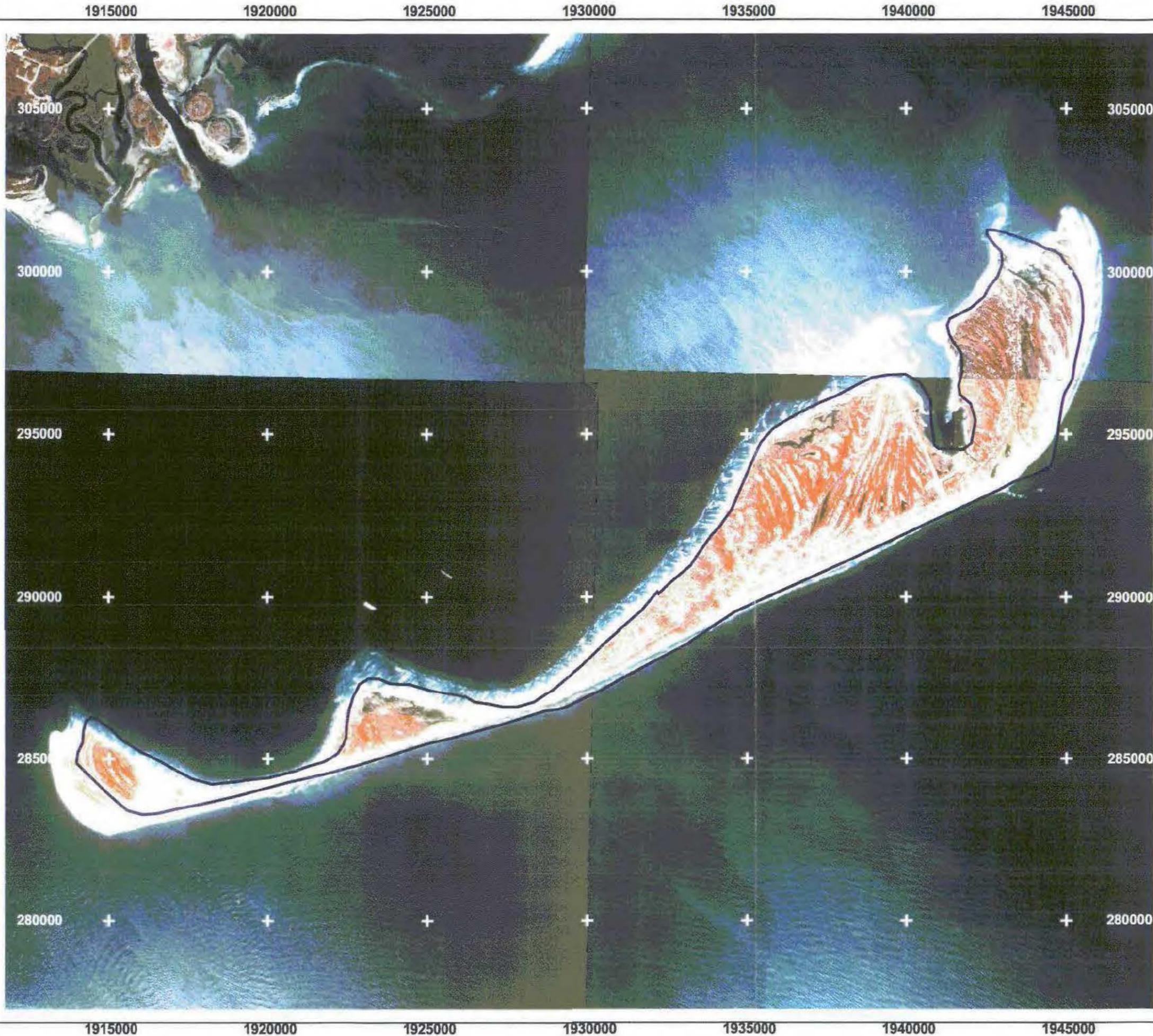


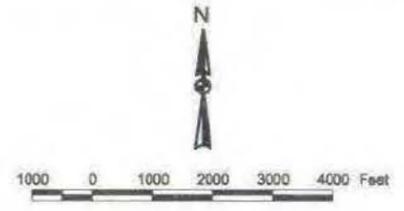
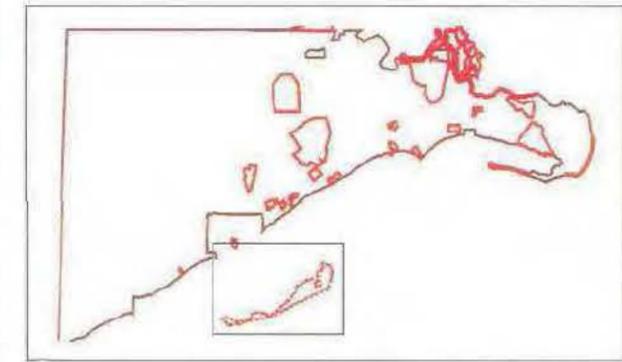
Figure 2.8

Area F Dog Island

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 2000' Grid Markers



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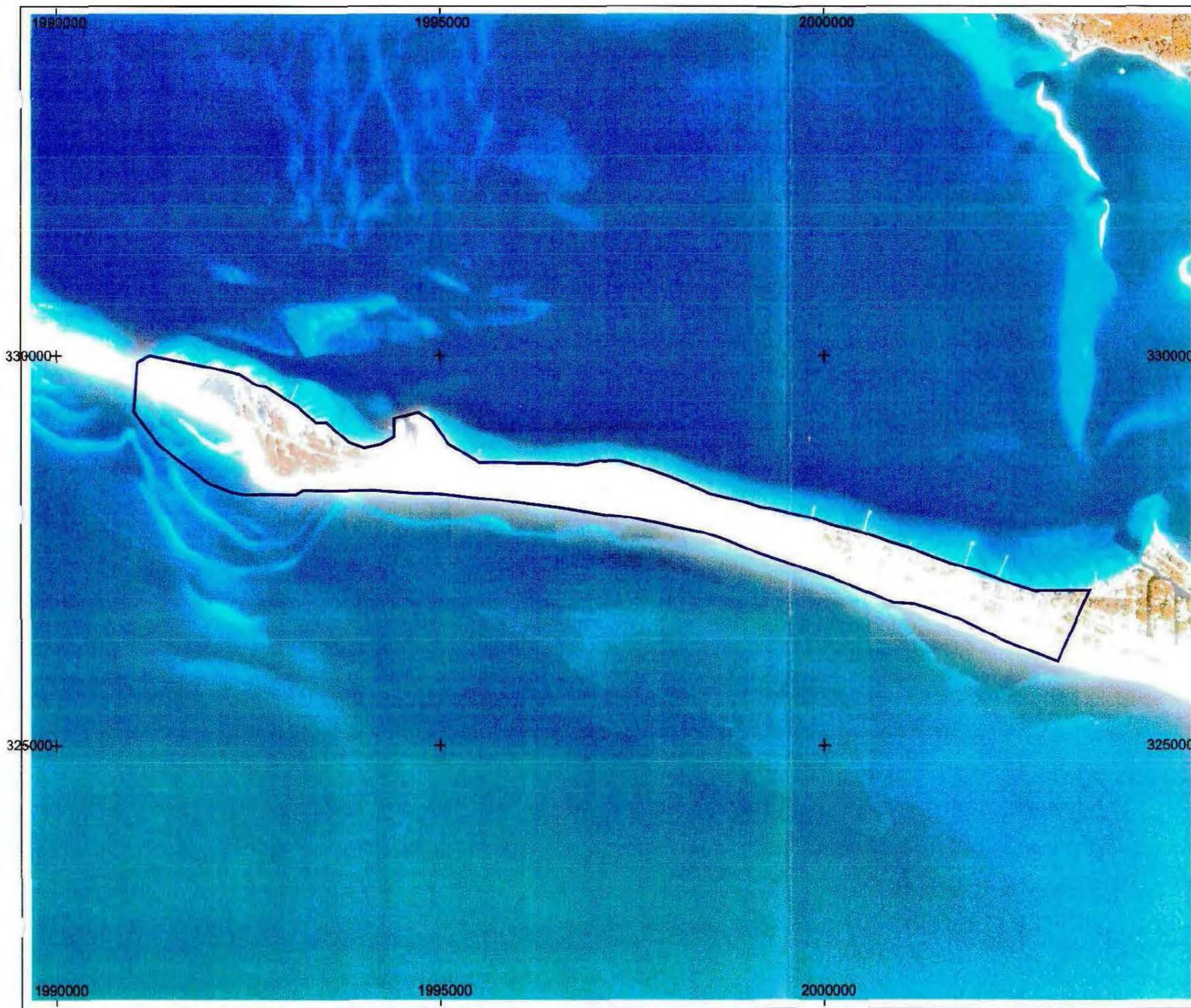
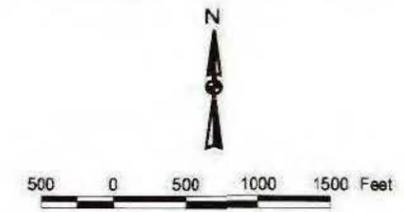
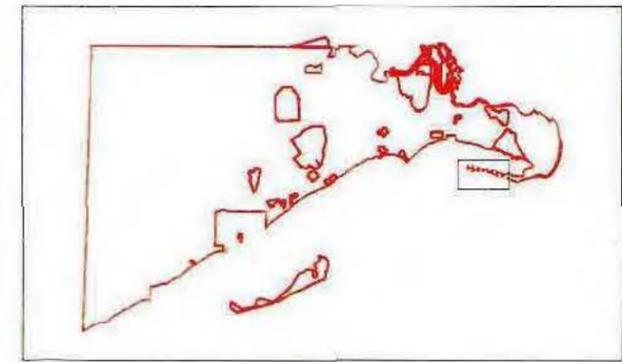


Figure 2.9
Area G
Alligator Point
Gunnery Range
 Camp Gordon Johnston
 Franklin County, Florida

LEGEND

 Project Area
 State Plane
 5000' Grid Markers



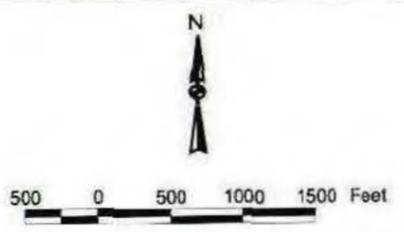
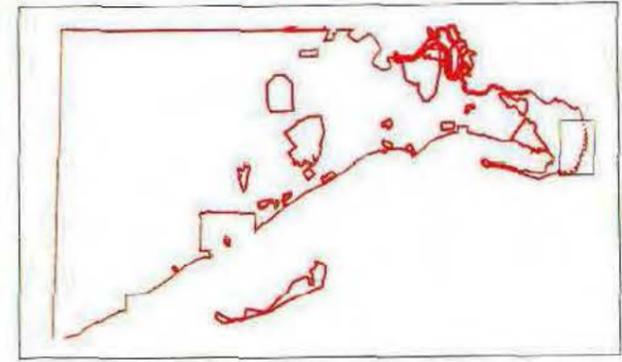
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Figure 2.10
Area H
Red, White, and Green
Beaches
 Camp Gordon Johnston
 Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 5000' Grid Markers



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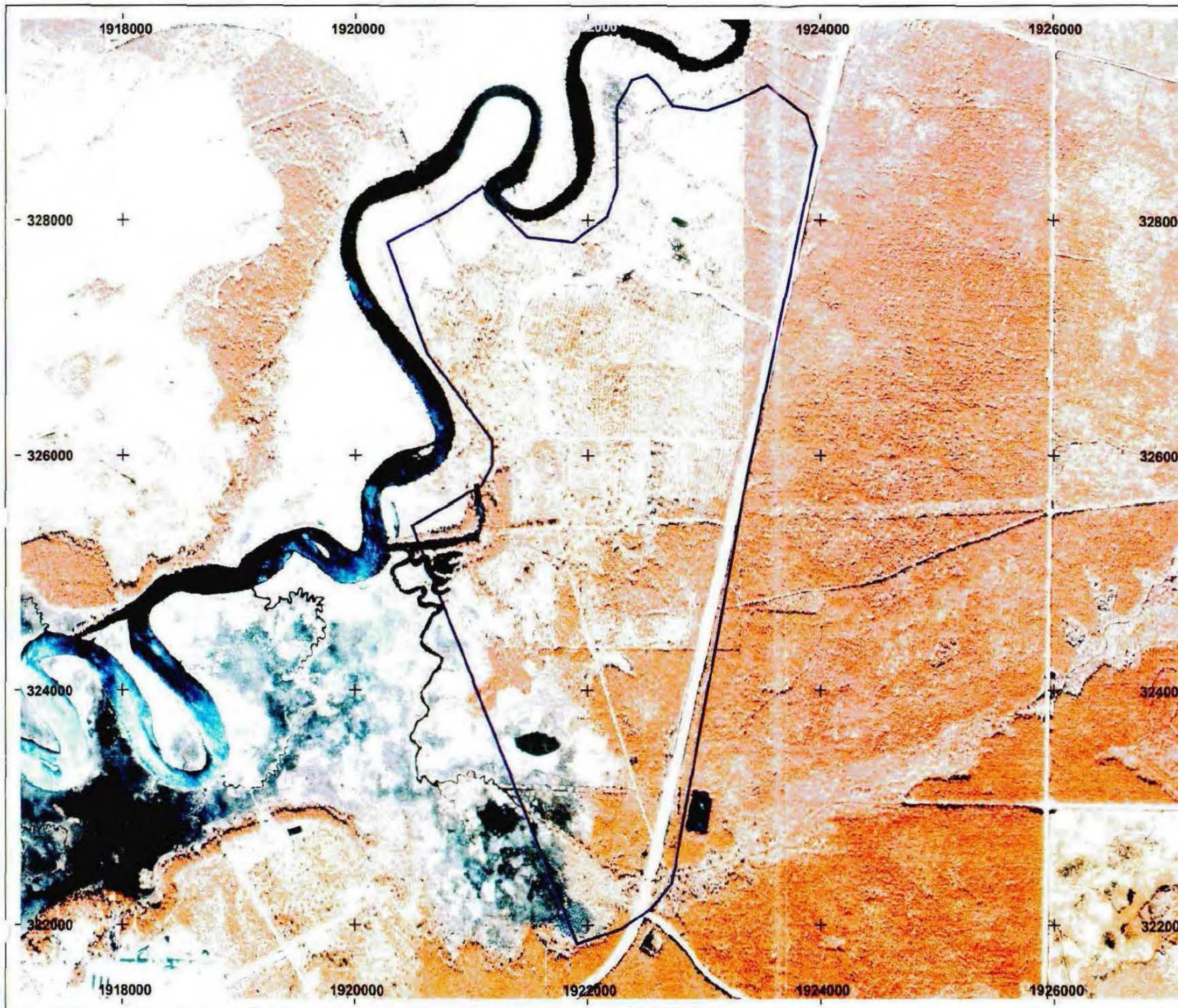


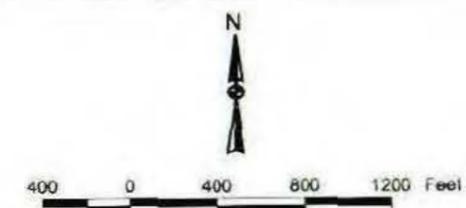
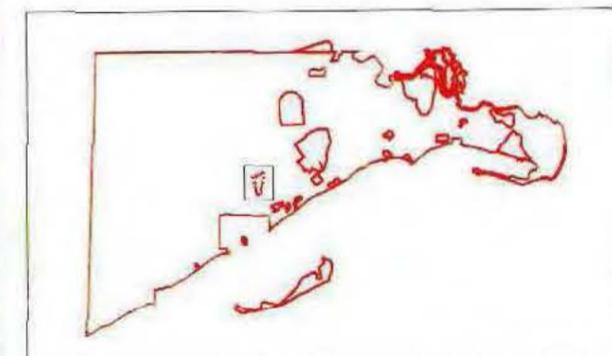
Figure 2.11

Area I Harbeson City

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 2000' Grid Markers



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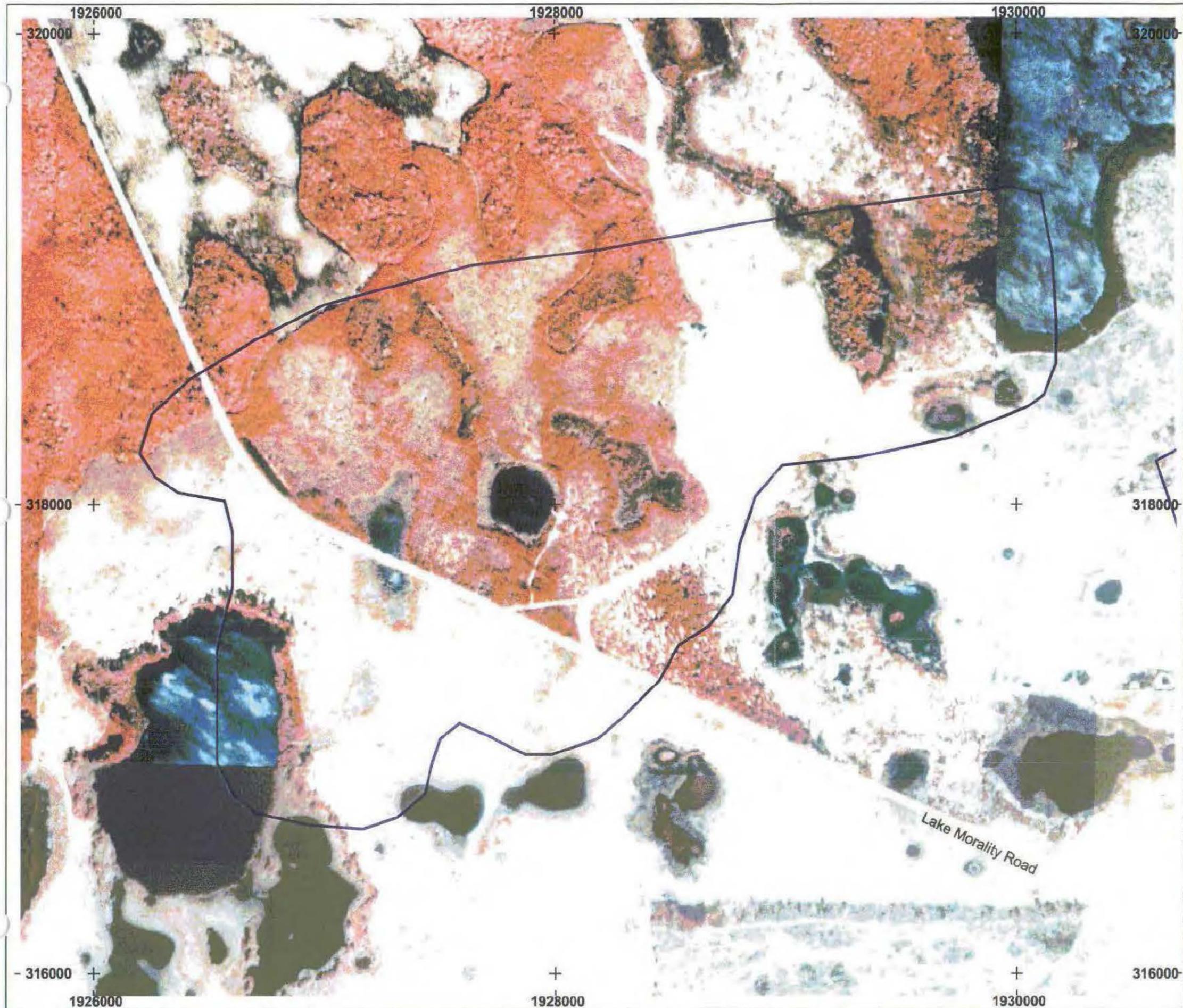


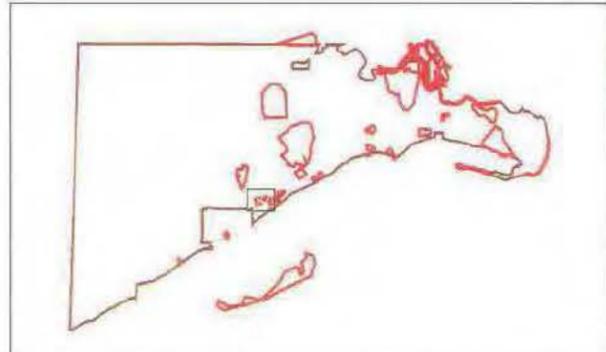
Figure 2.12

Area J1 Special Training Area

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 2000' Grid Markers



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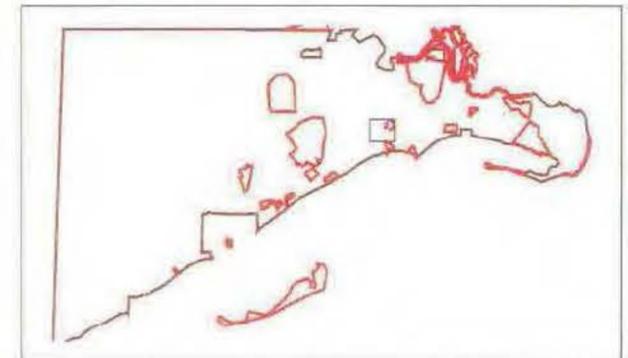
Figure 2.13

Area J2 Special Training Area

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 2000' Grid Markers



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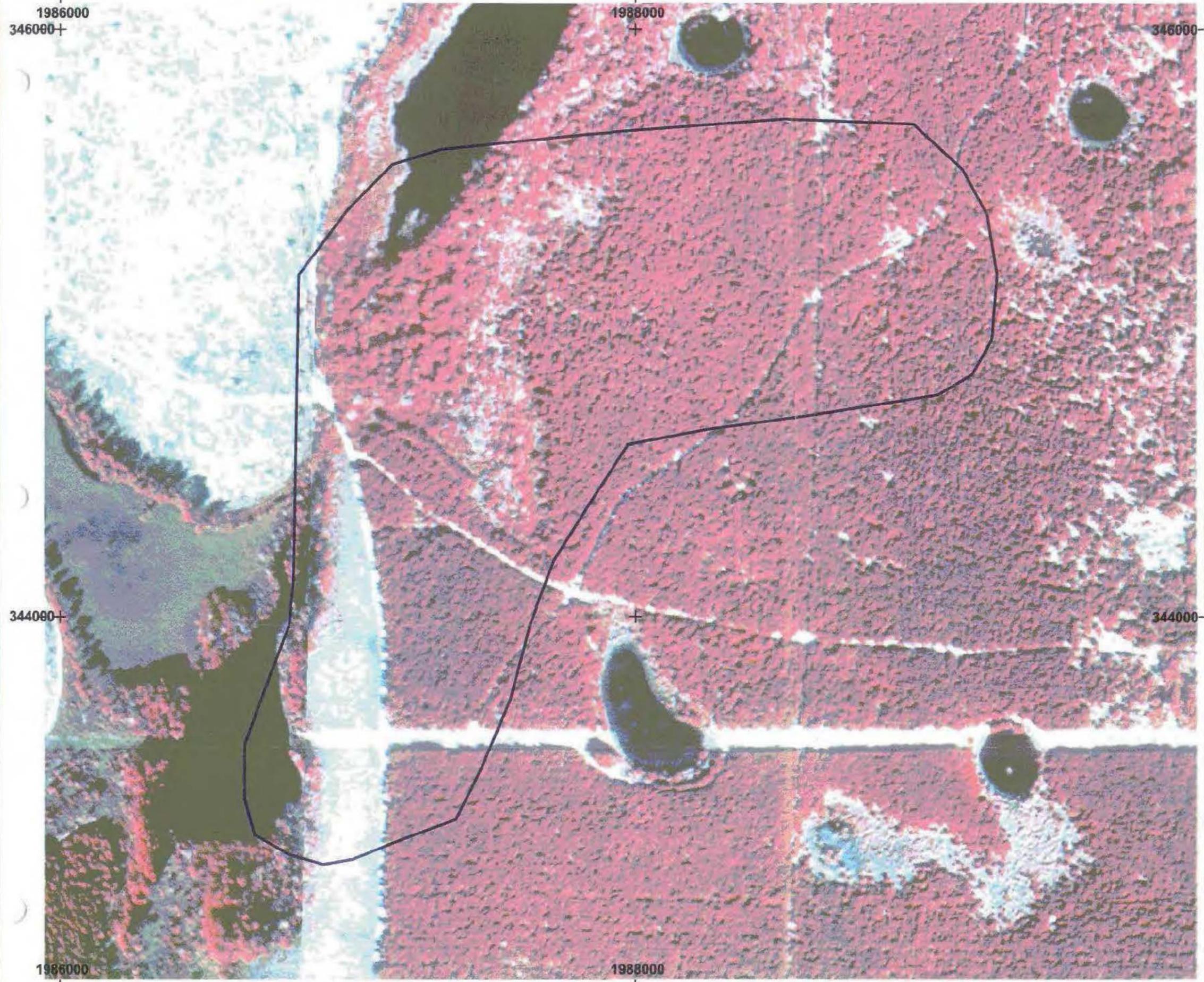


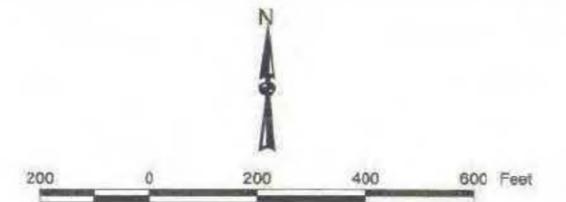
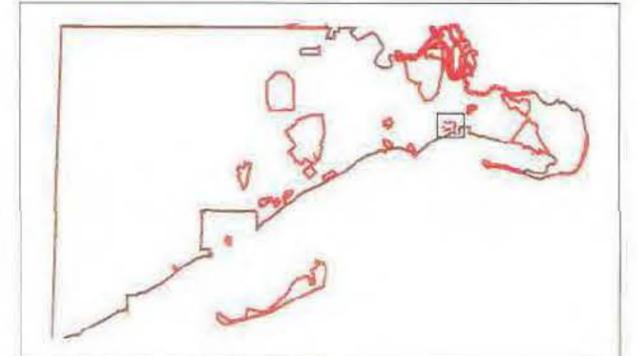
Figure 2.14

Area J3 Special Training Area

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 2000' Grid Markers



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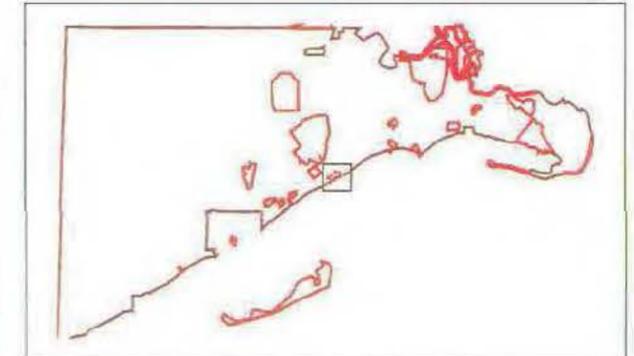
Figure 2.15

Area J4 Special Training Area

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 2000' Grid Markers



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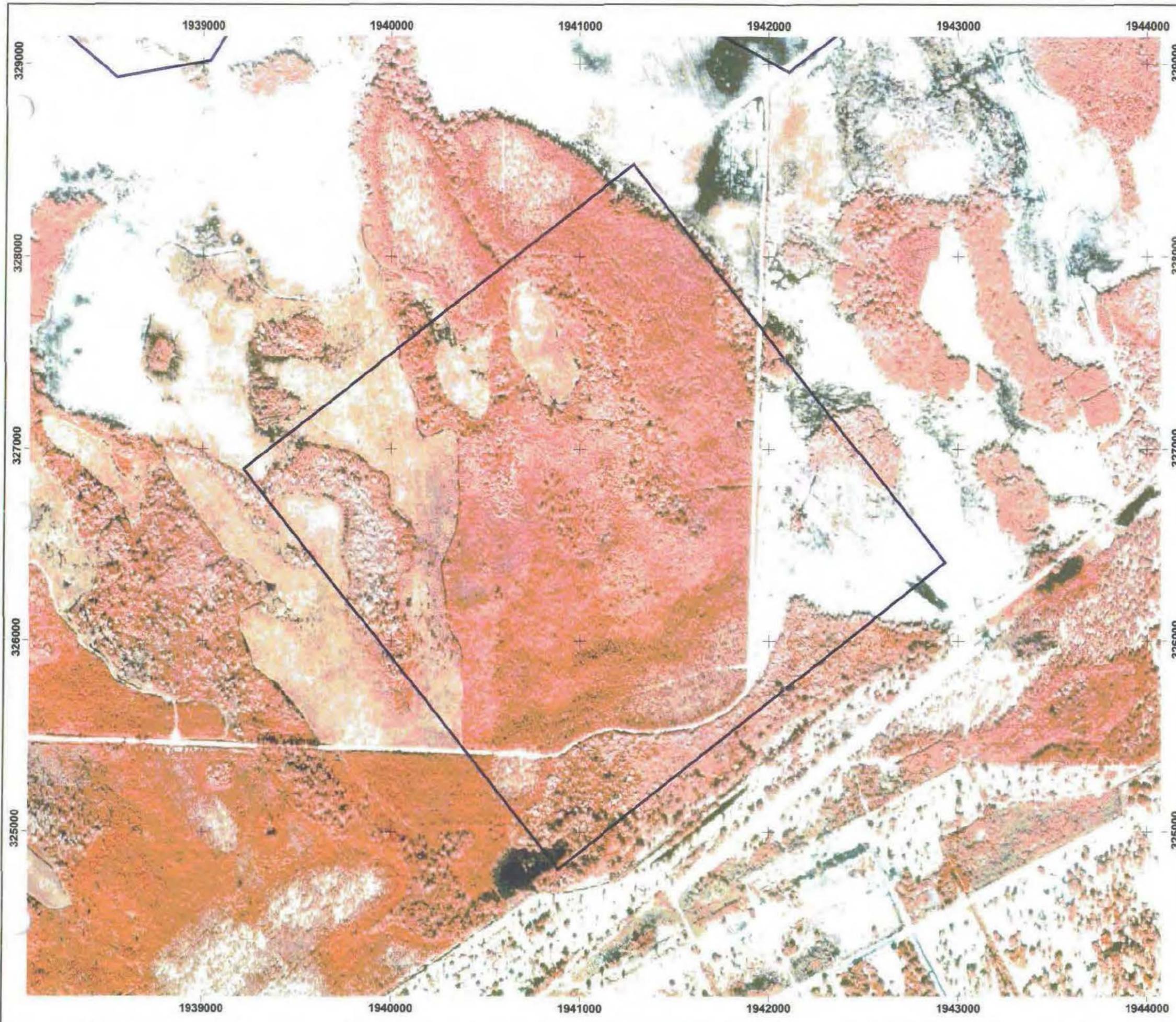


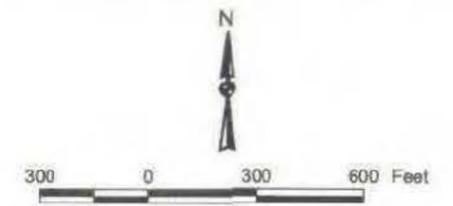
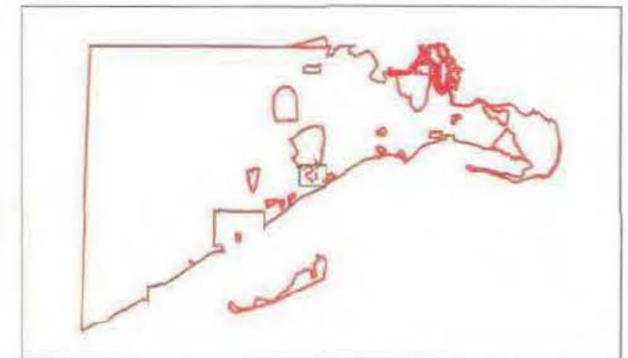
Figure 2.16

Area K Dump

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 1000' Grid Markers



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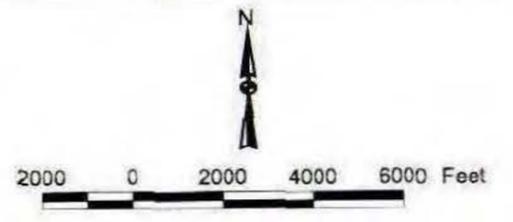
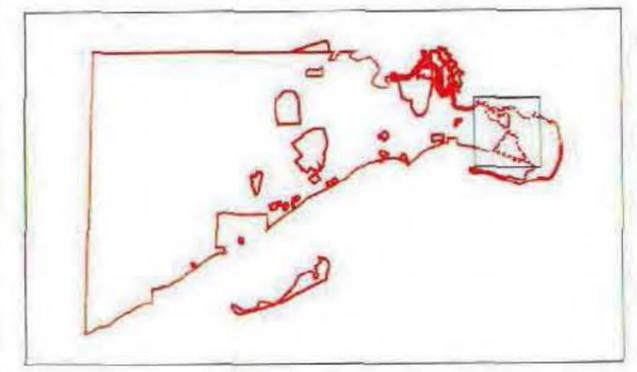


Figure 2.17
Area L
 Eastern EOD Cleared Sites

Camp Gordon Johnston
 Franklin County, Florida

LEGEND

-  Project Area
-  State Plane 10000' Grid Markers



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SECTION 3

SITE CHARACTERIZATION

3.1 SITE INVESTIGATION

3.1.1 Geophysical Survey

A geophysical survey to detect ferrous metal objects was performed at the Camp between November 17, 1999 and December 9, 1999 as part of the EE/CA investigation. Additional geophysical survey activities were conducted between January 17, 2000 and January 25, 2000 to augment data gaps identified following review of the initial data for statistical representativeness. An EM-61 Time Domain Metal Detector (TDMD) was used in conjunction with a global positioning system (GPS) to perform “meandering path” surveys over approximately 34 combined test acres (excludes Area L). The EM-61 was selected as the most appropriate geophysical instrument for the geophysical surveys within the Camp based on geology, terrain, proven technology, and other factors. In addition, a “mag-and-dig” survey using a modified “meandering path” geophysical methodology was applied within Area L in an effort to assess the presence of OE. Table 3.1 summarizes the geophysical survey by AOI.

3.1.1.1 Meandering Path Survey

The “meandering path” geophysical surveys were employed in most of the AOIs to allow flexibility in order to avoid obstacles and to minimize the impacts of significant brush clearance. To ensure a representative geophysical survey within an AOI, approximate individual meandering path start location coordinates were specified in the approved WP and plotted on recent aerial photographic maps. Field teams reacquired the meandering path start location using GPS and initiated surveying of a unique traverse. The length and direction of individual meandering path varied depending on field conditions and distribution of other “paths” within the AOI. In AOIs where the undergrowth was too dense (portions of Areas B, I, J, and K), mechanized brush removal was employed to cut paths in advance of the geophysical survey team. Survey activities were conducted by manually towing the EM-61 for the collection of subsurface geophysical data while the interconnected GPS unit continuously recorded location information. In this manner, anomalies as well as entire meandering paths could be depicted on maps for evaluation of coverage and reacquisition.

3.1.1.2 Mag-and-Dig Survey

A “mag-and-dig” geophysical survey was conducted in one of the AOIs, Area L. The vegetative cover within Area L is extremely dense and throughout most of the 3692 acres. As described in Subsection 2.2.3.12, an EE/CA investigation was not initially planned for Area L due to the lack of evidence regarding the potential presence of OE/UXO. However, based upon concerns expressed by FDEP during review of the

project WP, a limited geophysical survey was proposed within the Area L boundaries in an effort to confirm the absence of OE. To achieve this objective a versatile hand-held Schonstedt® metal detector (described below) and a GPS unit were used. As with the conventional meandering path survey, traverses were recorded but no brush cutting was necessary due to the smaller geophysical instrument used. All audibly discernable anomalies (regardless of magnitude) were intrusively investigated real time without screening by the project geophysicist. In this manner, the presence of OE or military debris could be evaluated to determine if Area L required a more stringent EE/CA investigation similar to the other AOIs.

3.2 INSTRUMENTATION

3.2.1 Geonics® EM-61 TDMD

The EM-61 device generates an electromagnetic pulse that triggers eddy currents in the subsurface. The eddy current decay produces a secondary magnetic field that is monitored by a receiving coil and recorded by the attached data logger. The EM-61 instrument consists of a transmitter/receiver frame, an electronics backpack, and a hand-held data logger. The frame may be equipped with wheels (as used at the Camp) and pushed or carried by an individual. The frame contains one figure eight shaped coil and acts as both a transmitter and receiver coil. The transmitter and receiver electronics and controls are mounted in the backpack. The data logger, connected to the electronics in the backpack, is hand-held. A lag bar test was conducted each morning, evening, and at the beginning and end of each meandering path line surveyed. The lag bar is a long metal bar placed on the ground surface and regularly surveyed to confirm consistent equipment operation. The lag test was run to measure the difference between the center measuring point of the coil and position recorded by the GPS. The time stamp recorded in the polycorder is then matched up to the time recorded in the GPS controller. At the Camp the EM-61 was operated in a single-cart manual configuration during the geophysical phase of the project and as a single cart hand held push configuration during the reacquisition phase of the project (Figure 3.1).

3.2.2 Trimble® Pro XRS

The Trimble® ProXRS is an integrated parallel channel GPS/Beacon receiver and antenna system that can be used for reception of differential GPS (DGPS) correction signals from U. S. Coast Guard land-based beacon transmitters or from Omnistar®, a private satellite service. GPS accuracy was obtained within approximately \pm one meter using a DGPS system at the Camp. This system added a land-based reference receiver located at an accurately surveyed site to the data used for coordinate calculations. The DGPS system used the data transmitted from the land-based receiver or Omnistar® satellites to correct its own measurements. The GPS data was collected by a mobile controller and was downloaded directly to the Pathfinder® program at the end of the workday.

3.2.3 Schonstedt® Magnetometer

3.2.3.1 Schonstedt® magnetometers are “flux-gate” ferrous metal locators and will only detect iron or magnetic materials. The size and orientation of the target and the soil characteristics of the work area limit the depth of detection. The instrument is not capable of classifying the anomaly; it will only show the presence or absence of a magnetic anomaly. The target must be excavated and investigated by a trained UXO Specialist.

3.2.3.2 Schonstedt® GA-52CX Flux gate magnetometers were utilized by UXO-qualified personnel to prescreen anomaly locations for subsequent reacquisition using hand-held EM-61s. Schonstedt®s were used for the geophysical evaluation of Area L.

3.3 INSTRUMENT CHECK

Prior to beginning each day's work, the geophysical survey teams checked the EM-61 instruments against a baseline to ensure that the equipment was operating properly. Ten-inch metal stakes were driven into the ground to a prescribed depth near the work location in an area anticipated to be free of metallic debris. The manually operated EM-61 was pulled directly over the stake and the data recorded in the geophysical survey logbooks and compared to initial responses (standard responses) established for each instrument. Instruments were rechecked multiple times throughout each day. All instrument checks were within project tolerances during the field effort and therefore no replacements were required.

3.4 GEOPHYSICAL INVESTIGATION FINDINGS

Investigation of the Camp focused on the AOIs identified in Section 2. The geophysical survey at the Camp resulted in the identification of a combined total of 1932 anomalies in 11 intrusively investigated AOIs, including Area L. The total area geophysically surveyed at the Camp was approximately 35 acres. A detailed summary of the geophysical findings by AOI is presented in Appendix B.

3.5 ANOMALY IDENTIFICATION

Once the geophysical and GPS data from the “meandering path” geophysical surveys were downloaded from the field data recorder; the data was exported to ASCII format for processing by the Project Geophysicist. Anomalies were selected based on observed peaks in the data for each meandering path and comparison to background readings for each individual meandering path. Peaks below the background value were not considered as anomalies.

3.6 ANOMALY REACQUISITION

The anomalies selected for investigation by the Project Geophysicist were uniquely numbered as per the approved WP and depicted on Anomaly Dig Sheets for intrusive investigation. Coordinates for these anomalies were compiled into waypoint files and uploaded to the GPS for reacquisition by the field team. Reacquisition was performed by

selecting of a specific anomaly waypoint and physically marking it along the meandering path for the intrusive field team. A labeled PVC pin flag was placed at each anomaly location. (Figure 3.1)

3.7 INTRUSIVE INVESTIGATIONS

3.7.1 The intrusive investigation of the Camp took place between March 20, 2000 and April 25, 2000. The investigation was performed according to the procedures outlined in the approved WP (Parsons ES, 1999). A total of 1932 anomalies were intrusively investigated in eleven AOIs, including Area L. The location of the individual AOIs within the Camp is presented on Figure 2.2.

3.7.2 During the EE/CA investigation at the Camp, each field team operated a single EM-61 to record geophysical data within each of the AOIs. Anomaly Dig Sheets were prepared from the data and provided to the intrusive teams following reacquisition flagging. Occasionally, anomalies identified on the Anomaly Dig Sheet could not be reacquired. In such instances, the anomaly was flagged at the coordinate location and the inability to reacquire the anomaly was documented in the reacquisition team logbook. This "false positive" occurrence was not made known to the intrusive field teams. As such, the intrusive teams would again geophysically search the immediate area around the flag. If no anomaly was identified, the area around the flag would be excavated to a one-foot depth and rechecked. If again no anomaly was identified, the location was designated as a "false positive". Sitewide, 148 "false-positives" were identified, which translates to 7.66% of the total anomalies intrusively investigated. The presence of some "false positives" is inherent in geophysical/intrusive investigations; with 15% being considered the maximum acceptable occurrence level. Many reasons exist for the presence of "false positives" including residual rust in the soil, proximity of power lines, metallic surface debris, metal bearing rocks, rough terrain causing equipment jolts, etc.

3.7.3 After an anomaly was intrusively investigated, the intrusive investigation team recorded the anomaly type based on six predetermined categories:

- unexploded ordnance (UXO);
- intact OE items (OE);
- OE-related scrap (OS),
- scrap (non OE-related scrap);
- other (not intrusively investigated); or
- false positive (EM-61 detected anomaly, but nothing found)

3.8 INTRUSIVE EXCAVATION

Geophysical data was evaluated by the Project Geophysicist and the anomalies were selected for intrusive investigation. Anomaly Dig Sheets were prepared and provided to the reacquisition teams with location coordinates. The reacquisition teams flagged the individual anomaly locations in the field. Intrusive investigation teams, comprised of

qualified UXO personnel, subsequently excavated the flagged anomalies and documented the findings. Each anomaly was treated as a suspect UXO until it was determined otherwise. Following the identification and removal of the item, the excavation area was backfilled and restored to its original pre-intrusive condition. All excavated material was segregated and stored onsite pending disposal via a local scrap metal dealer. All UXO discovered were blown in place (BIP) following protocol outlined in the approved WP.

3.9 INTRUSIVE INVESTIGATION FINDINGS

A total of eight UXO items were discovered (7 BIP by USA personnel and 1 removed by Tyndall EOD) during the EE/CA investigation. Of the eleven AOIs investigated, UXO (confirmed as live following BIP) were encountered in only two areas (Areas B and F). A total of 186 of the 1932 intrusively investigated anomalies contained items designated by the intrusive field teams as either UXO, OE, or OS. Table 3.2 summarizes the military-related intrusive findings. A detailed list of all anomalies and their associated intrusive recoveries is presented in Appendix B.

3.10 RECOVERED ORDNANCE ITEMS

3.10.1 A variety of OE-related items were recovered during the EE/CA investigation of the Camp. Scrap from several types of ordnance items were recovered including .50-caliber cartridges, 2.36-inch bazooka rockets (M6A1 practice and HE anti-tank), 4.2-inch mortars (M3A1 or M3 HE), M1B1 practice tank mines, practice and HE grenades, rifle grenades, an Mk23 practice bomb, an 81mm practice mortar, and a 100-pound bomb. With the exception of the two bomb fragments (both found in Area G), all of the recovered OE was consistent with historical documentation (Subsection 1.1). Most of the OE items recovered were significantly deteriorated, therefore distinguishable marks pertaining to Army or Navy delineated Mark (Mk) and Model (Mod) number were no longer present. Instead these items were categorized by the size of the OE item (i.e., 2.36-inch rockets, 4.2-inch mortar, 81mm mortar, etc.). In some instances, the USA personnel were able to infer the Mk and Mod numbers for the recovered item. These inferred ordnance characterizations are included in the OE descriptions found in Figures 3.2 through 3.11. Specific OE items identified included one practice Mk23 bomb, six M1B1 practice anti-tank mines, and multiple 2.36-inch M6A1 practice bazooka rockets.

3.10.2 The following paragraphs provide brief descriptions of ordnance items similar to those recovered during the EE/CA intrusive investigation at the Camp. At the completion of the EE/CA field effort, all OE items were certified as nonhazardous scrap by USA and disposed of through a local scrap recycler (Appendix C).

3.10.1 U.S. Army 2.36-inch Rocket, HE and Practice Antitank M6A1

A total of 57 2.36-inch rockets were recovered within the Camp, all within Area A – Bazooka Range. None of the intact rockets were determined to contain HE, however 30 required BIP as a precautionary response (Table 3.2). During preparations for 3 BIP events in Area A, 9 additional rockets were encountered in areas not originally geophysically surveyed. As a result, 39 total rockets were BIP in Area A. Figure 3.2

shows the dimensions of a 2.36-inch rocket as well as a photograph of one of the practice rounds that were recovered during the intrusive investigation of the Camp. Appendix D contains documentation of the BIP efforts.

3.10.2 Cartridge, 81 Millimeter: Training, M68

A single 81mm practice mortar was found during the EE/CA intrusive investigation. The mortar was recovered from Area A (anomaly A5-8) at a depth of approximately two feet (Table 3.2). Figure 3.3 shows a diagram of an 81mm mortar as well as a picture of the mortar that was recovered from Area A.

3.10.3 Cartridge, 4.2-inch: M3A1 & M3 HE

A single 4.2-inch mortar (M3A1 or M3 HE) was found during the EE/CA intrusive investigation. The mortar was recovered from Area F – Dog Island (anomaly F2A-1) and was identified as an HE UXO. The UXO was BIP (see Appendix D). In addition, HE fragments and one expended 4.2-inch mortar (M3A1 or M3 HE) and HE fragments were also found. Figure 3.4 shows the dimensions of a 4.2-inch mortar as well as a photograph of one of the expended 4.2-inch mortars recovered during the intrusive investigation.

3.10.4 3-LB Miniature Practice Bomb AN-Mk23 Mod 1

A single Mk23 practice bomb was found during the EE/CA intrusive investigation. The inert bomb was recovered from Area G – Alligator Point (anomaly AG-77). Figure 3.5 shows the dimensions of an AN-Mk23 as well as a photograph of the practice bomb recovered during the intrusive investigation of the Camp.

3.10.5 M1B1 Anti-Tank Mine, Practice

Seven M1B1 practice anti-tank mines were identified during the EE/CA investigation, all within Area B – Grenade Court. One of the practice mines was discovered on the ground surface during the geophysical survey of Area B and reported to the local authorities. Tyndall AFB EOD responded and removed the item. Six additional mines were discovered during the intrusive investigation and were each BIP due to the presence of a live spotting fuze (Table 3.2). Appendix D contains documentation of the BIP efforts. Figure 3.6 shows the dimensions of a M1B1 anti-tank practice mine as well as a picture of one of the seven recovered during the intrusive investigation of the Camp.

3.10.6 U.S. Army-Navy 100-lb General Purpose Bomb

The box tail section of a bomb was recovered from Area G – Alligator Point (anomaly AG-182). The tail section of another bomb was also found washed ashore on the Gulf of Mexico side of the peninsula in Area G. The bomb type was identified by the site UXO personnel as consistent with a U.S. Army-Navy 100-pound General Purpose Bomb as depicted on Figure 3.7. Since the area was not designated as an aerial bombing range and no shrapnel was found, it is likely that the bombs were inert practice bombs.

3.10.7 .50-Caliber Cartridge Small Arms Ammunition

Numerous .50-caliber bullets and clips were recovered during the intrusive investigation. These small arms do not represent a threat to public safety and were therefore not considered OE for this EE/CA project. Figure 3.8 shows a diagram of a typical cartridge as well as a photograph of a .50-caliber ball recovered from the site.

3.10.8 MkII & Mk1A1 Hand Grenade, HE Fragmentation and Practice

Several practice grenades (Mk1A1) and one empty MkII HE grenade body (without fuze) were found during the EE/CA investigation. The practice grenades were located in Area A – Bazooka Range, Area B – Grenade Court, and in Area J – Special Training Area. The MkII HE grenade body was recovered from Area J (Subarea J4). Figure 3.9 shows a cross-section and photograph of the Mk1A1 practice grenade.

3.10.9 Anti-Tank Rifle Grenade

A single anti-tank rifle grenade was found during the EE/CA intrusive investigation. The grenade was confirmed to be a non-HE practice variety and was recovered from Area B – Grenade Court (anomaly B4-14). Figure 3.10 shows the dimensions of a rifle grenade similar to the one recovered during the intrusive investigation of the Camp.

3.10.10 Point Detonating Fuze

One point detonating (PD) fuze typical of the type used on 105mm and 105mm HE projectiles was recovered from within the Camp. This PD fuze was found on the ground surface outside the perimeter of Area E – Artillery Impact Zone during additional geophysical activities to confirm the boundaries of this area. The exact designation of the fuze could not be ascertained due to its deteriorated condition. No other OE was found from within or adjacent to Area E. Figure 3.11 shows an example of a PD fuze as well as a photograph of the one recovered during the intrusive investigation of the Camp.

3.11 SOURCE, NATURE, AND EXTENT OF OE

3.11.1 The Camp was constructed in 1942 to conduct amphibious and other military training in order to prepare troops for the war in Europe. Camp activities continued through 1946 when the post officially closed.

3.11.2 The following section describes the OE findings of the EE/CA investigation by AOI and provides a summary of statistical factors. No OE-related debris or UXO was present in Area C, Area E (PD fuze outside area boundary), Area H, Subareas J2 and J3, Area K, and Area L. Each of the remaining areas contained at least one OE-related item with positively identified UXO items present in Area B and Area F. All of the OE recovered was consistent with those documented in historical records of the Camp with the exception of the practice bombs recovered from Area F.

3.12 DESCRIPTION OF HAZARDS OF SPECIFIC OE ENCOUNTERED

3.12.1 Area A – Bazooka Range

3.12.1.1 The Bazooka Range (Area A) was investigated via approximately 2.56 acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 5.12% of the total 50-acre AOI acreage. The traverses were distributed throughout Area A to not only provide representative coverage to justify extrapolation of the results to the entire AOI but also to bias survey locations to include observed craters, potential target areas, and other suspect areas. The gaps between the planted trees were incorporated into the meandering paths where possible and several traverses were intentionally extended beyond the AOI boundary to confirm area delineation. Minimal brush cutting was required to provide access for the EM-61 instrument. A total of 145 anomalies were identified from the geophysical data, 100% of which were intrusively investigated. Twelve (8.3%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2).

3.12.1.2 Various OE scrap was recovered from the majority of the anomalies (122 or 84.14%) including M6A1 2.36-inch practice rockets and one M68 81mm practice mortar (Table 3.2). Five OE fragments, indicative of HE detonations, were identified within the area confirming live rounds were used on the range. No UXO was detected within Area A although several BIPs were conducted for precautionary reasons (Figure 3.12/Table 3.3). The OE recovery depths ranged from surface to a maximum depth of 30 inches, however most of the items were within the top 12 inches of soil. The distribution of the OE findings within Area A is depicted on Plate 1 in Appendix F, Volume 2. The distribution did not indicate the presence of a specific high concentration area within Area A, thus footprint reduction for the AOI was not warranted.

3.12.2 Area B – Grenade Court

3.12.2.1 The Grenade Court (Area B) was investigated via approximately 2.86 acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 2.92% of the total 98-acre AOI acreage. The traverses were distributed throughout Area B to provide representative coverage to justify extrapolation of the results to the entire AOI and to bias survey locations to include areas where surface HE grenade fragments were observed during reconnaissance and near “dragon’s teeth” obstacles located within the AOI. Minimal brush cutting was required to provide access for the EM-61 instrument in much of the area, with the exception of the densely vegetated northeastern extent. A total of 154 anomalies were identified from the geophysical data, 100% of which were intrusively investigated. Four (2.59%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2).

3.12.2.2 Various OE scrap was recovered from the majority of the anomalies (20 or 12.99%) including seven M1B1 practice anti-tank mines with live fuzes (UXO), one M9A1 practice rifle grenade, and several Mk1A1 practice grenades (Table 3.2). Three OE fragments, indicative of HE detonations, were identified within the area confirming live grenades were used on the range. The six UXO items recovered during the intrusive investigation of Area B were detonated on-site (Figure 3.13/Table 3.3). The UXO item

discovered during the geophysical survey was removed from the site by Tyndall EOD personnel. The OE recovery depths ranged from surface to a maximum depth of 10 inches. Four of the mines were located on the surface, two at a depth of 3 inches, and one at a depth of 10 inches. The distribution of the OE findings within Area B is depicted on Plate 2 in Appendix F (Volume 2). The distribution did not indicate the presence of a specific high concentration area within Area B, thus footprint reduction for the AOI was not warranted.

3.12.3 Area C – Barracks and Dump

3.12.3.1 Investigation of the Barracks and Dump (Area C) was not originally planned during this EE/CA project since the selected geophysical survey equipment does not operate effectively within suspected dump areas (see Subsection 2.2.3.3). As a result of property owners' concerns, a limited geophysical survey was conducted to evaluate the presence and rough extent of the dump. Approximately 0.1 acre of geophysical meandering paths were surveyed within the one acre residential parcel, as depicted on Figure 3.12 (Table 3.1). Property ROEs were not granted for the northern and western parcels within the AOI, however the portion of the AOI where debris was previously reported (White's and Huska property) was included in the investigation area.

3.12.3.2 Several meandering paths were distributed within Area C strictly to gather general information regarding the suspected presence of a military dump on the parcel. No brush cutting was conducted due to the residential nature of the property. A total of 12 anomalies were identified from the geophysical data, 100% of which were intrusively investigated (Appendix B). None of the anomalies were considered "false positives". No OE or any OE-related scrap was recovered during the intrusive investigation of Area C. The anomaly locations within Area C are depicted on Figure 3.14. The apparent random distribution and types of debris recovered did not indicate the presence of a dedicated dump area within Area C. Further evaluation of this AOI will not be addressed in this EE/CA, however, further environmental investigation of Area C is recommended during hazardous and toxic waste (HTW) studies pending within the Camp.

3.12.4 Area D – Boat Dock

The Boat Dock – Area D was not investigated during this EE/CA project, as described in Subsection 2.2.3.4.

3.12.5 Area E – Artillery Impact Zone

3.12.5.1 The Artillery Impact Zone (Area E) was investigated via approximately 4.01 acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 0.23% of the total 1730-acre AOI acreage. The meandering paths were distributed throughout Area E to not only provide representative coverage to justify extrapolation of the results to the entire AOI but also to bias survey locations to include suspect target areas and confirm area extent. Several meandering paths were intentionally surveyed outside the AOI boundary to confirm area delineation. Moderate brush cutting was required to provide access for the EM-61 instrument due to the presence of relatively dense understory. A total of 136 anomalies were identified from the geophysical data,

99% of which were intrusively investigated. The two anomalies within Area E that were not investigated were the result of missing reacquisition flags. Review of the data for the two anomalies indicated low magnitude readings, implying an extremely low probability of the anomaly being UXO. Based on the findings of the 134 excavated anomalies, sufficient characterization data was determined to have been collected and the two anomalies were not intrusively investigated. Sixty-eight (39.3%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2). The high false positive rate was attributed to extremely rough terrain causing the EM-61 to frequently be jolted even at very slow speeds. As a result, the instrument recorded a spike in the data that was interpreted as an anomaly.

3.12.5.2 No OE or UXO was recovered from within Area E although one PD fuze was located on the ground surface outside the southern AOI perimeter. No HE fragments or other OE items (aside from .50-caliber bullets) were recovered. The anomaly locations within Area E are depicted on Plate 3 in Appendix F (Volume 2). The lack of OE fragments does not support the reported use of the area as an impact area for heavy artillery. In order to confirm that OE fragments would have been recovered during the EE/CA investigation if Area E had been used for heavy artillery training, a GIS impact simulation model was developed. The details and results of this model are presented in Appendix E. The results suggest Area E was not utilized for artillery training with HE projectiles.

3.12.6 Area F– Dog Island

3.12.6.1 Dog Island (Area F) was investigated via approximately 4.94 acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 0.26% of the total 1923-acre AOI acreage. The traverses were distributed throughout Area A to provide representative coverage to justify extrapolation of the results to the entire AOI and to bias survey locations to focus on suspect beach landing sites. Minimal brush cutting was required to provide access for the EM-61 instrument. A total of 119 anomalies were identified from the geophysical data, 100% of which were intrusively investigated. Twenty (16.81%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2). Property ROEs were not granted for many of the small privately-owned parcels on the coast, however access was granted to enough strategically located parcels to provide representative geophysical coverage.

3.12.6.2 OE scrap was recovered from 35 of the anomalies (29.41%) including one live (UXO) 4.2-inch mortar (M3 or M3A1) with flash tube (anomaly F2A-1) and in excess of twenty-five pieces of 4.2-inch mortar fragments (Table 3.2). The mortar fragments were considered indicative of HE detonations confirming live ordnance was used during beach assaults. The UXO item was located approximately 48 inches below the land surface and was detonated on-site (Figure 3.15/Table 3.3). The recovery depths of the other OE items ranged from less than 1 inch to a maximum depth of 48 inches. The distribution of the OE findings within Area F is depicted on Plate 4 in Appendix F (Volume 2). A review of the OE distribution suggests there is a spatial pattern for the concentration of OE items. With only one exception, all of the OE (including the UXO)

were found near the west-central portion of Area F designated as Cannonball Point on topographic maps. The single 4.2-inch mortar fragment found further west was likely displaced through erosion and wave action from storm events. As a result of the intrusive investigation, the footprint for Area F was reduced from 1923 acres to 158 acres. The data suggests that further investigation of the remainder of the AOI is not warranted.

3.12.7 Area G – Alligator Point Gunnery Range

3.12.7.1 Alligator Point (Area G) was investigated via approximately 5.51 acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 2.2% of the total 250-acre AOI acreage. The traverses were distributed throughout Area G to provide representative coverage to justify extrapolation of the results to the entire AOI and to bias survey locations to focus on suspect beach landing sites and straffing targets. No brush cutting was required to provide access for the EM-61 instrument. A total of 191 anomalies were identified from the geophysical data, 97% of which were intrusively investigated. The four anomalies within Area G that were not investigated were the result of missing reacquisition flags. Review of the anomaly data indicated only low magnitude readings, implying an extremely low probability of the items being UXO. Based on the findings of the 187 excavated anomalies, sufficient characterization data was determined to have been collected and the four anomalies were not intrusively investigated. Eighteen (9.94%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2). Property ROEs were not granted for many of the small privately-owned parcels primarily since most of the owners are absentee. However, access was granted to enough strategically located parcels to provide representative geophysical coverage of the area.

3.12.7.2 OE scrap was recovered from only two of the anomalies (1.1%) consisting of an Mk23 practice bomb (anomaly AG-77) and a box fin to a 100-pound bomb (Table 3.2). The Mk23 bomb was recovered from a residential parcel at approximately 6 inches below the land surface. The 100-pound bomb box fin was recovered from the ground surface along the beach within the Nature Conservancy property. Due to the deteriorated condition of the fin, it is likely that the item was redeposited as a result of wave-action. Numerous .50-caliber bullets were recovered (not considered OE for this project) from the western Gulf-side tidal zone tip of the peninsula, likely from aerial straffing. No UXO was identified in Area G. The distribution of the OE findings within Area G is depicted on Plate 5 in Appendix F (Volume 2). The distribution did not indicate the presence of a specific high concentration area within Area G thus footprint reduction for the AOI was not warranted.

3.12.8 Area H – Red, White, and Green Beaches

3.12.8.1 Red, White, and Green Beaches (Area H) was investigated via approximately 4.99 acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 9.41% of the total 53-acre AOI acreage. The traverses were distributed throughout Area H to provide representative coverage to justify extrapolation of the results to the entire AOI and to bias survey locations to focus on suspect beach landing sites. No brush cutting was required to provide access for the EM-61 instrument.

A total of 244 anomalies were identified from the geophysical data, 57% of which were intrusively investigated. The 104 anomalies within Area H that were not investigated were the result of a significant fluctuation in the seasonal tides. Even at low tide, these anomaly locations were underwater during the time of the intrusive investigation field effort. Review of the anomaly data indicated generally low magnitude readings. Based on the findings of the 140 excavated anomalies and lack of the presence of any OE, sufficient characterization data was determined to have been collected. Two (1.43%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2). Property ROEs were not granted for many of the small privately-owned parcels primarily since most of the owners are absentee. However, access was granted to enough strategically located parcels to provide representative geophysical coverage of the area.

3.12.8.2 No OE or any OE-related scrap was recovered during the intrusive investigation of Area H. The anomaly locations within Area H are depicted on Plate 6 in Appendix F (Volume 2).

3.12.9 Area I – Harbeson City

3.12.9.1 Harbeson City (Area I) was investigated via approximately 3.11 acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 0.90% of the total 347-acre AOI acreage. The traverses were distributed throughout Area I to provide representative coverage to justify extrapolation of the results to the entire AOI and to bias survey locations to focus on the newly identified location of the mock German village. Significant brush cutting was required to provide access for the EM-61 instrument due to the presence of extensive vegetation. A total of 419 anomalies were identified from the geophysical data, 96% of which were intrusively investigated. The sixteen anomalies within Area I that were not investigated were the result of missing reacquisition flags. Review of the anomaly data indicated only low magnitude readings, implying an extremely low probability of the items being UXO. Based on the findings of the 403 excavated anomalies, sufficient characterization data was determined to have been collected and the sixteen anomalies were not intrusively investigated. Six (1.49%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2). Property ROEs were not granted for several of the privately-owned parcels near the Crooked River, however access was granted to enough strategically located parcels to provide representative geophysical coverage.

3.12.9.2 OE scrap was recovered from only one anomaly (<1%) and consisted of an unidentifiable HE fragment located on the ground surface (anomaly IRD5-16, Table 3.2). Although the fragment was considered indicative of the use of live ordnance in the area, it was not confirmatory. The distribution of the anomalies within Area I is depicted on Plate 7 in Appendix F (Volume 2). As a result of area reconnaissance, historical records, and the field identification of the Harbeson City structures during the EE/CA investigation, the footprint for Area I was formally reduced from 347 acres to 247 acres. The data suggests that further investigation of the southern portion of the AOI is not warranted.

3.12.10 Area J1, J2, J3, J4 – Special Training Areas

3.12.10.1 The Special Training Areas (Area J) were investigated via approximately 4.16 combined acres of geophysical meandering paths (Table 3.1, Appendix B). This acreage represents 0.9% of the total 460-acre AOI acreage. The traverses were distributed throughout Area J to provide representative coverage of each of the four subareas to justify extrapolation of the results to the entire AOI. Significant brush cutting was required to provide access for the EM-61 instrument. A total of 79 anomalies were identified from the geophysical data, 99% of which were intrusively investigated. The single anomaly within Area J that was located in Subarea J2 and was not investigated as a result of a missing reacquisition flag. Review of the anomaly data indicated only a low magnitude reading, implying an extremely low probability of the item being UXO. Based on the findings of the 78 excavated anomalies, sufficient characterization data was determined to have been collected and the anomaly was not intrusively investigated. Thirteen (16.7%) of the anomalies were considered “false positives” as no discernable metallic debris was located (Subsection 3.7.1.2). The high false positive rate was attributed to extremely rough terrain causing the EM-61 to frequently be jolted even at very slow speeds. As a result, the instrument recorded a spike in the data that was interpreted as an anomaly. Property ROEs were granted for all of the subareas with the exception of a privately held portion of Subarea J4.

3.12.10.2 OE scrap was recovered from four different anomalies (5.1%) within Area J. Three Mk1A1 practice grenades were recovered from a single anomaly (J1B-6) from Subarea J1. Three anomalies within Subarea J4 resulted in an inert M1B1 anti-tank practice mine and two Mk1A1 practice grenades. No other OE or UXO was recovered from the AOI (Table 3.2). The distribution of the OE findings within Area J is depicted on Plates 2, 8, 9, and 10 in Appendix F (Volume 2). The presence of OE in Subareas J2 and J3 was not confirmed. Although practice grenades were recovered from Subarea J1 and Subarea J4, the distribution did not indicate the presence of a specific high concentration area within either subarea thus footprint reduction for the AOI was not warranted.

3.12.11 Area K – Dump

3.12.11.1 Investigation of the Dump (Area K) was not originally planned during this EE/CA project since the selected geophysical survey equipment does not operate effectively within suspected dump areas (see Subsection 2.2.3.3). However, based upon concerns expressed by FDEP during review of the project WP, a geophysical survey was proposed within the Area K boundaries in an effort to confirm the presence of the suspected dump. Approximately 1.57 acres (0.98%) of geophysical meandering paths were surveyed within the 160-acre forested parcel, as depicted on Plate 11 in Appendix F [Volume 2] (Table 3.1).

3.12.11.2 Several meandering paths were distributed within Area K strictly to gather general information regarding the suspected presence of a military dump on the parcel. Significant brush cutting was conducted due to the extremely dense vegetation in some areas of the property. A total of 13 anomalies were identified from the geophysical data,

100% of which were intrusively investigated (Appendix B). No OE or any OE-related scrap was recovered during the intrusive investigation of Area K. The anomaly locations within Area K are depicted on Plate 11 in Appendix F (Volume 2). The apparently random distribution and types of debris recovered did not indicate the presence of a dedicated dump area within Area K. Further evaluation of this AOI will not be addressed in this EE/CA, however, further environmental investigation of Area K is recommended during HTW studies pending within the Camp.

3.12.12 Area L – Eastern EOD Cleared Sites

3.12.12.1 The Eastern EOD Cleared Sites (Area L) were investigated via approximately 1.04 acres of geophysical meandering paths (Table 3.1, Appendix B). The investigation of Area L does not conform to the statistical sampling requirements used to identify minimum geophysical survey acreage. Since the presence of OE is unlikely in this AOI, only a cursory check was planned to verify the absence of OE items. The meandering paths were not distributed in advance for Area L but were selected in the field. Although the vegetation was extremely dense, no brush cutting conducted since Schonstedt® magnetometers were exclusively used. All anomalies were investigated by the “mag and dig” procedure described in Subsection 3.1.1.2. A total of 548 anomalies were identified and intrusively investigated “real-time”. By definition, no “false positives” were identified.

3.12.12.2 No OE or UXO was identified in Area L. Therefore, the data supports the hypothesis that the area was never used by the Camp for any ordnance training. The anomaly distribution within Area L is depicted on Plate 12 in Appendix F, Volume 2. Further evaluation of this AOI will not be addressed in this EE/CA.

3.12.13 Area M – Clearings 1 and 3

Area M – Clearings 1 and 3 was not investigated during this EE/CA project, as described in Subsection 2.2.3.

3.12.14 Area N – Small Arms Ranges

Area N – Small Arms Ranges was not investigated during this EE/CA project, as described in Subsection 2.2.3. However, environmental investigation for possible lead contamination is recommended during HTW studies pending within the Camp.

3.12.15 Area O – All Other Land

Area O – All Other Land was not investigated during this EE/CA project, as described in Subsection 2.2.3.

3.12.16 Area P – Off-Post EOD Cleared Sites

Area P – Off-Post EOD Cleared Sites was not investigated during this EE/CA project, as described in Subsection 2.2.3.

3.12.17 Area Q – USAF Radar Site

Area Q – USAF Radar Site was not investigated during this EE/CA project, as described in Subsection 2.2.3.

3.13 ARCHAEOLOGICAL RESOURCES

3.13.1 Affected Environment

3.13.1.1 The Draft Environmental Work Plan for the EE/CA investigation was reviewed by the Florida State Historic Preservation Office (SHPO), Division of Historical Resources. In a letter dated November 9, 1999, the Florida SHPO noted that 11 known archaeological sites are located in the areas of the proposed geophysical investigations. However, an additional 24 sites are located adjacent to the proposed geophysical investigations. The SHPO also noted that several areas subject to the geophysical investigations are considered to have a high or medium probability for containing archaeological sites

3.13.1.2 As noted above, review of the Florida Master Site Files at the SHPO, Division of Archaeology indicated 35 sites have been located within or adjacent to the survey area. Of these, 26 (74%) have prehistoric components, six (17%) have historic components, and three (9%) have no identified components. Prehistoric site types in the vicinity include villages, hamlets, mounds (both with and without human burials), short-term campsites, midden sites, and special procurement sites. Historic site types include historic bridges, artifact scatters associated with former historic buildings, a turpentine camp, trash dumps, and shipwrecks.

3.13.1.3 Several sites located in the immediate vicinity are listed in, or eligible for, the National Register, while other sites have been determined potentially eligible for the National Register. Potentially eligible sites and unevaluated sites are afforded the same level of protection as listed and eligible sites. Protected sites include, but are not limited to, Tucker Mound (8Fr4) (a multi-component Late Archaic to Late Woodland site), Yent Mound (8Fr5) (a Woodland period ceremonial site associated with the Hopewellian culture), several prehistoric sites, two historic shipwrecks, a turpentine camp, and a historic bridge at Harbeson City.

3.13.1.4 Portions of the area encompassing the Camp, including Dog Island, have been surveyed. Archaeological survey of the area began in 1902 with C.B. Moore's reconnaissance of mound sites along coastal Florida. This and subsequent surveys, including Gordon Willey's 1940 survey of the Florida Gulf Coast, resulted in the identification of several large and important prehistoric sites. Data from these surveys and subsequent excavations led to the refinement of the regional chronology. During the last ten years several comprehensive archaeological surveys have been conducted within Franklin County. These surveys have expanded the prehistoric and historic knowledge of the county by including smaller camp and procurement sites, as well as recording more recent historic sites thus filling out the archaeological record for Franklin County.

3.13.2 Archaeological Sensitivity

The archaeological sensitivity of the survey areas was based on environmental criteria and proximity to previously recorded sites in similar environmental settings. Where possible or practicable, the sensitivity of an area was based on probability modeling. However, in some cases (e.g., Area I) the number of archaeological investigations changed based on field conditions or UXO field investigations. The archaeological sensitivity of an area was determined using the following methods. First, known sites in the project vicinity were mapped on USGS 7.5-foot quadrangle maps. Several environmental factors were used to determine prehistoric archaeological sensitivity of a given area. These factors included (1) proximity to permanent water (i.e., a portion of the area adjacent to rivers, streams or the coast), (2) vegetation zones (e.g., oak hammocks, flatwoods, cypress swamp, seasonal wetlands, etc.), (3) presence of alluvial terraces or coastal sand dunes, (4) soil drainage characteristics, (5) proximity to areas with relatively high bio-diversity (i.e., ecotonal settings), (6) and proximity to known sites. Historical sensitivity was based on the above criteria as well as various types of historical information such as proximity to former buildings or structures, and proximity to the intersection of historic crossroads. Oral histories compiled during the background research also assisted in determining the probability for historical sites.

3.13.3 Methodology

3.13.3.1 As a result of the high sensitivity of large portions of the project area, the Florida SHPO requested an after-the-fact survey of “5 to 10 percent of the ground disturbances” (anomalies) investigated by the OE/UXO personnel. At the request of the SHPO, and in accordance with federal and state laws (e.g., National Historic Preservation Act (NHPA) of 1966, as amended, and its implementing regulations 36 CFR 800 and the National Environmental Policy Act (NEPA) of 1969), Parsons ES, the USAESCH, and the Florida SHPO developed a plan to conduct further archaeological investigations in the project area. Concerns for human safety were first and foremost in the development of the archaeological work plan. Specifically, the archaeological crews were only permitted to investigate those areas that had been previously cleared by the EOD teams (i.e., areas subject to a surface sweep and the excavation of all anomalies).

3.13.3.2 The areas selected for the geophysical and the subsequent archaeological investigations were determined on the review of historical records, including, but not limited to, the ASR, and other data provided by the USAESCH. The ASR divided the Camp into 22 areas, designated Areas A through Q (see Figure 2.2). Area J was further subdivided into four subareas (J1-J4), and Area L was subdivided into three areas (L1-L3) for the purpose of the archaeological investigations. Based on the review of former military land-use practices, the ASR, and other data sets, Areas D, M, N, O, P, and Q were not selected for geophysical investigations due to the extremely low potential for the occurrence of OE/UXO. Consequently, no archaeological investigations were conducted in the aforementioned six areas.

3.13.3.3 Archaeological survey strategies included pedestrian reconnaissance and screening the “backdirt” of soils excavated to remove UXO. Testing variables for

archaeological investigations were dependent on the archaeological sensitivity of an area, the OE/UXO sensitivity of an area, number of meandering paths/corridors cleared by the EOD teams per area, depth of UXO investigations, ground visibility, and soil type.

3.13.3.4 Based on archaeological probability, a percentage of holes excavated by the EOD teams were left open for archaeological review. Size, depth, and mutual proximity of the holes varied. Once a meandering path was cleared of UXO, archaeologists examined the open holes. Soil information was recorded on standardized forms and included soil color, texture, and natural and cultural inclusions. Backdirt was screened through ¼-inch mesh hardware cloth in order to ensure the uniform recovery of cultural material. Artifacts (i.e., cultural material greater than 50 years of age) recovered were placed in polyethylene bags according to provenience. Each hole had an exact provenience obtained by a GPS unit.

3.13.3.5 Sites discovered during the survey were recorded and mapped, and the area location was photographed. Site forms were completed and added to the Master Site Files at the Florida SHPO. Documentation of each site included cultural finds, relevant physiographic features environmental setting, GPS coordinates, a site map, and photographs of the area. Each site was photographed using black and white prints and color-slide film. Although military ordnance and shrapnel were observed throughout the survey, all ordnance/shrapnel was left undisturbed by archaeologists because of health and safety concerns. Military foundations dating to World War II were noted and photographed, as were historic foundations related to Harbeson City. Given that both Harbeson City and Camp Gordon Johnston were occupied more than 50 years ago, artifacts, features, and foundations suspected to date to these episodes were recorded on standard Florida Master Site File forms. Artifacts known or suspected to be less than 50 years of age (e.g., aluminum cans, plastic, etc.) were discarded in the field, though such items were noted in the STP field forms.

3.13.3.6 Because of the sensitive nature of OE/UXO investigations, changes in the proposed work schedule were anticipated, and the investigations at the Camp proved to be no different. The 5-10% sample strategy requested by the SHPO was maintained despite the changes in the proposed work and the inclusion of Areas L1-L3, which was not part of the original archaeological scope.

3.13.4 Archaeological Survey Results

3.13.4.1 As a result of the archaeological investigations of Areas A, B, E, F, G, H, I, J1-4, K and L1-3, five new sites were identified. Three sites, the Crooked River Site (8Fr896), the Metcalf Beach Site (8Fr897), and La Sola Piedra Site (8Fr898) are prehistoric, and two sites, Harbeson City Mill Site (8Fr899) and Camp Gordon Johnston (8Fr900) are historical. The Metcalf Beach Site (8Fr897) was identified in Area L2, whereas sites 8Fr896, 8Fr898, and 8Fr899 were identified in Area I. Evidence (both structural and artifactual remains) of Camp Gordon Johnston (Site 8Fr900) was recorded or observed in several areas. However, the densest recovery of historic remains was observed in Area I. A brief description of each site is presented below and Table 3.3 summarizes the results of the archaeological testing.

3.13.4.2 **8Fr896.** The Crooked River Site (Fr896) was identified as containing prehistoric artifacts in a single, intrusive EOD investigation (Area I: I3X-7). The site is located in an immature oak hummock east of Crooked River. The hammock, which measures approximately 30m x 30m, is bounded to the east and west by small swampy wetlands. North of the site, the young hammock gives way to fetterbush and scrub vegetation. Pines with a hardwood understory are present to the south. Although Area I is characterized by minimal relief, the Crooked River site is located on a slight topographic rise. Fourteen prehistoric sherds were recovered from I3X-10 at a depth of 0 to 25cm below surface. The soils containing the sherds as well as those in the immediate vicinity appear to be undisturbed. Eleven of the 14 sherds recovered from the intrusive pit crossmend. Based on the paste, the amount of inclusions in the paste, the presence of sponge spicules in the paste, and the lack of decoration, the vessel is tentatively identified as a dating to the Belle Glade ceramic series. These sherds, which date to the Late Woodland period, are not typically found in the northwestern Florida.

3.13.4.3 **8Fr897.** The Metcalf Beach Site is located in Area L2 along a small beach facing Ochlockonee Bay. The site was identified on the basis of two chert flakes recovered from two test holes located within a 10- to 12-meter area. Intrusive investigations were confined to an elevated terrace or second terrace of the beach. A large oak hammock is present to the south of the site. The flakes collected from test holes L-6 and L-12 were recovered from an undisturbed context at a depth between 20 to 65cm below surface. The other four tests located along this portion of Area L2 were negative. The site is located east of 8FR818 and west/southwest of 8FR819 on a terrace slightly raised from the beach.

3.13.4.4 **8Fr898.** La Sola Piedra site (8Fr898), located in a wet flatwood and swamp community, is represented by a single isolated chert flake recovered from IRD-1-69. The flake was recovered approximately 30 to 35cm below surface. This EOD investigation also resulted in the recovery of various historic artifacts, including clear bottle glass, embossed glass, and iron strap hinges. The latter artifacts were recovered higher in the soil profile and are related to Harbeson City or the Camp Gordon Johnston era. The site is located along an access road of Area I.

3.13.4.5 **8Fr899.** The Harbeson City Mill Site (8FR899), situated on the east side of Crooked River, is located in the westernmost portion of Area I. The area, also known as Mill Pond Landing, is set in a lush, swampy area dominated by pines with a dense understory of hardwoods and shrubs. The site was identified on the basis of wooden structural remains (2-inch x 8-inch boards) that were located between 15 to 45cm below surface in a single investigation. Trace amounts of mortar were observed between the lumber. The wooden remains may represent either lumber used for the damming of Crooked River for controlled water pooling/intake for the millrace, or actual mill foundation remains. The structural remains were discovered at the northern most tip of the millrace (area dredged east and north from Crooked River) in EOD investigation I 1X-19. Although no historical artifacts were recovered within a 50-meter radius of the structural remains or the millrace, some of the artifacts attributed to Camp Gordon Johnston (8Fr900) may be part of the Harbeson City Mill site. However, a railway that

ran northwest to southeast through Harbeson City to the Harbeson City Bridge (8FR 879) passed within 160 meters east of the mill.

3.13.4.6 **8Fr900.** Camp Gordon Johnston (8Fr900) was identified by archival research supplemented by fieldwork. Numerous concrete foundations and radio tower footers were identified, both in the field and from historical map research. Foundations are especially numerous in Area I. Although it has been assumed that all the structural remains and artifacts from Area I are related to camp Gordon Johnston, it is possible that some of foundations and/or artifacts may be part of Site 8Fr899. A total of 174 historical artifacts from 26 positive subsurface tests were recovered throughout the project area. The majority of these artifacts are associated with all aspects of the former military training facility, though some of the artifacts from Area I may be related to the Harbeson City Mill (8Fr899). Representative artifacts assumed to be associated with the military use of the area include various bottle sherds (both body and base fragments), a military identification dog tag, tinware vessel fragments, and a brass bullet cartridge. Numerous wire-nails, an iron hinge, a pipe fragment, various other glass sherds, window glass sherds, and some brick fragments were also recovered. Harbeson City, located in Area I, was abandoned in 1942 to make way for the training facility. Therefore, a large portion of the Camp Gordon Johnston training facility overlapped the abandoned Harbeson City.

Table 3.4
Results of the Camp Gordon Johnston Archaeological Survey

Area	Site No.	Site Name	Provenience	Time Period	Arch. Materials
I	8FR896	Crooked River	I3X-7	Prehistoric	14 sherds
L	8FR897	Metcalf Beach	L-6, L-12	Prehistoric	2 chert flakes
I	8FR898	La Sola Piedra	IRD-1-69	Prehistoric	1 chert flake
I	8FR899	Harbeson City Mill	?	Historic	Mill foundation and mill race
B, I, L	8Fr900	Camp Gordon Johnston	32 positive anomalies	Historic	Brick, glass, ceramics, iron axe, wire nails

3.13.5 Management Recommendations

The archaeological survey conducted in support of the Camp EE/CA resulted in the identification of five new archaeological sites. These include three prehistoric sites (8Fr896, 8Fr897, and 8Fr898) and two historical sites (8Fr899 and 8Fr900). In addition to the five new sites, 17 previously recorded sites were located in the selected project areas. With the exception of Site 8Fr51, no archaeological tests were conducted within the boundaries of the 17 previously recorded sites. It should be noted that Site 8Fr51 is partially destroyed and is underwater during high tide. Furthermore, it was not part of the current scope of work to relocate, assess, or test the status of existing sites, unless they were bisected by one of the geophysical survey meandering paths. Meandering Paths in Area L2 passed in proximity to Sites 8Fr818 and 8Fr819.

Figure 3.1
Site Photo of EM-61 Equipment in Operation



Photo #5-15 - EM61/GPS geophysical survey in progress- Single Cart EM61 manual configuration.



Photo #9-22 - EM61 Hand Held following GPS for reacquisition of magnetic anomalies.

2.36-inch Rocket H.E., AT, M6A1

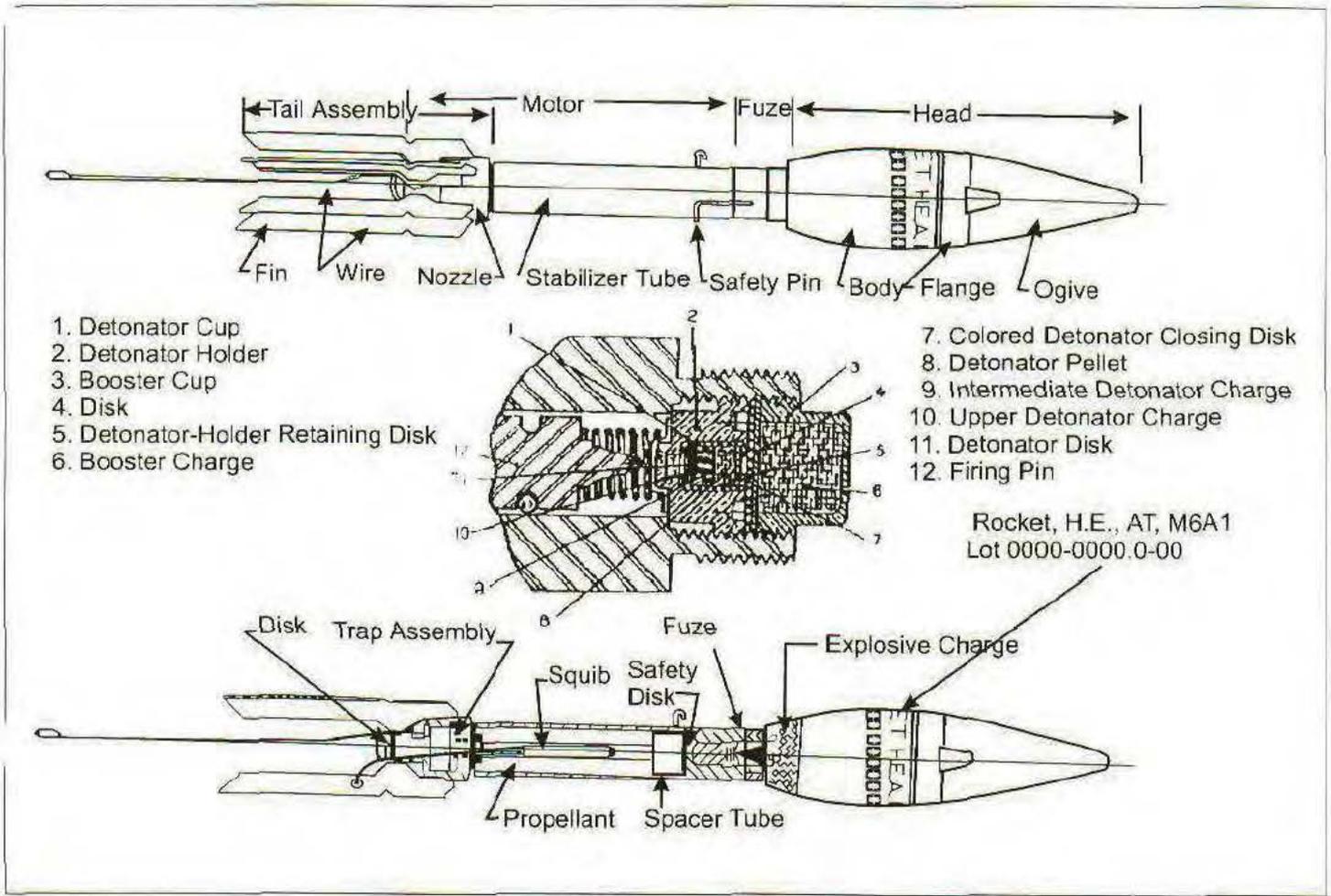


Photo 8-18: Area A- Anomaly A9-38

Cartridge. 81 Millimeter: Training, M68

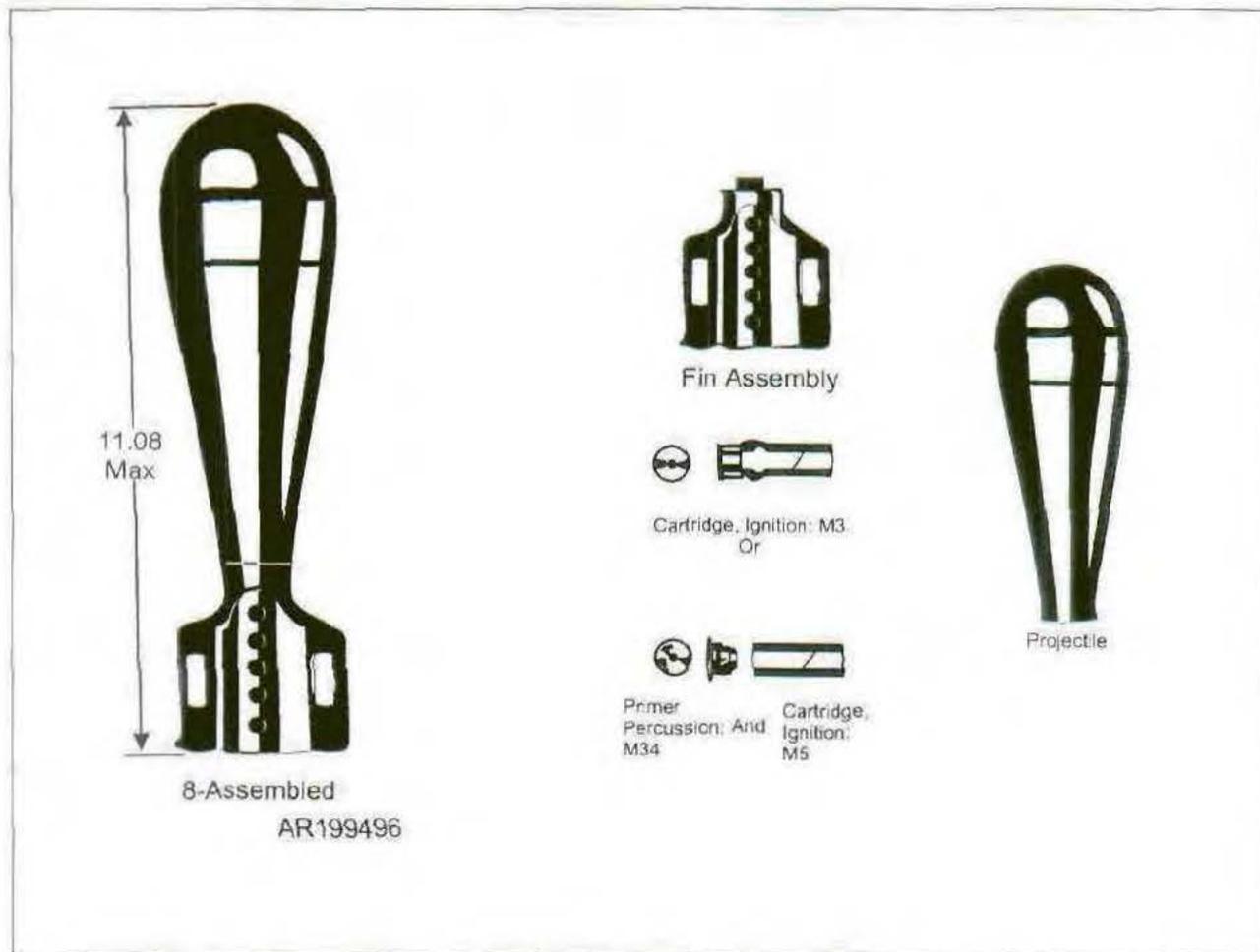


Photo 10-5: Area A- Bazooka Range - Anomaly A5-8

Cartridge, 4.2-Inch: HE, M3A1 & M3

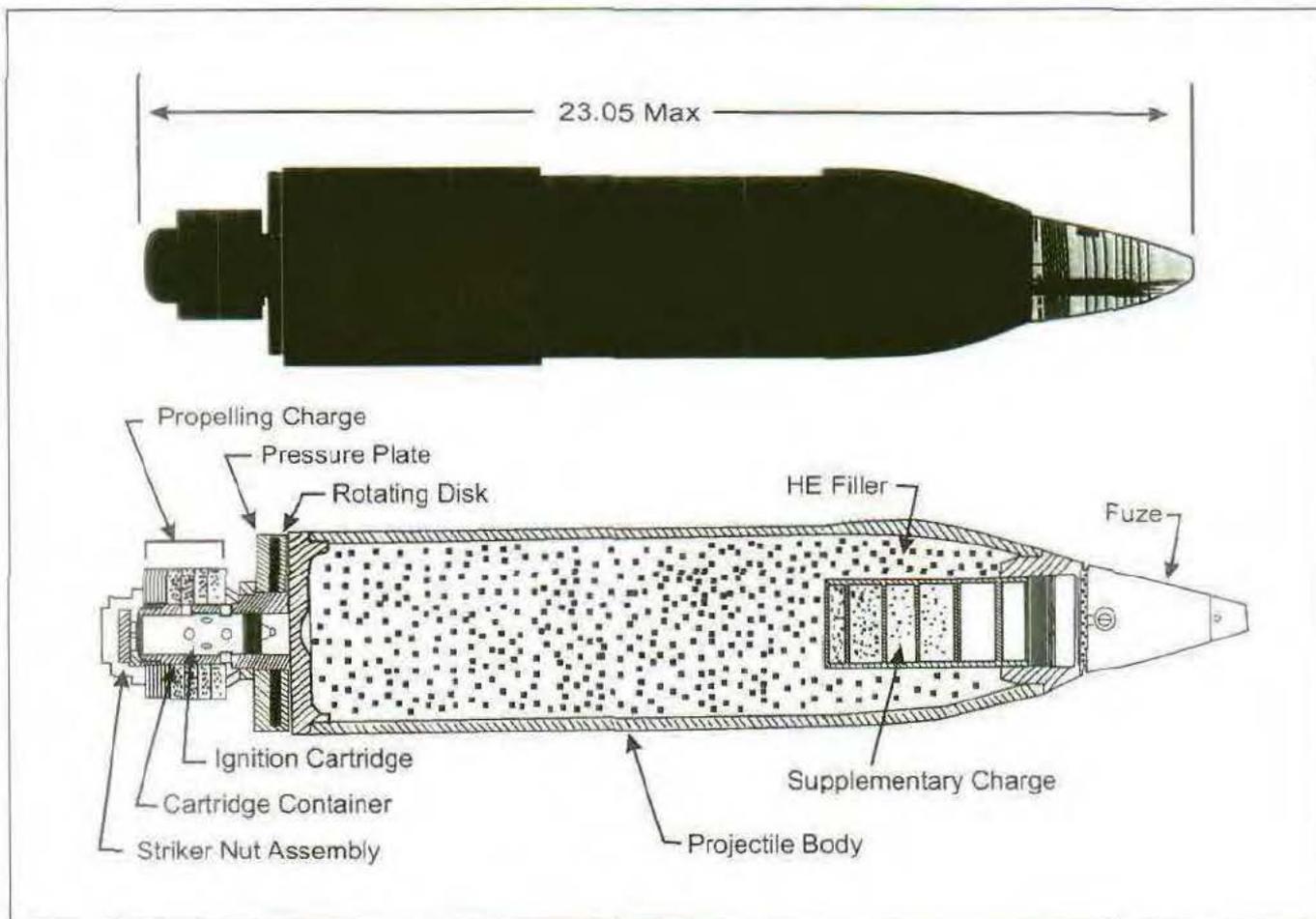


Photo 10-18: Area F - Dog Island - Anomaly F2A-1

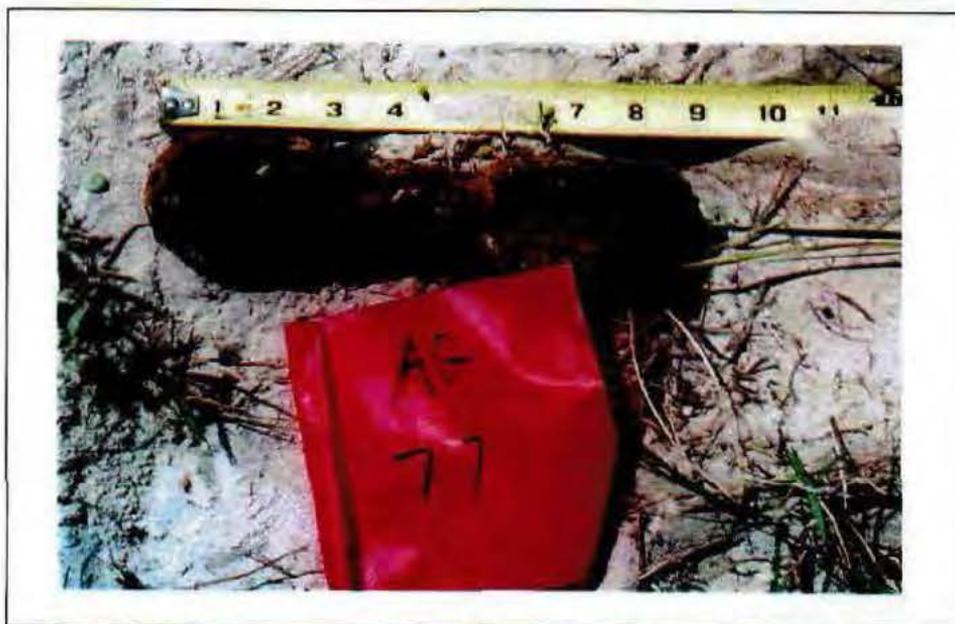
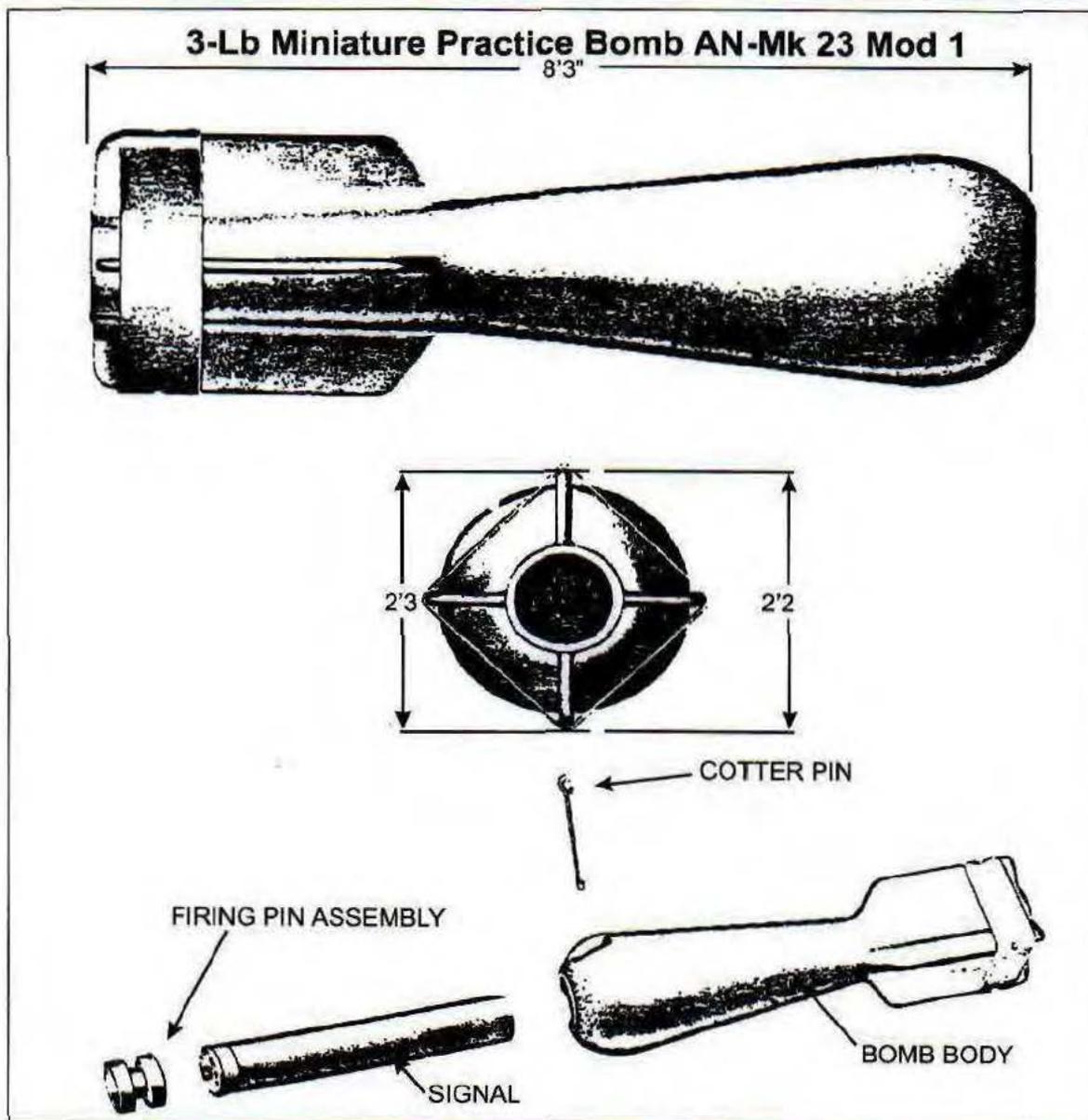


Photo 11-8:

Area G- Anomaly AG-77

M1B1 Practice Mine

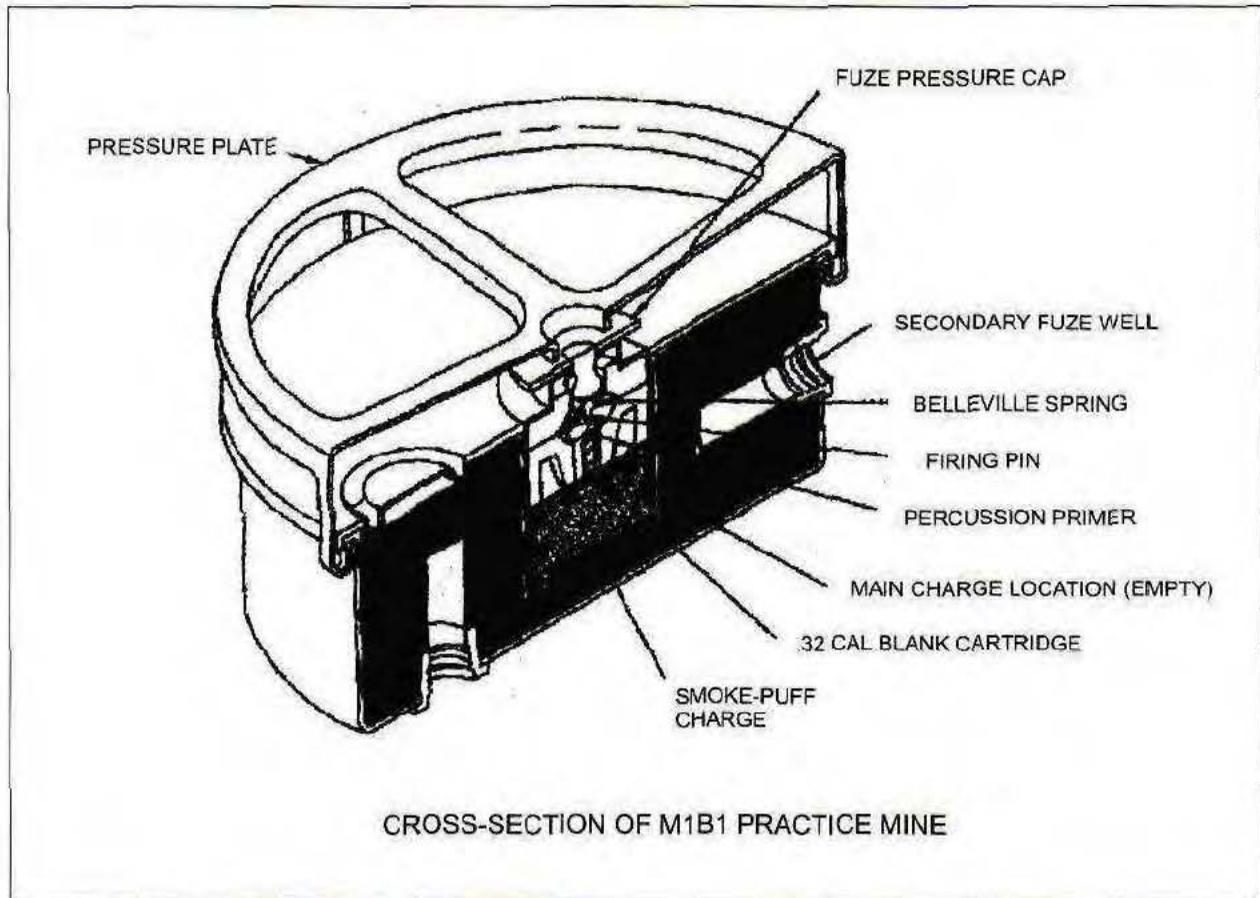


Photo 11-4: Area B - Anomaly B8-1

100 Lb. General Purpose Bomb Mk. 4 Mod 4

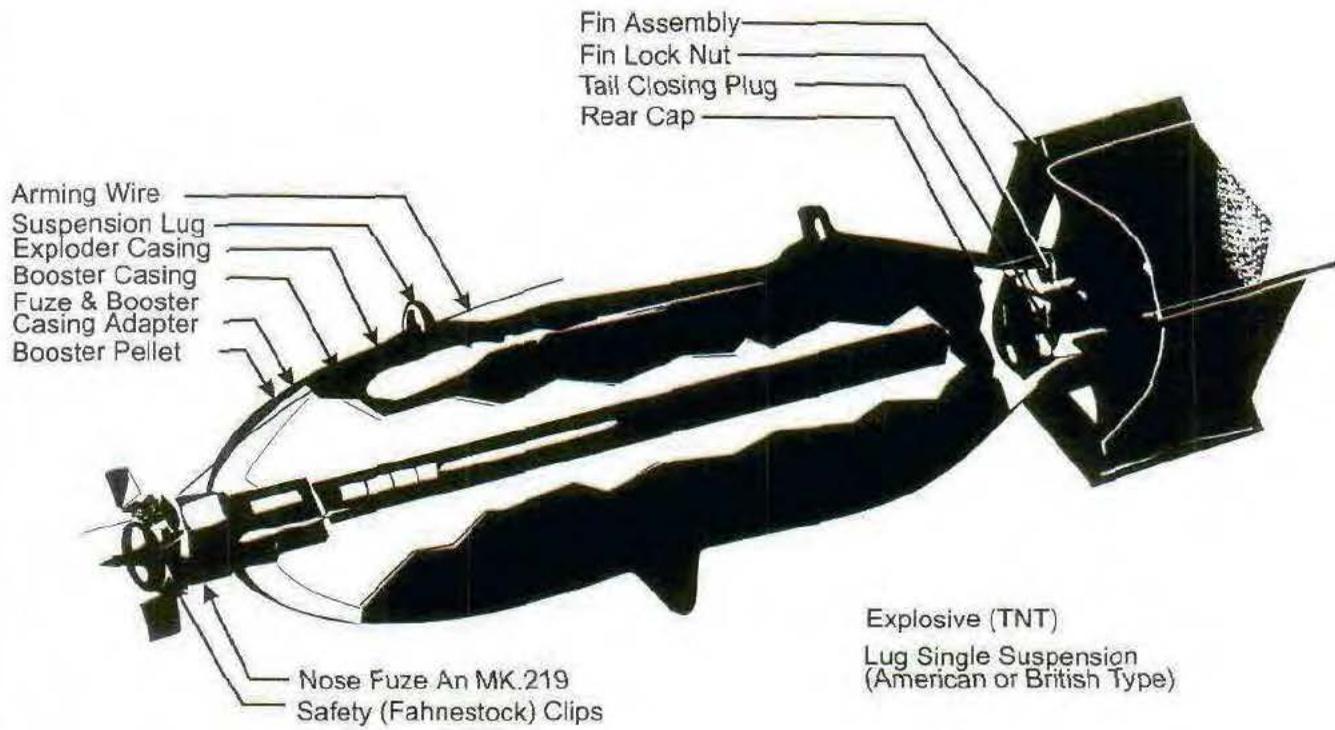
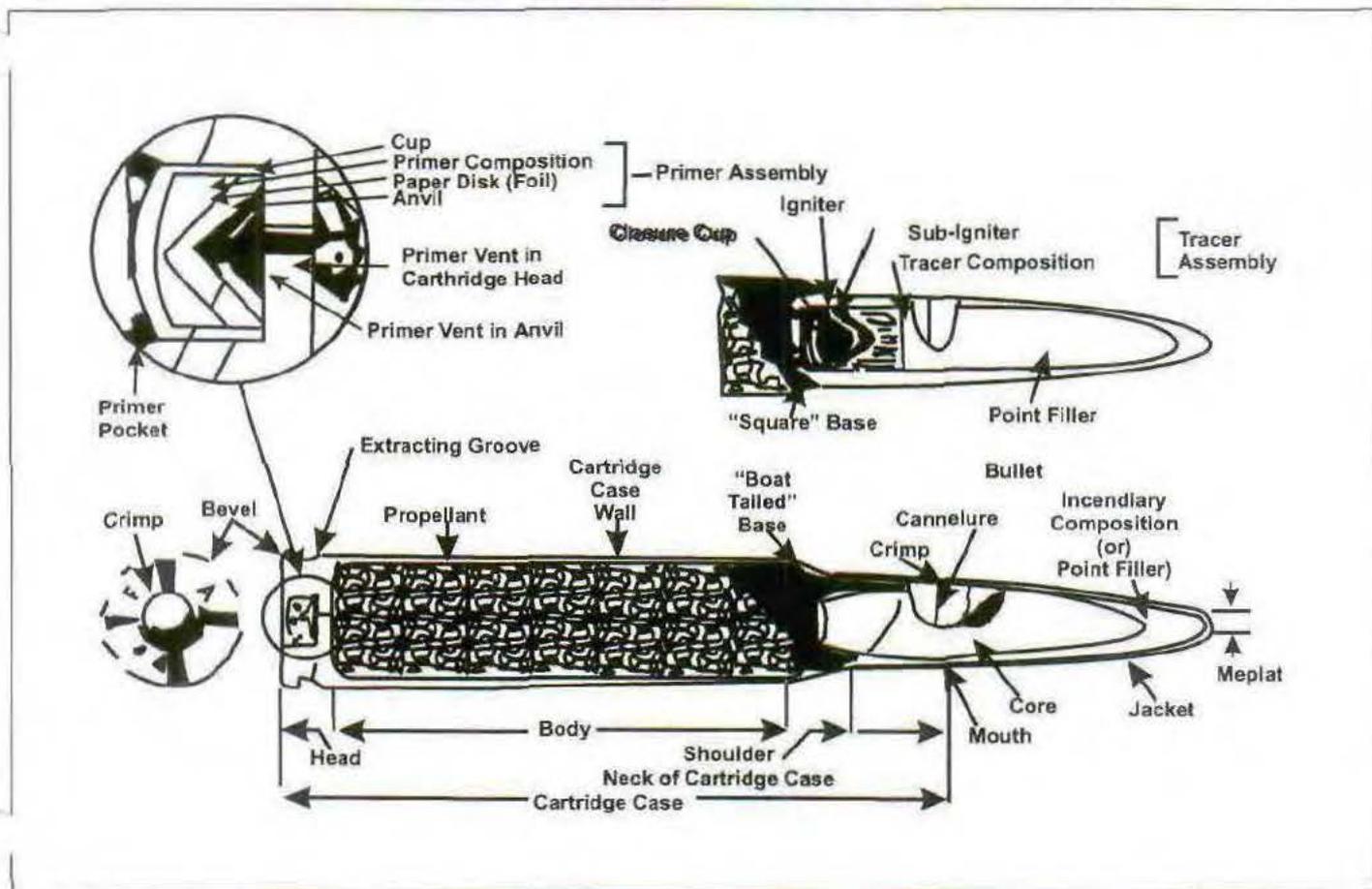


Photo 10-24: Alligator Point - Anomaly AG-182
Remains of box type fin

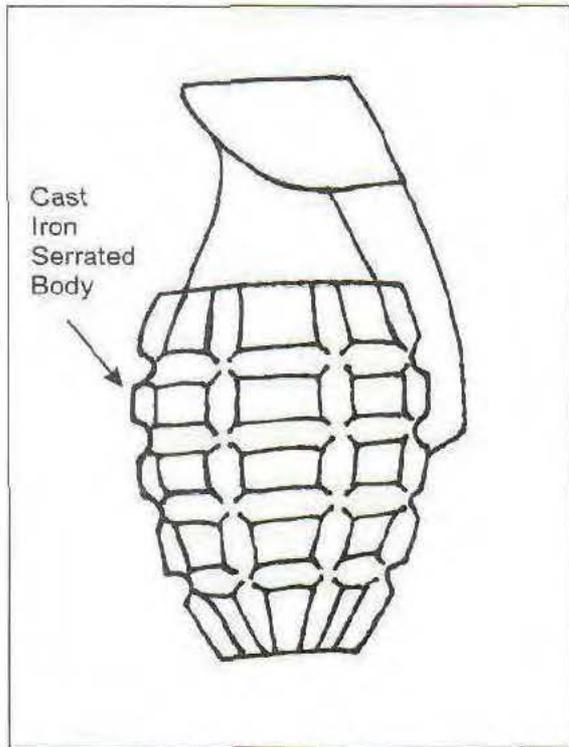
.50-Caliber Cartridge Small Arms Ammunition



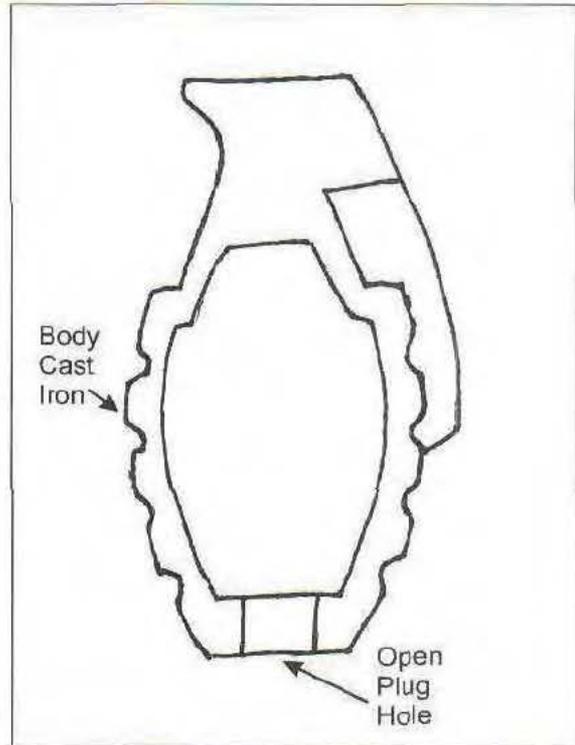
Typical Cartridge (Sectioned).



Mk1A1 Practice Grenade



Grenade, Hand, Practice

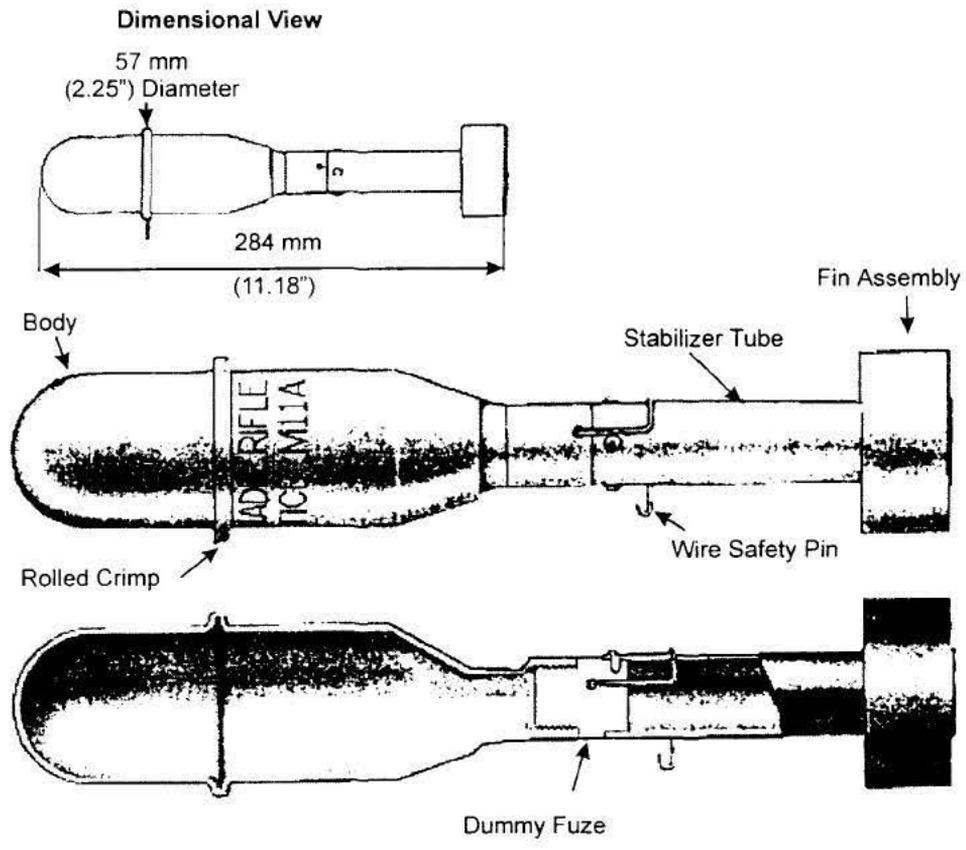


Grenade Section View



Photo 10-3: Area J4 - Anomaly J4X-6

Anti-Tank Rifle Practice Grenade M11 Series



No Photo Available: Area B - Grenade Court Anomaly B4-14

Point Detonating Fuze

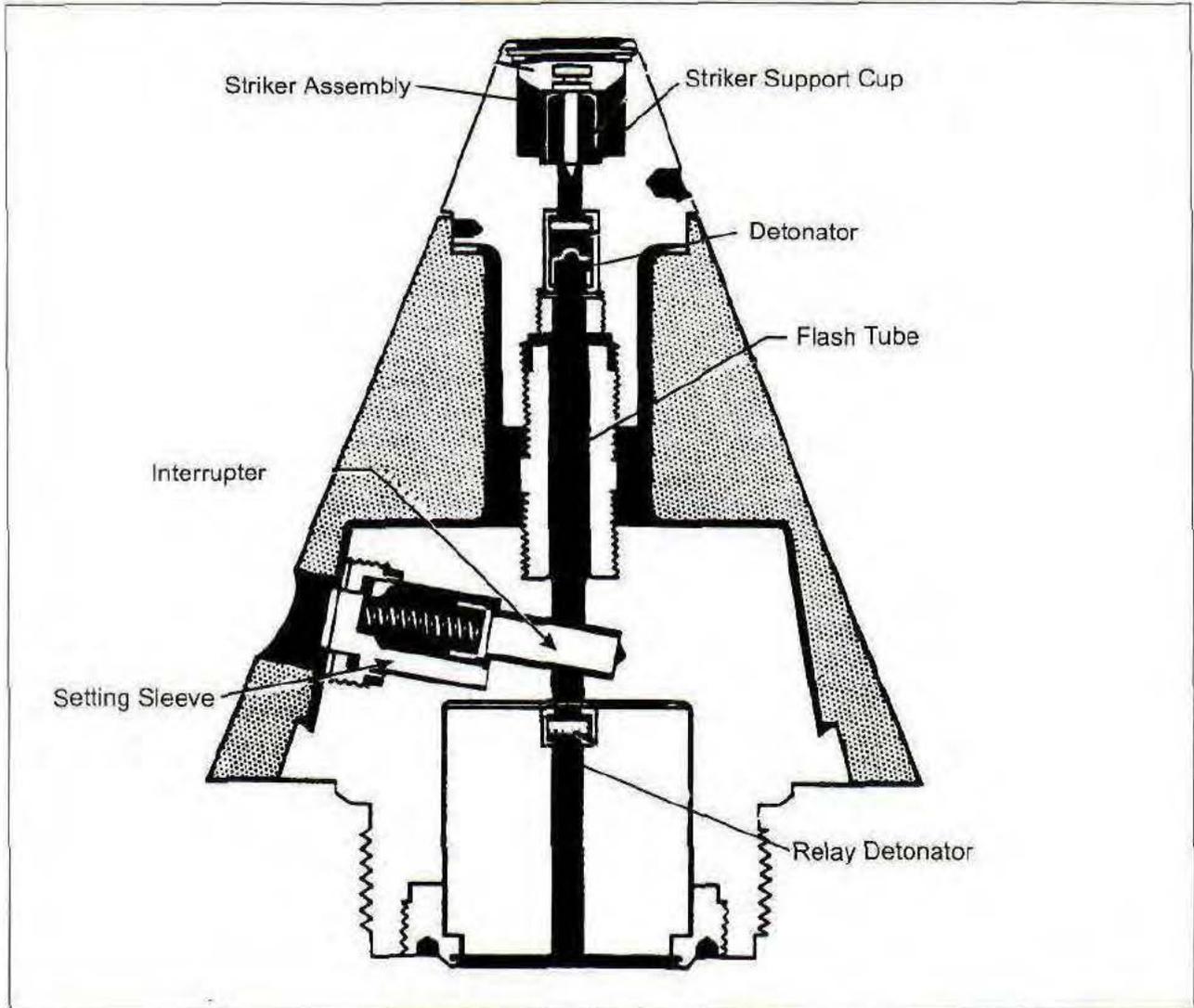


Photo 10-2: Area E- Outer boundary

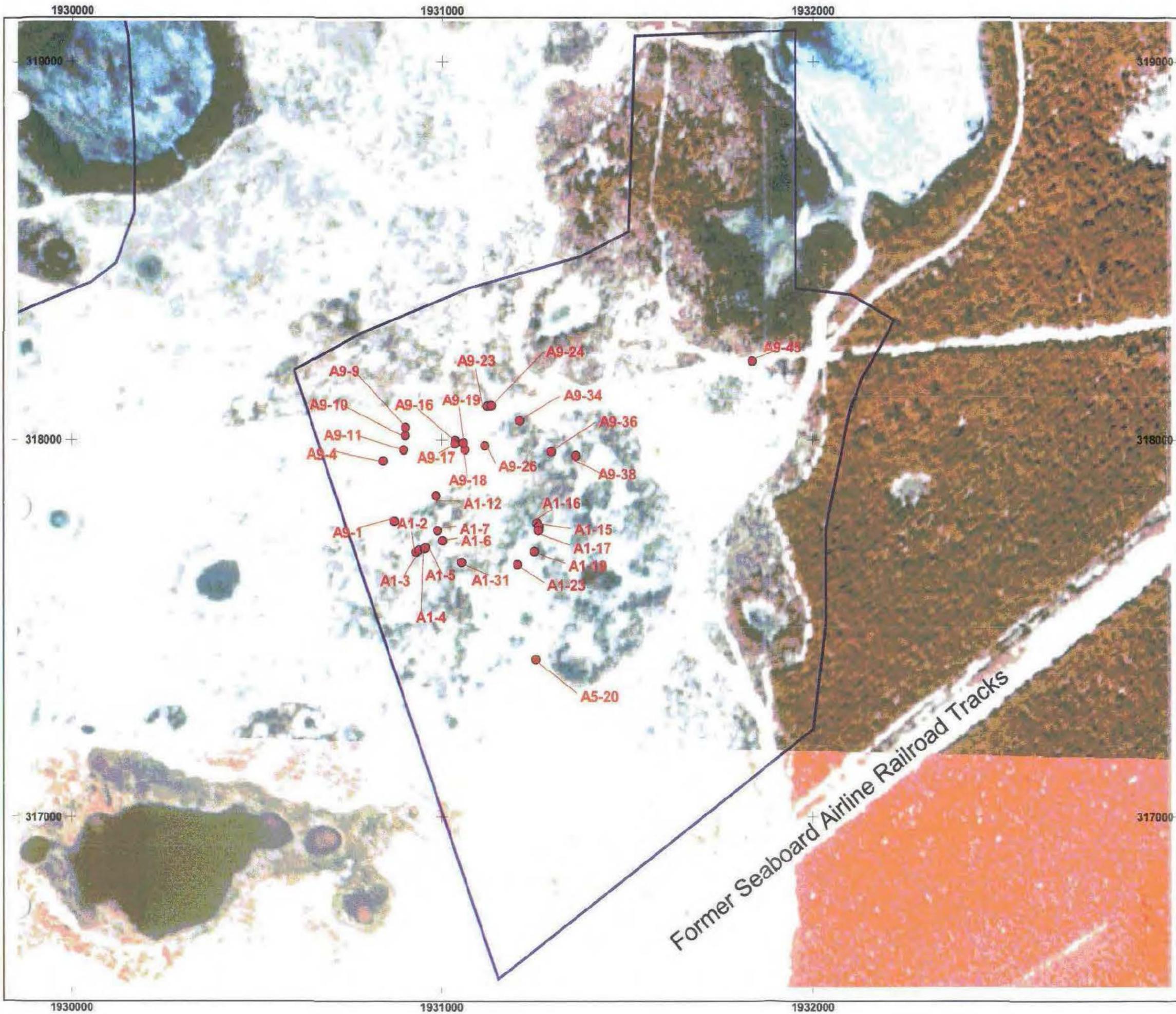


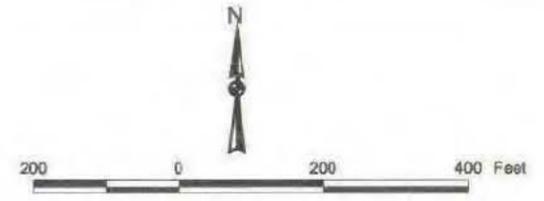
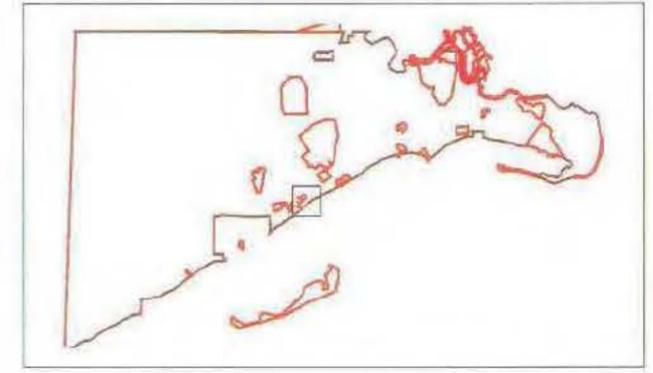
Figure 3.12

Detonated Items Area A Bazooka Range Camp Gordon Johnston Franklin County, Florida

LEGEND

- Project Area
- Detonated Items
- + State Plane 1000' Grid Markers

NOTE: Refer to Plate 1 in Volume 2 for details regarding OE Scrap locations.



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DRAWN BY: DD			
CHECKED BY: DS	SCALE: 1:3000	PROJECT NUMBER: 736121	
SUBMITTED BY: Parsons GIS	DATE: June 2001	PAGE NUMBER: 3-31	
	FILE: A09601/gu/736121/ev/wcsa_defn.apr		

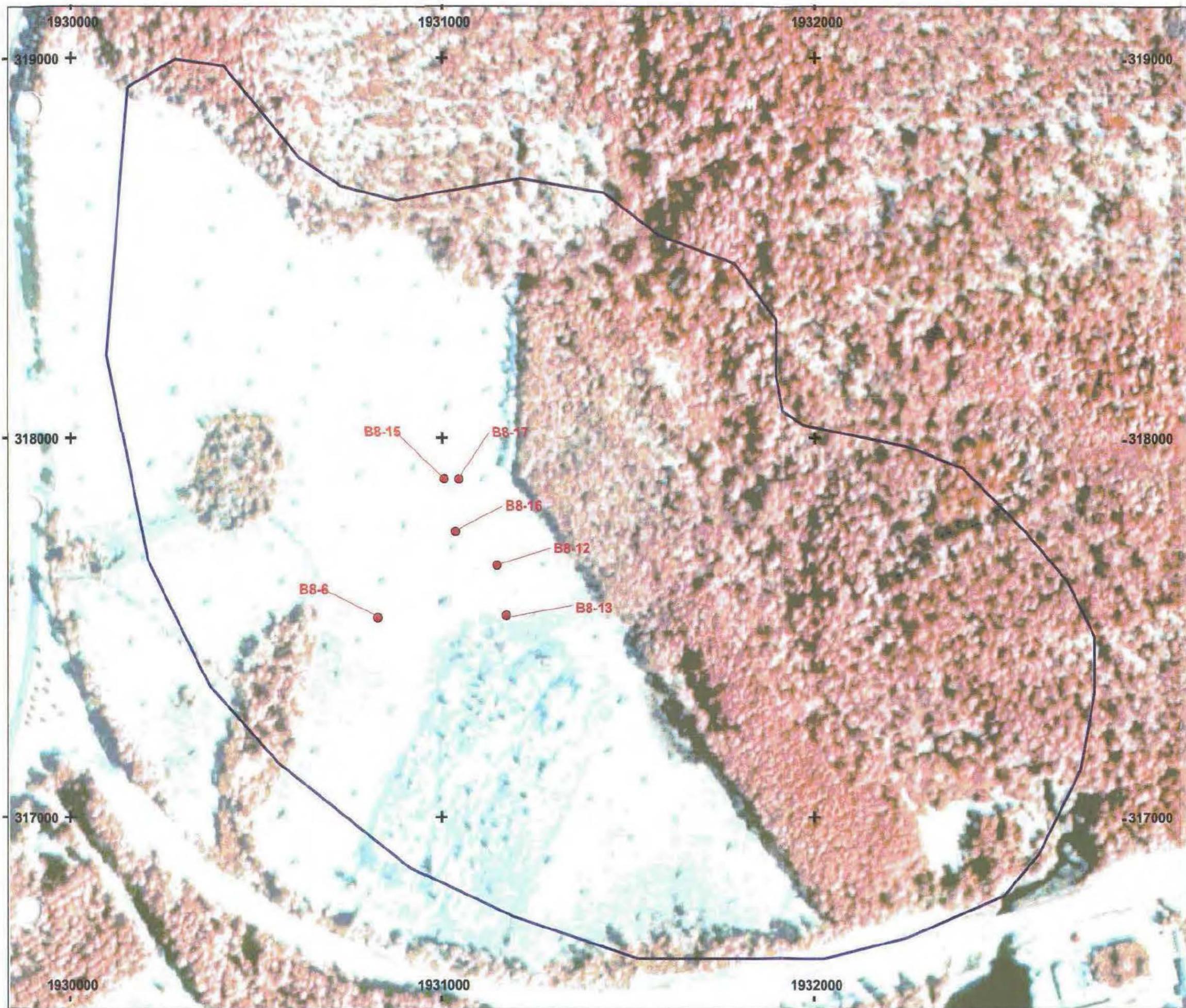


Figure 3.13

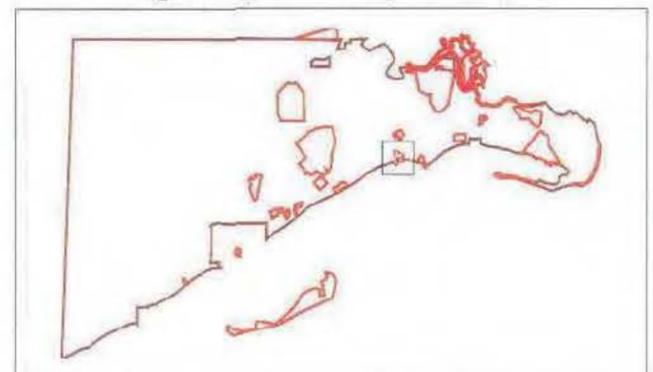
Detonated Items Area B Grenade Court

Camp Gordon Johnston
Franklin County, Florida

LEGEND

-  Project Area
-  Detonated Items
-  State Plane 1000' Grid Markers

NOTE: Refer to Plate 2 in Volume 2 for details regarding OE Scrap locations.



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CHECKED BY: DS	DATE: June 2001	PAGE NUMBER:	
SUBMITTED BY: Parsons GIS	FILE: Acj9801/gis/736121/ev/eca_sref.apr	3-32	

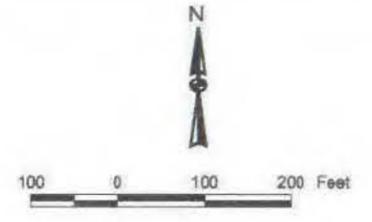
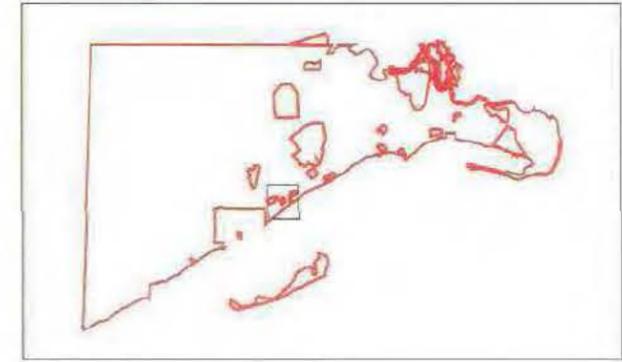
1933000 1933500 1934000 1934500 1935000



Figure 3.14
**Area C
 Barracks and Dump**
 Camp Gordon Johnston
 Franklin County, Florida

LEGEND

-  Project Area
-  Property Lines
-  Transects
-  Non OE-related Scrap



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SUBMITTED BY: Parsons GIS	DATE: June 2001	PAGE NUMBER: 3-33
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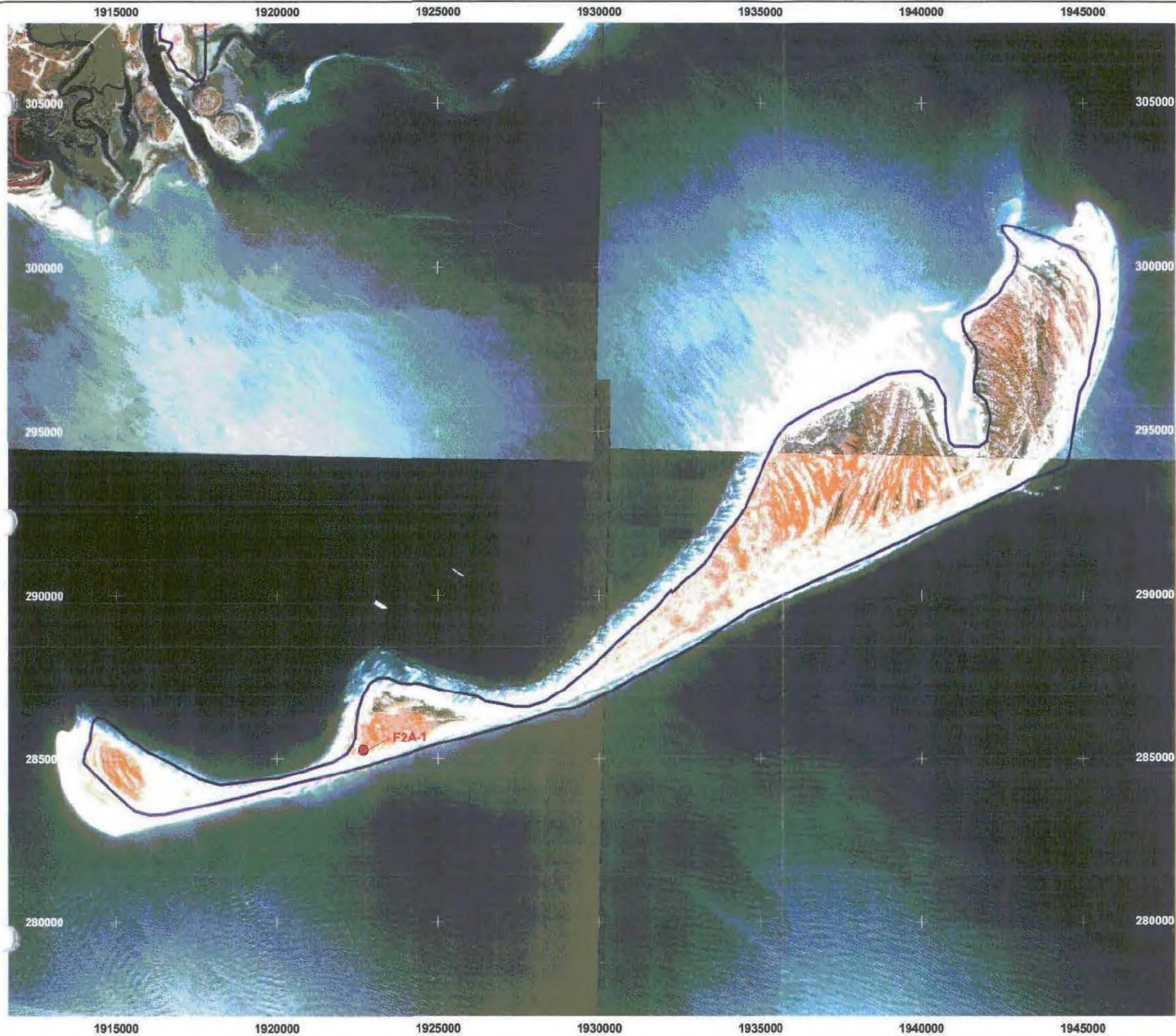


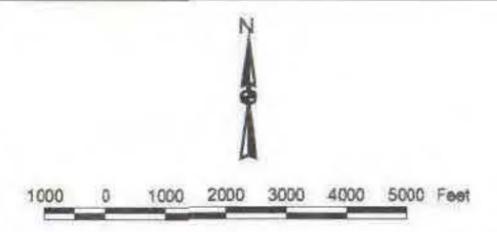
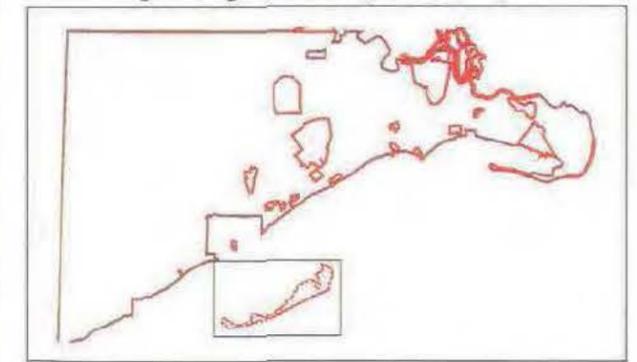
Figure 3.15
Detonated Items
Area F
Dog Island

Camp Gordon Johnston
 Franklin County, Florida

LEGEND

-  Project Area
-  Detonated Items
-  State Plane 5000' Grid Markers

NOTE: Refer to Plate 4 in Volume 2 for details regarding OE Scrap locations.



PARSONS ENGINEERING SCIENCE, INC. U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: DD	Camp Gordon Johnston Franklin County, Florida	
DRAWN BY: DD		
CHECKED BY: DS	SCALE: 1:36000	PROJECT NUMBER: 736121
SUBMITTED BY: Parsons GIS	DATE: June 2001	PAGE NUMBER: 3-34
	FILE: Atgpd01\jpl\736121\ev\wca_draft.apr	

Table 3.1
Geophysical Investigation Areas
Camp Gordon Johnston, Franklin County, Florida

Project Area Designation	Description/Former Usage	Approx. Size (Acres)	Potential OE Contamination	Proposed Survey Test Acreage	% of Area for Geophysical Survey	Actual Surveyed Acreage*
A	Bazooka Range	50	2.36" Practice and HE Rockets	2.3	2.2	2.56
B	Grenade Court	98	Mk1A1 HE and Practice Grenades	2.3	2.3	2.86
C	Barracks and Dump	1	2.36" Practice Rockets & Land Mines, Various	0	0	0.1
D	Boat Dock	1	HE Projectiles	0	0	0
E	Artillery Impact Zone	1,730	105 and 155mm HE Projectiles	2.4	0.14	4.01
F	Dog Island	1,923	4.2" HE and White Phosphorous Mortars, 4.5" Rockets	2.4	0.12	4.94
G	Alligator Point Gunnery Range	250	37mm Cannon and HE Rockets, 4.2" HE and White Phosphorous Mortars, 4.5" Rockets, Bangalore Torpedos	2.3	0.92	5.51
H	Red, White, and Green Beaches	53	Mines, Bangalore Torpedos, Various	2.3	4.3	4.99
I	Harbeson City	347	HE Grenades, Various	2.3	0.66	3.11
J1, J2, J3, J4	Special Training Areas 1,2,3,4	460	HE Grenades, Various	2.3	0.50	4.16
K	Dump	160	Various	0	0	1.57
L	Eastern EOD Cleared Sites	3,692	None	0	0	1.03
P	Off-Post EOD Cleared Sites	1,733	None	0	0	0
Contingency Sampling				30		
TOTALS		8,764		48.6	0.98	34.04

HE – High Explosives

Contingency sampling acreage may be distributed throughout investigation areas based on field determination.

Areas D and P are not planned for geophysical investigation unless additional evidence of the presence of OE is obtained.

Areas M, N, O, and Q will not be geophysically investigated due to ASR recommendation of No Further Action or FUDs ineligibility.

*Excludes data that was screened as unuseable during processing effort.

TABLE 3.2
UXO AND EXPENDED OE RECOVERED
CAMP GORDON JOHNSTON

Area	Anomaly ID	Depth (inches)	Weight (lbs.)	Findings	Comments
A	A1-1	6	1.00	warhead ballast/rust	
A	A1-2	4-6	7.00	2.36" rockets (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A1-3	14	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-4	4-10	2.00	2.36" rockets (2), motor w/weight	Detonated - Post BIP verified as inert, NON-UXO
A	A1-5	0-6	7.00	2.36" rockets(2)	Detonated - Post BIP verified as inert, NON-UXO
A	A1-6	4	1.00	rocket warhead, no fuze	Detonated - Post BIP verified as inert, NON-UXO
A	A1-7	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-8	6	2.00	rocket motor with partial warhead	training
A	A1-9	4	1.00	rocket motor	
A	A1-10	6	2.00	rocket motor & warhead (training)	
A	A1-11	0	2.00	rocket motor	surface OE noted during reacq
A	A1-12	6	7.00	rocket warheads (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A1-14	6	1.00	training hand grenade	
A	A1-15	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-16	5	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-17	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-18	12	1.00	warhead w/ ballistic weight	
A	A1-19	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-20	8/6	1.50	rocket warhead ballast/WH ogive	
A	A1-21	8	1.00	rocket warhead (training)	
A	A1-22	6	1.00	rocket warhead ballast	
A	A1-23	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-24	6	2.00	2.36" rocket (training)	
A	A1-28	8	2.00	2.36" rocket (training)	
A	A1-31	0	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A2-1	5	1.00	2.36" rocket warhead (expended)	
A	A2-2	8	1.00	2.36" rocket motor (expended)	
A	A2-4	0	1.00	2.36" rocket motor (expended)	surface OE noted during reacq
A	A2-5	2	1.00	2.36" rocket motor (expended)	
A	A2-6	4	1.00	rocket motor - venturi	
A	A2-7	4	0.50	rocket ballistic weight	
A	A2-8	3	1.00	rocket warhead/venturi (expended)	
A	A2-9	4	1.00	2.36" rocket motor (expended)	
A	A2-10	2/6	1.00	rocket fins,venturi/ ballistic weight	
A	A2-11	2/3	1.00	rocket nose cone/ballast	
A	A2-13	3	0.50	rocket nose cone	
A	A2-14	2	1.00	2.36" rocket motor (expended)	
A	A2-15	2	1.00	rocket motor tail	
A	A2-16	1	1.00	2.36" rocket motor (expended)	
A	A2-17	6	0.50	2.36" rocket warhead (training)	
A	A2-18	8	0.50	2.36" rocket warhead (training)	
A	A5-2	2	1.00	warhead (training) and motor	
A	A5-3	10	1.00	rocket frag	
A	A5-4	8	1.00	rocket frag	
A	A5-5	12	1.00	rocket motor (expended)	surface OE noted during reacq
A	A5-6	1	0.50	rocket ballistic weight	
A	A5-8	24	9.00	81 mm mortar (practice)	
A	A5-9	2	1.00	rocket motor (expended)	
A	A5-10	8	2.00	rocket motor with ballast	
A	A5-11	10	1.00	rocket warhead ballast	
A	A5-12	10/8	3.00	rocket motor w/ballast/ballast	
A	A5-13	12/6	2.00	rocket motors (2)	surface OE noted during reacq
A	A5-14	8	1.00	rocket motor with ballast	
A	A5-15	4-12	2.00	rocket motors (2), ogive	
A	A5-16	6/12	3.00	2.36" training rocket/rocket motor	surface OE noted during reacq
A	A5-17	8	1.00	rocket warhead cone	

TABLE 3.2
UXO AND EXPENDED OE RECOVERED
CAMP GORDON JOHNSTON

DRAFT FINAL

Area	Anomaly ID	Depth (inches)	Weight (lbs.)	Findings	Comments
A	A5-18	12	2.00	rocket motor with ballast	
A	A5-19	10	2.00	rocket motor with ballast	
A	A5-20	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A5-21	3	1.00	rocket motor with ballast	
A	A5-22	3	2.00	2.36" training rocket	
A	A5-23	8	1.00	rocket warhead (training)	
A	A5-24	4	1.00	rocket warhead ballast	
A	A6-2	3	0.25	frag	
A	A7-3	4	1.00	warhead cone	
A	A7-6	2	0.25	frag	
A	A9-1	4	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-2	3	4.00	2.36" rocket (training)	
A	A9-4	2	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-6	6	4.00	2.36" rocket (training)	
A	A9-7	3	1.00	2.36" rocket fin	
A	A9-8	6	4.00	2.36" rocket (training)	
A	A9-9	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-10	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-11	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-13	10	4.00	2.36" rocket (training)	
A	A9-14	3	0.25	small frag	
A	A9-15	4	0.50	2.36" rocket warhead (training)	
A	A9-16	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-17	8	1.00	2.36" rocket warhead w/o fuze	Detonated - Post BIP verified as inert, NON-UXO
A	A9-18	3	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-19	5	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-20	3	4.00	2.36" rocket (training)	
A	A9-21	3	4.00	2.36" rocket (training)	
A	A9-22	0	4.00	2.36" rocket (training)	
A	A9-23	6	7.00	2.36" rocket (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A9-24	3	7.00	2.36" rocket (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A9-25	3	4.00	2.36" rocket (training)	
A	A9-26	12	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-28	8	3.50	2.36" rocket	
A	A9-29	6	3.50	2.36" rocket (training)	
A	A9-30	2	3.50	2.36" rocket (training)	
A	A9-31	2	1.00	2.36" rocket parts	
A	A9-32	3	3.50	2.36" rocket (training)	
A	A9-34	2	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-35	8	3.50	2.36" rocket	
A	A9-36	3	3.50	2.36" rocket (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A9-38	4	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-39	6	3.50	2.36" rocket (training)	
A	A9-40	2	1.00	2.36" rocket motor	
A	A9-41	4	1.00	2.36" rocket nose cone	
A	A9-42	12	0.50	rocket ballistic weight	
A	A9-43	30	0.50	rocket ballistic weight	
A	A9-45	4	3.50	2.36" rocket	Detonated - surface contact located by USA

B(St. Joe property)	BX-15	12	3.00	M1B1 mine	fuze "mushroom" missing, rest of fuze intact
B(St. Joe property)	B4-9	1	0.25	Mk1A1 grenade fuze	
B(St. Joe property)	B4-14	6	2.00	M9A1 rifle grenade (practice)	
B(St. Joe property)	B4-16	6	0.25	frag	
B(St. Joe property)	B4-26	0	0.25	grenade fuze (expended)/frag	
B(St. Joe property)	B8-1	4	3.00	M1B1 training mine (expended)	

TABLE 3.2
UXO AND EXPENDED OE RECOVERED
CAMP GORDON JOHNSTON

DRAFT FINAL

Area	Anomaly ID	Depth (inches)	Weight (lbs.)	Findings	Comments
B(St. Joe property)	B8-6	10	3.00	M1B1 training mine (live)	Detonated - Live fuze - UXO
B(St. Joe property)	B8-7	3	1.00	M1B1 mine fuze (expended)	
B(St. Joe property)	B8-12	3	3.00	M1B1 mine fuze (live)	Detonated - Live fuze - UXO
B(St. Joe property)	B8-13	3	1.00	M1B1 mine fuze (live)	Detonated - Live fuze - UXO
B(St. Joe property)	B8-15	0	3.00	M1B1 training mine (live)	UXO/Detonated - surface item located by USA
B(St. Joe property)	B8-16	0	3.00	M1B1 training mine (live)	UXO/Detonated - surface item located by USA
B(St. Joe property)	B8-17	0	3.00	M1B1 training mine (live)	UXO/Detonated - surface item located by USA
B(St. Joe property)	NA	0	3.00	M1B1 training mine (live)	UXO - Transported by Tyndall A.F.B. EOD

B(FSU property)	B1-34	1	0.50	frag	
B(FSU property)	B5-18	6	0.50	practice grenade	
B(FSU property)	B5-22	18	2.00	M1B1 mine (training) no fuze	
B(FSU property)	B9-2	6	1.00	Mk1A1 practice grenade	
B(FSU property)	B9-8	6	3.00	M1B1 mine (training) expended	
B(FSU property)	B9-10	10	1.00	M1B1 mine fuze - expended	

F	F2-1	8	1.00	4.2" mortar scrap	
F	F2A-1	48	1	4.2" mortar (UXO), M3A1 or M3 HE	UXO - Detonated
F	F2C-4	24	3	4.2" mortar base	
F	F3-1	12	0.5	frag	
F	F3-2	12	3	4.2" mortar and frag (expended)	
F	F3-3	12	6	4.2" mortar scrap	
F	F3-4	0	3	4.2" mortar scrap	
F	F3-5	18	4	4.2" mortar scrap	
F	F3-6	12	6	4.2" mortar scrap	
F	F3-7	16	4	4.2" mortar scrap	
F	F3-8	12	1	frag pieces (2)	
F	F3-10	5	6	4.2" mortar scrap	
F	F3-11	8	16	4.2" mortar scrap	
F	F3-12	10	2	4.2" mortar scrap	
F	F3A-1	12	8	4.2" mortar scrap	
F	F3A-2	18	6	4.2" mortar scrap	
F	F3A-3	30	6	4.2" mortar scrap	
F	F3A-4	12	6	4.2" mortar scrap	
F	F3A-5	0	0.5	frag	
F	F3A-6	3	0.5	frag	
F	F3A-7	3	0.5	frag	
F	F3A-9	12	1	4.2" mortar scrap	
F	F3A-10	2	1	4.2" mortar scrap	
F	F3A-11	<1	1	4.2" mortar scrap	
F	F3A-12	6	0.5	4.2" mortar scrap	
F	F3A-13	12	4	4.2" mortar scrap	
F	F3A-14	12	6	4.2" mortar scrap	
F	F3A-15	12	6	4.2" mortar scrap	
F	F3A-16	12	10	4.2" mortar scrap	
F	F3A-17	24	10	4.2" mortar scrap	
F	F3A-22	24	3	4.2" mortar scrap	
F	F3A-23	12	10	4.2" mortar scrap	
F	F6-6	3	0.25	probable frag	
F	F6A-7	0/14		frag	

G(Residential)	AG-77	6	3.00	MK23 practice bomb (expended)	
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TABLE 3.2
 UXO AND EXPENDED OE RECOVERED
 CAMP GORDON JOHNSTON

DRAFT FINAL

Area	Anomaly ID	Depth (inches)	Weight (lbs.)	Findings	Comments
G(Nature Conserv.)	AG-182	36	6.00	bomb fin - box type	
J	IRD5-16	0		frag	
J	J1B-6	10	3.00	training grenades (3)	
J	J4X-4	3	1.00	grenade w/out fuse/empty	
J	J4X-5	6	1.00	M1B1 landmine spider	
J	J4X-6	6	1.00	training grenade	

Table 3.3
Detonated Items at
Camp Gordon Johnston

Area	Anomaly ID	Coordinates		Depth (inches)	Weight (lbs.)	Findings	Comments
		Easting	Northing				
A	A1-2	1930929.9600	317703.3600	4-6	7.00	2.36" rockets (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A1-3	1930937.8000	317709.1600	14	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-4	1930952.8900	317713.2300	4-10	2.00	2.36" rockets (2), motor w/weight	Detonated - Post BIP verified as inert, NON-UXO
A	A1-5	1930955.7900	317714.3900	0-6	7.00	2.36" rockets(2)	Detonated - Post BIP verified as inert, NON-UXO
A	A1-6	1931001.7700	317734.0800	4	1.00	rocket warhead, no fuze	Detonated - Post BIP verified as inert, NON-UXO
A	A1-7	1930988.1500	317760.5700	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-12	1930983.3300	317852.6500	6	7.00	rocket warheads (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A1-15	1931255.6800	317779.3400	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-16	1931260.8100	317771.0300	5	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-17	1931259.6300	317761.5400	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-19	1931248.5600	317704.2100	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-23	1931203.5000	317670.6000	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A1-31	1931052.8400	317676.0600	0	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A5-20	1931253.3200	317418.4300	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-1	1930871.2800	317785.4600	4	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-4	1930840.3700	317944.6700	2	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-9	1930901.7700	318032.3600	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-10	1930900.6600	318010.5300	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-11	1930896.2200	317972.7900	8	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-16	1931035.2800	317996.8400	6	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-17	1931034.9100	317989.0700	8	1.00	2.36" rocket warhead w/o fuze	Detonated - Post BIP verified as inert, NON-UXO
A	A9-18	1931061.9000	317973.9000	3	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-19	1931057.8400	317991.6600	5	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-23	1931122.8300	318088.4500	6	7.00	2.36" rocket (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A9-24	1931133.3300	318089.7600	3	7.00	2.36" rocket (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A9-26	1931115.8400	317983.4600	12	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-34	1931209.4200	318049.5200	2	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-36	1931295.1200	317969.0200	3	3.50	2.36" rocket (2)	Detonated - Post BIP verified as inert, NON-UXO
A	A9-38	1931360.7200	317957.6500	4	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
A	A9-45	1931835.4500	318208.0650	4	3.50	2.36" rocket	Detonated - Post BIP verified as inert, NON-UXO
B(St. Joe property)	B8-6	1963002.4901	334420.7100	10	3.00	M1B1 training mine (live)	Detonated - Live fuze - UXO
B(St. Joe property)	B8-12	1963321.8600	334558.2000	3	3.00	M1B1 mine fuze (live)	Detonated - Live fuze - UXO
B(St. Joe property)	B8-13	1963346.7900	334425.6400	3	1.00	M1B1 mine fuze (live)	Detonated - Live fuze - UXO
B(St. Joe property)	B8-15	1963180.0000	334785.0000	0	3.00	M1B1 training mine (live)	UXO/Detonated - surface item located by USA
B(St. Joe property)	B8-16	1963211.0000	334646.5000	0	3.00	M1B1 training mine (live)	UXO/Detonated - surface item located by USA
B(St. Joe property)	B8-17	1963219.6200	334784.2300	0	3.00	M1B1 training mine (live)	UXO/Detonated - surface item located by USA
F	F2A-1	1922673.5296	285260.6300	48	1	4.2" mortar (UXO), M3A1 or M3 HE	UXO - Detonated

SECTION 4 OE FINDINGS AND DENSITY EVALUATION

4.1 INTRODUCTION

This OE findings and density evaluation provides an assessment of the potential presence of UXO within the AOIs at the Camp based on the data collected during the EE/CA investigation. In performing the evaluation, the objective was to develop decision criteria for determining the need for performing an OE response action at any or all of the AOIs.

4.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARS)

4.2.1 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.

4.2.2 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 Camp was practical in a particular removal situation. These factors included:

- The exigencies of the situation;
- The scope of the potential response action to be taken; and
- The effect of ARAR attainment on the statutory limits for potential response action duration and cost.

4.2.3 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.

4.2.4 "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 ordnance, 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.

4.2.5 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. Examples of each type of ARAR are listed in Table 4.1.

4.2.6 Non-promulgated advisories or guidance documents issued by federal or state governments do not have the status of potential ARARs. However, these "to be considered" criteria (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 4.1 and discussed in the following paragraphs.

4.2.7 No chemical-specific ARARs or TBCs were identified for the potential response actions that may be applicable at the Camp because removal of UXO is the primary concern of this EE/CA and not residual contamination that may have occurred due to ordnance burial, detonation, or disposal. After selected OE response actions are implemented, an evaluation of potential chemical contamination, if warranted, will be conducted as part of an environmental investigation.

4.2.8 The EE/CA investigation at the Camp has been managed pursuant to CERCLA and the NCP. The NCP regulations require that all removal actions or investigations on the site comply with the substantive requirements of federal, state, and local regulations. However, administrative permitting procedures are not required.

4.2.9 There are five potential location-specific ARARs that have been identified for review prior to implementation of an OE response action at an AOI within the Camp. These include the National Historic Preservation Act, Protection of Wetlands, Endangered Species Act, Protection of Archaeological Resources, and Preservation of American Antiquities. The ASR did not identify any significant historical/cultural resources within the boundaries of the AOIs retained for EE/CA

investigation (USACE, 1995). However, numerous archaeological sites were identified in proximity to the AOIs during preparation of the project WP (Parsons ES, 1999d).

4.2.10 Protection of wetlands is an important concern at the Camp. Wetland avoidance was practiced during the geophysical surveys with the meandering path geophysical survey technique providing the flexibility. Small wetland areas are present in the floodplains of the major rivers traversing the Camp (Crooked River and New River) and there are several perennial surface water bodies (Duck Lake, Lake Morality, etc) that are generally found in low-lying areas. Consequently, any OE response action must comply with 33 CFR (Code of Federal Regulations) 320 pursuant to the Clean Water Act (33 U.S.C. 1344 section 404). Executive Orders 11988 and 11990 as well as the Clean Water Act require that appropriate action be taken to minimize the loss of any wetlands. Moreover, section 404 of the Clean Water Act authorizes USACE to be the permitting office responsible for oversight of all actions that result in the discharge of dredged or fill materials into the waters of the U.S., including wetlands. The work within the Camp was being performed under CERCLA; however, a specific permit to perform work in a wetland area was not required.

4.2.11 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 4.1.

4.3 SITE SPECIFIC OE DENSITY ESTIMATE

4.3.1 The EE/CA sampling efforts at the Camp were determined to be sufficient to characterize the AOIs for potential residual UXO. Inferential statistical techniques were employed to assess residual UXO density. To determine an estimate of the residual levels of surface and subsurface UXO within each AOI, statistical analysis based on the USAESCH UXO Calculator Tool was conducted (QuantiTech, 2000). These statistical techniques yield a probabilistic UXO density estimate based on the AOI, the sampled area, and the number of UXO items found. This estimate is interpreted as the density limit (total number of surface or subsurface UXO items in the AOI) at which there is a 90% probability that, given the amount of sampling that occurred in the AOI, at least one UXO item would have been found. Parcels within an AOI, where OE sampling was not permitted or ROE was not granted from the property owner were expected to be similar to the closely adjacent sampled areas and were assumed to present similar exposures.

4.3.2 The Camp was evaluated both as a "dispersed" site and as a "localized" site. "Dispersed" sites are defined (for purposes of the OECert model) as sites contaminated with UXO as the result of training activities, accidents, kick-outs surrounding the open burning/open detonation of ordnance, etc. "Localized" sites, on the other hand, are defined as sites contaminated with UXO as the result of depot activities, burial of ordnance, etc. Those AOIs within the Camp that exhibited a

homogeneous dispersion of ordnance and similar terrain features were evaluated as "dispersed" areas. All areas investigated at the Camp were categorized as "dispersed" sites with the exception of Areas C, K, and L. Areas C and Area K, not originally part of the investigation, were categorized as "localized" sites and were investigated to confirm the presence or absence of a military dump. Area L was not classified as either a "dispersed" or a "localized" site but was investigated for the possible presence of OE items in the area. Areas C, K, and L were not included in the OECert Risk Evaluation.

4.3.3 The acreage of several of the AOIs was modified as discussed in previous sections of this report. The southern extent of Area I, consisting of approximately 100 acres, was not geophysically investigated as a result of footprint reduction associated with the positive identification of the location of Harbeson City (Subsection 3.12.9). Similarly, the extent of Area F was significantly reduced as a result of the distribution of OE items recovered during the EE/CA investigation. The acreage of Area F was refined from 1923 acres to 158 acres.

4.3.4 Two AOIs, Area B and Area G, were each divided into two subareas for risk evaluation based on portions of the AOIs have very different and distinct characteristics. The western half of Area B is owned by the St. Joe Timber Land Company and is used for timber production and leased for hunting. The eastern half of Area B is owned by FSU and usage is basically considered as idle. The Nature Conservancy portion of Area G (approximately 63 acres) was considered to significantly differ from the completely residentially developed portion of the AOI. As such, Area G was divided into two subareas.

4.3.5 Finally, the grouping of the subareas of Area J were revised. Subareas J1, J2, and J3 were evaluated together. These three parcels are owned by the St. Joe Timber Land Company and are used for timber production and leased for hunting. However, Subarea J4 is owned by several private individuals and is in an area (near Lanark Village) that may result in residential/commercial development. As such, Area J was evaluated as two separate subarea groups.

4.3.6 Table 4.2 shows the OE density range estimates calculated for the investigation areas. These density range estimates were derived as noted above. The sample density estimates reflect existing conditions of the AOIs based on the calculated OE density and depth distribution from the EE/CA investigation. The total anomaly count, intrusive area investigated, specific OE item location and depth, and additional area characteristics were key elements in the estimation of OE density and AOI definition. These range estimates identify the extrapolated results of the field sampling for each of the AOIs defined for the Camp. The expected OE items on the surface are reflected in the surface percentage of OE items density as shown in Table 4.3. This distribution was derived from the evidence of UXO and OE scrap as found during the EE/CA investigation. There was neither UXO nor any evidence of OE items found during sampling at a depth greater than four feet.

Table 4.2
OE Density Range Estimates for the Former Camp Gordon Johnston
(OE Per Acre)

Area	Size (acres)	UXO Density Estimate Range (per acre)
A	50	0.00 – 1.12
B (West Half)	54	3.20 – 10.44
B (East Half)	44	0.02 – 2.05
E	1730	N/A
F	158	0.22 – 2.93
G (Nature Conservancy)	63	0.03 – 2.35
G (Residential Property)	187	0.01 – 0.73
H	53	0.00 – 0.92
I (North-Private Res.)	247	0.01 – 0.93
I (South-St. Joe)	100	N/A
J (J1 – J3)	335	0.01 – 0.75
J (J4)	125	0.06 – 4.14

Table 4.3
OE Surface and Subsurface Estimates
(OE Per Acre)

Percentage of UXO on Surface	Percentage of UXO from 0 – 1 foot	Percentage of UXO from 1 – 2 foot	Percentage of UXO from 2 – 3 foot	Percentage of UXO from 3 – 4 foot
7.5	85.5	4.8	1.6	0.5

4.4 UXO DENSITY AT AREA A – BAZOOKA RANGE

4.4.1 No live OE items were recovered in the 145 intrusively investigated anomalies within Area A during the EE/CA investigation, but various OE items indicative of potentially hazardous UXO were recovered (Plate 1, Appendix F/Volume 2). The large quantity of the OE scrap recovered during the EE/CA investigation are indicative of past activities conducted in this area of the Camp. Approximately 247.00 pounds of the 290.15 pounds (approximately 86%) of metallic debris recovered from the Area A were classified as OE-related (Appendix B). Of the OE-related items located in Area A, 89 anomalies were located at a depth of 0 to 1 foot below ground

surface and 2 anomalies were located at a depth of 1 to 2 feet below ground surface. Sixteen OE-related items were located on the ground surface in Area A. Land use in Area A consists of growing and harvesting pine trees for industrial use and is projected to remain as such in the future. However, other activities such as biking, hunting, and hiking are likely within this AOI. Therefore, a potential for OE exposure in Area A exists.

4.4.2 Although no UXO items were found within Area A, the OE sampling data was sufficient to characterize for UXO remaining using inferential statistical techniques. The calculated probabilistic density estimate for Area A ranges from 0.0 to 1.12 UXO per acre. The maximum density estimate of 1.12 UXO/acre ranks sixth among the twelve areas/subareas evaluated at the Camp. It is important to note that the majority of the OE related items recovered from Area A were located at shallow depths and that during the intrusive and demolition activities conducted in Area A, additional OE related items were discovered.

4.5 UXO DENSITY AT AREA B - WEST (ST. JOE PROPERTY) - GRENADE COURT

4.5.1 Seven live OE items (UXO) were recovered in the 85 intrusively investigated anomalies located within the western portion of Area B during the EE/CA investigation (Plate 2, Appendix F/Volume 2). In addition to the live OE items recovered, seven OE items indicative of hazardous UXO were also present. Ordnance related items recovered consisted of various mines, mine fuzes, grenades, and grenade fragments. Approximately 25.75 pounds of the 50.25 pounds (51%) of metallic debris recovered from the area were classified as OE-related. Four of the UXO items were located on the ground surface and three were located at depths less than 1 foot. The OE related scrap items were recovered from depths of 1 foot or less. This portion of the former grenade court is used for timber production and is projected to remain the same. However, other activities such as biking, hunting, and hiking are likely within this AOI. Therefore, a potential for OE exposure in Area B exists.

4.5.2 The calculated probabilistic density estimate for Area B ranges from 3.20 to 10.44 UXO per acre. The maximum density estimate of 10.44 UXO/acre ranks first of the 12 areas/subareas evaluated at the Camp. Furthermore, the confirmed presence of UXO items poses a significant safety concern.

4.6 UXO DENSITY AT AREA B - EAST (FSU PROPERTY) - GRENADE COURT

4.6.1 No live OE items were recovered in the 70 intrusively investigated anomalies located within the eastern portion of Area B during the EE/CA investigation, but various OE items indicative of potentially hazardous UXO were recovered (Plate 2, Appendix F/Volume 2). Six of the 70 anomalies investigated were OE related scrap items. Ordnance related items recovered consisted of Mk1A1 practice grenades, expended M1B1 training mines, and frag. Approximately 6 pounds of the 110.5 pounds (6%) of metallic debris recovered from the area were classified as OE-related. One of the OE items was located at a depth of 1.5 feet below ground surface and the

five were located at depths of less than 1 foot. This portion of the grenade court has been recently cleared of timber and is projected to remain idle. Other activities such as hunting, biking and hiking are likely within this AOI. Therefore, a potential for OE exposure in Area B exists.

4.6.2 Although no UXO items were found within the east portion of Area B, the OE sampling data was sufficient to characterize for UXO remaining using inferential statistical techniques. The calculated probabilistic density estimate for this portion of Area B ranges from 0.02 to 2.05 UXO per acre. The maximum density estimate of 2.05 UXO/acre ranks fifth among the 12 areas/subareas evaluated at the Camp.

4.7 UXO DENSITY AT AREA E – ARTILLERY IMPACT ZONE

4.7.1 No live OE items were recovered in the 134 intrusively investigated anomalies within Area E during the EE/CA investigation (Plate 3, Appendix F/Volume 2). Twelve of the 134 anomalies investigated contained OE-related scrap. Ordnance related items recovered at Area E consisted only of 0.50 caliber bullets. Approximately 1.2 pounds of the 173.51 pounds (<1.0%) of metallic debris recovered from Area E were classified as OE-related. One of the OE related items was located at a depth of 2 feet below ground surface, while the remaining eleven items were located at depths ranging from 0 to 12-inches. The State of Florida Forestry Division for Wildlife Preservation purchased the vast majority of the current land in this area from the Rex Lumber Company. There are no indications that future land use in this area will change. Therefore, a limited potential for OE exposure in this area exists.

4.7.2 Inferential statistical techniques were not used to characterize the residual UXO density in Area E since all available evidence indicates that the AOI was not used as an artillery impact area. A GIS simulation was conducted to confirm that the geophysical survey would have identified OE debris if the site was an impact area (Appendix E).

4.8 UXO DENSITY AT AREA F – DOG ISLAND

4.8.1 One live OE item (UXO) was recovered in the 119 intrusively investigated anomalies within Area F during the EE/CA investigation (Plate 4 East and West, Appendix F/Volume 2). In addition to the live OE item recovered, numerous OE items indicative of hazardous UXO were also present. Thirty-four of the 119 anomalies investigated contained OE-related scrap. Ordnance related items recovered consisted of one live mortar, mortar scrap, and HE fragments. Approximately 136.75 pounds of the 182.50 pounds (75%) of metallic debris recovered from the area were classified as OE-related. Of the 34 OE items located, 24 were at depths of 1 foot or less, 6 were located between 1 and 2 feet below ground surface, one item was located between 2 and 3 feet below ground surface, and two items were located on the ground surface. The UXO item was located at a depth of 4-feet below ground surface. Land use in this area is comprised of residential areas, beach areas, and undeveloped Nature Conservancy property. Activities presenting a potential exposure pathway include biking, short cutting, hiking, swimming, fishing, construction, picnicking, and beach

combing. No future change in the current land use for this area is anticipated. Therefore, a potential for OE exposure in this area exists.

4.8.2 The calculated probabilistic density estimate for Area F ranges from 0.22 to 2.93 UXO per acre. The maximum density estimate of 2.93 UXO/acre ranks third among the 12 area/subareas evaluated at the Camp. Furthermore, the confirmed presence of one UXO item poses a significant safety concern.

4.9 UXO DENSITY AT AREA G - ALLIGATOR POINT GUNNERY RANGE (NATURE CONSERVANCY PROPERTY)

4.9.1. No live OE items were recovered in the 31 intrusively investigated anomalies within the Nature Conservancy Property of Area G during the EE/CA investigation (Plate 5, Appendix F/Volume 2). One of the 31 anomalies intrusively investigated contained OE-related scrap. Ordnance related items recovered consisted of bomb fins (box type), although .50 caliber bullets were visible throughout the AOI. Approximately 6.24 pounds of the 21 pounds (30%) of metallic debris recovered from this portion of Area G were classified as OE-related. Two of the items were located at a depth of one foot or less and one item was located at 3 feet below ground surface. Land use in this portion of Area G consists of property owned by the Nature Conservancy and is projected to remain the same.

4.9.2 Although no UXO items were found within this portion of Area G, the OE sampling data was sufficient to characterize for UXO remaining using inferential statistical techniques. The calculated probabilistic density estimate for Area G (Nature Conservancy) ranges from 0.03 to 2.35 UXO per acre. The maximum density estimate of 2.35 UXO/acre ranks fourth among the 12 areas/subareas evaluated at the Camp.

4.10 UXO DENSITY AT AREA G - ALLIGATOR POINT GUNNERY RANGE (RESIDENTIAL PROPERTY)

No live OE items were recovered in the 160 intrusively investigated anomalies within the residential property of Area G during the EE/CA investigation (Plate 5, Appendix F/Volume 2). One of the 160 anomalies intrusively investigated contained OE-related scrap and was identified as an expended Mk23 practice bomb. Approximately 3.0 pounds of the 82.54 pounds (4%) of metallic debris recovered from this portion of Area G were classified as OE-related. One additional OE item was recovered on the beach during reacquisition activities and was not an identified anomaly for the intrusive investigation. Land use in this portion of Area G consists of residential areas and beach areas and is projected to remain as such. Activities presenting a potential exposure pathway include child play, biking, short cutting, hiking, swimming, fishing, construction, picnicking, and beach combing. No future change in the current land use for this area is anticipated. Therefore, a potential for OE exposure in this area exists.

4.10.2 Although no UXO items were found within this portion of Area G, the OE sampling data was sufficient to characterize for UXO remaining using inferential

statistical techniques. The calculated probabilistic density estimate for Area G (residential property) ranges from 0.01 to 0.73 UXO per acre. The maximum density estimate of 0.73 UXO/acre is the lowest of the 10 areas/subareas at the Camp for which a density estimate was calculated.

4.11 UXO DENSITY AT AREA H – RED, WHITE AND GREEN BEACHES

No live OE items were recovered in the 140 intrusively investigated anomalies within Area H during the EE/CA investigation (Plate 6, Appendix F/Volume 2). A total of 244 anomalies were identified during the geophysical investigation, but due to higher tides during the intrusive investigation activities, 104 of the anomalies remained submerged during low tide and could not be investigated. The investigation in Area H included the beach areas where possible OE-related items were used during amphibious beach assault training exercises. None of the 140 anomalies investigated contained OE-related scrap. Approximately 49.90 pounds of non-ordnance related metallic debris was recovered from the Area H. Land use at Area H is predominantly undeveloped areas and residential areas with beach access. Activities presenting a potential exposure pathway include child play, biking, short cutting, hiking, swimming, fishing, construction, picnicking, and beach combing. No future change in the current land use for this area is anticipated. Therefore, a potential for OE exposure in this area exists.

4.11.2 Although no UXO items were found within Area H, the OE sampling data was sufficient to characterize for UXO remaining using inferential statistical techniques. The probabilistic density estimate for Area H ranges from 0.0 to 0.92 UXO per acre. The maximum of 0.92 UXO/acre ranks eighth among the 12 areas/subareas evaluated at the Camp.

4.12 UXO DENSITY AT AREA I – HARBESON CITY

4.12.1 No live OE items were recovered in the 403 intrusively investigated anomalies within Area I during the EE/CA investigation (Plate 7, Appendix F/Volume 2). The investigation in Area I was conducted in the northern portion of the area and did not include the St. Joe property to the south (Area I – South). The investigation in Area I included the area of the old German village (Harbeson City) and areas to the north. Only one of the 403 anomalies investigated contained OE-related scrap. This item was identified as scrap, weighed approximately 0.4 pounds, and was located on the ground surface along one of the roadways in the area. Approximately 791.4 pounds of non-ordnance related metallic debris was recovered from Area I. Land use at Area I consists of residential, unimproved residential, and undeveloped privately owned land. Activities presenting a potential exposure pathway include fishing and construction and to a lesser extent child play, biking, short cutting, hiking, and picnicking. No future change in the current land use for this area is anticipated. Therefore, a limited potential for OE exposure in this area exists.

4.12.2 Although no UXO items were found within Area I (north), the OE sampling data was sufficient to characterize for UXO remaining using inferential statistical techniques. The probabilistic density estimate for Area I (North) range from

0.01 to 0.93 UXO per acre. The maximum density estimate of 0.93 UXO/acre ranks seventh among the 12 subareas evaluated at the Camp.

4.13 UXO DENSITY AT AREAS J1, J2, J3– SPECIAL TRAINING AREA

4.13.1 No live OE items were recovered in the 66 anomalies intrusively investigated within Areas J1, 2, and 3 during the EE/CA investigation, but OE items indicative of potentially hazardous UXO were recovered (Plates 2, 8, 9, Appendix F/Volume 2). One of the 66 anomalies investigated was OE related items. Ordnance related items recovered consisted of training grenades. Approximately 3.0 pounds of the 16.0 pounds (19.0%) of metallic debris recovered from the Areas J1, 2, and 3 were classified as OE-related. One of the anomaly locations in Area J1 contained OE related items. Land in Areas J1, J2, and J3 is used for timber production. No future change in the current land use for these areas is anticipated. Activities presenting a potential exposure pathway include timber harvesting and hunting and to a lesser extent biking, short cutting, and hiking. No future change in the current land use for this area is anticipated. Therefore, a limited potential for OE exposure in these areas exists.

4.13.2 Although no UXO items were found within Areas J1 through J3, the OE sampling data was sufficient to characterize for UXO remaining using inferential statistical techniques. The calculated probabilistic density estimate for the J1 through J3 Areas ranges from 0.01 to 0.75 UXO per acre. The maximum estimated density of 0.75 UXO/acre ranks ninth among the 12 areas/subareas evaluated at the Camp.

4.14 UXO DENSITY AT AREA J4 – SPECIAL TRAINING AREA

4.14.1 No live OE items were recovered in the 12 anomalies intrusively investigated within Area J4 during the EE/CA investigation, but OE items indicative of potentially hazardous UXO were recovered (Plate 10, Appendix F/Volume 2). Three of the 12 anomalies investigated were OE related items. Ordnance related items recovered consisted of training grenade, one empty grenade without a fuse, and part of a landmine. Approximately 3.0 pounds of the 13.5 pounds (23%) of metallic debris recovered from the Area J4 were classified as OE-related. Three anomaly locations in Area J4 contained OE related items. Land use in Area J4 consists predominantly of undeveloped private land, with a church occupying the far western edge of the area. No future change in the current land use for this area is anticipated. Activities presenting a potential exposure pathway include hunting and to a lesser extent biking, short cutting, and hiking. No future change in the current land use for this area is anticipated. Therefore, a potential for OE exposure in these areas exists.

4.14.2 Although no UXO items were found within J4, the OE sampling data was sufficient to characterize for UXO remaining using inferential statistical techniques. The calculated probabilistic density estimate for the J4 Area ranges from 0.06 to 4.14 UXO per acre. The maximum density estimate of 4.14 UXO/acre ranks second among the 12 areas/subareas evaluated at the Camp.

4.15 SUMMARY

Based on the findings of the UXO density evaluation performed for ordnance at the Camp, the potential exists for residual UXO to be present within many of the AOIs. The Camp was used for amphibious beach assault training, urban warfare training, artillery, mortar, rocket, 50-caliber training, and aerial combat training and has been evaluated as a "dispersed" site. A basic assumption related to dispersed sites is that any ordnance located is assumed to have been subject to some force that may have armed the ordnance. Areas A, B, E, F, G, H, I, and J were evaluated as dispersed sites. The UXO density estimates developed in this section were used in conjunction with other evaluation criteria to determine the need for an OE response action within an individual AOI.

**Table 4.1
Potential ARARs for OE Removal
Camp Gordon Johnston**

Activity	ARAR/TBC	Citation	Applicability or Relevance
<u>Chemical-Specific</u>			
None			
<u>Location-Specific</u>			
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	36 CFR Part 65, and 800	During removal action, any material that may be considered historical will be reported pursuant to requirements
	Protection of Wetlands	33 CFR 320 et. seq. Executive Order 11988	Requires action to be taken to minimize loss or degradation of wetlands.
	Endangered Species Act	16 USC § 1531 et. seq.	Requires that authorized actions do not jeopardize the continued existence of endangered or threatened species, or their habitats.
	Protection of Archaeological Resources	43 CFR Part 7 (also: 36 CFR Part 296, 32 CFR Part 229, and 18 CFR Part 1312 – same regulations)	Requires a permit to excavate, remove, or otherwise alter any archaeological resource
	Preservation of American Antiquities	43 CFR Part 3	Requires a permit for the examination of ruins, excavation of archaeological sites, and gathering of objects of antiquity
<u>Action-Specific</u>			
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	D.O.T. Hazardous Material	49 CFR 107, 171-177, 100-199	Regulates transportation of hazardous materials such as

**Table 4.1
Potential ARARs for OE Removal
Camp Gordon Johnston**

Activity	ARAR/TBC	Citation	Applicability or Relevance
	Transportation Regulations		ordnance.
	E.P.A. Hazardous Materials Manifesting Requirements	40 CFR 262, 263	Manifesting for transportation of ordnance items may be required pursuant to RCRA.
Disposal	Disposal of Ordnance Items	40 CFR 264, Subpart X	Established ordnance disposal requirements.
	D.O.T. Hazardous Material Transportation Regulations	49 CFR 107, 171-177	Regulates transportation of hazardous materials such as ordnance.
<u>Action-Specific</u>			
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	D.O.T. Hazardous Material Transportation Regulations	49 CFR 107, 171-177, 100-199	Regulates transportation of hazardous materials such as ordnance.
	E.P.A. Hazardous Materials Manifesting Requirements	40 CFR 262, 263	Manifesting for transportation of ordnance items may be required pursuant to RCRA.
Disposal	Disposal of Ordnance Items	40 CFR 264, Subpart X	Established ordnance disposal requirements.
	D.O.T. Hazardous Material Transportation Regulations	49 CFR 107, 171-177	Regulates transportation of hazardous materials such as ordnance.

SECTION 5

IDENTIFICATION OF RESPONSE ACTION OBJECTIVES

5.1 RESPONSE ACTION GOAL

None of the AOIs within the former Camp Gordon Johnston investigated as part of this EE/CA were identified as warranting an immediate (time-critical) OE response action. However, non-time-critical OE response actions were evaluated for applicability at each of the individual AOIs. The goal of a non-time-critical OE response action is public safety, which can be achieved by reducing the explosive threat posed by the UXO that potentially remains on the property. This goal was achieved by determining the appropriateness of a potential OE response action for minimizing the public's exposure to UXO.

5.2 RESPONSE ACTION OBJECTIVES

5.2.1 A number of factors were considered for establishing the specific objectives for a response action. The objectives had to meet the requirements set forth in the ARARs while still being realistic and achievable in terms of cost. To attain the goal of reducing the explosive threat posed by the potential for UXO remaining at the AOIs within the Camp, the objectives identified had to be effective, implementable, and economical. The criteria of effectiveness, implementability and cost were used to evaluate the potential OE response actions in accordance with USAESCH guidance.

5.2.2 The OE response action objectives guided the development of alternatives for each AOI within the Camp 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 degree and horizontal and vertical extent of OE contamination by AOI;
- Evaluating the effectiveness of various response alternatives;
- Determining the ability to implement various response alternatives; and
- Determining the cost to implement the various response alternatives.

5.3 DESCRIPTION OF OE CLEARANCE TECHNOLOGIES

Various technologies and approaches exist for the clearance of OE. An OE clearance 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.

5.3.1 OE Detection

5.3.1.1 OE detection includes those methods and instruments used to locate surface and subsurface OE at a site. The best detection method is selected based on the OE properties, such as the depth and size of the suspected OE items, and the physical characteristics of the site, such as soil type, topography, vegetation, and geology.

5.3.1.2 There are two basic forms of OE detection. The first, 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 typically divided into five-foot lanes that are systematically inspected for OE. A metal detector is sometimes used to supplement the visual search in areas where ground vegetation may conceal surface OE. Typically, any OE found during these searches is flagged or marked on a grid sheet for immediate removal.

5.3.1.3 The second form of OE detection, geophysics, includes a family of detection instruments designed to locate subsurface OE. This family of instruments includes magnetic instruments, electromagnetic instruments, and ground penetrating radar (GPR). 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 paramount to the survey success. Nevertheless, geophysics is usually the most cost-effective method of conducting OE surveys. The equipment designed for OE geophysical surveys is lightweight, easily maintained, and very effective. However, there are limitations to geophysics. Geophysical equipment cannot always distinguish ordnance items from other metallic objects located below the surface. Cultural interference, such as underground utility lines, construction debris, or metal bearing rock, can deliver a signature to the equipment similar to OE, or can mask OE. Therefore, it is necessary for the geophysical survey team to carefully document any known cultural interference prior to beginning the survey. 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. For instance, in the case of the EM-31 (an electromagnetic instrument) its magnetic field can extend to a depth of 18 feet. However, 50 percent of its signal strength is used in the first foot of material below the ground surface.

5.3.1.4 The geophysical instrument used for survey at the Camp was the Geonics® EM-61 TDMD. The instrument and its operation are described in Section 3 of this EE/CA.

5.4.2 OE Recovery

5.4.2.1 Once a site has been surveyed by either visual or geophysical means, the recovery of OE can begin. OE recovery operations can take the form of a surface-only clearance, an intrusive (subsurface) clearance, or a combination of the two methods. The decision on the appropriate level of clearance operation is based on the nature and extent of the OE contamination as well as the intended future use of the site.

5.4.2.2 During a surface clearance operation, exposed OE or suspected OE items are identified during the detection phase. The OE items are then inspected, identified, collected (if possible), 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, then it may be necessary to destroy the OE item in place.

5.4.2.3 Potential OE items identified during a subsurface clearance operation by the geophysical survey or other detection methods require excavation for removal or detonation. Because the actual nature of the buried OE item cannot be determined without it being uncovered, non-essential personnel evacuations are necessary within a predetermined minimum separation distance (MSD) [formerly Public Withdrawal Distance (PWD)] to ensure the safety of the operation. The MSD is calculated based on the explosive characteristics of the most probable munition (MPM) that may be present within the AOI. 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 sufficient engineering controls are implemented, such as sandbag mounds and sandbag walls over and around the potential OE item.

5.4.2.4 Excavation of the potential OE item takes place with either hand tools or mechanical equipment depending on the suspected depth of the object. Once the item has been exposed, it is then inspected, identified, collected (if possible), and transported to a designated area for cataloging and eventual disposal. If it is determined during the inspection that the item is UXO and cannot be safely moved, then it may be necessary to destroy the item in place. In such cases another MSD [formerly Personnel Separation Distance (PSD)] is imposed on *all personnel* for intentional detonations. The MSD is based on the actual identified UXO item (as opposed to the MPM). The MSD may be reduced if appropriate engineering controls are applied. 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. Every possible option will be explored to minimize potential evacuations with the exception of compromising public safety.

5.5.3 OE Disposal

5.5.3.1 Disposal of recovered OE at the Camp 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 items recovered.

5.5.3.2 If an OE item is recovered in proximity to occupied buildings, sufficient engineering controls may not be available to safely destroy the OE item in place. In this instance, an assessment will be made as to whether the OE item may be moved to a remote part of the project site where demolition and disposal can safely take place. Situations where the OE item cannot be moved safely due to fuzing or deteriorated condition will be addressed on a case by case basis. For moveable OE items, a countercharge can be used to destroy the OE item or the OE item can be burned as a means of destruction. Burning an OE item is not as desirable as a countercharge as the burning can produce secondary explosions or the item may not be completely destroyed, thus leaving the OE item in a more dangerous state than it was originally. Engineering controls, such as sandbag mounds and sandbag walls over and around the OE item, are often used to minimize the blast effects when an OE item is destroyed in this manner.

5.5.3.3 Alternatively, some OE items may require destruction in place. This technique is typically employed when the OE item cannot be safely moved to a remote location. When employing this technique, procedures similar to those described above are used that will detonate the OE item or apply sufficient pressure and heat to neutralize the hazard. When this technique is employed, engineering controls are again often used to minimize the blast effects.

SECTION 6 IDENTIFICATION AND ANALYSIS OF RESPONSE ACTION ALTERNATIVES

6.1 RESPONSE ACTION ALTERNATIVES

6.1.1 Response action alternatives have been identified for the former Camp Gordon Johnston AOIs. The alternatives were selected that may potentially achieve the OE response action objectives discussed in Section 5. The alternatives and response actions were grouped into the following categories:

- No OE removal action;
- Institutional controls;
- OE surface clearance; and
- OE subsurface clearance

6.1.2 These four categories of OE response actions were used as a basis for determining the OE response action alternatives to be considered in this EE/CA. General OE response actions are described below. The potential response alternatives derived for the AOIs within the Camp are developed later in this section and analyzed in Section 7.

6.2 IDENTIFICATION AND DESCRIPTION OF OE RESPONSE ALTERNATIVES

6.2.1 Introduction

6.2.1.1 The alternatives identified below have been selected based on the results of the field investigations conducted to date as well as available OE detection and disposal technology. Four alternatives were developed for potential implementation within AOIs at the Camp:

- No DoD Action Indicated (NDAI);
- Institutional Controls (IC);
- Surface Removal of OE items; and
- Clearance to Depth Removal of OE items

No OE response action, even using the best available technology, can completely remove all OE risk for an AOI within the Camp.

6.2.1.2 Implementation of a recurring review program (see Section 9) was not evaluated as a separate alternative, but as an integral part of any alternative. The recurring review program

will be used in conjunction with the NDAI alternative, the IC alternative, and the OE clearance alternatives. As part of this program, visual surveys will be performed on a proposed schedule. These visual surveys will consist of the inspection of areas within AOIs to determine the effectiveness of the OE response action alternative implemented. These visual surveys will be concentrated in areas most susceptible to erosion and other disturbances such as timber harvesting. Any incident reports will be reviewed and any IC in effect will be checked to ensure viability and proper maintenance. During the periodic inspections changes in the land-uses will be assessed. The first visual inspection would occur approximately one year after OE response action alternatives have been completed. After this initial inspection, 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 actions. If the results of these inspections indicate that the conditions of the AOI have changed significantly, the recommendations of the EE/CA will be revisited and revised as warranted. Section 9 of this document provides additional details regarding the recurring review process.

6.2.1.3 Each of the four OE response action alternatives listed above was developed for the Camp 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 is developed based on the identified receptors and varying results of the OE investigation.

6.2.2 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 Camp. In addition, no public awareness or education training would be initiated with regards to the risk of OE. 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. It is important to note that the government will respond to any future UXO discovery on the Camp property regardless of whether the affected parcel was designated for NDAI. The NDAI alternative is a potential candidate alternative for each of the AOIs within the Camp.

6.2.3 Alternative 2: Institutional Controls

6.2.3.1 Description and Objective

6.2.3.1.1 The implementation of an IC alternative would provide a means for the DoD and their representatives to coordinate with private landowners in an effort to reduce OE exposure risk through behavior modification. 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 IC 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. Instead of direct removal of the OE from the AOI, the IC response action relies on behavior modification and access control strategies to reduce or eliminate OE risk. For example, an educational program may be required to warn the public of the location of former firing ranges within the Camp. The educational program would provide guidance on public safety and prudent actions should a person discover OE material.

6.2.3.1.2 Aside from conventional OE response actions, risks related to potential OE contamination may be managed through land use restrictions, access control, public awareness programs, or a combination of strategies. It is important to understand that the risk associated with ordnance contamination is associated with three causative factors that, if completely avoided, would prevent an OE-related accident. 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 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 accident. An accident requires all three events or circumstances to be present. No accident will happen if any one causative factor is missing. Each factor provides the basis for a separate implementation strategy.

6.2.3.1.3 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 Camp. Some behaviors that must be modified may belong to the local government.

6.2.3.2 Land Use Restrictions and Regulatory Controls

Land Use Restrictions and Regulatory Controls provide the primary IC that can be exercised over areas where ordnance is present. Through these controls, local government can dictate the type of development that will occur within an AOI, and the methods in which that development occurs. The Camp is located entirely within Franklin County, which has a Comprehensive Plan for development that defines the kinds of uses that may occur on the Camp property currently and in the foreseeable future (Franklin County, 1991). However, existing regulations in Franklin County do not provide information about the potential presence of ordnance. The Comprehensive Plan could be modified (or an appendix added) to include a discussion that discloses the potential of OE within the Camp and the need for special concern in clearing and construction within certain parcels. The primary intent would be to disclose to property owners and the public at large that OE may be present within certain areas and an increased level of awareness and caution should be taken in the use of the land.

6.2.3.3 OE Trained Escorts for Timber Harvesting

A large portion of the Camp is used commercially for timber production. The act of harvesting and replanting the trees is infrequent but can be significantly intrusive. Therefore, the implementation of a program to provide OE escorts for the harvesting crews working in certain potentially elevated risk areas may provide additional safety. The role of the OE trained escort would primarily be for avoidance of UXO and not to perform clearance operations. Since it is anticipated that timber harvesting at the Camp will be a perpetual activity in many areas; the OE trained escorts could be placed under contract with USACE to streamline the process and relieve the burden of payment for the service from the timber company.

6.2.3.4 Printed Media

6.2.3.4.1 Ordnance awareness, respect for the risk involved, and reinforcement of the message are key ingredients in minimizing the public risk associated with ordnance contamination. One of the major avenues available 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. Although there are few obvious reminders of past DoD activities, many of the current residents and property owners within the Camp are aware of the potential ordnance risk associated with the former use of the property. This awareness can be attributed to annual Camp reunions and the local former Camp Gordon Johnston museum. However, area residents should still be reminded of the potential presence of ordnance items on a regular basis. Also, providing information to new residents and visitors is of primary importance. The addition, reinforcement, and augmentation of current knowledge is desirable in order to keep the realization of ordnance contamination and the potential hazards in the minds of people at all times.

Notification by Tax Bill

6.2.3.4.2 Tax bills are sent to all property owners in Franklin County every year. A notice *could be included in the tax bills of landowners within the Camp informing them of the potential of ordnance in the area and the procedure for handling and reporting any ordnance discovery.*

Brochures

6.2.3.4.3 Brochures can be very effective educational tools and could be prepared and distributed by the County or local agencies. Brochures could describe the history of the Camp, 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.

Newspaper Articles/Interviews

6.2.3.4.4 Newspaper articles and interviews with local residents, the USACE, and other institutions can be printed to further educate the public concerning the ordnance contamination at the Camp. These articles can be very informative and can effectively reduce the risk of improper handling of ordnance. Local newspapers distributed in the area include the Franklin Chronicle (printed twice monthly) and the daily Tallahassee Democrat. Many of the residents of the region lived and worked in the area when the Camp was active. As a result, the Camp Gordon Johnston Association (the Association) was established. The Association sponsors an annual veteran's reunion and parade and has recently established a museum housing Camp memorabilia. The Camp newspaper, The Amphibian, has also been revived by the Association and is printed monthly albeit with limited distribution. Therefore, implementation of IC through this mechanism would be relatively easy.

6.2.3.5 Visual Media

Ordnance awareness, respect for the risk involved, and reinforcement of the message are key ingredients in minimizing the risk associated with ordnance contamination. Visual media in the

form of videotape programs for use during presentations and for broadcast on local television stations is a major avenue available to facilitate this awareness and understanding. The opportunity to disseminate information through the visual media is readily available and can be easily facilitated. A ten-minute professional videotape prepared for classroom and other use would be highly effective tool in educating the public about ordnance safety. These videos should describe the history of the Camp, how to identify ordnance, safety procedures associated with 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. Videotapes can be shown in classrooms throughout the region. Copies could also be provided to local libraries, the Association, and government agencies. These institutions could make the videotapes a part of permanent exhibits/displays.

6.2.3.6 Classroom Education

Public awareness can be facilitated through the classroom. Although much of the local populous is aware that ordnance exists within the Camp, they do not have the necessary training to properly identify and avoid ordnance if encountered. A properly educated public is more likely to make correct decisions related to the safe and proper precautions of found ordnance. The basic message should be not to touch anything that looks like ordnance, shrapnel, or any other unidentified material. The affected public should also be educated about the potential dangers associated with ordnance and should understand the safety procedures to follow should they encounter any suspected ordnance item. Safety presentations should be made to all public and private primary and secondary schools in the region. The 5 to 7 minute visual media recommended above could be utilized in these presentations together with participation by the County or local agencies.

6.2.3.7 Signs

Signs can be posted along the perimeter of specific areas to warn the public about the risk of exposure to ordnance items. Signs can also include information regarding access restrictions, how to respond to discoveries of ordnance items, telephone numbers and addresses to contact with questions or concerns, and any other applicable site-specific information.

6.2.3.8 Fencing

Fencing would provide a physical barrier to prevent the public from entering specific areas and inadvertently coming in contact with ordnance. However, the impact on exposure reduction is somewhat intangible. Construction of fences is also generally considered only as a last resort IC strategy for privately-owned property due to generally negative public acceptance. Implementation of this IC alternative would require UXO support personnel to screen fence post locations prior to installation.

6.2.3.9 Other Institutional Controls

Exhibits/displays could be prepared and placed in the local public library and other areas where the public will be exposed to educational information. In addition, the creation of a Web Page on the Internet and creation of an ad hoc committee could also be effective methods of raising and preserving general awareness and educating the public about the Camp.

6.2.4 Alternative 3: Surface Removal Action

6.2.4.1 Alternative 3, if selected, would include the surface clearance of all OE and OE-related items from the specific AOI within the Camp. This alternative is viable when there is a high number of anticipated exposures to OE by the public on the ground surface and a low risk of exposure to subsurface OE. A land surveyor would establish control points for a grid system that would cover the areas where surface clearance was required. Where necessary, brush clearing crews would clear enough undergrowth so that the surface clearance crews could adequately perform their work. Brush clearing should be limited to only those areas where the vegetation prevents the effective use of the geophysical equipment. In areas where the geophysical equipment can be used effectively in the natural state, no brush clearance would be necessary. In areas where the future land use is anticipated to be nonresidential, brush clearing would only be used as necessary so that the surrounding ecosystem would not be disturbed. It is assumed that brush clearance will create minimal short-term disturbances to the ecosystem due to the rapid vegetation growth rates in this climate.

6.2.4.2 Surface OE clearance would be completed by experienced UXO-qualified personnel who visually search the ground surface for any OE. In addition, UXO-qualified personnel would use metal-detection devices to ensure that any OE items that may exist on the surface of the ground or protruding from the ground are located during the sweep. The UXO-qualified personnel would perform their sweep in lanes eight feet wide, or some other comparable width depending on the sweep reach of the type of metal detection equipment used, to ensure complete surface coverage. All potential OE contacts on the ground surface or protruding from the ground surface would then be identified and removed.

6.2.4.3 Any OE item located during the sweep would be inspected to ensure its stability. During this inspection, a determination would be made whether any uncovered OE items could be moved. If a determination is made that the OE item is not safe to move, then the object would be destroyed in place, otherwise, the item would be removed to a remote location for onsite destruction and disposal. If necessary, engineering controls would be used to minimize the need for evacuation of the public. All inert OE items or other OE-related scrap would be removed from the area and transported off-site for disposal.

6.2.5 Alternative 4: Clearance to Depth Removal Action

6.2.5.1 Alternative 4, if selected, would include the surface clearance of all OE and OE-related items (as specified in Alternative 3) with the addition of subsurface clearance of all OE items identified to depths consistent with the EE/CA findings within a given area. Based on the distribution of the sampling data, implementation of this alternative will require clearance of all OE items to maximum depths between three and four feet depending on the AOI (Table 3.2). However 93% of all OE items recovered from the Camp were less than 12 inches below the ground surface. A land surveying and brush clearing operation would be necessary as described in Alternative 3. This alternative would consist of two phases, an investigation phase and a subsurface clearance phase. Experienced UXO-qualified personnel will perform both phases of this alternative.

6.2.5.2 During the investigation phase, a geophysical instrument would be used to perform surveys over established grids. This geophysical survey would identify subsurface anomalies and any surface anomalies not identified during the brush clearing activities. In this way, both the surface and subsurface surveys could be performed simultaneously saving time and money. The primary difference in performing this kind of survey over that described in Alternative 3 is that instead of relying primarily on visual identification and near surface detection, a marking/locating system is used to relocate the subsurface anomalies for subsequent intrusive investigation and removal. All surface anomalies uncovered during the performance of the survey would be immediately identified and removed/disposed from the AOI to ensure that only subsurface anomalies remain to be investigated.

6.2.5.3 The second phase to this approach includes the intrusive investigation of all subsurface metallic anomalies identified during the metal detection survey to determine their exact nature. During this intrusive investigation, phased engineering controls may have to be used to reduce the evacuation distance (MSD) that would be required during the conduct of these investigations. Evacuation distances are determined as described in Subsection 5.4.2. Once the intrusive investigations begin, each anomaly will be excavated in 6-inch depth increments. If the item causing the magnetic reading has not been identified within the first foot below the ground surface, then the excavation will continue in 12-inch depth increments until the item is identified. Following removal of the source of the anomaly, the excavation will be restored to as close to its original state as possible.

6.3 ALTERNATIVE SCREENING

6.3.1 As part of the EE/CA process each of the four response action alternatives were analyzed in relative terms against three general categories of effectiveness, implementability, and cost. If the alternative failed either the effectiveness or the implementability category, it was eliminated from further consideration. This screening was performed for the Camp as a whole as well as for each AOI for which an alternative selection was applicable. Once the screening was completed, the alternatives were qualitatively compared against each other as described in Section 7.

6.3.2 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 protection of public safety and the human environment; compliance with ARARs; long-term effectiveness; and short-term effectiveness.

6.3.3 The implementability category addresses the technical and administrative feasibility of implementing an alternative as well as the availability of various services and materials required during its implementation. The implementability category is divided into three evaluation criteria including: Technical Feasibility, Administrative Feasibility, and Availability of Services and Materials.

6.3.4 Finally, each alternative was evaluated to determine projected overall implementation cost. Cost estimating inputs for each AOI were prepared based on extrapolation of field costs incurred during the EE/CA intrusive activities and actual cost data for other OE

clearance projects. Each of the evaluation criteria introduced above are discussed in greater detail in the following paragraphs.

6.3.1 Effectiveness

6.3.1.1 Effectiveness is the threshold criteria. The following two components of effectiveness are mandatory requirements that must be evaluated in order for an OE response action alternative to be selected:

- (1) **Protection of Public Safety and the Human Environment** is the ability of the OE response action alternative to adequately reduce the risk of inadvertent detonation that could injure members of the public.
- (2) **Compliance with ARARs** is the ability of the OE response action alternative to satisfy the requirements of the ARARs identified for the site. The assessment should also include consideration of the TBC criteria. Table 4.1 presents a summary of the ARARs and TBC criteria identified for consideration during selection of an OE response action for the AOIs at the former Camp Gordon Johnston.

6.3.1.2 Each of the components above are evaluated for their ability to achieve the OE response action goals for effectiveness in both the short-term and the long-term.

6.3.1.3 Long-Term Effectiveness: This criterion measures how an OE response action alternative maintains the protection of the public after the OE response objectives have been met. The analysis focuses on:

- The permanence of the OE response action alternative;
- The magnitude of residual risk following completion of the response action; and
- The adequacy and reliability of controls, if any, used to manage the treated residuals or untreated wastes that remain following the OE response action.

6.3.1.4 Short-Term Effectiveness: This criterion addresses the effects of an alternative during the implementation phase. Alternatives are evaluated for their effects on public safety prior to the OE response 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 response action objectives.

6.3.2 Implementability

6.3.2.1 Implementability is a primary balancing criteria that is used to compare the major trade-offs between the OE response action alternatives. Implementability is the technical and administrative services required to implement an OE response alternative. Each response action alternative was assessed to determine the ease or difficulty of implementation by considering the following factors:

- (1) **Technical Feasibility**, including technical difficulties and uncertainties associated with the detection and clearance operations;
- (2) **Administrative Feasibility** of the OE response action alternative; and
- (3) **Availability of Services and Materials** for implementation of the OE response action alternative.

6.3.2.2 The technical feasibility 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 alternative;
- The reliability of the OE response action alternative in relation to implementation; and
- The need and ease of conducting future OE response actions/requirements following the initial undertaking.

6.3.2.3 The administrative feasibility 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.

6.3.2.4 The availability of services and materials needed to carry out a response action alternative must be assessed prior to selection. Two issues are of primary importance under this criterion:

- Can the services and materials be delivered conveniently?
- Are the quantities needed to implement the response action alternative available in a timely manner?

6.3.3 Cost

6.3.3.1 Cost is a primary balancing criteria. Cost is also used to compare the major trade-offs between the OE response action alternatives. Cost is the amount of funds required to conduct and maintain the OE response action alternatives. Each OE response action alternative was assessed to determine the capital and operating costs that would be required:

- (1) **Capital Costs** are the OE detection, clearance, and disposal costs. In the case of the Institutional Controls alternative, capital costs include those initial costs associated with establishing OE education programs, preparing and disseminating brochures, installing signs, and other similar costs.
- (2) **Operating Costs** are any costs associated with long-term administrative controls, educational awareness programs, or future OE detection activities. In the case of the Institutional Controls alternative, the operating costs will include those costs associated with continued and periodic maintenance of the programs established using capital costs.

6.3.3.2 As the scope of work for each alternative is developed, an order of magnitude cost estimate is calculated for costs associated with the implementation of each OE response action. These costs include the direct and indirect capital costs as well as the operating costs incurred in implementing the OE response action. As part of this assessment a time frame for completion of each of the proposed alternatives is also developed.

6.4 ANALYSIS OF SITE-WIDE IC OE RESPONSE ACTION ALTERNATIVE COMPONENTS

6.4.1 This subsection provides an analysis of the IC OE response action alternative with respect to the selection criteria specified in Subsection 6.2. Many of the components of within the IC Alternative (Alternative 2) would be the most effective when applied to the former Camp Gordon Johnston as a whole, and, therefore individual components were evaluated on a “site-wide” basis. Additional components to the site-wide baseline IC will be evaluated for individual AOIs.

6.4.2 All of the IC components identified in Subsection 6.2.3 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 subsections 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. However, the inherent goal of IC is to favorably modify the public’s behavior, thereby decreasing the risk

6.4.1 Access Control

6.4.1.1 **Effectiveness:** Fencing can be effective in reducing the risk of exposure to ordnance contamination. The effects of fencing on animals in the area must also be addressed when considering whether fencing would be an effective means for protecting the environment. To be considered effective, any fencing would need to be the chain-link variety topped with barbed wire. Many of the large inland parcels are controlled by the St. Joe Timber Land Company and are currently not fenced. The St. Joe Timber Land Company has leased some of these parcels for hunting.

6.4.1.2 Fencing of the two coastal AOIs (Area F – Dog Island and Area H – Red, White, and Green Beaches) is not feasible as it would significantly impact tourism in the area. Furthermore, private property owners would not likely be receptive to the imposition. Area E – Artillery Impact Zone is completely within a State Forest, therefore fencing this AOI would be impractical. None of the AOIs are currently fenced and therefore there is little evidence of property demarcation. The lack of fencing readily allows access to those who are determined to enter the property for shortcuts.

6.4.1.3 The posting of signs along the AOI access roads and perimeters provide “on the spot” warnings of the potential presence of ordnance. The signs can include instructions regarding how an OE discovery should be reported. Unfortunately, signs often become convenient targets for vandalism and must be maintained to be effective.

6.4.1.4 The Franklin County system of land use restrictions, zoning and permitting would likely be the most effective tool for implementation of IC components (Franklin County, 1991). Regulatory powers can be used to control the type, location, design, and construction materials and techniques of all development that occurs within the Camp property. These controls provide Franklin County the ability to inform prospective developers about the potential of ordnance, require additional ordnance surveys in areas where excavation will occur, and deny clearing and construction where significant ordnance is found and not removed.

6.4.1.5 **Implementability:** Considering the anticipated area growth described in the Franklin County Comprehensive Plan, the economic impact of the extensive tourism associated with the beaches, and the need to maintain public access to the State Forest, only the St. Joe Timber Land Company property and the FSU property are viable for implementation of fencing as an IC component. Area A, Area B, Area J1, J2, and J3 are included within this ownership. The terrain is flat and generally accessible, therefore fencing is an implementable IC alternative.

6.4.1.6 Installation of a system of warning signs throughout the Camp is readily implementable. Discretion should be used for designing the signs so as not to negatively affect area visitors. The signs should warn about the potential existence of ordnance, warn about the hazards of physical contact, and provide information on how to report any OE discovery.

6.4.1.7 At this time, current land use and permitting restrictions have not been evaluated for Franklin County. If not already in place, land use and permitting restrictions could be developed to include concerns for the existence of ordnance. Specific depths of ordnance surveys could be required for various types of construction with those requiring greater excavation also requiring deeper ordnance removal. Clearing and construction can be required to occur only in areas subjected to ordnance surveys where no ordnance has been found or ordnance has been removed. The receptiveness of the local government agencies to implement these procedures cannot be assessed at this time.

6.4.1.8 **Cost:** To determine costs for installing fencing it was assumed that six-foot chain-link fencing would be installed topped with three strands of barbed wire. The associated costs for fencing specific AOIs is presented with the evaluation of alternatives for each AOI.

6.4.1.9 The cost of signage for the Camp can be estimated assuming that 50 signs will be prepared. The signs will be painted metal approximately four (4) square feet each, mounted on an eight (8) foot 4x4 pressure treated wood post sunk two (2) feet in the ground and secured with concrete. The cost to cut and paint each sign is \$75.00, plus the cost of wood at \$8.00 each, and installation of \$10.00 each equals a total cost of \$93.00 per sign for a total of \$4,650.00 for 50 signs installed. The signs will have to be maintained and replaced from time to time as they fade or are vandalized. Assume an average cost of \$20.00 per sign per year maintenance, or \$1,000.00 per year. The lifecycle cost for signage is approximately \$18,740.00.

6.4.2 Notice

6.4.2.1 **Effectiveness:** Land use controls can be an effective IC component that can be exercised over potentially OE-contaminated land. Although no known existing zoning and permitting requirements in Franklin County specifically relate to ordnance contamination, they

can be amended to provide direction and control in the location and approach to construction that includes concerns for the existence of ordnance.

6.4.2.2 Implementability: Limited residential and commercial development is anticipated in the coming years for Franklin County as documented in the Comprehensive Plan (Franklin County, 1991). Projected residential growth is noted for AOIs including Area I – Harbeson City and properties adjacent to both Area H – Red, White and Green Beaches and Area A – Bazooka Range. Franklin County can implement OE-related permitting requirements but would be unlikely to do so if they were perceived to stifle new growth. In addition, much of the highly desirable coastal property has numerous private ownerships that could be negatively impacted by any such land use restrictions. Dialogue with County officials is necessary to further evaluate the viability of this IC component. Therefore, OE-related zoning and permitting requirements were considered not readily implementable at this time.

6.4.2.3 Cost: Administrative costs incurred by Franklin County to implement zoning and permitting requirements have not been determined.

6.4.3 Printed Media

6.4.3.1 Effectiveness: Providing information via printed media would be a very effective method for modifying behavior by educating the public at-large and public officials about the potential presence of ordnance within the Camp and its potential impact. Most of the local populace (mostly older retirees especially in Lanark Village) is familiar with the historical significance of the Camp and the type of training conducted. Numerous Camp veterans live within the nearby communities. The annual reunion, parade, and museum play a major role in the education of the public. The Association has printed numerous articles in the *Amphibian* regarding the current EE/CA investigation. The local paper (the *Franklin Chronicle*) coupled with the widely distributed *Tallahassee Democrat* have run feature stories on the Camp. Therefore numerous sources are available to disseminate OE education information. However, tourists and visitors make up a large percentage of the population at any given time. Much of the housing in Area G – Alligator Point is exclusively used for rental. Therefore brochures/fact sheets need to be made available through such sources as the rental agencies and local hotels/RV parks. Distribution of the brochures or fact sheets on a one-time basis would not be effective. Articles in the papers need to be periodically updated and resubmitted and brochures/fact sheets need to be restocked to the appropriate distribution sources at regularly scheduled intervals. Ongoing exposure to and reinforcement of information about ordnance contamination should result in a more educated public. When the public uses the State Forest (Area E) and parks (within Area H) as well as rents accommodations in Alligator Point (Area G), they will have been previously informed of the potential presence of ordnance and be advised to avoid all contact with potential ordnance. Furthermore, ongoing distribution will provide information to new residents, visitors, or others not currently aware of the ordnance contamination.

6.4.3.2 Implementability: Information concerning the ordnance contamination at the Camp, and the investigation presently being coordinated by the USACE, has been distributed in newspaper articles and in public meetings with County residents. Continued public dissemination is readily implementable and can be easily augmented to include brochures/fact

sheets as discussed above. Local institutions would likely be agreeable to assist in distribution of the information.

6.4.3.3 **Cost:** The estimated cost to produce an original professional quality, two-color brochure/fact sheet designed as a folded 8 1/2 x 11 format suitable as a mailer or handout is approximately \$10,000.00. This brochure could be prepared to include primarily graphics with minimal text in bullet form to provide information about the presence, identification, handling and reporting of ordnance. The cost to print and distribute the brochure will depend on the number of copies to be distributed. Assume that 10,000 brochures are to be printed and distributed by local institutions at \$0.25 each. The total cost for design and preparation of the brochure and printing of 10,000 copies will be approximately \$12,500.00. The estimated annual cost to reinforce the message (providing an additional 1,000 brochures per year and the labor associated with periodic editing and updating of the brochures/fact sheets) is \$5,000.00.

6.4.3.4 There would be no associated costs for the preparation of newspaper articles and the conducting of interviews.

6.4.4 Classroom Education

6.4.4.1 **Effectiveness:** Providing education through the classroom would be a very effective method of modifying behavior by informing the public and public officials concerning the presence of ordnance at the Camp and how to safely deal with the ordnance. Ordnance identification and ordnance safety classes/education would likely be very effective in the area. However, to be fully effective over a period of time, the message must be reinforced. Ordnance identification classes should be conducted on a regularly scheduled basis (possibly every 2 to 3 years) and ordnance safety should be incorporated as a regular part of the current classes. It is anticipated that these instructors would be trained by outside courses given by experts in ordnance instruction or an ordnance expert would be contracted to perform training.

6.4.4.2 **Implementability:** Providing classroom education should be easily implementable. The most difficult part of the process will be coordinating efforts with an ordnance expert who will be retained to educate the public in ordnance identification and scheduling the maximum number of people per class. Implementation will be most easily facilitated during a time when an ordnance expert is scheduled to be on-site for a removal action.

6.4.4.3 **Cost:** The estimated cost to retain the services of an ordnance expert (including preparation, classroom training time, travel, and per diem) to provide ordnance identification education is approximately \$5,000. The estimated cost to provide the necessary information and to assist the institutions that are willing to include ordnance safety into their current education process is approximately \$5,000. The total estimated cost to implement the classroom education alternative would be \$10,000. The estimated annual cost to reinforce the classroom education process (assuming ordnance identification classes once every 3 years and periodic update and supplementing of the information concerning ordnance safety) is approximately \$3,000 per year. The lifecycle costs for classroom education are approximately \$52,270.

6.4.5 Audio Visual Media

6.4.5.1 **Effectiveness:** Providing information using visual media would be an effective method of modifying behavior by educating the public concerning the presence of ordnance at the Camp. Production and dissemination of videotapes and presentation of the message over local television would be an effective form of UXO education. However, the message must be reinforced. Frequent and regularly scheduled re-broadcast of the original television presentation is recommended. Periodic updating of the videotapes is recommended to ensure the accuracy and timeliness of the information presented. Additional footage and editing of the original videotapes may be required every 2 to 3 years.

6.4.5.2 **Implementability:** Providing information via the visual media should be easily implementable.

6.4.5.3 **Cost:** The estimated cost to produce a professional quality 10-minute videotape for airing on the public television station and for distribution to the local institutions and the community is approximately \$50,000. The estimated cost to copy and distribute videotapes to various institutions and to television stations would depend on the number of copies needed. However, assuming 50 copies at \$20 each (including the cost of the videotape, dubbing, and postage) the cost would be approximately \$1,000. Therefore, the total estimated cost to implement the information via visual media would be \$51,000. The estimated annual cost to reinforce the message (assuming updating of the videotape once every 3 years at a cost of \$5,000 per update and distribution) would be \$2,000 per year. The lifecycle costs for implementation of visual media are approximately \$79,180.

6.4.6 Exhibits/Displays

6.4.6.1 **Effectiveness:** The presentation of information through exhibits/displays is an effective method of modifying behavior by educating the public concerning the presence of ordnance at the Camp. Producing displays and presenting them in the existing museum and other areas of high public exposure would be an effective form of education. The more people that visit the museum or area where the information is displayed, the more effective the alternative. At the present time, providing information about ordnance would be most effective through the use of a mobile display at various locations. A permanent display at the museum would be constructed. An exhibit or display becomes outdated either through changes in the information or wear and tear and must be updated or replaced every four to five years. This updating is recommended periodically to ensure the condition, accuracy and timeliness of the information presented.

6.4.6.2 **Implementability:** Providing information via exhibits and mobile displays should be implementable. The primary concern will be the transport and relocation of the mobile display to the various locations. This task may be accepted by the County or by a specific group such as the Association. This effort will require additional coordination and effort.

6.4.6.3 **Cost:** The estimated cost to purchase a mobile exhibit and properly design and prepare it for display is \$6,000. The estimated cost to prepare a permanent display for the museum is approximately \$4,000. Therefore, the total cost to prepare one permanent and one

mobile display is \$10,000. The estimated annual cost to update and reinforce the message on the displays is \$1,000 per year. The lifecycle costs for the preparation and use of exhibits and displays for a period of 25 years are approximately \$24,090.

6.4.7 Internet Web Site

6.4.7.1 **Effectiveness:** The Internet Web page would be less effective than some of the other alternatives in facilitating public awareness due to the demographics of the area. However, it would be very effective in presenting in-depth information about the Camp and the presence of ordnance and safety precautions.

6.4.7.2 **Implementability:** Creation of a Web Site should be easily implementable. The EE/CA project already provides a Web Site which details information about the history of the Camp and progress of the current investigation..

6.4.7.3 **Cost:** The cost to design a Web Site varies from \$50.00 to \$100.00 per hour. Assuming that the design would require 50 hours at \$75.00 per hour including review, revisions, and placing the site on the Web, the total cost would be \$3,750.00. The lifecycle costs for the implementation of the Web Site have not been determined.

6.4.8 Ad Hoc Committee

6.4.8.1 **Effectiveness:** The Ad hoc committee would be effective in providing information and understanding to citizen volunteers who then would be active in facilitating broader public awareness. This ad hoc committee would include representatives from the various stakeholders at the Camp. These groups should include, but not be limited to: St. Joe Timber Land Company, Nature Conservancy, Trust for Public Land, State Forest, the Association, and Lanark Village neighborhood representatives.

6.4.8.2 **Implementability:** Creation of an Ad hoc committee should be easily implementable. That committee could continue to function after the cleanup is completed. There will be significant public interest in the future and potential public use of the Camp.

6.4.8.3 **Cost:** The members of the Ad hoc committee would not be paid for their time. Therefore, the estimated cost to implement this alternative would be 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 plus costs associated with purchasing stationary, copying, telephone calls, and other miscellaneous expenses. The lifecycle costs for continued implementation of the Ad hoc committee for a period of 25 years is approximately \$16,090.

6.4.9 OE Trained Escorts for Timber Harvesting

6.4.9.1 **Effectiveness:** The use of OE trained escorts to accompany the St. Joe Timber Land Company harvesting crews would be an effective means of reducing the risk of exposures to OE items in Area A, Area B, and Area J123. The primary role of these escorts would be for avoidance of OE items not for clearance of OE items.

6.4.9.2 **Implementability:** This program would be easily implementable. Coordination would be required between the St. Joe Timber Land Company harvesting crews and the contracted OE trained escorts to determine scheduling and availability. Coordination will be required with the USACE for any removals that may be necessary as a result of finding UXO during timber harvesting.

6.4.9.3 **Cost:** The cost for this program includes a weekly salary for OE trained escorts. The cost of an OE trained technician to provide an escort for the timber harvesting personnel is derived from an estimated \$60 per hour plus a \$90 per diem. Therefore, the annual cost for two full-time OE trained technicians, assuming that timber harvesting would occur for eight weeks per year, is estimated to be approximately \$48,500. This amount could fluctuate according to the number of escorts deemed necessary by the timber harvesting crews and the length of the timber harvesting that occurred each year. Since it is anticipated that timber harvesting at the Camp will be a perpetual activity; the OE trained escorts could be placed under contract and used as needed.

6.4.10 Site-Wide IC Summary

Several IC components were identified for implementation site-wide at the Camp that were considered effective, implementable, and cost effective. Posting of warning signs, preparation and distribution of printed media, classroom education, visual media, establishment of exhibits/displays, creation of an internet Web site, and establishment of an Ad Hoc committee are all recommended. Fencing, notice, and OE escorts were deemed as not appropriate for the Camp as a whole but were considered on an AOI basis. Table 6.1 below presents a summary of the IC site-wide analysis.

6.5 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA A – BAZOOKA RANGE

Access rights were granted by the sole property owner for Area A (St. Joe Timber Land Company) to provide representative OE sampling coverage throughout the AOI. In addition, the AOI is relatively homogenous. Therefore, the geophysical data collected from the geophysical meandering paths was considered representative and extrapolated to the entire AOI. As noted previously in Subsection 2.3, the total acreage comprising Area A was incorrectly reported as 105 acres in the ASR and EE/CA Work Plan. Area A is actually 50 acres.

6.5.1 Alternative 1: No DoD Action Indicated

6.5.1.1 **Effectiveness:** For Area A the NDAI alternative will not provide for the overall public safety and protection of the human environment. The data collected during this EE/CA investigation confirms the AOI was used as a bazooka range.

Table 6.1
Summary of Institutional Control Alternatives Components

Alternative	Effectiveness	Implementation	Initial Cost	Annual Cost	Lifecycle Costs (25 years)
Institutional Controls					
Access Control					
- Fencing	- Somewhat effective in defining ownership & limiting access.	- Implementable (depending on ownership)	Various	Various	Various
- Signage	- Effectively reinforce warnings as long as they continue to be maintained	- Implementable	\$4,650	\$1,000	\$18,740
- Land Use Restrictions and Regulatory Control	- Effective in restricting type & location of clearing & development.	- Unknown	Not Determined	Not Determined	Not Determined
Notice	Effective	Not Readily Implementable	Not Determined	Not Determined	Not Determined
- Deed Notification					
- At Property Transfer					
- At Permitting					
Printed Media	Very Effective	Implementable	\$12,500	\$5,000	Various
- Brochures/Fact Sheets					
- Newspaper Articles					
Classroom Education	Very Effective	Implementable	\$10,000	\$3,000	\$52,270
- Ordnance Identification					
- Ordnance Safety					
Visual Media	Effective	Implementable	\$51,000	\$2,000	\$79,180
- Videotapes					
- Television					
Exhibits/Displays (Stationary & Mobile)	Effective	Implementable	\$10,000	\$1,000	\$24,090
Internet Web Site	Effective	Implementable	\$3,750	Not Determined	Not Determined
Ad hoc Committee	Effective	Easily implementable	\$2,000	\$1,000	\$16,090
Timber Harvesting OE Escorts	Effective	Easily implementable (St. Joe)	Various	\$48,500	Various

6.5.1.2 During the EE/CA field investigation, no UXO was recovered. However, approximately 84% of the anomalies contained OE-related debris (see Subsection 3.12.1). Furthermore, the visual similarity between practice and unexploded HE anti-tank (HE-AT) 2.36-inch rockets (Figure 3.2) presents an intangible public safety risk associated with persons potentially developing a complacency due to the high concentration of practice rockets. The maximum density estimate was 1.12 UXO/acre. Potential exposure pathways are associated with continued use of the area for timber production, as supported by the County Comprehensive Plan. Although no UXO was identified during the EE/CA investigation, the fact that the practice and HE projectiles are virtually identical coupled with the known usage of HE items within the AOI suggests a public safety risk is present. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the NDAI alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

6.5.2 Alternative 2: Institutional Controls

6.5.2.1 **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 will result in the number of exposures. If the St. Joe Timber Land Company were amenable, Area A could be fenced and hunting activities could be curtailed. In addition, OE trained escorts for timber harvesting can be assigned to the crews as described in Subsection 6.4.9. As a result, the annual exposure risk would be significantly reduced as a function of the lack of contributing participation activities. Aside from adoption of the site-wide IC components, as detailed in Subsection 6.4, fencing and OE escorts would be effective for Area A. Thus, this alternative satisfies the Effectiveness category and further analysis was performed.

6.5.2.2 **Implementability:** Both fencing and OE escorts are both technically and administratively feasible and the services and materials necessary to implement such are readily available. Discussions with the St. Joe Timber Land Company management are necessary to confirm acceptance and cooperation.

6.5.2.3 **Cost:** To determine costs for installing fencing it was assumed that six-foot chain-link fencing would be installed topped with three strands of barbed wire. The associated costs for fencing Area A assume \$10 per foot installed. The annual cost for inspecting and maintaining the fencing depends on the amount of fencing installed. Assuming that the entire perimeter of the AOI is fenced, approximately 5900 linear feet are required. Thus an initial capital expenditure of \$59,000 is necessary to implement with annual costs for maintenance anticipated to be approximately \$3,000. UXO support during installation was estimated to be two qualified personnel and screening equipment for a period of two weeks. This one-time cost was estimated at \$10,000.

6.5.2.4 The cost for OE escorts for timber harvest activities are based on the discussion presented in Subsection 6.4.9. Timber harvest within Area A is not anticipated for the next 10 to 15 years due to the current presence of young saplings. In addition, the AOI is only 50 acres and can likely be harvested in a matter of days. Therefore, for this analysis the cost associated with this IC component will be considered to be nominal.

6.5.3 Alternative 3: Surface Clearance of OE

6.5.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area A will include removal of UXO on the surface regardless of future land use. Implementation of this alternative for Area A will provide increased overall protection of public safety and the human environment. Some OE-related items were recovered on the ground surface during the EE/CA investigation. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.5.3.2 **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 available. Neighboring homes are beyond the MSD for any of the ordnance items recovered from this AOI during the EE/CA investigation. The existing young *trees would not be removed* although some moderate brush-cutting would be necessary. The alternative will be implemented as described in Subsection 6.2.4.

6.5.3.3 **Cost:** The cost to implement Alternative 3 for Area A is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the surface clearing option is estimated at approximately \$3,542/acre inclusive of mobilization/demobilization costs, brush cut, land survey, evacuation/relocation, and oversight (Table 6.2). The UXO removal effort assumes 2 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$177,100. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

6.5.4 Alternative 4: Clearance to Depth of OE

6.5.4.1 **Effectiveness:** In this alternative, the 50 acres within Area A would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings of Area A. During the EE/CA investigation of Area A, 99.5% of the recovered OE items were located from 0 to 12 inches below ground surface with no OE items recovered from greater than 30 inches in depth. The Clearance to Depth of OE items from Area A will provide additional protection of public safety and the human environment than afforded by Alternatives 1, 2, and 3. The primary activity contributing to exposure risk is participation in timber harvesting. Alternative 4 complies with ARARs and would be effective in both the long-term and short-term.

6.5.4.2 **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 available. The logistics associated with excavation of residential properties will not be necessary for this area due to its remoteness. Neighboring homes are beyond the MSD for any of the ordnance items recovered from this AOI during the EE/CA investigation. Site preparation for implementation of Alternative 4 at Area A will consist of complete removal of tree cover and understory. The alternative will be implemented as described in Subsection 6.2.5.

Table 6.2
Area A - Bazooka Range
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 1 Week

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	50	\$90,000
A-E Field Oversight ²	\$270	50	\$13,500
A-E Project Management ³	\$144	50	\$7,200
Land Survey ⁴		50	\$5,000
Brush Cut ⁵		50	\$5,000
Relocation Costs ⁶			\$2,500
		Subtotal	\$123,200
CEHNC Costs Contracting & Oversight ⁷			\$18,480
		Total Cost Estimate:	\$141,680
		Contingency (25%):	\$35,420
			\$177,100
		Cost per Acre =	\$3,542

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 1 week field effort, demobilization, and all field equipment/ODCs. Assumes two detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be moderate at this site. No tree removal only underbrush.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal. Closest residential is Lanark Village.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.5.4.3 **Cost:** The cost to implement Alternative 4 for Area A is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the subsurface clearing option is estimated at approximately \$10,914/acre inclusive of mobilization/demobilization costs, brush/tree removal, land survey, evacuation/relocation, timber revenue costs, and oversight (Table 6.3). The UXO removal effort assumes 4 detonations of UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$545,675. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

6.6 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA B (WEST)– GRENADE COURT

Access rights were granted by the sole property owner for the western portion of Area B (St. Joe Timber Land Company) to provide representative OE sampling coverage throughout the AOI. Area B was subdivided into two distinct AOIs based on a variety of factors as detailed in Subsection 4.3.2. The western portion of the area was delineated as a 54-acre tract and is relatively homogenous. Therefore, the data collected from the geophysical meandering paths was considered representative and extrapolated to the entire western portion of the AOI.

6.6.1 Alternative 1: No DoD Action Indicated

6.6.1.1 **Effectiveness:** For Area B (West) the NDAI alternative will not provide for the overall public safety and protection of the human environment. The data collected during this EE/CA investigation confirms the AOI was used as a grenade range as well as mine training.

6.6.1.2 During the EE/CA field investigation of Area B (West), seven UXO were recovered from the 85 anomalies identified. All the UXO items were either fuzed training mines or live fuze bodies. UXO or OE-related debris was recovered from a total of 13 anomalies intrusively investigated. In addition to the mines, grenade bodies and HE fragments were also recovered. The maximum density estimate was 10.44 UXO/acre. Potential exposure pathways are associated with continued use of the area for timber production, as supported by the County Comprehensive Plan. The confirmed presence of UXO within the AOI suggests a serious public safety risk. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the NDAI alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

Table 6.3
Area A - Bazooka Range
Alternative 4 - Clearance to Depth of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 3.5 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$5,400	50	\$270,000
A-E Field Oversight ²	\$810	50	\$40,500
A-E Project Management ³	\$432	50	\$21,600
Land Survey ⁴		50	\$5,000
Brush Cut ⁵		50	\$15,000
Cost of Timber Replacement	\$500	50	\$25,000
Relocation Costs ⁶			\$2,500
		<i>Subtotal</i>	\$379,600
CEHNC Costs Contracting & Oversight ⁷			\$56,940
		Total Cost Estimate:	\$436,540
		Contingency (25%):	\$109,135
			\$545,675
		Cost per Acre =	\$10,914

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 3.5-week field effort, demobilization, and all field equipment/ODCs. Assumes four detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored. Assume 71 anomalies investigated per acre.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting inclusive of all onsite young saplings and disposal.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal. Closest residential is Lanark Village.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used and items up to 4 feet in depth will be removed, as stated in 6.2.5

6.6.2 Alternative 2: Institutional Controls

6.6.2.1 **Effectiveness:** The exposure risk 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 will result in the number of exposures. Seven UXO items were discovered, four of which were located on the ground surface. The other three UXO items were located at depths of less than one foot below land surface. These shallow depths could result in exposure during timber cutting operations and hunting activities. If the St. Joe Timber Land Company were amenable, OE trained escorts for timber harvesting can be assigned to the crews as described in Subsection 6.4.9. As a result, the annual exposure risk would be significantly reduced as a function of the lack of contributing participation activities. Aside from adoption of the site-wide IC components, as detailed in Subsection 6.4, OE escorts would be effective for Area B (West). Thus, this alternative satisfies the Effectiveness category and further analysis was performed.

6.6.2.2 **Implementability:** OE escorts are both technically and administratively feasible and the services and materials necessary to implement such are readily available. Discussions with the St. Joe Timber Land Company management are necessary to confirm acceptance and cooperation.

6.6.2.3 **Cost:** The cost for OE escorts for timber harvest activities are based on the discussion presented in Subsection 6.4.9. Timber harvest within Area B (West) is not anticipated for the next 10 years due to the current presence of immature pine. In addition, the AOI is only 54 acres and can likely be harvested in a matter of days. Therefore, for this analysis the cost associated with this IC component will be considered to be nominal.

6.6.3 Alternative 3: Surface Clearance of OE

6.6.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area B (West) will include removal of UXO on the surface regardless of future land use. Implementation of the Surface Clearance of OE alternative for Area B (West) will likely provide some increase in the overall protection of public safety and the human environment. Several UXO and other OE-related items were recovered on the ground surface during the EE/CA investigation. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.6.3.2 **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 available. The existing immature trees would not be removed although some brush-cutting would be necessary. The alternative will be implemented as described in Subsection 6.2.4.

6.6.3.3 **Cost:** The cost to implement Alternative 3 for Area B (West) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the surface clearing option is estimated at approximately \$3.582/acre inclusive of mobilization/demobilization costs, brush cut, land survey,

evacuation/relocation, and oversight (Table 6.4). The UXO removal effort assumes 2 detonations of surface UXO using an “on-call” explosives vendor. The cost to complete this alternative is approximately \$193,424. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.4
Area B (West) – Grenade Court
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 1 Week

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	54	\$97,200
A-E Field Oversight ²	\$270	54	\$14,580
A-E Project Management ³	\$144	54	\$7,776
Land Survey ⁴		54	\$5,000
Brush Cut ⁵		54	\$5,000
Relocation Costs ⁶			\$5,000
		<i>Subtotal</i>	\$134,556
CEHNC Costs Contracting & Oversight ⁷			\$20,183
		Total Cost Estimate:	\$154,739
		Contingency (25%):	\$38,685
			\$193,424
		Cost per Acre =	\$3,582

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 1 week field effort, demobilization, and all field equipment/ODCs. Assumes two detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be moderate at this site. No tree removal only underbrush.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal. Closest occupied structure is FSU Marine laboratory.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.6.4 Alternative 4: Clearance to Depth of OE

6.6.4.1 **Effectiveness:** In this alternative, the 54 acres within Area B (West) would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings in Area B. During the EE/CA investigation of Area B (West), 65% of the recovered OE items were located from 0 to 12 inches below ground surface with the remaining 35% located on the surface. The Clearance to Depth of OE items from Area B (West) will provide additional protection of public safety and the human environment than afforded by Alternatives 1, 2, and 3. The activities contributing to the exposure risk are participation in hunting, biking, and timber harvesting. Alternative 4 complies with ARARs and would be effective in both the long-term and short-term.

6.6.4.2 **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 available. The logistics associated with evacuation of residential properties will not be necessary for this area due to its remoteness. Neighboring homes (aside from the FSU Marine Laboratory) are beyond the MSD for any of the ordnance items recovered from this AOI during the EE/CA investigation. Site preparation for implementation of Alternative 4 at Area B (West) will consist of complete removal of tree cover and understory. The alternative will be implemented as described in Subsection 6.2.5.

6.6.4.3 **Cost:** The cost to implement Alternative 4 for Area B (West) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the subsurface clearing option is estimated at approximately \$10,932/acre inclusive of mobilization/demobilization costs, brush/tree removal, land survey, evacuation/relocation, timber revenue costs, and oversight (Table 6.5). The UXO removal effort assumes 4 detonations of UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$590,335. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.5
Area B (West) – Grenade Court
Alternative 4 - Clearance to Depth of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 3.5 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$5,400	54	\$291,600
A-E Field Oversight ²	\$810	54	\$43,740
A-E Project Management ³	\$432	54	\$23,328
Land Survey ⁴		54	\$5,000
Brush Cut ⁵		54	\$15,000
Cost of Timber Replacement	\$500	54	\$27,000
Relocation Costs ⁶			\$5,000
		<i>Subtotal</i>	\$410,668
CEHNC Costs Contracting & Oversight ⁷			\$61,600
		Total Cost Estimate:	\$472,268
		Contingency (25%):	\$118,067
			\$590,335
		Cost per Acre =	\$10,932

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 3.5-week field effort, demobilization, and all field equipment/ODCs. Assumes four detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored. Assume 71 anomalies investigated per acre.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting inclusive of all onsite young saplings and disposal.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal. Closest residential is Lanark Village.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used and items up to 4 feet in depth will be removed, as stated in 6.2.5.

6.7 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA B (EAST)– GRENADE COURT

Access rights were granted by the sole property owner for the eastern portion of Area B (FSU) to provide representative OE sampling coverage throughout the AOI. Area B was subdivided into two distinct AOIs based on a variety of factors as detailed in Subsection 4.3.2. The eastern portion of the area was delineated as a 44-acre tract and is relatively homogenous. Therefore, the data collected from the geophysical meandering paths was considered representative and extrapolated to the entire western portion of the AOI.

6.7.1 Alternative 1: No DoD Action Indicated

6.7.1.1 **Effectiveness:** For Area B (east) the data collected during this EE/CA investigation confirms the AOI was used as a grenade range as well as mine training.

6.7.1.2 During the EE/CA field investigation of Area B (East), no UXO were recovered from the 70 anomalies identified. OE-related debris was recovered from a total of 6 anomalies intrusively investigated. In addition to mines, grenade bodies and HE fragments were also recovered. The maximum density estimate was 2.05 UXO/acre. Potential exposure pathways are associated with continued nonuse of the AOI for any purpose. The County Comprehensive Plan identifies the property as zoned agricultural. The confirmed presence of UXO in the adjacent parcel coupled with the findings of HE fragments is a concern. This alternative does comply with ARARs since no UXO items have been recovered from this AOI. The short-term and long-term effectiveness criteria are met in this alternative although the risk is not reduced. However, it is important to note that the government will respond to any future UXO discovery within the AOI regardless of whether the affected parcel was designated for NDAI. Thus, the NDAI alternative for Area B (East) meets the Effectiveness category.

6.7.1.3 **Implementability:** The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

6.7.1.4 **Cost:** The NDAI alternative is a no-cost alternative.

6.7.2 Alternative 2: Institutional Controls

6.7.2.1 **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 will result in the number of exposures. No UXO items were discovered during the EE/CA investigation of this AOI but OE was present. The shallow depths of OE, ranging from 1 to 18 inches below ground surface, suggests that if UXO is present it would likely be shallow. If FSU were amenable, Area B (East) could be fenced thus restricting the participation activities that contribute to the exposure risk (biking, hiking, and unsanctioned hunting). Aside from adoption of the site-wide IC components, as detailed in Subsection 6.4, fencing would be effective for Area B (East). Thus, this alternative satisfies the Effectiveness category and further analysis was performed.

6.7.2.2 **Implementability:** Fencing is technically and administratively feasible and the services and materials necessary to implement such are readily available. Discussions with FSU property management are necessary to confirm acceptance and cooperation.

6.7.2.3 **Cost:** To determine costs for installing fencing it was assumed that six-foot chain-link fencing would be installed topped with three strands of barbed wire. The associated costs for fencing Area B (East) assume \$10 per foot installed. The annual cost for inspecting and maintaining the fencing depends on the amount of fencing installed. Assuming that the entire perimeter of the AOI is fenced, approximately 5538 linear feet are required. Thus an initial capital expenditure of \$55,380 is necessary to implement with annual costs for maintenance anticipated to be approximately \$3,000. UXO support during installation was estimated to be two qualified personnel and screening equipment for a period of two weeks. This one-time cost was estimated at \$10,000.

6.7.3 Alternative 3: Surface Clearance of OE

6.7.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area B (East) will include removal of UXO on the surface regardless of future land use. Implementation of the Surface Clearance of OE alternative for Area B (East) will provide some increase in the overall protection of public safety and the human environment. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short term. Based on the OECert analysis, the maximum annual UXO exposures would be reduced by 8 exposures per year (100%) over the NDAI alternative (from 8 to 0). Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.7.3.2 **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 available. The existing trees would not be removed although some brush-cutting would be necessary. The alternative will be implemented as described in Subsection 6.2.4.

6.7.3.3 **Cost:** The cost to implement Alternative 3 for Area B (East) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the surface clearing option is estimated at approximately \$3.673/acre inclusive of mobilization/demobilization costs, brush cut, land survey, evacuation/relocation, and oversight (Table 6.6). The UXO removal effort assumes 2 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$161,598. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.6
Area B (East) – Grenade Court
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 1 Week

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	44	\$79,200
A-E Field Oversight ²	\$270	44	\$11,880
A-E Project Management ³	\$144	44	\$6,336
Land Survey ⁴		44	\$5,000
Brush Cut ⁵		44	\$5,000
Relocation Costs ⁶			\$5,000
		<i>Subtotal</i>	<i>\$112,416</i>
CEHNC Costs Contracting & Oversight ⁷			\$16,862
		Total Cost Estimate:	\$129,278
		Contingency (25%):	\$32,320
			\$161,598
		Cost per Acre =	\$3,673

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 1 week field effort, demobilization, and all field equipment/ODCs. Assumes two detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be moderate at this site. No tree removal only underbrush.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal. Closest occupied structure is FSU Marine laboratory.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.7.4 Alternative 4: Clearance to Depth of OE

6.7.4.1 **Effectiveness:** In this alternative, the 44 acres within Area B (East) would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings in Area B. During the EE/CA investigation of Area B (East), 657 of the recovered OE items were located from 0 to 6 inches below ground surface. The Clearance to Depth of OE items from Area B (East) will provide additional protection of public safety and the human environment than afforded by Alternatives 1, 2, and 3. The activities contributing to the exposure risk are participation in hunting, biking, and timber harvesting. Alternative 4 complies with ARARs and would be effective in both the long-term and short-term.

6.7.4.2 **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 available. The logistics associated with evacuation of residential properties will not be necessary for this area due to its remoteness. Neighboring homes (aside from the FSU Marine Laboratory) are beyond the MSD for any of the ordnance items recovered from this AOI during the EE/CA investigation. Site preparation for implementation of Alternative 4 at Area B (east) will consist of complete removal of tree cover and understory. The alternative will be implemented as described in Subsection 6.2.5.

6.7.4.3 **Cost:** The cost to implement Alternative 4 for Area B (East) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the subsurface clearing option is estimated at approximately \$12,390/acre inclusive of mobilization/demobilization costs, significant brush/tree removal, land survey, evacuation/relocation, timber revenue costs, and oversight (Table 6.7). The UXO removal effort assumes 4 detonations of UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$545,169. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.7
Area B (East) – Grenade Court
Alternative 4 - Clearance to Depth of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 3 Weeks

*Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.*

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$5,400	44	\$237,600
A-E Field Oversight ²	\$810	44	\$35,640
A-E Project Management ³	\$432	44	\$19,008
Land Survey ⁴		44	\$5,000
Brush Cut ⁵		44	\$50,000
Cost of Timber Replacement	\$500	44	\$27,000
Relocation Costs ⁶			\$5,000
		<i>Subtotal</i>	\$379,248
CEHNC Costs Contracting & Oversight ⁷			\$56,887
		Total Cost Estimate:	\$436,135
		Contingency (25%):	\$109,033
			\$545,169
		Cost per Acre =	\$12,390

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 3-week field effort, demobilization, and all field equipment/ODCs. Assumes four detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored. Assume 71 anomalies investigated per acre.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting inclusive of all numerous mature trees and heavy vegetation.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal. Closest residential is Lanark Village.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used and items up to 4 feet in depth will be removed, as stated in 6.2.5.

6.8 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA E – ARTILLERY IMPACT ZONE

Access rights were granted by the sole property owner for the eastern portion of Area E (Florida State Forestry Service) to provide representative OE sampling coverage throughout the AOI. In addition, the AOI is relatively homogenous. As a result, the geophysical data collected from the sampling anomalies was extrapolated to apply to the uninvestigated portions of the AOI.

6.8.1 Alternative 1: No DoD Action Indicated

6.8.1.1 **Effectiveness:** For Area E the data collected during this EE/CA investigation does not confirm the AOI was used as an artillery impact area.

6.8.1.2 During the EE/CA field investigation of Area E, no OE or UXO was recovered from the 134 anomalies identified with the exception of a PD fuze outside the AOI perimeter. A UXO density estimate was not calculated for this AOI as the absence of OE suggests the AOI was not used as an impact area for heavy artillery (Appendix E). The County Comprehensive Plan identifies the property as zoned agricultural although continued use of the AOI as a State Forest is anticipated. This alternative does comply with ARARs since no UXO items have been recovered from this AOI. The short-term and long-term effectiveness criteria are met in this alternative although the risk is not reduced. However, it is important to note that the government will respond to any future UXO discovery within the AOI regardless of whether the affected parcel was designated for NDAI. Thus, the NDAI alternative for Area B (east) meets the Effectiveness category.

6.8.1.3 **Implementability:** The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

6.8.1.4 **Cost:** The NDAI alternative is a no-cost alternative.

6.8.2 Alternative 2: Institutional Controls

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 will result in the number of exposures. No UXO items were discovered during the EE/CA investigation of this AOI and only one OE item was present (PD fuze). If the forestry service were amenable, Area E could be fenced thus restricting the participation activities that contribute to the exposure risk (biking, hiking, and hunting). However, acceptance of this IC component is unlikely. Aside from adoption of the site-wide IC components, as detailed in Subsection 6.4, no other IC components were considered effective for this AOI. 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 category and further analysis of this alternative will not be performed.

6.8.3 Alternative 3: Surface Clearance of OE

6.8.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area E will include removal of UXO on the surface regardless of future land use. Since the UXO density is

considered to be zero for this AOI, implementation of the Surface Clearance of OE alternative for Area E will not provide any increase in the overall protection of public safety and the human environment. No UXO and only one OE-related item were recovered on the ground surface during the EE/CA investigation. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.8.3.2 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 available. The existing forest would not be removed although some brush-cutting would be necessary. The alternative will be implemented as described in Subsection 6.2.4.

6.8.3.3 Cost: The cost to implement Alternative 3 for Area E is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the surface clearing option is estimated at approximately \$3,336/acre inclusive of mobilization/demobilization costs, brush cut, land survey, evacuation/relocation, and oversight (Table 6.8). The UXO removal effort assumes 60 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$5,771,879. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.8
Area E – Artillery Impact Zone
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 34 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	1730	\$3,114,000
A-E Field Oversight ²	\$270	1730	\$467,100
A-E Project Management ³	\$144	1730	\$249,120
Land Survey ⁴		1730	\$5,000
Brush Cut ⁵		1730	\$175,000
Relocation Costs ⁶			\$5,000
		<i>Subtotal</i>	\$4,015,220
CEHNC Costs Contracting & Oversight ⁷			\$602,283
		Total Cost Estimate:	\$4,617,503
		Contingency (25%):	\$1,154,376
			\$5,771,879
		Cost per Acre =	\$3,336

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 34 weeks field effort, demobilization, and all field equipment/ODCs. Assumes up to 60 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be moderate at this site. No tree removal only underbrush.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.8.4 Alternative 4: Clearance to Depth of OE

Effectiveness: In this alternative, the 1730 acres within Area E would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings. During the EE/CA investigation 100% of the recovered OE items (1) were located on the surface and outside of the area boundary. The Clearance to Depth of OE items from Area E will not provide additional protection of public safety and the human environment than afforded by Alternative 3. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the Clearance to Depth alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

6.9 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA F – DOG ISLAND

Access rights were granted by a sufficient number of the many property owners of Area F to provide representative OE sampling coverage throughout the AOI. The extent of Area F was significantly reduced as a result of the distribution of OE items recovered during the EE/CA investigation. The acreage of the AOI was refined from 1923 acres to 158 acres based on the data collected from the geophysical meandering paths, as described in Subsection 3.12.6.

6.9.1 Alternative 1: No DoD Action Indicated

6.9.1.1 **Effectiveness:** For Area F the NDAI alternative will not provide for the overall public safety and protection of the human environment. The data collected during this EE/CA investigation confirmed the portion of the original AOI near Cannonball Point was used as a beach landing area using live weaponry. No significant OE contamination was present for the remainder of the island.

6.9.1.2 During the EE/CA field investigation, one UXO item was recovered from the 119 anomalies identified. In addition, numerous OE scrap from 4.2-inch mortars were recovered. As described in Subsection 3.12.6, all of the OE (with only one exception) were found within the refined AOI portion of Area F designated as Cannonball Point. The maximum density estimate was 2.93 UXO/acre. Potential exposure pathways are associated with continued use of the area for light residential, as supported by the County Comprehensive Plan. The confirmed presence of UXO within the AOI suggests a public safety risk. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the NDAI alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

6.9.2 Alternative 2: Institutional Controls

Effectiveness: The exposure risk 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 will likely result in the number of exposures. The single UXO item discovered was located at a depth of four feet below ground surface. The majority of the OE items were recovered at depths less than 6 inches. These shallow depths could result in exposure during beach combing and other recreational activities. Fencing of Area F to restrict the participation activities that contribute to the exposure risk would be logistically impossible.

Aside from adoption of the site-wide IC components, as detailed in Subsection 6.4, no other IC components were considered effective for this AOI. 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 category and further analysis of this alternative will not be performed.

6.9.3 Alternative 3: Surface Clearance of OE

6.9.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area F will include removal of UXO on the surface regardless of future land use. Implementation of the Surface Clearance of OE alternative for Area F will likely provide some increase in the overall protection of public safety and the human environment. Numerous OE-related items were recovered on the ground surface (or within the top few inches) during the EE/CA investigation, although the UXO item was located at a depth of four feet. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.9.3.2 Area F is frequently altered as a result of erosion. The beaches and adjacent inland areas experience extensive removal and reformation, suspected as the reasons for the presence of the UXO item at depth. This phenomenon is not captured by the classic surface clearance as a removal alternative. Since the land surface can change so dramatically, a *modified* surface clearance should be implemented once a year (preferably prior to the tourist season) for a period of 5 years. After the fifth year the process and findings will be reviewed to assess suspension of the process. Modified Surface Clearance will consist of a one-time 100% geophysical mapping of the AOI and surface removal followed by four years of visual only surface clearance (as needed) using simple geophysical instruments (non-recording) for gross screening.

6.9.3.2 **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 available. The sparse tree cover would not be removed although limited brush-cutting may be necessary. The alternative will be implemented as described in Subsection 6.2.4.

6.9.3.3 **Cost:** The cost to implement Alternative 3 for Area F (Footprint Reduced) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the initial surface clearing/geophysical mapping option is estimated at approximately \$3,337/acre inclusive of mobilization/demobilization costs, minimal brush cut, land survey, evacuation/relocation, and oversight (Table 6.9). The UXO removal effort assumes 6 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$527,292. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort. The cost for each of the four successive years is estimated at \$10,000 per year, respectively. Geophysical mapping equipment will only be used during the initial surface clearance effort. The remaining four surface clearance efforts will consist of visual sweeps aided by Schonstedt (or equivalent) geophysical screening tools conducted prior to the beginning of the tourist season.

Table 6.9
Area F – Dog Island (Footprint Reduced)
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 3 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	158	\$284,400
A-E Field Oversight ²	\$270	158	\$42,660
A-E Project Management ³	\$144	158	\$22,752
Land Survey ⁴		158	\$5,000
Brush Cut ⁵		158	\$2,000
Relocation Costs ⁶			\$10,000
		<i>Subtotal</i>	\$366,812
CEHNC Costs Contracting & Oversight ⁷			\$55,022
		Total Cost Estimate:	\$421,834
		Contingency (25%):	\$105,458
			\$527,292
		Cost per Acre =	\$3,337

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 3 weeks field effort, demobilization, and all field equipment/ODCs. Assumes up to 6 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be minimal at this site.

Relocation/evacuation costs expected to be moderate due to residential component.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.9.4 Alternative 4: Clearance to Depth of OE

Effectiveness: In this alternative, the 158 acres within Area F would be cleared of all surface and subsurface OE-related items to a depth consistent with the maximum EE/CA findings. During the EE/CA investigation of the refined 158-acre Area F AOI (Subsection 3.12.6), only 29% of the recovered OE items were located either on the surface or at a depth of less than 6 inches. With the exception of the limited construction exposure activity scenario, all other potential exposure pathways for the AOI are generally non-intrusive (i.e. biking, beach combing, picnicking, etc.). The implementation of Alternative 4 (Clearance to Depth of OE items) will likely provide minimal additional protection of public safety and the human environment than afforded by Alternative 3 because the potential exposure pathways are basically incomplete. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the Clearance to Depth alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

6.10 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA G (NATURE CONSERVANCY) – ALLIGATOR POINT GUNNERY RANGE

Access rights were granted by the sole property owner for the western portion of Area G (Nature Conservancy) to provide representative OE sampling coverage throughout the AOI. Area G was subdivided into two distinct AOIs based on a variety of factors as detailed in Subsection 4.3.2. The western portion of the area was delineated as a 63-acre undeveloped tract and is relatively homogenous. Therefore, the data collected from the geophysical meandering paths was considered representative and extrapolated to the entire western portion of the AOI.

6.10.1 Alternative 1: No DoD Action Indicated

6.10.1.1 **Effectiveness:** For Area G (Nature Conservancy) the data collected during this EE/CA investigation confirms the AOI was used for military training including aerial target practice. However, the presence of .50-caliber bullets was observed throughout the AOI but they were not considered OE for the purposes of this study.

6.10.1.2 During the EE/CA field investigation, no UXO were recovered from the 31 anomalies identified. OE-related debris was recovered from only one anomaly intrusively investigated. The maximum density estimate was 2.35 UXO/acre. Potential exposure pathways are associated with continued use of the AOI as an undeveloped conservation area, as supported by the zoning identified in the County Comprehensive Plan. This alternative does comply with ARARs since no UXO items have been recovered from this AOI. The short-term and long-term effectiveness criteria are met in this alternative although the risk is not reduced. However, it is important to note that the government will respond to any future UXO discovery within the AOI regardless of whether the affected parcel was designated for NDAI. Thus, the NDAI alternative for Area G (Nature Conservancy) meets the Effectiveness category.

6.10.1.3 **Implementability:** The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

6.10.1.4 **Cost:** The NDAI alternative is a no-cost alternative.

6.10.2 Alternative 2: Institutional Controls

6.10.2.1 **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 will likely result in the number of exposures. No UXO items were discovered during the EE/CA investigation of this AOI and only one OE item was present (box fins). Area G (Nature Conservancy) is already fenced and access controlled to both pedestrian and vehicular traffic from the residential portion of the Alligator Point. Logistics (erosion and protected species access) preclude fencing of the beachfront portion of the AOI. The only participation activity that contributes to the exposure risk is site management associated with the conservation effort. Implementation of the site-wide IC components, as detailed in Subsection 6.4, includes preparation of brochures, signs, and videos that can be provided to Nature Conservancy personnel. Therefore, no other IC components were considered effective for this AOI. 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 category and further analysis of this alternative will not be performed.

6.10.3 Alternative 3: Surface Clearance of OE

6.10.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area G (Nature Conservancy) will include removal of UXO on the surface regardless of future land use. Implementation of the Surface Clearance of OE alternative for Area G (Nature Conservancy) will likely provide some increase in the overall protection of public safety and the human environment. No OE-related items were recovered on the ground surface during the EE/CA investigation. However, significant erosion associated with wave-action is common in this area. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.10.3.2 **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 available. Due to the presence of protected species of both plants and animals as well as habitats, implementation of this alternative would be logistically challenging. Furthermore, it is unlikely that the private Nature Conservancy will be amenable the necessary level of disturbance to implement this OE response action. The alternative will be implemented as described in Subsection 6.2.4.

6.10.3.3 **Cost:** The cost to implement Alternative 3 for Area G (Nature Conservancy) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the initial surface clearing/mapping option is estimated at approximately \$3,388/acre inclusive of mobilization/demobilization costs, minimal brush cut, geophysical survey, evacuation/relocation, and oversight (Table 6.10). The UXO removal effort assumes 2 detonations of surface UXO using an “on-call” explosives vendor. The cost to complete this alternative is approximately \$213,443. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort. The cost for each of the four successive years is estimated at \$10,000 per year, respectively. Geophysical equipment will only be used during

the initial surface clearance effort. The remaining four surface clearance efforts will consist of visually conducting a reconnaissance of the AOI prior to the beginning of the tourist season.

6.10.4 Alternative 4: Clearance to Depth of OE

Effectiveness: In this alternative, the 63 acres within Area G (Nature Conservancy) would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings. During the EE/CA investigation, the single OE item was recovered from a depth of three feet below ground surface. The Clearance to Depth of OE items from Area G (Nature Conservancy) will likely not provide additional protection of public safety and the human environment than afforded by Alternative 3. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the Clearance to Depth alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

Table 6.10
Area G – Alligator Point (Nature Conservancy)
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 1.5 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	63	\$113,400
A-E Field Oversight ²	\$270	63	\$17,010
A-E Project Management ³	\$144	63	\$9,072
Land Survey ⁴		63	\$5,000
Brush Cut ⁵		63	\$2,000
Relocation Costs ⁶			\$2,000
		<i>Subtotal</i>	<i>\$148,482</i>
CEHNC Costs Contracting & Oversight ⁷			\$22,272
		Total Cost Estimate:	\$170,754
		Contingency (25%):	\$42,689
			\$213,443
		Cost per Acre =	\$3,388

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 1.5 weeks field effort, demobilization, and all field equipment/ODCs. Assumes up to 2 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be minimal at this site due to bird rookery issues.

Relocation/evacuation costs expected to be low due to only a few adjacent residential properties.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.11 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA G (RESIDENTIAL) – ALLIGATOR POINT GUNNERY RANGE

Access rights were granted from a sufficient number of property owners comprising Area G (residential) to provide representative coverage throughout the area. Area G was subdivided into two distinct AOIs based on a variety of factors as detailed in Subsection 4.3.2. The eastern portion of the area was delineated as a 187-acre residential tract and is relatively homogenous. Therefore, the data collected from the geophysical meandering paths was considered representative and extrapolated to the entire western portion of the AOI.

6.11.1 Alternative 1: No DoD Action Indicated

6.11.1.1 Effectiveness: For Area G (residential) the NDAI alternative will not provide for the overall public safety and protection of the human environment. The data collected during this EE/CA investigation confirms the AOI was used for military training using live weaponry.

6.11.1.2 During the EE/CA field investigation, only one OE-related item and no UXO were recovered from the 160 anomalies identified. The maximum density estimate was 0.73 UXO/acre. Potential exposure pathways are associated with continued use of the AOI as residential, as supported by the County Comprehensive Plan. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the NDAI alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

6.11.2 Alternative 2: Institutional Controls

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 will result in the number of exposures. No UXO items were discovered during the EE/CA investigation of this AOI and only one OE item was present (practice bomb). Area G (residential) is a major tourist area and therefore access is generally open to both pedestrian and vehicular traffic. As a result, numerous participation activities (beach combing, biking, child play, etc.) contribute to the exposure risk. Implementation of the site-wide IC components, as detailed in Subsection 6.4, include preparation of brochures, signs, and videos that can be provided to the locations frequented by tourists. Therefore, no other IC components were considered effective for this AOI. 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 category and further analysis of this alternative will not be performed.

6.11.3 Alternative 3: Surface Clearance of OE

6.11.3.1 Effectiveness: The Surface Clearance of OE alternative for Area G (residential) will include removal of UXO on the surface regardless of future land use. Implementation of the Surface Clearance of OE alternative for Area G (residential) will likely provide some increase in the overall protection of public safety and the human environment. No OE-related items were recovered on the ground surface during the EE/CA investigation. However, significant erosion associated with wave-action is common in this area. The Surface Clearance of OE alternative for

this AOI would comply with ARARs and would be very effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.11.3.2 Area G is frequently altered as a result of erosion. The beaches and adjacent inland areas experience extensive removal and reformation. However, no evidence of the use of live ordnance (aside from small arms) has been identified. Therefore, conventional surface clearance is a viable alternative. Furthermore, only approximately 70 acres of the beachfront is recommended for surface clearance.

6.11.3.3 **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 available. Due to the number of property owners and rental properties, implementation of this alternative would be logistically challenging. Furthermore, it is unlikely that the 100% of the property owners will be amenable to the necessary level of disturbance and inconvenience to implement this OE response action. The alternative will be implemented as described in Subsection 6.2.4.

6.11.3.4 **Cost:** The cost to implement Alternative 3 for Area G (Residential) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the initial surface clearing option of the 70 acres of beachfront is estimated at approximately \$2,261/acre inclusive of mobilization/demobilization costs, minimal brush cut, evacuation/relocation, and oversight (Table 6.11). The UXO removal effort assumes 2 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$158,268. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort. The cost for each of the four successive years is estimated at \$10,000 per year, respectively. Geophysical equipment will only be used during the initial surface clearance effort. The remaining four surface clearance efforts will consist of visually conducting a reconnaissance of the AOI prior to the beginning of the tourist season.

Table 6.11
Area G – Alligator Point (Residential)
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 1 Week

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1000	70	\$70,000
A-E Field Oversight ²	\$150	70	\$10,500
A-E Project Management ³	\$80	70	\$5,600
Land Survey ⁴		70	\$2,000
Brush Cut ⁵		70	\$2,000
Relocation Costs ⁶			\$20,000
		<i>Subtotal</i>	\$110,100
CEHNC Costs Contracting & Oversight ⁷			\$16,515
		Total Cost Estimate:	\$126,615
		Contingency (25%):	\$31,654
			\$158,268
		Cost per Acre =	\$2,261

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 1 week field effort, demobilization, and all field equipment/ODCs. Assumes up to 2 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be minimal at this site.

⁶Relocation/evacuation costs expected to be significant due to the high concentration of beach homes.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.11.4 Alternative 4: Clearance to Depth of OE

Effectiveness: In this alternative, the 187 acres within Area G (residential) would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings. During the EE/CA investigation, the single OE item was recovered from a depth of six inches below ground surface. The Clearance to Depth of OE items from Area G (residential) will likely not provide additional protection of public safety and the human environment than afforded by Alternative 3. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the Clearance to Depth alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

6.12 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA H – RED, WHITE, AND GREEN BEACH

Access rights were granted from a sufficient number of property owners comprising Area H to provide representative coverage throughout the area. In addition, the area is relatively homogenous. As a result, the geophysical data collected from the sampling grids can be extrapolated to apply to the uninvestigated portions of the AOI.

6.12.1 Alternative 1: No DoD Action Indicated

6.12.1.1 **Effectiveness:** For Area H the data collected during this EE/CA investigation did not confirm the AOI was used for amphibious landing and other military activities using live weaponry. During the EE/CA field investigation, no OE or UXO was recovered from the 140 anomalies excavated. The maximum density estimate was 0.92 UXO/acre. Potential exposure pathways are associated with continued use of the AOI as residential and conservation, as supported by the County Comprehensive Plan. This alternative does comply with ARARs since no UXO items have been recovered from this AOI. The short-term and long-term effectiveness criteria are met in this alternative although the risk is not reduced. However, it is important to note that the government will respond to any future UXO discovery within the AOI regardless of whether the affected parcel was designated for NDAI. Thus, the NDAI alternative for Area H meets the Effectiveness category.

6.12.1.2 **Implementability:** The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

6.12.1.3 **Cost:** The NDAI alternative is a no-cost alternative.

6.12.2 Alternative 2: Institutional Controls

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 will result in the number of exposures. No OE or UXO items were discovered during the EE/CA investigation of this AOI. Area H is a moderate tourist area and therefore access is generally open to both pedestrian and vehicular traffic. As a result, numerous participation activities (beach combing, biking, child play, etc.) contribute to the exposure risk. Implementation of the site-wide IC components, as detailed in Subsection 6.4, include preparation of brochures, signs, and videos that can be provided to the locations

frequented by tourists. Therefore, no other IC components were considered effective for this AOI. 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 category and further analysis of this alternative will not be performed.

6.12.3 Alternative 3: Surface Clearance of OE

6.12.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area H will include removal of UXO on the surface regardless of future land use. Implementation of the Surface Clearance of OE alternative for Area H will likely provide some increase in the overall protection of public safety and the human environment. No OE-related items were recovered on the ground surface during the EE/CA investigation. However, significant erosion associated with wave-action is common in this area. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be very effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.12.3.2 Area H is frequently altered as a result of erosion. The beaches and adjacent inland areas experience extensive removal and reformation. However, no evidence of the use of live ordnance has been identified. Therefore, conventional surface clearance is a viable alternative.

6.12.3.3 **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 available. Due to the number of property owners and the conservation ownership (Trust for Public Land), implementation of this alternative would be logistically challenging. Furthermore, it is unlikely that the 100% of the property owners will be amenable to the necessary level of disturbance and inconvenience to implement this OE response action. The alternative will be implemented as described in Subsection 6.2.4.

6.12.3.4 **Cost:** The cost to implement Alternative 3 for Area H is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the initial surface clearing option is estimated at approximately \$2,243/acre inclusive of mobilization/demobilization costs, minimal brush cut, geophysical survey, evacuation/relocation, and oversight (Table 6.12). The UXO removal effort assumes 2 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$118,866. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort. The cost for each of the four successive years is estimated at \$10,000 per year, respectively. Geophysical equipment will only be used during the initial surface clearance effort. The remaining four surface clearance efforts will consist of visually conducting a reconnaissance of the AOI prior to the beginning of the tourist season

6.12.4 Alternative 4: Clearance to Depth of OE

6.12.4.1 **Effectiveness:** In this alternative, the 53 acres within Area H would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings. During the EE/CA investigation no OE items were located within the AOI. The Clearance to

Depth of OE items from Area H will likely provide additional protection of public safety and the human environment than afforded by Alternatives 1, 2, and 3. The activities contributing to the exposure risk is participation in beach combing, child play, and new construction. Alternative 4 complies with ARARs and would be effective in both the long-term and short-term.

6.12.4.2 **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 available. Evacuations would be required as some neighboring homes are within the MSD for MPMs for this AOI. Site preparation for implementation of Alternative 4 at Area H will consist of complete removal of tree cover and understory. This requirement will unlikely be acceptable on the conservation properties. The alternative will be implemented as described in Subsection 6.2.5.

6.12.4.3 **Cost:** The cost to implement Alternative 4 for Area H is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the subsurface clearing option is estimated at approximately \$10,280/acre inclusive of mobilization/demobilization costs, light brush removal, land survey, evacuation/relocation, and oversight (Table 6.13). The UXO removal effort assumes 4 detonations of UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$544,850. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.12
Area H – Red, White, and Green Beaches
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 1 Week

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,000	53	\$53,000
A-E Field Oversight ²	\$150	53	\$7,950
A-E Project Management ³	\$144	53	\$4,240
Land Survey ⁴		53	\$2,000
Brush Cut ⁵		53	\$3,500
Relocation Costs ⁶			\$12,000
		Subtotal	\$82,690
CEHNC Costs Contracting & Oversight ⁷			\$12,404
		Total Cost Estimate:	\$95,093
		Contingency (25%):	\$23,773
			\$118,866
		Cost per Acre =	\$2,243

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 1 week field effort, demobilization, and all field equipment/ODCs. Assumes up to 2 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be minimal at this site.

⁶Relocation/evacuation costs expected to be moderate due to the concentration of beach homes.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

Table 6.13
Area H – Red, White, and Green Beaches
Alternative 4 - Clearance to Depth of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 1 Week

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$5,400	53	\$286,200
A-E Field Oversight ²	\$810	53	\$42,930
A-E Project Management ³	\$432	53	\$22,896
Land Survey ⁴		53	\$5,000
Brush Cut ⁵		53	\$7,000
Cost of Timber Replacement	\$500	53	\$0
Relocation Costs ⁶			\$15,000
		<i>Subtotal</i>	\$379,026
CEHNC Costs Contracting & Oversight ⁷			\$56,854
		Total Cost Estimate:	\$435,880
		Contingency (25%):	\$108,970
			\$544,850
		Cost per Acre =	\$10,280

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 1 week field effort, demobilization, and all field equipment/ODCs. Assumes four detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored. Assume 71 anomalies investigated per acre.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting inclusive of all light vegetation.

⁶Due to the residential component of the site, relocation/evacuation costs expected to be moderate.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used and items up to 4 feet in depth will be removed, as stated in 6.2.5

6.13 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA I – HARBESON CITY

Access rights were granted by a sufficient number of the property owners of Area I to provide representative OE sampling coverage throughout the AOI. The footprint of Area I was significantly reduced from 347 acres to 247 acres as a result of area reconnaissance, historical records, and the field identification of the Harbeson City structures during the EE/CA investigation, as described in Subsection 3.12.9.

6.13.1 Alternative 1: No DoD Action Indicated

6.13.1.1 **Effectiveness:** For Area I the data collected during this EE/CA investigation did not confirm the AOI was used for special training using live weaponry. During the EE/CA field investigation, a single HE fragment was recovered from the 403 anomalies excavated. The maximum density estimate was 0.93 UXO/acre. Potential exposure pathways are associated with continued use of the AOI as rural residential, as supported by the County Comprehensive Plan. This alternative does comply with ARARs since no UXO items have been recovered from this AOI. The short-term and long-term effectiveness criteria are met in this alternative although the risk is not reduced. However, it is important to note that the government will respond to any future UXO discovery within the AOI regardless of whether the affected parcel was designated for NDAI. Thus, the NDAI alternative for Area I meets the Effectiveness category.

6.13.1.2 **Implementability:** The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

6.13.1.3 **Cost:** The NDAI alternative is a no-cost alternative.

6.13.2 Alternative 2: Institutional Controls

Effectiveness: The exposure risk 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 will likely result in the number of exposures. The single OE item discovered was located on the ground surface. Fencing of Area I to restrict the participation activities that contribute to the exposure risk would be logistically impossible due to new residential development. Aside from adoption of the site-wide IC components, as detailed in Subsection 6.4, no other IC components were considered effective for this AOI. 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 category and further analysis of this alternative will not be performed.

6.13.3 Alternative 3: Surface Clearance of OE

6.13.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area I will include removal of UXO on the surface regardless of future land use. Implementation of the Surface Clearance of OE alternative for Area I will likely provide some increase in the overall protection of public safety and the human environment. One OE-related item was recovered on the ground surface during the EE/CA investigation. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short

term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.13.3.2 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 available. The existing thick vegetation would need to be removed but the mature trees would be left in place. The alternative will be implemented as described in Subsection 6.2.4.

6.13.3.3 Cost: The cost to implement Alternative 3 for Area I is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the surface clearing option is estimated at approximately \$3,433/acre inclusive of mobilization/demobilization costs, extensive brush cut, land survey, evacuation/relocation, and oversight (Table 6.14). The UXO removal effort assumes 10 detonations of surface UXO using an “on-call” explosives vendor. The cost to complete this alternative is approximately \$847,921. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

6.13.4 Alternative 4: Clearance to Depth of OE

Effectiveness: In this alternative, the 247 acres within Area I would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings. During the EE/CA investigation of Area I, the single OE item recovered was on the ground surface. This item was an unidentifiable small piece of metal possibly characteristic of an HE fragment. No other OE-related items were recovered. The bulk of the intrusive anomaly investigations yielded railroad spikes and related materials or items likely attributable to the old sawmill and town. Although the expected number of annual UXO exposures for this AOI after implementation of Alternative 4 – Clearance to Depth of OE items would likely be reduced, no additional protection is likely afforded over implementation of Alternative 3. This lack of exposure reduction for Alternative 4 is due to the presence of near-surface OE. With the exception of the limited current construction exposure activity scenario, all other potential exposure pathways for the AOI are generally non-intrusive (i.e. biking, child play, fishing, short cuts, etc.). As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk likely reduced. Thus, the Clearance to Depth alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

Table 6.14
Area I – Harbeson City
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 5 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	247	\$444,600
A-E Field Oversight ²	\$270	247	\$66,690
A-E Project Management ³	\$144	247	\$35,568
Land Survey ⁴		247	\$10,000
Brush Cut ⁵		247	\$25,000
Relocation Costs ⁶			\$8,000
		<i>Subtotal</i>	\$589,858
CEHNC Costs Contracting & Oversight ⁷			\$88,479
		Total Cost Estimate:	\$678,337
		Contingency (25%):	\$169,584
			\$847,921
		Cost per Acre =	\$3,433

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 5 weeks field effort, demobilization, and all field equipment/ODCs. Assumes up to 10 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be extensive at this site.

Relocation/evacuation costs expected to be moderate due to the development in the area.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.14 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA J – SPECIAL TRAINING AREAS J1, J2, J3

Access rights were granted by the sole property owner of Areas J1, J2, and J3 (St. Joe Timber Land Company) to provide representative OE sampling coverage throughout the AOI. Area J was subdivided into four distinct subareas based on a variety of factors as detailed in Section 2. These subareas were regrouped into two areas for evaluation purposes, as described in Subsection 4.3.2. Areas J1, J2, and J3 was delineated as a 335-acre tract and is relatively homogenous. The data collected from the geophysical meandering paths was considered representative and extrapolated throughout the AOI.

6.14.1 Alternative 1: No DoD Action Indicated

6.14.1.1 **Effectiveness:** For Areas J1, J2, and J3 the NDAI alternative will not provide for the overall public safety and protection of the human environment. The data collected during this EE/CA investigation confirms the AOI was used for some military training but the use of HE weaponry was not confirmed.

6.14.1.2 During the EE/CA field investigation, no UXO was recovered. However, only one of the 66 anomalies investigated contained OE-related debris (see Subsection 4.13). The maximum density estimate was 0.75 UXO/acre. Potential exposure pathways are associated with continued use of the area for timber production, as supported by the County Comprehensive Plan. The presence of grenades, although practice, is a public safety concern. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the NDAI alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

6.14.2 Alternative 2: Institutional Controls

6.14.2.1 **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 will likely result in the number of exposures. If the St. Joe Timber Land Company were amenable, OE trained escorts for timber harvesting can be assigned to the crews as described in Subsection 6.4.9. As a result, the annual exposure risk would be significantly reduced as a function of the lack of contributing participation activities. Aside from adoption of the site-wide IC components, as detailed in Subsection 6.4, OE escorts would be effective for Areas J1, J2, and J3. Thus, this alternative satisfies the Effectiveness category and further analysis was performed.

6.14.2.2 **Implementability:** OE escorts are both technically and administratively feasible and the services and materials necessary to implement such are readily available. Discussions with the St. Joe Timber Land Company management are necessary to confirm acceptance and cooperation.

6.14.2.3 **Cost:** To determine costs for installing fencing it was assumed that six-foot chain-link fencing would be installed topped with three strands of barbed wire. The associated costs for fencing Area A assume \$10 per foot installed. The annual cost for inspecting and maintaining the fencing depends on the amount of fencing installed. Assuming that the entire

perimeter of the AOI is fenced, approximately 15,280 linear feet are required. Thus an initial capital expenditure of \$152,800 is necessary to implement with annual costs for maintenance anticipated to be approximately \$6,000. UXO support during installation was estimated to be two qualified personnel and screening equipment for a period of two weeks. This one-time cost was estimated at \$10,000.

6.14.2.4 The cost for OE escorts for timber harvest activities are based on the discussion presented in Subsection 6.4.9. Timber harvest within Areas J1, J2, and J3 will likely be needed within the next 10 years due to the maturity of the forest. For this analysis the cost associated with this IC component will be considered to be \$50,000.

6.14.3 Alternative 3: Surface Clearance of OE

6.14.3.1 **Effectiveness:** The Surface Clearance of OE alternative is viable for Areas J1 only since no evidence of OE was identified in Areas J2 or J3. This alternative would include removal of UXO on the surface regardless of future land use. Implementation of this alternative for Area J1 will likely provide increased overall protection of public safety and the human environment. However, no OE-related items were recovered on the ground surface during the EE/CA investigation. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.14.3.2 **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 available. The existing trees would not be removed although some brush-cutting would be necessary.

6.14.3.3 **Cost:** The cost to implement Alternative 3 for Area J1 (approximately 100 acres) is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the surface clearing option is estimated at approximately \$3,757/acre inclusive of mobilization/demobilization costs, brush cut, land survey, evacuation/relocation, and oversight (Table 6.15). The UXO removal effort assumes 13 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$375,762. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.15
Area J1, J2, J3 – Special Training Areas
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 3 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	100	\$180,000
A-E Field Oversight ²	\$270	100	\$27,000
A-E Project Management ³	\$144	100	\$14,400
Land Survey ⁴		100	\$35,000
Brush Cut ⁵		100	\$100,000
Relocation Costs ⁶			\$5,000
		<i>Subtotal</i>	\$261,400
CEHNC Costs Contracting & Oversight ⁷			\$39,210
		Total Cost Estimate:	\$300,610
		Contingency (25%):	\$75,152
			\$375,762
		Cost per Acre =	\$3,757

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 3 weeks field effort, demobilization, and all field equipment/ODCs. Assumes up to 13 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be extensive at this site.

⁶Relocation/evacuation costs expected to be minimal.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

6.14.4 Alternative 4: Clearance to Depth of OE

6.14.4.1 **Effectiveness:** In this alternative, the 335 acres within Areas J1, J2, and J3 would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings. During the EE/CA investigation the only recovered OE items was located at a depth of 10 inches below ground surface. The Clearance to Depth of OE items from Areas J1, J2, and J3 will likely provide additional protection of public safety and the human environment than afforded by Alternatives 1, 2, and 3. The primary activity contributing to the exposure risk is participation in timber harvesting. Alternative 4 complies with ARARs and would be effective in both the long-term and short-term.

6.14.4.2 **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 available. The logistics associated with excavation of residential properties will not be necessary for this area due to its remoteness. Site preparation for implementation of Alternative 4 at Areas J1, J2, and J3 will consist of complete removal of tree cover and understory.

6.14.4.3 **Cost:** The cost to implement Alternative 4 for Area J1,J2,J3 is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the subsurface clearing option is estimated at approximately \$11,060/acre inclusive of mobilization/demobilization costs, brush/tree removal, land survey, evacuation/relocation, timber revenue costs, and oversight (Table 6.16). The UXO removal effort assumes 26 detonations of UXO using an “on-call” explosives vendor. The cost to complete this alternative is approximately \$3,705,264. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

Table 6.16
Area J1, J2, J3 – Special Training Areas
Alternative 4 - Clearance to Depth of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 6.5 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$5,400	335	\$1,809,000
A-E Field Oversight ²	\$810	335	\$271,350
A-E Project Management ³	\$432	335	\$144,720
Land Survey ⁴		335	\$35,000
Brush Cut ⁵		335	\$150,000
Cost of Timber Replacement	\$500	335	\$167,500
Relocation Costs ⁶			\$5,000
		Subtotal	\$2,577,575
CEHNC Costs Contracting & Oversight ⁷			\$386,636
		Total Cost Estimate:	\$2,964,211
		Contingency (25%):	\$741,053
			\$3,705,264
		Cost per Acre =	\$11,060

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 6.5 weeks field effort, demobilization, and all field equipment/ODCs. Assumes 26 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored. Assume 71 anomalies investigated per acre.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting inclusive of all mature trees and vegetation and disposal.

⁶Due to isolated nature of the site, relocation/evacuation costs expected to be minimal.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used and items up to 4 feet in depth will be removed, as stated in 6.2.5

6.15 APPLICATION OF THE EVALUATION CRITERIA BY ALTERNATIVE FOR AREA J – SPECIAL TRAINING AREA J4

Area J was subdivided into four distinct subareas based on a variety of factors as detailed in Section 2. These subareas were regrouped into two areas for evaluation purposes, as described in Subsection 4.3.2. Area J4 was delineated as a 125-acre tract and is relatively homogenous. Only two of the four property owners of Area J4 granted access rights. As a result, the ability of the field team to obtain representative geophysical survey coverage for the entire subsector was hindered by the access limitation. OE sampling coverage throughout the AOI.

6.15.1 Alternative 1: No DoD Action Indicated

6.15.1.1 **Effectiveness:** For Area J4 the data collected during this EE/CA investigation confirmed the AOI was used for military training. During the EE/CA field investigation, three OE items were recovered from the 12 anomalies identified within the AOE.). The maximum density estimate was 0.4.14 UXO/acre. Potential exposure pathways are associated with continued use of the area for rural residential/commercial area, as supported by the County Comprehensive Plan. This alternative does comply with ARARs since no UXO items have been recovered from this AOI. The short-term and long-term effectiveness criteria are met in this alternative although the risk is not reduced. However, it is important to note that the government will respond to any future UXO discovery within the AOI regardless of whether the affected parcel was designated for NDAI. Thus, the NDAI alternative for Area J4 meets the Effectiveness category.

6.15.1.3 **Implementability:** The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

6.15.1.4 **Cost:** The NDAI alternative is a no-cost alternative.

6.15.2 Alternative 2: Institutional Controls

6.15.2.1 **Effectiveness:** The exposure risk 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 will likely result in the number of exposures. No UXO items were discovered but practice grenades and mine parts were located at depths less than 6 inches below the ground surface. These shallow depths could result in exposure during hiking and hunting activities. If the property owners were amenable, Area J4 could be fenced and hunting activities could be curtailed. However, owner support is unlikely due to the presence of a church and potential future residential/commercial development opportunities. A side from adoption of the site-wide IC components, as detailed in Subsection 6.4, no other IC components were considered effective for this AOI. 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 category and further analysis of this alternative will not be performed.

6.15.3 Alternative 3: Surface Clearance of OE

6.15.3.1 **Effectiveness:** The Surface Clearance of OE alternative for Area J4 will include removal of UXO on the surface regardless of future land use. Implementation of this alternative

for Area J4 will likely provide increased overall protection of public safety and the human environment. Some OE-related items were recovered at very shallow depths surface during the EE/CA investigation. The Surface Clearance of OE alternative for this AOI would comply with ARARs and would be somewhat effective in both the long term and short term. Thus, this alternative satisfies the Effectiveness category and further analysis will be performed.

6.15.3.2 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 available. The existing trees would not be removed although some brush-cutting would be necessary.

6.15.3.3 Cost: The cost to implement Alternative 3 for Area J4 is based on the size, vegetation, and anomaly density and depth distribution encountered during the EE/CA field investigation of the AOI. The cost for the surface clearing option is estimated at approximately \$4,049/acre inclusive of mobilization/demobilization costs, brush cut, land survey, evacuation/relocation, and oversight (Table 6.17). The UXO removal effort assumes 5 detonations of surface UXO using an "on-call" explosives vendor. The cost to complete this alternative is approximately \$506,072. The overall removal cost per acre may be reduced as a result of economies of scale and mobilization reductions if multiple AOIs are remediated during the same field effort.

6.15.4 Alternative 4: Clearance to Depth of OE

Effectiveness: In this alternative, the 125 acres within Area J4 would be cleared of all surface and subsurface OE-related items to a depth consistent with the EE/CA findings. During the EE/CA investigation, the three OE items were recovered from a depths of less than 6 inches below ground surface. The Clearance to Depth of OE items from Area J4 will likely not provide additional protection of public safety and the human environment than afforded by Alternative 3. As a result, neither the short-term nor long-term effectiveness criteria are met in this alternative nor is the risk reduced. Thus, the Clearance to Depth alternative does not satisfy the Effectiveness category and further analysis of this alternative will not be performed.

Table 6.17
Area J4 – Special Training Area
Alternative 3 - Surface Clearance of OE Cost Estimate
Camp Gordon Johnston EE/CA

Field Time: 2.5 Weeks

Number of Teams and Composition: 3 Teams: 6 UXO Tech II and 1 UXO Tech III per team.
 1 SUXOS and 1 Safety/QC for entire site.

Item	Cost per acre	Acreage	Total Costs
UXO Clearance Sub ¹	\$1,800	125	\$225,000
A-E Field Oversight ²	\$270	125	\$33,750
A-E Project Management ³	\$144	125	\$18,000
Land Survey ⁴		125	\$15,000
Brush Cut ⁵		125	\$60,000
Relocation Costs ⁶			\$3,000
		<i>Subtotal</i>	\$352,050
CEHNC Costs Contracting & Oversight ⁷			\$52,807
		Total Cost Estimate:	\$404,858
		Contingency (25%):	\$101,214
			\$506,072
		Cost per Acre =	\$4,049

Notes:

¹Cost for UXO Clearance Subcontractor includes mobilization, 2.5 weeks field effort, demobilization, and all field equipment/ODCs. Assumes up to 5 detonations requiring response of "on-call" explosives distributor. No onsite explosives will be stored.

²A-E Field Oversight estimated at 15% of UXO clearance costs. Includes documentation and reporting.

³A-E Project Management estimated at 8% of UXO clearance costs.

⁴Land survey will consist of marking area of interest (AOI) boundary and establishing grid system within site for clearance.

⁵Brush cutting is expected to be moderate to extensive at this site.

⁶Relocation/evacuation costs expected to be minimal.

⁷CEHNC Costs for Contracting and Oversight estimated at 15% of UXO clearance costs.

Geophysical instruments will be used but only ordnance items on surface or protruding will be removed, as stated in 6.2.4

SECTION 7

COMPARATIVE ANALYSIS OF RESPONSE ACTION ALTERNATIVES

7.1 INTRODUCTION

In Section 6, each of the identified AOIs were screened as to the applicability of the four OE response action alternatives based on effectiveness, implementability, and cost. After elimination of the OE response actions that failed the above criteria, the remaining alternatives for each AOI were qualitatively compared in relative terms against each other using an alphabetic scale with "A" representing the best or ideal choice and "E" representing the least desirable choice. In this manner the most appropriate OE response action for a specific AOI was recommended. The comparative analysis for the individual AOIs is presented on the following pages.

7.2 COMPARATIVE ANALYSIS FOR AREA A – BAZOOKA RANGE

The primary concerns for Area A are the high concentration and types of OE items recovered during the EE/CA investigation, proximity to residential areas, frequent hunting activities, and periodic timber harvesting activities. The former use of Area A as a bazooka range was confirmed. As a result of these factors, the NDAI alternative was eliminated during the alternative screening process for Area A (Section 6). In addition to the site-wide IC alternative components selected for implementation, fencing and OE escorts for timber harvest passed the screening process. Both the surface clearance alternative and clearance to depth alternative were considered as candidate OE response actions. Table 7.1 summarizes the comparative analysis for Area A.

Table 7.1
Area A – Bazooka Range
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness		A	C	A
Protection of Public Safety and the Human Environment		A	C	A
Compliance with ARARs		A	A	A
Implementability		B	C	D
Technical Feasibility		A	A	B
Administrative Feasibility		B	C	D
Availability of Services and Materials		B	B	C
Cost (capital only)		\$100,000+	\$177,100	\$545,675

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.3 COMPARATIVE ANALYSIS FOR AREA B (WEST) – GRENADE COURT

The primary concerns for Area B (West) are the number of UXO items (especially on the ground surface) recovered during the EE/CA investigation, accessibility to the public, frequent hunting activities, and periodic timber harvesting activities. The former use of Area B (west) as a grenade range was confirmed, inclusive of the use of HE grenades. Furthermore, former mine training was also identified. As a result of these factors, the NDAI alternative was eliminated during the alternative screening process for Area B (West) (Section 6). In addition to the site-wide IC alternative components selected for implementation, OE escorts for timber harvest passed the screening process. Both the surface clearance alternative and clearance to depth alternative were considered as candidate OE response actions. Table 7.2 summarizes the comparative analysis for Area B (west).

Table 7.2
Area B (West) – Grenade Court
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness		A	C	A
Protection of Public Safety and the Human Environment		A	C	A
Compliance with ARARs		A	A	A
Implementability		B	C	D
Technical Feasibility		A	A	B
Administrative Feasibility		B	C	D
Availability of Services and Materials		B	B	C
Cost (capital only)		< \$5,000	\$193,424	\$590,335

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.4 COMPARATIVE ANALYSIS FOR AREA B (EAST) – GRENADE COURT

The primary concerns for Area B (East) are the number of UXO items (especially on the ground surface) recovered during the EE/CA investigation of adjacent Area B (west), accessibility to the public, unsanctioned hunting activities, and recent grading activities. The former use of Area B (East) as a grenade range was confirmed, inclusive of the use of HE grenades. Furthermore, former mine training was also identified. However, the NDAI alternative was still considered as appropriate due to the extremely low OE exposure calculated by the OECert model. The clearance to depth alternative was eliminated during the alternative screening process for Area B (east) because no additional reduction in exposure was afforded over the surface clearance alternative (Section 6). In addition to the site-wide IC alternative components selected for implementation, fencing passed the screening process. The surface clearance alternative was considered as a candidate OE response action. Table 7.3 summarizes the comparative analysis for Area B (East).

Table 7.3
Area B (East) – Grenade Court
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness	C	C	B	A
Protection of Public Safety and the Human Environment	C	C	B	A
Compliance with ARARs	A	A	A	A
Implementability	A	B	B	B
Technical Feasibility	A	A	B	C
Administrative Feasibility	A	B	B	B
Availability of Services and Materials	A	B	A	B
Cost (capital only)	\$0	\$100,000+	\$161,598	\$545,169

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.5 COMPARATIVE ANALYSIS FOR AREA E – ARTILLERY IMPACT ZONE

The primary concerns for Area E are accessibility to the public for hunting, biking, and hiking. The former use of Area E as a heavy artillery impact area was not confirmed, although one PD fuze was found on the ground surface outside the limits of the AOI. As a result, the NDAI alternative was still considered as appropriate and passed the OE response alternative screening process. The clearance to depth alternative was eliminated because no additional reduction in exposure was afforded over the surface clearance alternative (Section 6). No other IC components, in addition to the site-wide IC alternative components selected for implementation, passed the screening process. The surface clearance alternative was considered as a candidate OE response action. Table 7.4 summarizes the comparative analysis for Area E

**Table 7.4
Area E – Artillery Impact Zone
Response Alternative Evaluation**

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness	B		A	
Protection of Public Safety and the Human Environment	B		A	
Compliance with ARARs	A		A	
Implementability	A		C	
Technical Feasibility	A		B	
Administrative Feasibility	A		C	
Availability of Services and Materials	A		B	
Cost (capital only)	\$0		\$5,771,879	

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.6 COMPARATIVE ANALYSIS FOR AREA F – DOG ISLAND

The primary concerns for Area F are accessibility to the public for beach combing, biking, and other recreational activities; surface OE, frequent erosion, and a residential component. The former use of Area F as an amphibious landing area was confirmed, with the presence of a UXO item and numerous OE items. As a result of these factors, the NDAI alternative was eliminated during the alternative screening process for Area F (Section 6). The clearance to depth alternative was eliminated because minimal reduction in exposure was afforded over the surface clearance alternative (Section 6). No other IC components, in addition to the site-wide IC alternative components selected for implementation, passed the screening process. A modified surface clearance alternative (described in Subsection 6.9.3) was considered as a candidate OE response action. Table 7.5 summarizes the comparative analysis for Area F.

Table 7.5
Area F – Dog Island
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance (modified)	Clearance to Depth
Effectiveness			A	
Protection of Public Safety and the Human Environment			A	
Compliance with ARARs			A	
Implementability			B	
Technical Feasibility			B	
Administrative Feasibility			C	
Availability of Services and Materials			B	
Cost (capital only)			\$527,292	

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.7 COMPARATIVE ANALYSIS FOR AREA G (NATURE CONSERVANCY) – ALLIGATOR POINT GUNNERY RANGE

The primary concerns for Area G (Nature Conservancy) are accessibility to the public for beach combing, biking, and other recreational activities; frequent erosion; and an adjacent residential component. The former use of Area G as a straffing range was confirmed. In additional evidence of aerial bombing was identified. However, the NDAI alternative was still considered as appropriate and passed the OE response alternative screening process. The clearance to depth alternative was eliminated because no additional reduction in exposure was afforded over the surface clearance alternative (Section 6). No other IC components, in addition to the site-wide IC alternative components selected for implementation, passed the screening process. The surface clearance alternative was considered as a candidate OE response action. Table 7.6 summarizes the comparative analysis for Area G (Nature Conservancy).

**Table 7.6
Area G (Nature Conservancy) – Alligator Point Gunnery Range
Response Alternative Evaluation**

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness	B		A	
Protection of Public Safety and the Human Environment	B		A	
Compliance with ARARs	A		A	
Implementability	A		B	
Technical Feasibility	A		B	
Administrative Feasibility	A		B	
Availability of Services and Materials	A		B	
Cost (capital only)	\$0		\$213,443	

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.8 COMPARATIVE ANALYSIS FOR AREA G (RESIDENTIAL) – ALLIGATOR POINT GUNNERY RANGE

The primary concerns for Area G (Residential) are accessibility to the public for beach combing, biking, and other recreational activities; presence of a shallow OE item, frequent erosion, and a residential component. The former use of Area G as a straffing range was confirmed. In addition evidence of aerial bombing was identified. As a result of these factors, the NDAI alternative was eliminated during the alternative screening process for Area G (Residential) (Section 6). The clearance to depth alternative was eliminated because minimal reduction in exposure was afforded over the surface clearance alternative (Section 6). No other IC components, in addition to the site-wide IC alternative components selected for implementation, passed the screening process. A surface clearance alternative (described in Subsection 6.11.3) for just the approximately 70 acres of beaches was considered as a candidate OE response action. Table 7.7 summarizes the comparative analysis for Area G (Residential).

Table 7.7
Area G (Residential) – Alligator Point Gunnery Range
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance (modified)	Clearance to Depth
Effectiveness			A	
Protection of Public Safety and the Human Environment			A	
Compliance with ARARs			A	
Implementability			C	
Technical Feasibility			C	
Administrative Feasibility			C	
Availability of Services and Materials			B	
Cost (capital only)			\$158,268	

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.9 COMPARATIVE ANALYSIS FOR AREA H – RED, WHITE, AND GREEN BEACH

The primary concerns for Area H are accessibility to the public for beach combing, biking, and other recreational activities; frequent erosion; construction; and a residential component. The former use of Area H as an amphibious landing area was not confirmed and no OE was recovered. As a result, the NDAI alternative was still considered as appropriate and passed the OE response alternative screening process. No other IC components, in addition to the site-wide IC alternative components selected for implementation, passed the screening process (Section 6). Both the surface clearance alternative and clearance to depth alternative were considered as candidate OE response actions. Table 7.8 summarizes the comparative analysis for Area H

Table 7.8
Area H - Red, White, and Green Beach
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness	B		A	A
Protection of Public Safety and the Human Environment	B		B	A
Compliance with ARARs	A		A	A
Implementability	A		C	C
Technical Feasibility	A		B	C
Administrative Feasibility	A		C	C
Availability of Services and Materials	A		B	B
Cost (capital only)	\$0		\$118,866	\$544,850

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

The NDAI Risk Summary is presented in Table 6.1.

7.10 COMPARATIVE ANALYSIS FOR AREA I – HARBESON CITY

The primary concerns for Area I are accessibility to the public, presence of a surface OE item, construction, and a residential component. The former use of Area I as a special training area was not positively confirmed. However, the NDAI alternative was still considered as appropriate and passed the OE response alternative screening process. The clearance to depth alternative was eliminated because minimal reduction in exposure was afforded over the surface clearance alternative (Section 6). No other IC components, in addition to the site-wide IC alternative components selected for implementation, passed the screening process. The surface clearance alternative was considered as a candidate OE response action. Table 7.9 summarizes the comparative analysis for Area I.

Table 7.9
Area I – Harbeson City
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness	B		A	
Protection of Public Safety and the Human Environment	C		A	
Compliance with ARARs	A		A	
Implementability	A		B	
Technical Feasibility	A		C	
Administrative Feasibility	A		B	
Availability of Services and Materials	A		B	
Cost (capital only)	\$0		\$847,921	

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.11 COMPARATIVE ANALYSIS FOR AREAS J1, J2, AND J3 – SPECIAL TRAINING AREAS

The primary concerns for Areas J1, J2, and J3 are the presence of training grenades recovered during the EE/CA investigation, frequent hunting activities, and periodic timber harvesting activities. The former use of Areas J1, J2, and J3 as special training areas was not positively confirmed. As a result of these factors, the NDAI alternative was eliminated during the alternative screening process for Areas J1, J2, and J3 (Section 6). In addition to the site-wide IC alternative components selected for implementation, OE escorts for timber harvest passed the screening process. Both the surface clearance alternative and clearance to depth alternative were considered as candidate OE response actions. Table 7.10 summarizes the comparative analysis for Areas J1, J2, and J3.

Table 7.10
Areas J- Special Training Areas J1, J2, and J3
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance (J1 only)	Clearance to Depth
Effectiveness		C	C	A
Protection of Public Safety and the Human Environment		E	E	A
Compliance with ARARs		A	A	A
Implementability		B	C	D
Technical Feasibility		A	A	B
Administrative Feasibility		B	C	D
Availability of Services and Materials		B	B	C
Cost (capital only)		\$250,000	\$375,762	\$3,705,264

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.12 COMPARATIVE ANALYSIS FOR AREA J4 – SPECIAL TRAINING AREA

The primary concerns for Area J4 are accessibility to the public for hunting, biking, and hiking; presence of shallow OE items recovered during the EE/CA field investigation; potential residential/commercial development, and proximity of existing residential dwellings. The former use of Area J4 as a special training area was confirmed, based on the OE items present. However, the NDAI alternative was still considered as appropriate and passed the OE response alternative screening process. The clearance to depth alternative was eliminated because no additional reduction in exposure was afforded over the surface clearance alternative (Section 6). No other IC components, in addition to the site-wide IC alternative components selected for implementation, passed the screening process. The surface clearance alternative was considered as a candidate OE response action. Table 7.11 summarizes the comparative analysis for Area J4

Table 7.11
Area J- Special Training Area J4
Response Alternative Evaluation

OE Response Alternative	NDAI	Institutional Controls (additional to site-wide)	Surface Clearance	Clearance to Depth
Effectiveness	B		A	
Protection of Public Safety and the Human Environment	B		A	
Compliance with ARARs	A		A	
Implementability	A		B	
Technical Feasibility	A		B	
Administrative Feasibility	A		B	
Availability of Services and Materials	A		B	
Cost (capital only)	\$0		\$506,072	

Each alternative is rated on a letter scale of A through E. A is considered the Best or Most Desirable Choice and E is the Least Desirable Choice.

7.13 LIMITATIONS OF THIS REPORT

Activities conducted in connection with this site have been conducted under the provisions of CERCLA, DERP, and relevant U.S. Army regulations and guidance for OE programs and do not constitute an admission of any kind by the United States. The results of the investigations described above are based on the best available information to date and should not be taken as a representation that other OE items could not be discovered at the site in the future.

SECTION 8 RECOMMENDED RESPONSE ACTION ALTERNATIVE

8.1 INTRODUCTION

OE response action alternatives were evaluated for each of the eleven AOIs within the Camp that were investigated during this EE/CA investigation. Each potential alternative was initially screened against the general evaluation criteria of effectiveness, implementability, and cost. The screening of alternatives detailed in Section 6 was used to identify candidate OE response alternatives for further qualitative evaluation as tabulated in Section 7. Site-wide IC components were evaluated and selected. As a result of the comprehensive evaluation of alternatives by AOI, the following paragraphs present the recommendations for implementation.

8.2 RECOMMENDATIONS

8.2.1 Area A - Bazooka Range

Area A is used exclusively for timber production. Therefore, periodic recurring harvests will potentially expose work crews to a safety risk, albeit low. Furthermore, the presence of numerous 2.36-inch practice rockets suggests that HE rockets may have also been fired. Although, implementation of fencing and OE escort IC components would reduce the likelihood of exposure to UXO, clearance to depth would permanently eliminate any future concerns and coordination. This fact coupled with the overall small parcel size and anticipated low cost associated with reimbursement of the St. Joe Timber Land Company for the young trees, makes the clearance to depth alternative attractive. ***Therefore, the clearance to depth alternative is recommended as the OE response alternative for implementation at Area A.***

8.2.2 Area B (West) - Grenade Court

Area B (West) is used exclusively for timber production. Therefore, periodic recurring harvests will potentially expose work crews to a safety risk; an order of magnitude higher than calculated for Area A. Furthermore, the presence of numerous practice grenades and fuzes as well as HE fragments at shallow depths has been observed. Although, implementation of fencing and OE escort IC components would reduce the likelihood of exposure to UXO, clearance to depth would permanently eliminate any future concerns and coordination. This fact coupled with the overall small parcel size and anticipated low cost associated with reimbursement of the St. Joe Timber Land Company for the young trees, makes the clearance to depth alternative attractive. ***Therefore, the clearance to depth alternative is recommended as the OE response alternative for implementation at Area B (West).***

8.2.3 Area B (East) – Grenade Court

Area B (East) is controlled by FSU and is currently not used for any purpose. Several practice mines and grenades were recovered during the EE/CA field effort. However, the AOI is not used commercially for timber production. Therefore, exposure resulting from periodic recurring harvests is not present at this AOI. Implementation of fencing in addition to the site-wide IC alternative would reduce the already extremely low annual exposure to UXO. However, the presence of shallow OE-related debris from 6 anomalies intrusively investigated including mines, grenade bodies and HE fragments is a concern. Coupled with the proximity to Area B (West) from which UXO items were present, an OE removal action (versus an IC strategy) was deemed appropriate. Given the confirmed presence of UXO in the adjacent parcel and circumstantial evidence suggesting HE training, an OE removal action is warranted. Although, implementation of a fencing IC component would reduce the likelihood of exposure to UXO, clearance to depth would permanently eliminate any future concerns and coordination. This fact coupled with the overall small parcel size makes the clearance to depth alternative attractive. ***Therefore, the clearance to depth alternative is recommended as the OE response alternative for implementation at Area B (East).***

8.2.4 Area C – Barracks and Dump

Area C was investigated as part of this EE/CA to attempt to confirm the presence of a military dump, and if confirmed, delineate it. The geophysical survey did not identify significant concentrations of metallic objects indicative of a dump site. Furthermore, no OE debris was recovered during the intrusive investigation. ***Therefore, the NDAI alternative is recommended as the OE response alternative for implementation at Area C.*** Further investigation may be required as part of a future environmental assessment for chemical contamination.

8.2.5 Area E - Artillery Impact Zone

Area E is owned by the State of Florida and is operated as a State forest. Although timber harvests are periodically contracted, the lack of OE recovered during the EE/CA investigation suggests the AOI was never used as an impact area. ***Therefore, the NDAI alternative is recommended as the OE response alternative for implementation at Area E.***

8.2.6 Area F - Dog Island

Area F is remote but residentially developed. Many of the residential properties are rented to area visitors on vacation. The presence of numerous shallow mortar fragments and scrap in Cannonball Point coupled with the likelihood of others being unearthed by erosion supports the need for a removal action. However, the constant effects of erosion that are characteristic for this area cause the relative quick obsolescence of the removal action. ***Therefore, a modified surface clearance/mapping alternative, implemented in a progressively less extensive fashion over a five-year period, is recommended at Area F. Following the implementation period, a thorough review will be conducted to ascertain if continued UXO support is warranted.***

8.2.7 Area G (Nature Conservancy) - Alligator Point Gunnery Range

Area G (Nature Conservancy) is currently used for conservation of natural land in the area and this use is unlikely to change. The area is fenced and access is somewhat controlled. The presence of a practice bomb during the EE/CA investigation suggests the AOI was used for aerial training but the site-wide IC components should provide the necessary public awareness to the limited visitors. ***Therefore, the NDAI alternative is recommended as the OE response alternative for implementation at Area G (Nature Conservancy). Site-wide IC components including brochures, signs, and videos will be implemented as detailed in Subsection 6.4.***

8.2.8 Area G (Residential Property) – Alligator Point Gunnery Range

Area G (residential) is entirely residentially developed and seasonally populated by tourists. Only a single OE item was recovered during the EE/CA field investigation from the area. The susceptibility of the area to significant erosion coupled with the confirmed use of the AOI for military training supports the need for a removal action. However, the constant effects of erosion that are characteristic for the beach portion of this area cause the relative quick obsolescence of the removal action. ***Therefore, a surface clearance alternative, followed by a visual check each year over a five-year period, is recommended at Area G. Following the implementation period, a thorough review will be conducted to ascertain if continued UXO support is warranted.***

8.2.9 Area H - Red, White, and Green Beach

Area H is currently used both for conservation of natural land and some residential development. No OE was recovered during the EE/CA investigation which suggests the AOI was either never used for amphibious training or the significant erosion of the AOI was resulted in redeposition of the military debris somewhere else. The site-wide IC components should provide the necessary public awareness to the limited visitors and residents. ***Therefore, a surface clearance alternative, followed by a visual check each year over a five-year period, is recommended at Area G. Following the implementation period, a thorough review will be conducted to ascertain if continued UXO support is warranted.***

8.2.10 Area I - Harbeson City

Area I is currently experiencing some residential development. The remains of the foundations of Harbeson City were positively identified during the EE/CA field effort. This identification confirmed the presence of the mock German village. However, only a single OE fragment was recovered from the AOI. The site-wide IC components should provide the necessary public awareness to the construction crews and new and residents. ***Therefore, the NDAI alternative is recommended as the OE response alternative for implementation at Area I. If UXO is encountered during construction within the AOI, reevaluation of appropriate OE response alternatives will be required.***

8.2.11 Area J - Special Training Areas J1, J2, and J3

Areas J1, J2, and J3 are owned by the St. Joe Timber Land Company and is used for timber production. Therefore, periodic recurring harvests will potentially expose work crews to a safety risk, albeit low. Several practice grenades were recovered during the EE/CA field effort, exclusively in Area J1. However, no OE indicative of the use of HE was identified. The implementation of an OE escort IC component would reduce the likelihood of exposure to UXO, without the prohibitive cost of a potentially unwarranted subsurface removal action. *Therefore, the IC alternative coupled with surface clearance of Area J1 only is recommended as the OE response alternative for implementation at Areas J1, J2, and J3.*

8.2.12 Area J - Special Training Area 4

Area J4 is owned by several private entities. The location does offer potential for residential/commercial development in the future but is currently mostly undeveloped. Therefore, potential construction will potentially expose work crews to a safety risk, albeit low. The presence of OE at shallow depths confirms the AOI was used for military training. The implementation OE support for construction activities IC component would reduce the likelihood of exposure to UXO, without the prohibitive cost of a potentially unwarranted subsurface removal action. *Therefore, the IC alternative coupled with surface clearance is recommended as the OE response alternative for implementation at Area J4.*

8.2.13 Area K - Dump

Area K was investigated as part of this EE/CA to attempt to confirm the presence of a military dump, and if confirmed, delineate it. The geophysical survey did not identify significant concentrations of metallic objects indicative of a dump site. Furthermore, no OE debris was recovered during the intrusive investigation. *Therefore, the NDAI alternative is recommended as the OE response alternative for implementation at Area K. Further investigation may be required as part of a future environmental assessment for chemical contamination.*

8.2.14 Area L/P – EOD Cleared Sites

Area L was investigated as part of this EE/CA to attempt to evaluate the presence of military activity in the AOI. The geophysical survey did not identify any OE or UXO items. *Therefore, the NDAI alternative is recommended as the OE response alternative for implementation at Area L as well as adjacent Area P.*

Table 8.1
Recommended Response Action Alternatives
Camp Gordon Johnston, Franklin County, Florida

Project Area Designation	Description/Former Usage	Approx. Size (Acres)	NDAI	IC (in addition to sitewide)	Surface Clearance	Clearance to Depth
A	Bazooka Range	50				X
B (West)	Grenade Court (St. Joe)	54				X
B (East)	Grenade Court (FSU)	44				X
C	Barracks and Dump	1	X			
D	Boat Dock	1				
E	Artillery Impact Zone	1,730	X			
F	Dog Island (footprint reduced)	158			X ¹	
G (Nature Conservancy)	Alligator Point Gunnery Range	63	X			
G (Residential)	Alligator Point Gunnery Range	187			X	
H	Red, White, and Green Beaches	53			X	
I	Harbeson City (footprint reduced)	247	X			
J1, J2, J3	Special Training Areas 1,2,3	335		X	X	
J4	Special Training Area 4	125		X	X	
K	Dump	160	X			
L	Eastern EOD Cleared Sites	3,692	X			
P	Off-Post EOD Cleared Sites	1,733				

NDAI – No DoD Action Indicated

FSU – Florida State University

IC – Institutional Contrals

St. Joe – St. Joe Timberland Company

EOD – Explosives Ordnance Disposal

FUDs – Formerly Used Defense Site

X¹ – Modified version of the surface clearance alternative which includes a 5-year implementation as described in Subsection 6.9.3.

Areas C and K were identified for environmental investigation Areas D and P were not included in the EE/CA investigation as described in Section 2.

Areas M, N, O, and Q were not geophysically investigated due to ASR recommendation of No Further Action or FUDs ineligibility.

Table 8.2
Recommended OE Response Action Summary
Camp Gordon Johnston, Franklin County, Florida

Project Area Designation	Description/Former Usage	Approx. Size (Acres)	OE Contamination	Recommended OE Response Action	Estimated Implementation Cost	Detail Table Ref.
All	Entire Camp Gordon Johnston Site	159,348	Various	Site-wide IC	\$13,000 (\$190,370 over 25 years)*	6.1
A	Bazooka Range	50	57 2.36" Practice Antitank Rockets 81mm Practice Mortar Mk1A1 Practice Grenades 5 HE Fragments	Clearance to Depth	\$545,675 (\$10,914/acre)	6.3
B (West)	Grenade Court	54	7 M1B1 Anti-Tank Practice Mines (UXO) Mk1A1 Practice Grenades M9A1 Practice Rifle Grenade MkII HE Grenade Fragments 3 HE Grenade Fragments	Clearance to Depth	\$590,335 (\$10,932/acre)	6.5
B (East)	Grenade Court	44	M1B1 Anti-Tank Practice Mine Parts Mk1A1 Practice Grenades HE Grenade Fragments	Clearance to Depth	\$545,169 (\$12,390/acre)	6.7
C	Barracks and Dump	1	No OE-related Findings	NDAI/Sitewide IC	-	6.1
D	Boat Dock	1	Not Investigated	NDAI/Sitewide IC	-	6.1
E	Artillery Impact Zone	1,730	Single inert 105mm HE Projectile Fuze located outside site boundary.	NDAI/Sitewide IC	-	6.1
F	Dog Island Amphibious Training Area	1,923 to 158 ²	4.2" HE Mortar (UXO) 25+ Pieces of 4.2" HE Mortar Fragments	Modified Surface Clearance ³	\$527,292 (\$3,337/acre)	6.9
G (Nature)	Alligator Point Gunnery Range Straffing Range Amphibious Training Area	63	Box Tail Fins from 100-lb GP Bomb	NDAI/Sitewide IC	-	6.1
G (Residential)	Alligator Point Gunnery Range Straffing Range Amphibious Training Area	187 to 70 ²	3-lb AN-Mk23 Practice Bomb	Surface Clearance	\$158,268 (\$2,261/acre)	6.11
H	Red, White, and Green Beaches Amphibious Training Area	53	No OE-related Findings	Surface Clearance	\$118,866 (\$2,243/acre)	6.12

**Table 8.1 (continued)
Recommended OE Response Action Summary
Camp Gordon Johnston, Franklin County, Florida**

Project Area Designation	Description/Former Usage	Approx. Size (Acres)	OE Contamination	Recommended OE Response Action	Estimated Implementation Cost	Detail Table Ref.
I	Harbeson City Special Training Area	347 to 247 ²	Single Unidentified Suspect HE Fragment	NDAI/Sitewide IC	-	6.1
J1, J2, J3	Special Training Areas 1,2,3	335 to 100	3 Mk1A1 Practice Grenades (J1)	Institutional Controls Surface Clearance	\$50,000 \$375,762 (\$3,757/acre)	6.1 6.15
J4	Special Training Area 4	125	1 MkII HE Grenade Body 1 Mk1A1 Practice Grenade M1B1 Anti-Tank Practice Mine Part	Institutional Controls Surface Clearance	\$50,000 \$506,072 (\$4,449/acre)	6.1 6.17
K	Dump	160	No OE-related Findings	NDAI/Sitewide IC	-	6.1
L	Eastern EOD Cleared Sites	3,692	No OE-related Findings	NDAI/Sitewide IC	-	6.1
P	Off-Post EOD Cleared Sites	1,733	Not Investigated	NDAI/Sitewide IC	-	6.1
TOTALS					\$3,657,809	

HE – High Explosives, IC – Institutional Controls, AOI – Area of Interest

¹USAESCH contracting and oversight

²Effective AOI acreage following footprint reduction.

³Modified Surface Clearance will consist of a one-time 100% geophysical mapping of the AOI and surface removal followed by four years of visual only surface clearance (as needed) using simple geophysical instruments (non-recording) for gross screening.

* Site-wide IC costs were only considered for Year 1. Additional annual costs would be required over the 25-year life for this alternative.

Areas D was not geophysically investigated based on a determination of NDAI during the EE/CA Work Plan phase.

Area P was not investigated due to its similarity to Area L and the fact that it lies outside the site boundary.

Areas M, N, O, and Q were not geophysically investigated due to ASR recommendation of No Further Action or FUDs ineligibility.

SECTION 9 RECURRING REVIEWS

9.1 FOLLOW-ON ACTIVITIES

9.1.1 Follow-on activities associated with the Camp will be conducted by the USACE in the form of recurring reviews. The recurring review process is consistent with Section 121(c) of CERCLA, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, 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.

9.1.2 Recurring reviews will be conducted at the Camp to:

- Determine if a response action was conducted at the site or if it was technically impractical to conduct a response.
- Determine if the response action continues to reduce risk from unexploded ordnance.
- Determine if new information has become available to reconsider prior decisions at the site.
- 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.

9.1.3 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. Changes to be evaluated consist of:

- Physical conditions of the AOI.
- Public accessibility and land use.
- New technology or techniques that have become available and may warrant reconsideration of the EE/CA recommendations.
- Effectiveness of the response action to reduce risk.

9.1.4 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. At the completion of the review, a Recurring Review Report will be prepared, a public notice will be placed in the local newspaper concerning the continued effectiveness of the OE response action, and a formal Decision Document referencing any actions taken will be prepared.

SECTION 10 REFERENCES

- Code of Federal Regulations (CFR). 1993. *National Oil and Hazardous Substances Pollution Contingency Plan (NCP)*. 40 CFR 300.415, 7/93.
- Department of Anthropology, University of South Florida. 1995. *Archaeological Survey of Dog Island, Franklin County, Florida*, Prepared for Barrier Island Trust, December 1995.
- Franklin County Planning Department and Florida Department of Community Affairs. *Franklin County Comprehensive Plan*. Prepared for Franklin County Board of County Commissioner, April 16, 1991.
- Parsons Engineering Science, Inc. 1999a. *Site Visit Report for the Former Camp Gordon Johnston, Franklin County, Florida*. Prepared for U.S. Army Engineering and Support Center, Huntsville, January 1999.
- Parsons Engineering Science, Inc. 1999b. *Reunion Site Visit Trip Report*. Former Camp Gordon Johnston, Franklin County, Florida. Prepared for U.S. Army Engineering and Support Center, Huntsville, April 1999.
- Parsons Engineering Science, Inc. 1999c. *Technical Report of Findings*. Former Camp Gordon Johnston, Franklin County, Florida. Prepared for U.S. Army Engineering and Support Center, Huntsville, May 1999.
- U.S. Army Corps of Engineers (USACE). 1994. *Findings and Determination of Eligibility/Site Survey Summary for the Former Camp Gordon Johnston*, December 1994.
- U.S. Army Corps of Engineers (USACE), Rock Island District. 1995a. *Ordnance and Explosive Archives Search Report Findings for the Former Camp Gordon Johnston*, September 1995.
- U.S. Army Corps of Engineers (USACE), Rock Island District. 1995b. *Ordnance and Explosive Archives Search Report Conclusions and Recommendations for the Former Camp Gordon Johnston*, September 1995.
- U.S. Occupational Health and Safety Administration (OSHA). 1994. *Hazardous Waste Operations and Emergency Response Training Regulations*. 40 CFR 1910.120, 7/94.
- QuantiTech Inc. *OE Cert Analysis*. Former Camp Gordon Johnston, Franklin County, Florida. Prepared for Parsons Engineering Science, July 2000
- Parsons Engineering Science Inc. *Final Workplan*. Former Camp Gordon Johnston, Franklin County, Florida. Prepared for U.S. Army Engineering and Support Center, Huntsville, Oct. 1999