

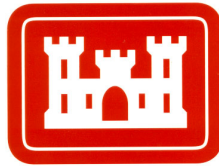
FINAL

DECISION DOCUMENT

FORMER CAMP CROFT

ROCKET AND RIFLE GRENADE AREA

SPARTANBURG, SOUTH CAROLINA
FUDS PROJECT NUMBER I04SC001606



Prepared by:

U.S. Army Corps of Engineers

MAY 2019

EXECUTIVE SUMMARY

ES.1 This Decision Document (DD) presents the selected remedy for the Rocket and Rifle Grenade Area. This area is located within the former Camp Croft Formerly Used Defense Site (FUDS) Property Number I04SC0016 and is designated as FUDS Project I04SC001606.

ES.2 The Rocket and Rifle Grenade Area is comprised of approximately 109 acres and includes private properties.

ES.3 The Remedial Action Objective (RAO) is to reduce the unacceptable risk due to presence of munitions and explosives of concern (MEC) within Project 06 to a depth of 24 inches below ground surface to address the likelihood of exposure to landowners via non-intrusive and intrusive activities such that an acceptable condition of negligible risk is achieved. The selected remedy is chosen to satisfy the RAO. In developing the RAO, current and future land use were taken into account.

ES.4 The selected remedy for FUDS Project I04SC001606: Rocket and Rifle Grenade Area is Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure (UU/UE). This remedy includes removal of surface and subsurface MEC to a depth of two feet using advanced geophysical data collection and anomaly classification. Public education is not part of the remedy.

ES.5 The selected remedy is protective of human health and the environment and is cost effective. The estimated present worth cost for implementing the selected remedy at FUDS Project I04SC001606: Rocket and Rifle Grenade Area is approximately \$722,896.

ES.6 Other MEC response actions were considered and evaluated against the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) nine criteria. The alternatives included No Action; Public Education; Analog Surface and Subsurface MEC Clearance and Public Education; and Digital Advanced Classification Surface and Subsurface MEC Clearance to Support UU/UE. The No Action and Public Education alternatives were considered but judged not to be protective of human health. The Analog Surface and Subsurface MEC Clearance and Public Education would not provide additional effectiveness for the added cost. This analysis was based on the results of the Remedial Investigation (RI) fieldwork, where there was physical evidence of MEC or evidence of concentrated munitions use within the Rocket and Rifle Grenade Area. Munitions constituents (MC) do not pose an unacceptable risk to human health and the environment and no further action is recommended for MC.

ES.7 The expected result of implementing this remedy is protectiveness of human health and the environment for current and reasonably anticipated future land use activities. Because the selected remedy supports UU/UE, a statutory review within five years after initiation of the remedial action is not required. It is the United States Army Corps of Engineers (USACE) expectation this alternative will result in negligible residual risk allowing for UU/UE at this site. However, USACE will conduct a post remedial action assessment that will report on the effectiveness of the remedial actions taken. If there was an impediment to full remediation as planned in this alternative, the

USACE will implement public education (as described in Alternative 2) to ensure protectiveness is provided as part of the remedial action. In that situation, five year reviews will be required until the site reaches UU/UE.

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ABBREVIATIONS AND ACRONYMS

AoPI	Area of Potential Interest
ARAR	Applicable or Relevant and Appropriate Requirements
ASR	Archives Search Report
BD/DR	Building Demolition and Debris Removal
bgs	Below Ground Surface
BIP	Blow-in-Place
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CESAC	U.S. Army Corps of Engineers, Charleston District
CFR	Code of Federal Regulations
DD	Decision Document
DHEC	Department of Health and Environmental Control
DMM	Discarded Military Munitions
DoD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
FS	Feasibility Study
FUDS	Formerly Used Defense Sites
HA	Hazard Assessment
IGD	Interim Guidance Document
IRTC	Infantry Replacement Training Center
LTM	Long-term Management
MC	Munitions Constituent
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
mm	millimeter
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
OOU	Ordnance Operable Unit
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RI	Remedial Investigation
SC	South Carolina
TCRA	Time Critical Removal Action
USACE	United States Army Corps of Engineers
USC	United States Code
UU/UE	Unlimited Use/ Unrestricted Exposure
UXO	Unexploded Ordnance
XRF	X-ray Fluorescence

1.0 PART 1: THE DECLARATION

1.1 PROJECT NAME AND LOCATION

The Rocket and Rifle Grenade Area is located within the former Camp Croft Formerly Used Defense Site (FUDS) and comprises FUDS Project I04SC001606. Its location is shown on Figure 2-1.

1.2 STATEMENT OF BASIS AND PURPOSE

1.2.1 This Decision Document is being presented by the United States Army Corps of Engineers (USACE) to describe the Department of Defense (DoD) selected remedy for the FUDS Project I04SC001606: Rocket and Rifle Grenade Area, Camp Croft FUDS, Spartanburg, SC.

1.2.3 The remedy described in this Decision Document was selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC)§ 9601 et seq., as amended, and, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300. The South Carolina Department of Health and Environmental Control (SC DHEC) has reviewed the Proposed Plan and provided comments. These comments and response to comments are provided in Part 3: The Responsiveness Summary.

The Administrative Record provides supporting documentation for this decision.

1.3 ASSESSMENT OF FUDS PROJECT I04SC001606

Historical information related to the use of the Camp Croft Infantry Replacement Training Center (IRTC) indicated the potential for MEC to be present on the site. Prior investigations and removal actions found MEC and extensive amounts of munitions debris (MD) within the Rocket and Rifle Grenade Area indicating it was likely affected by concentrated munitions use and a complete MEC exposure pathway is likely. The selected remedy is necessary to protect the public health and welfare or the environment from potential interaction with MEC.

1.4 DESCRIPTION OF SELECTED REMEDY

1.4.1 The selected remedy for addressing potential hazards at FUDS Project I04SC001606: Rocket and Rifle Grenade Area is Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure (UU/UE) which involves the following components:

- Brush clearing;
- Removal/treatment of surface MEC;
- Geophysical data collection;
- Advanced classification and target anomaly selection; and
- Removal/treatment of subsurface MEC.

1.4.2 This remedial alternative will be implemented by the USACE.

1.5 STATUTORY DETERMINATIONS

1.5.1 In accordance with CERCLA §121 and NCP, the selected remedy is protective of human health and the environment; complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action; is cost effective; and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. This remedy also satisfies the statutory preference for treatment as a principal element of the remedy (i.e., reduces the toxicity, mobility, or volume of MEC).

1.5.2 Because the selected remedy supports UU/UE, a statutory review within five years after initiation of the remedial action is not required.

1.6 DATA CERTIFICATION CHECKLIST

1.6.1 The following information is included in the Decision Summary section of this Decision Document. Additional information can be found in the Administrative Record file.

- MEC suspected to be present;
- Baseline hazard represented by MEC;
- How MEC will be addressed;
- Current and reasonably anticipated future land use assumptions;
- Total present worth costs and the number of years over which the remedy cost estimates are projected; and
- Key factors that led to selecting the remedy.

1.6.2 The risk assessments concluded that the potential for adverse risks to human health or ecological receptors from exposure to munitions constituents (MC) in soil and sediment is considered negligible at the former Camp Croft. No action is recommended for MC. As such, the following information is not included in this Decision Document:

- MC and their respective concentrations;
- Baseline risk represented by the MC;
- Cleanup levels established for MC and the basis for these levels;
- How MC will be addressed; and
- Current and potential beneficial uses of groundwater used in the baseline assessment.

1.7 AUTHORIZING SIGNATURES

This Decision Document presents the determination for the CERCLA remedial response action needed for FUDS Project I04SC001606: Rocket and Rifle Grenade Area. The U.S. Army Corps of Engineers is the lead agency under the Defense Environmental Restoration Program at the former Camp Croft, and has developed this Decision Document consistent with the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, and the National Oil and Hazardous Substances Pollution Contingency Plan. This Decision Document will be incorporated into the Administrative Record file for the former Camp Croft, which is available for public view at the Spartanburg County Public Library, 151 South Church Street, Spartanburg, SC 29306. This document, presenting the Digital Advanced Classification Surface and Subsurface

MEC Removal to Support Unlimited Use/Unrestricted Exposure determination with a present worth cost of \$722,896, is approved by the undersigned, pursuant to CEMP-CED (1200 PERM) Interim Guidance Document (IGD) for the Formerly Used Defense Sites (FUDS) Decision Document (DD) Staffing and Approval dated February 9, 2017.

APPROVED:

Date: 24 May 2019

THEODORE A. BROWN, P.E., SES
Director of Regional Business

2.0 PART 2: THE DECISION SUMMARY

2.1 PROJECT NAME, LOCATION, AND BRIEF DESCRIPTION

2.1.1 The Former Camp Croft is located in the upstate of South Carolina, less than 10 miles southeast of downtown Spartanburg, SC. Between 1941 and 1944, the United States acquired 19,044.46 acres, comprising 19,039.04 acres in fee, 5.42 acres in easement interests, six no-area easements, and two no-area licenses. Acquisition was accomplished by condemnation. Land use prior to DoD use was a mix of woodlands, farms, and private residences. The entire installation (just over 19,000 acres) was declared surplus in November 1946 and excessed in 1947. One of the most significant conveyances was approximately 7,054 acres by quitclaim deed to the South Carolina Commission of Forestry; the property is now known as Croft State Natural Area. The USACE has determined that Camp Croft is eligible for the FUDS program. The single original FUDS Project Number I04SC001603 covered a military munitions response site (MRS) approximately 12,337 acres in size to include all areas thought to overlap with munitions use. That single MRS has subsequently been delineated into numerous areas with various proposed outcomes.

2.1.2 This Decision Document is being presented by the USACE to describe the DoD determination of the remedial response for FUDS Project I04SC001606: Rocket and Rifle Grenade Area. The Secretary of Defense designated the Army as the Executive Agent for FUDS, regardless of which DoD component previously owned or used the property. The Secretary of the Army further delegated the program management and execution responsibility for FUDS to the USACE. USACE is the lead agency for investigating, reporting, evaluating, and implementing remedial action at the former Camp Croft. The regulatory agency for this project is the SC DHEC.

2.1.3 FUDS Project I04SC001606: Rocket and Rifle Grenade Area (approximately 109 acres) is comprised of private properties. A public roadway and right-of-way bisects the site. Landowners have unrestricted access.

2.2 PROJECT HISTORY

2.2.1 Camp Croft IRTC was officially activated on January 10, 1941 and consisted of two general areas: a series of firing ranges and a troop housing area with attached administrative headquarters, with housing for 20,000 trainees and support personnel. Camp Croft served as one of the Army's principal IRTCs; approximately 250,000 soldiers were trained at the facility. Camp Croft was also a prisoner-of-war camp during World War II.

2.3 PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS

Since the early 1990s, many investigations and removal actions have been conducted at various locations within the former Camp Croft property and are summarized below. These areas are identified in various ways based on site actions, and are more clearly described in the Remedial Investigation Report.

2.3.1 On-site Survey

The earliest known investigation at the former Camp Croft was an August 1984 On-site Survey conducted by the U.S. Army Corps of Engineers, Charleston District (CESAC), Environmental and Real Estate Divisions. The survey determined that there was no Building Demolition and Debris Removal (BD/DR) responsibility incurred by the DoD at Camp Croft. Further investigation was recommended to define the extent of MEC and MC based on interviews revealing the “potential for unexploded ordnance and dangerous bombs, shells, rockets, mines, and charges either upon or below the surface” and “a great deal of unexploded ordnance” uncovered and hauled away during the grading of the country club golf course.

2.3.2 Preliminary Assessment

A Preliminary Assessment was performed by CESAC with a Findings and Determination dated 25 November 1991; the site was determined to be FUDS-eligible. An Archives Search Report (ASR) was prepared by the USACE, Rock Island District in 1993 that covered the following potential FUDS: 1) Training Range Impact Area A, 2) Gas Chambers/Gas Obstacle Course Area D, 3) Cantonment Area B, and 4) Grenade Court Area B.

2.3.3 Phase I Engineering Evaluation/Cost Analysis (EE/CA) and Removal Actions

A Phase I Engineering Evaluation/Cost Analysis (EE/CA) was conducted in 1996. Nine Ordnance Operable Units (OOUs) were investigated. The area that comprises the Rocket and Rifle Grenade Area was not included in the EE/CA.

2.3.4 Phase II EE/CA and Removal Actions

2.3.4.1 A Phase II EE/CA was performed in 1998 that investigated five OOUs. The former OOU12A included in the EE/CA lies within FUDS Project I04SC001606. MEC and MD were found during the Phase II EE/CA.

2.3.5 Additional Actions

An ASR Supplement was prepared in 2004 focusing on the 12 ranges at Camp Croft and the munitions used.

2.3.6 Remedial Investigation

2.3.6.1 RI fieldwork was conducted at the former Camp Croft between January and October 2012. The investigation involved characterizing the nature and extent of MEC and MC and performing ecological and human health risk assessments. The RI was performed in former MRS 1, portions of former MRS 3, Area of Potential Interest (AoPI) 8, AoPI 9E, AoPI 10A, AoPI 10B, and AoPI 11C. Areas that denied rights-of-entry include former MRS 2 and portions of former MRS 3, AoPI 3, AoPI 5, AoPI 9G, AoPI 11B, and AoPI 11D. Thirty-nine UXO, one discarded military munition (DMM), and approximately 2,900 pounds of MD were removed during the RI.

2.3.6.2 Munitions-related items are present in many locations across the former Camp Croft. Historical evidence collected from previous investigations and removal actions were combined with findings from the RI to present a comprehensive understanding of the nature and extent of MEC and MC at many of the areas included in this investigation.

2.3.6.3 Based on the findings of the RI, former MRS 3 Rocket & Rifle Grenade Area is delineated as FUDS Project I04SC001606: Rocket and Rifle Grenade Area. Table 2-1 presents the revised designation. Those highlighted are included in this Decision Document and shown on Figure 2-2.

TABLE 2-1 PROJECT DELINEATIONS

Pre-RI Designation	Revised Designation	Decision Document Delineation (FUDS Project #)
MRS 1	MRS 1	Project 12: Gas Chamber and Cantonment AoPIs
MRS 2	MRS 2	Project 13: Grenade Court
MRS 3 (Land)	105mm Area	Project 10: 105mm Area
	Maneuver Area	Project 07: Maneuver Area/Croft State Park
	60mm Mortar Area	Project 11: 60mm Mortar Area
	60/81mm Mortar Area	Project 08: 60/81mm Mortar Area
	Rocket & Rifle Grenade Area (109 acres)	Project 06: Rocket and Rifle Grenade Area
	Rocket/Grenade Maneuver Area	Project 03: Munitions Debris Area
	Remaining Lands	Project 05: Range Complex Remaining Lands
AoPI 3	Grenade Area	Project 03: Munitions Debris Areas
AoPI 5	AoPI 5	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 8	AoPI 8	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 9E	AoPI 9E	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 9G	AoPI 9G	Project 12: Gas Chamber and Cantonment AoPIs
AoPI 10A	Rocket Area	Project 03: Munitions Debris Area
AoPI 10B	Grenade Maneuver Area	Project 09: Grenade Maneuver Area
AoPI 11B		
AoPI 11C	Practice Grenade Area	Project 03: Munitions Debris Area
AoPI 11D	Mortar/Rifle Grenade Area	Project 03: Munitions Debris Area

2.3.6.4 *Rocket and Rifle Grenade Area* – MEC (MKII and rifle grenades, 2.36-inch rockets) and MD (mortars, grenades, and undifferentiated fragments) were found during the RI.

2.4 ENFORCEMENT ACTIONS

No CERCLA enforcement actions have taken place at FUDS Project I04SC001606: Rifle and Grenade Area.

2.5 COMMUNITY PARTICIPATION

2.5.1 The Public Involvement Plan, prepared in August 2011, facilitates dialogue between the USACE and residents of the surrounding community regarding the Remedial Investigation (RI)/Feasibility Study (FS) at the former Camp Croft. A project website, www.campcroft.net, contains information on the site history, meeting transcripts, historical documents, and project deliverables.

2.5.2 The Restoration Advisory Board (RAB) was formed in 1996 to increase public awareness and encourage open communication with the community and is still active. From its inception through April 2017, the RAB has met 66 times.

2.5.3 The RI Report, FS report, and Proposed Plan for the former Camp Croft were made available to the public for comment and are available at the Spartanburg County Public Library, Spartanburg, SC as well as on the project website. A public meeting to present the Proposed Plan was held at the Spartanburg Marriott Renaissance Hotel, Spartanburg, SC on 24 March 2016. The Proposed Plan was available at the meeting and in the Information Repository. The notice of the public meeting and availability of the Proposed Plan for public comment was published on 15 March and 20 March 2016 in the Spartanburg Herald-Journal. In addition, meeting announcement cards were sent to more than 500 local residents and property owners. The Proposed Plan was also presented at the RAB meeting on 05 May 2016, which was announced in the online Spartanburg Herald-Journal and via mailed meeting announcements. Oral and written comments were solicited at the meeting and accepted during a public comment period from 24 March 2016 through 06 June 2016. No written comments from the public were received. The SC DHEC reviewed the Proposed Plan and provided comments. These comments and response to comments are provided in Part 3: The Responsiveness Summary.

2.6 SCOPE AND ROLE OF RESPONSE ACTION

2.6.1 The former Camp Croft is comprised of 10 Projects created out of the original FUDS Project I04SC001603. This Decision Document addresses FUDS Project I04SC001606: Rocket and Rifle Grenade Area. The remaining Projects are addressed in separate Decision Documents.

2.6.2 The selected remedy for FUDS Project I04SC001606: Rocket and Rifle Grenade Area is protective of human health and the environment by eliminating, reducing, or controlling potential MEC exposure hazards at the site through surface and subsurface MEC removal. The risk assessments concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC in soil and sediment is considered negligible; no action is recommended for MC. The selected remedy will be implemented under the authority of the USACE.

2.7 PROJECT CHARACTERISTICS

2.7.1 *Site Characteristics*

2.7.1.1 Site risks were evaluated in terms of a Conceptual Site Model that consists of a source of contamination, a receptor, and interaction at the exposure point or exposure pathways. Within this model, the source consists of MEC in the environment. Receptors include landowners. Based on the findings of the RI, the exposure pathway is complete. These areas are relatively flat to gently rolling topography. Vegetation type and density varies based on land use. Figure 2-1 illustrates these areas with respect to past military use.

2.7.1.2 The former Camp Croft is located in the upstate of South Carolina, less than 10 miles southeast of downtown Spartanburg, SC. The site is roughly bound to the north by SC Highway 295, to the east by US Highway 176, to the south by SC Highway 150 and to the west by SC Highway 56. The site can be accessed by taking US Highway 176 south at Exit 72 along US Interstate 85. Spartanburg County is located in the northwestern part of the state, in what has come to be known as the “Piedmont Crescent.” The county lies just southeast of the Blue Ridge Mountains in the piedmont plateau, which is characterized by subdued topographic features and moderate relief. The land surface is inclined to elevations exceeding 1,000 feet in the northwest section of the county to less than 600 feet in the southeast. Hills have a well-rounded appearance

with no conspicuously prominent ridges or peaks. Valley floors are generally about 100 feet deep with well-developed water courses. There are few swamp-like areas.

2.7.1.3 Croft State Natural Area occupies 7,054 acres of the 19,044-acre FUDS property. Facilities associated with the park include campgrounds (both primitive and for recreational vehicles), horse stables and a show ring, picnic shelters, restrooms, a comfort station, a dump station, a boat ramp, and park office. Lake Tom Moore Craig, a 148-acre impoundment, and Lake Edwin Johnson, a 37.5-acre impoundment, are also located within the park. These lakes total 186 acres and were constructed after the FUDS was transferred to state ownership. Soil from onsite was used to construct the lakes' earthen dams.

2.7.1.4 Residential areas are concentrated in the north end of the former Camp Croft and private properties exists across much of the former camp, outside the Croft State Natural Area. The Creek Golf Course is located on the north end of Camp Croft.

2.7.1.5 Numerous small wetlands and riparian areas are located in the northern portion of the FUDS. The southern portion of the FUDS is dominated by numerous larger wetlands, primarily along Fairforest Creek. The largest wetland in southern portion of the FUDS is 82.85 acres and is located southwest of Lake Craig.

2.7.1.6 Bald eagles are known to nest in Croft State Natural Area and are protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. Both laws prohibit killing, selling or otherwise harming eagles, their nests, or eggs.

FIGURE 2-1 FUDS PROJECT LOCATIONS

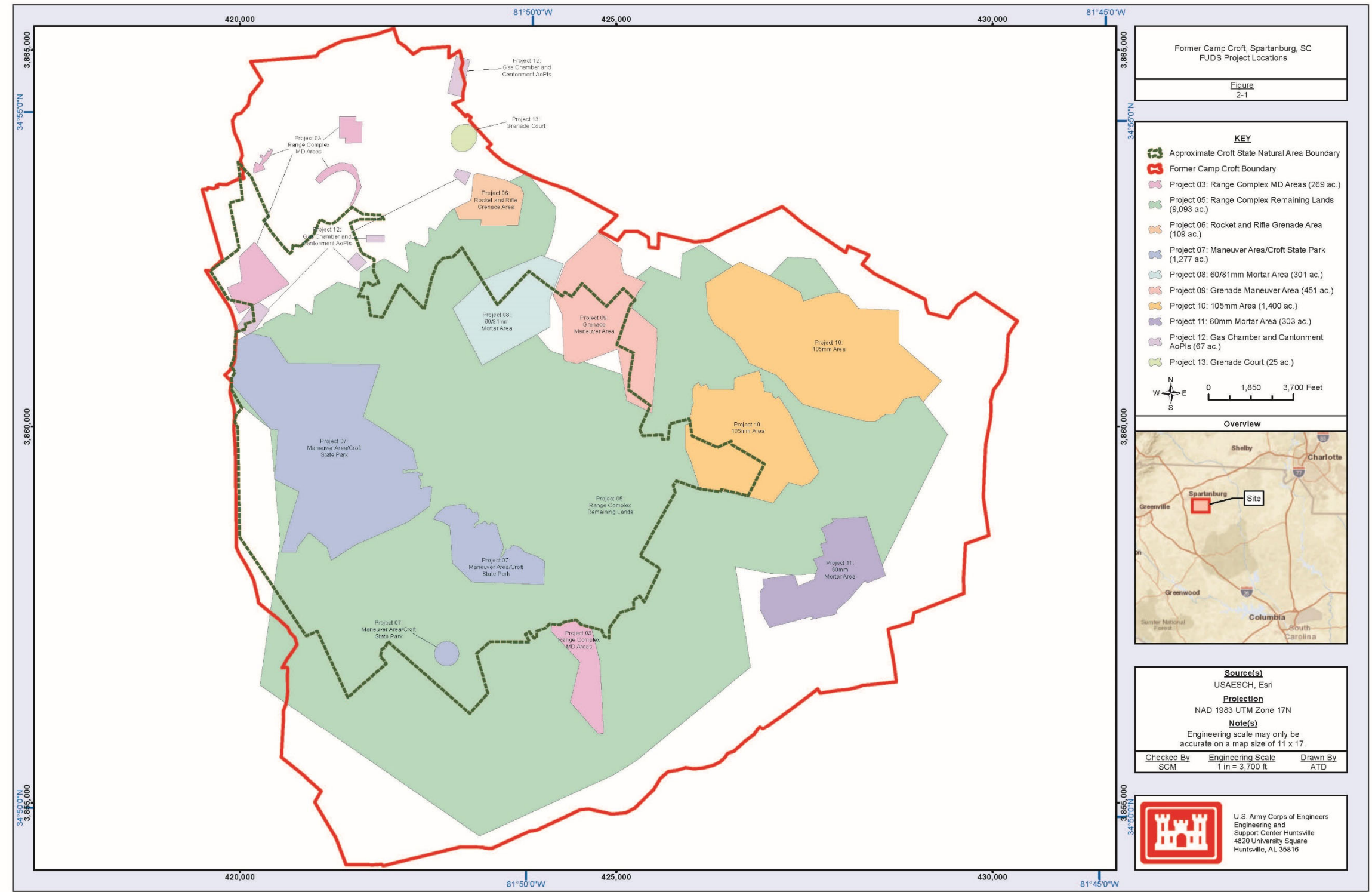


FIGURE 2-2 FUDS PROJECT I04SC001606 LOCATION



2.7.2 Sampling Strategy

2.7.2.1 For the RI, transects were positioned generally in an east-west orientation. Transect spacing varied between areas based on the detonation fragmentation distance of the smallest item of interest in each area and were investigated either by mag-and-dig or analog instrument-assisted surface reconnaissance. After reviewing the data collected during the mag-and-dig transect coverage, 110 individual 2,500 square foot grids were positioned principally in areas of medium and high estimated anomaly distribution to better define the nature and extent of MEC contamination. Targets of interest were intrusively investigated.

2.7.2.2 MC sampling was also conducted to support the RI; soil samples were collected from grids with high anomaly densities detected during the MEC investigation. Surface soil samples were collected from the four grid quadrants (northeast, northwest, southwest, and southeast) and the center point of the grid (i.e., five samples per grid). One-hundred-twenty four discrete surface soil samples, plus 12 duplicates, were collected during the initial round of soil sampling. Samples were analyzed for explosives using EPA method 8330A and antimony, copper, lead, and zinc using EPA method 6020A.

2.7.2.3 X-ray fluorescence (XRF) was used to analyze soil samples in the field for lead in areas where soil lead levels exceed preliminary action levels. XRF samples were collected at 20-foot intervals in all directions from the original sample locations. In addition to the discrete surface soil samples, post-blow-in-place (BIP) composite surface soil samples were collected immediately following detonation of MEC items to determine if any MC contamination remained after the detonation. The U.S. Army Cold Regions Research and Engineering Laboratory's 7-Sample Wheel Approach was used to collect composite post-BIP soil samples.

2.7.2.4 Groundwater in this area is not expected to be part of a complete exposure pathway to receptors at this site, and therefore was not sampled.

2.7.3 FUDS Project Contamination

2.7.3.1 *Rocket and Rifle Grenade Area* – Sixteen MEC items (MKII and rifle grenades, 2.36" rockets) and MD (mortars, grenades, and undifferentiated fragments) were discovered during the RI field investigation. The maximum depth of MEC was 10 inches below ground surface.

2.7.4 Location of Contamination and Routes of Migration

2.7.4.1 Camp Croft had at least 12 live ammunition training ranges used for small arms ammunition, anti-tank rockets, anti-aircraft artillery, 60-millimeter (mm) infantry mortars, and 81mm infantry mortars. The training range impact areas comprised 16,929 acres; a 175-acre grenade court was also located at the camp.

2.7.4.2 MEC may remain for long periods of time. Several factors influence the possible migration of MEC from the site, such as human activity resulting in redistribution of MEC items, and erosion.

2.7.4.3 Human populations which could be affected include landowners.

2.8 CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES

2.8.1 Land Uses

2.8.1.1 Land use in Spartanburg County generally is divided into four broad categories including agricultural/ cropland, urban/built up land, mixed forest (woodland), and deciduous forest (woodland). From an aerial perspective, these four land use groups present a physical form. The urban/built up land form represents a continually changing land mass, running into agricultural, grasslands and forested areas, continually altering its boundaries in response to changes brought by growth and development. Land use in Project 06 is agricultural.

2.8.2 Groundwater and Surface Water Uses

2.8.2.1 Groundwater in this area is not expected to be part of a complete exposure pathway to receptors at this site; no potable groundwater wells were identified within FUDS Project I04SC001606.

2.8.2.2 Lake Craig (148 acres) and Lake Johnson (37.5 acres), both located within Croft State Natural Area, are used by boaters and fishers.

2.9 PROJECT SITE RISKS

2.9.1 Human Health & Ecological Risks

During the RI, risk assessments were conducted to determine the human health and ecological risks associated with potential MC exposure at the former Camp Croft. Based on the MC analytical results, the risk assessments concluded that the potential for adverse risks to human health or ecological receptors from exposure to MC is negligible. Therefore, MC do not pose an unacceptable risk to human health and the environment and no further action will be taken for MC.

2.9.2 MEC Hazard Assessment

2.9.2.1 A qualitative MEC Hazard Assessment (HA) was conducted using information from previous investigations and the RI to provide a baseline assessment of response alternatives.

2.9.2.2 Considering the current site conditions, the MEC HA results indicate the potential for the highest potential explosive hazard conditions for current and reasonably anticipated future land uses at FUDS Project I04SC001606: Rocket and Rifle Grenade Area. Results of the Hazard Assessment are discussed in detail within the RI and FS Reports, which are available on the project website and in the Administrative Record file.

2.9.2.3 Previously recovered MEC locations, MD density and future land-use activities were also used to assess response alternatives and develop basis for the selected remedy. In areas with a higher relative MD density, a receptor (human) may have a greater chance of encountering MEC based on anticipated future land use activities in these areas.

2.9.3 Basis for Response Action

2.9.3.1 The selected remedy for FUDS Project I04SC001606: Rocket and Rifle Grenade Area is implementation of Digital Advanced Classification Surface and Subsurface MEC Removal to

Support UU/UE. MEC has been confirmed to be present (either during the RI or historically) within this area.

2.9.3.2 The selected response action presented in this Decision Document is necessary to protect public health and welfare from potential MEC on the surface and subsurface. The completion of the MEC clearance would reduce MEC hazards.

2.10 REMEDIAL ACTION OBJECTIVES

The Remedial Action Objective (RAO) is to limit or mitigate an interaction between a receptor and potential MEC items remaining in FUDS Project I04SC001606. The selected remedy is chosen to satisfy the RAO. A clearance to a depth of two feet, as shown on Table 2-2, is based on known MEC depths, current land use, and reasonably anticipated land use. This response action reduces the volume of MEC, thus reducing MEC hazards at FUDS Project I04SC001606.

TABLE 2-2 REMEDIAL ACTION OBJECTIVES

Area	MEC Depth (bgs)	Land Use/ Depth (bgs)	RAO Depth (bgs)
Rocket and Rifle Grenade	10 in.	Resident/2 ft	2 ft

2.11 DESCRIPTION OF ALTERNATIVES

2.11.1 The FS developed and evaluated four remedial alternatives for FUDS Project I04SC001606:

- Alternative 1 – No Action;
- Alternative 2 – Public Education;
- Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education; and
- Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE.

2.11.2 Remedy Components

2.11.2.1 Alternative 1 - No Action is carried forward to represent the existing condition at the site. Under CERCLA, the No Action alternative is required for use as a baseline measure against the other alternatives. No Action assumes the following:

- No treatment technology;
- No containment technology;
- No institutional controls; and
- No monitoring requirements.

2.11.2.2 Alternative 2 – Public Education assumes that no physical MEC remediation would take place but would involve the following components:

- Funded and implemented by USACE;
- Community MEC awareness program;
- Posting of MEC awareness signs; and
- Development and distribution of informational material.

2.11.2.3 Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education. Alternative 3 involves the following major components:

- Funded and implemented by USACE;
- Community MEC awareness program;
- Posting of MEC awareness signs;
- Development and distribution of informational material;
- Removal of MEC items visible on the ground surface; and
- Removal of subsurface anomalies identified by analog sensors.

2.11.2.4 Alternative 4 - Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE. With this advanced technology, it is anticipated that the completion of the MEC removal would reduce the MEC hazard to a level to support UU/UE. As such, Public Education and long-term management would not be required. The following components make up Alternative 4:

- Funded and implemented by USACE;
- Removal of MEC items visible on the ground surface; and
- Use of digital geophysical mapping and advanced classification to identify subsurface MEC items and conduct removal action.

2.11.3 Common Elements and Distinguishing Features of Each Alternative

2.11.3.1 Applicable or Relevant and Appropriate Requirements (ARARs)

ARARs are “those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site” as defined in 40 CFR 300.5. ARARs applicable to implementation of Alternative 4 are listed in Table 2-3. Extensive brush clearing that is required for this remedy has the potential to impact nesting eagles.

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TABLE 2-3 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)

Regulatory Authority	Law/Regulation	Requirement	Comment
Federal	<i>Migratory Bird Treaty Act (16 U.S.C. §703 and 704)</i>	Governs activities that may affect threaten migratory birds. Destruction of active bird nests, eggs, or nestlings that can result from spring and summer vegetation clearing is a violation of the Act.	Bald eagles have been known to nest in the former Camp Croft.
Federal	<i>40 CFR 264.601</i>	Requires miscellaneous units for the management of hazardous waste, such as open burning/open detonation units, to be located, designed, constructed, operated, maintained, and closed in a manner that will ensure protection of human health and the environment.	Prevent any releases that may have adverse effects on human health or the environment due to migration of waste constituents in ground water, subsurface soil, surface water, wetlands, surface soil and/or air. Specifically referenced for consolidation of MEC.

2.11.4 Long-term Reliability

2.11.4.1 Alternative 1 – No Action provides no reduction in MEC hazard and therefore, offers no permanent remedy.

2.11.4.2 Alternative 2 – Public Education provides no reduction in MEC volume because no MEC clearance will take place. However, there is a reduction of MEC hazard to residents through MEC awareness via distribution of informational documents and posting of MEC awareness signs.

2.11.4.3 Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education greatly and permanently reduces the risk of an accidental encounter with surface and subsurface MEC.

2.11.4.4 Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE would provide permanent reduction of hazard for residents performing intrusive activities in areas where present and future land use dictates.

2.11.5 Estimated time to Implement

2.11.5.1 Alternative 1 – No action can be implemented immediately.

2.11.5.2 Alternative 2 – Implementation of Public Education can occur within three to six months. Distribution of material should be ongoing.

2.11.5.3 Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education can be implemented within four to six months. The time frame to complete the remedial design, fieldwork and reporting is dependent on design and review schedule, site conditions at the time of field work execution, and public and regulatory review accommodations; however, a conservative estimated time-to-complete would be three years.

2.11.5.4 Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support Unlimited Use/Unrestricted Exposure can be implemented within four to six months. The time frame to complete the remedial design, fieldwork and reporting is dependent on design and review schedule, site conditions at the time of field work execution, and public and regulatory review accommodations; however, a conservative estimated time-to-complete would be three years.

2.11.6 Cost

Estimated present worth costs for each alternative are shown in Table 2-4.

TABLE 2-4 ALTERNATIVE APPROXIMATE COST SUMMARY

Alternative	Present Worth* (\$)
1. No Action	\$0
2. Public Education	\$310,749
3. Analog Surface and Subsurface MEC Removal and Public Education	\$812,464
4. Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE	\$722,896

*In accordance with EPA guidance for the purpose of the detailed analysis of alternatives, the period of performance used for costing purposes was 30 years. Though not part of the remedy, the cost of five-year reviews is included where applicable to show total cost.

2.11.7 Expected Outcomes of Each Alternative

Alternative 1 affords no protection to human health and is not effective in reducing the MEC hazard at FUDS Project I04SC001606. Alternative 2 – Public Education reduces MEC hazards through education of residents, workers and site visitors. However, there is no reduction in volume of MEC with Alternative 2. Alternative 3 – Analog Surface and Subsurface MEC Removal and Public Education greatly reduces the risk of an accidental encounter with surface and subsurface MEC. Public Education will reduce the hazard to residents, workers, and site visitors through community MEC awareness via distribution of informational material and posting of signs. Alternative 4 – Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE would provide permanent reduction of hazard for former Camp Croft residents performing surface and intrusive activities.

2.12 COMPARATIVE ANALYSIS OF ALTERNATIVES

Table 2-5 provides an assessment of each remedial alternative with respect to the nine NCP criteria.

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TABLE 2-5 ASSESSMENT OF REMEDIAL ALTERNATIVES

Remedial Alternative	NCP Nine Evaluation Criteria								
	Threshold Criteria		Balancing Criteria					Modifying Criteria	
	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Short-Term Effectiveness	Long-Term Effectiveness & Permanence	Reduction of Toxicity, Mobility, and Volume Through Treatment	Implementability	Cost	State Acceptance	Community Acceptance
Alternative 1 No Action No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce potential MEC hazards to a potential receptor. This alternative is not protective of human health and the environment.	N/A	No action would be taken to reduce potential MEC hazards to a potential receptor. Accordingly, alternative would be implemented immediately, there would be no risks resulting from implementation, but risks to receptors would remain the same.	No action would be taken to reduce potential MEC hazards to a potential receptor.	No action would be taken to reduce mobility or volume of MEC.	Not administratively feasible, otherwise easy to implement.	No cost associated with this alternative.	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.
Alternative 2 Public Education Includes distribution of informational material and posting of MEC awareness signs.	Public education will reduce the hazard to human receptors through education resulting from distribution of informational documents and posting of signs. Does not provide overall protectiveness.	N/A	Individuals familiar with formerly used military sites, munitions types, and safety would be involved with the development and distribution of informational documents. Protection will occur immediately following implementation and can be executed within three to six months. Distribution of materials will be ongoing.	Since MEC is not removed, the long-term effectiveness/permanence is questionable. Distribution of community MEC awareness informational documents would need to occur continually to ensure availability to receptors.	No reduction in volume as no MEC clearance would take place.	Distribution of informational documents and posting of signs are technically feasible. Materials and personnel are readily available for implementation. Property rights-of-entry would only be required for posting of signs. Implementation s can occur within three to six months. Distribution of materials should be ongoing.	\$67,558 \$310,749 (includes LTM)	The State provided comment on this Alternative.	No comments from the public were received.
Alternative 3 Analog Surface and Subsurface MEC Removal and Public Education Clearance of surface MEC and subsurface anomalies, including public education.	This alternative is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (i.e. clearance) and public education.	YES	The clearance of surface MEC and subsurface anomalies is effective in mitigating hazards.	This alternative is effective as a long-term remedy.	All surface MEC and subsurface anomalies would be removed, resulting in the reduction of mobility and volume.	Surface and subsurface clearance of MEC is technically feasible for an entire area or a smaller footprint within an area, based on accessibility and land use. Moderate technical effort required for implementation. UXO-qualified personnel would visually inspect, aided by hand-held instruments, the ground surface and use hand-held sensors to detect and remove items under dense vegetation as well as subsurface anomalies. Suspected MEC items would be inspected for explosive hazards and disposed of accordingly.	\$569,273 \$812,464 (includes LTM)	The State did not comment on the acceptability of this Alternative.	No comments from the public were received.
Alternative 4 Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE This alternative includes clearance of surface MEC and MEC from below the surface, to a depth compatible with land use or actual known depths of the ordnance.	This alternative is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (i.e. clearance).	YES	The clearance of surface and subsurface MEC is effective. Potential significant exposure to UXO workers during implementation. Hazard to the public resulting from implementation is considered minimal.	This alternative is effective as a long-term remedy if MEC is present.	Greatest reduction of MEC volume. Surface and subsurface MEC would be removed using the most effective technology available, resulting in the reduction of mobility and volume.	Surface and subsurface clearance of MEC is technically feasible for an entire area or a smaller footprint within an area, based on accessibility and land use. Extensive brush clearance would likely be required. Uses digital geophysical instrumentation in a specialized configuration for data collection such that data can be digitally compared to an established database, and anomalies can be discriminated Anomalies identified as MEC would be excavated and disposed of using approved/safe procedures.	\$722,896	The State provided comment on the acceptability of this Alternative.	No comments from the public were received.

2.13 PRINCIPAL MEC/MC ISSUES

The principal issue at the FUDS Project I04SC001606 is MEC. The selected remedy will be protective by utilizing a MEC clearance to locate and remove explosive hazards on the surface and below ground.

2.14 SELECTED REMEDY

The selected remedy for FUDS Project I04SC001606: Rocket and Rifle Grenade Area is Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE.

2.14.1 Summary of the Rationale for the Selected Remedy

2.14.1.1 The selected remedy, which implements a surface and subsurface MEC clearance, is appropriate for FUDS Project I04SC001606. The selected remedy will reduce potential hazard associated with MEC exposure through reduction in MEC volume. The selected remedy will comply with the ARARs listed in Table 2-1.

2.14.1.2 USACE believes that the remedy is protective of human health and the environment and satisfies the statutory requirements of CERCLA §121(b): (1) be protective of human health and the environment; (2) comply with ARARs; (3) be cost effective; (4) utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and (5) satisfy the preference for treatment as a principal element.

2.14.2 Detailed Description of the Selected Remedy

The selected remedy includes clearance of MEC from the surface and in the subsurface to support UU/UE. The selected remedy is considered appropriate in areas where MEC items are present on the surface and in the subsurface. A surface MEC removal would be conducted, followed by digital geophysical mapping. Advanced classification of the digital geophysical data would be performed to identify targets-of-interest, or MEC anomalies, which would be intrusively investigated. MEC would be disposed of using approved/safe procedures. Extensive brush clearance would likely be required in many areas prior to the response action. Each anomaly would be investigated and MEC removed to a maximum depth of two feet, based on land use (see Table 2-2). MEC-like items detected below the RAO will be investigated. Considering the advanced data interpretation ability associated with this alternative, intrusive investigation of predicted MEC anomalies would result in fewer false positive digs and thus, increased fieldwork efficiencies. Public Education will not be implemented with this remedy. It is the USACE expectation this alternative will result in negligible residual risk allowing for UU/UE at this site. However, USACE will conduct a post remedial action assessment that will report on the effectiveness of the remedial actions taken. If there was an impediment to full remediation as planned in this alternative, the USACE will implement public education (as described in Alternative 2) to ensure protectiveness is provided as part of the remedial action. In that situation, five year reviews will be required until the site reaches UU/UE.

2.14.3 Cost Estimate for Selected Remedy

2.14.3.1 A summary of the cost estimate for Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE is provided in Table 2-6. Detailed cost is provided in the FS Report located in the Information Repository/Administrative Record.

2.14.3.2 The information in this cost estimate summary table is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost elements are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a memorandum in the Administrative Record file, an explanation of significant differences, or a Decision Document amendment. This is an order-of-magnitude engineering cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

2.14.4 Expected Outcomes of the Selected Remedy

The expected result of implementing this remedy is to reduce potential explosive hazards by preventing interaction between receptors (i.e., humans) and surface and subsurface MEC for current and reasonably anticipated future land use activities based on best available information at this time. The selected remedy will provide permanent reduction of hazard for landowners performing surface and intrusive activities in the FUDS Project I04SC001606: Rocket and Rifle Grenade Area. Extensive brush clearance will be required in many areas prior to the response action. Each target-of-interest would be investigated and MEC removed to a maximum depth of two feet, based on private land use (see Table 2-2). If MEC is encountered, the item would be disposed of using approved/safe procedures. The completion of the MEC clearance would reduce MEC hazards. The selected remedy will not impact current or anticipated future land uses.

TABLE 2-6 COST ESTIMATE - DIGITAL ADVANCED CLASSIFICATION SURFACE AND SUBSURFACE MEC REMOVAL TO SUPPORT UNLIMITED USE/UNRESTRICTED EXPOSURE

Digital Advanced Classification Surface and Subsurface Removal to Support UU/UE	
Contractor Cost (Labor, Supplies, and Travel)	\$ 461,250
Government Cost (30% of Contractor Cost)	\$ 138,376
Subtotal	\$ 599,626
Contingency (20% of Subtotal)	\$ 123,270
Total	\$ 722,896

The estimated cost for Alternative 4 per acre is \$6,632.

2.15 STATUTORY DETERMINATIONS

In accordance with statutory requirements of CERCLA, the remedial action shall be protective of human health, comply with ARARs, be cost effective, utilize permanent solutions and alternative treatment technologies to the maximum extent practicable, and prefer treatment as a principal element.

2.15.1 Protection of Human Health and the Environment

This remedy is protective of human health and the environment by eliminating, reducing, or controlling hazards at the site through treatment (MEC clearance). The actual known depth of MEC/MD is less than two feet below ground surface (bgs). Surface and subsurface MEC clearance will remove MEC to a depth of two feet bgs, based on land use (see Table 2-2). Source reduction is used to minimize hazard related to a receptor interaction with a MEC hazard. The implementation of the selected remedy will not pose unacceptable short-term risks to human health or the environment or result in any cross-media impacts.

2.15.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected remedy will comply with ARARs.

2.15.3 Cost Effectiveness

The selected remedy is considered cost effective because it provides the most comprehensive means of reducing MEC exposure hazard to individuals who are engaged in intrusive activities as compared to the other alternatives. The estimated costs presented in Table 2-4 and Table 2-5 represent the costs developed for the FS Report.

2.15.4 Permanent Solution and Alternate Technology

Since MEC is removed, the permanence of the selected remedy is extremely effective as a long-term remedy. Advanced technology, data processing, and classification will support UU/UE.

2.15.5 Preference for Treatment as a Principal Element

The selected remedy includes treatment as a principal component. A surface and subsurface clearance will be used to actively treat the area by removing MEC and achieving the greatest reduction of MEC volume. Surface and subsurface MEC would be removed using the most effective technology available, resulting in the reduction of mobility and volume.

2.15.6 Five-year Reviews

Five-year reviews are a requirement for alternatives not allowing for unlimited use and unrestricted exposure in accordance with 40 CFR 300.430(f)(4)(ii). The selected remedy supports UU/UE; as such, five-year reviews are not required.

2.16 DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for the former Camp Croft was released for public comment on 24 March 2016. The Proposed Plan identified Alternative 4 - Digital Advanced Classification Surface and Subsurface MEC Removal to Support UU/UE for FUDS Project I04SC001606: Rocket and Rifle Grenade Area. The RAO depth of clearance to three feet below ground surface, which includes a buffer, as presented in the Proposed Plan, has been changed to a two foot clearance based on land

use. Based on comments received from the RAB, the term “Land Use Controls” has been replaced with “Public Education”; this change has been incorporated herein. It is the USACE expectation the alternative selected as the remedy for this MRS (Alternative 4) will result in negligible residual risk allowing for UU/UE at this site. Due to SC DHEC concerns regarding the UU/UE determination associated with Alternative 4, USACE will conduct a post remedial action assessment that will report on the effectiveness of the remedial actions taken. If there was an impediment to full remediation as planned in this alternative, the USACE will implement public education (as described in Alternative 2) to ensure protectiveness is provided as part of the remedial action. In that situation, five year reviews will be required until the site reaches UU/UE.

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3.0 PART 3: THE RESPONSIVENESS SUMMARY

The public comment period for the Proposed Plan was from 24 March 2016 to 06 June 2016. USACE facilitated a public meeting at the Spartanburg Marriott Renaissance Hotel on 24 March 2016. The Proposed Plan was also presented to the RAB and the public on 05 May 2016.

3.1 STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES

No comments were received from the public on the Proposed Plan. The SC DHEC has reviewed the Proposed Plan and provided the following comments on the acceptability of the selected remedy. Responses are included below each comment.

SC DHEC Comment: As stated in comments to the Feasibility Study, the Department is hesitant to support any alternative with the goal of unrestrictive use/unrestrictive exposure as we believe some type of land use controls (LUCs) will be necessary. Our opinion of necessary LUCs may vary for different areas of the former Camp Croft based on the former land use, coverage of the investigations, work complete, and accessibility of area for investigation based on right-of-entry.

Response:

No LUCs (public education) are specified in the Digital Advanced Classification Surface and Subsurface MEC Removal (Alternative 4) areas as they will not be needed for these specific areas. However, educational material and signage will be implemented for the remedy for several areas at the Camp Croft FUDS, addressed in a separate Decision Document. This will result in a broad application of public education throughout the entire Camp Croft FUDS. It is the USACE expectation the alternative selected as the remedy for this MRS (Alternative 4) will result in negligible residual risk allowing for unlimited use and unrestricted exposure (UU/UE) at this site. However, USACE will conduct a post remedial action assessment that will report on the effectiveness of the remedial actions taken. If there was an impediment to full remediation as planned in this alternative, the USACE will implement public education (as described in Alternative 2) to ensure protectiveness is provided as part of the remedial action. In that situation, five year reviews will be required until the site reaches UU/UE.

SC DHEC Comment: The RAOs listed in Table 2 [*of the Final Proposed Plan*] show a maximum depth of potential intrusive depth based on the prior land use and associated MEC. The Department is curious if the USACE will investigate any anomalies that are retained during the advanced geophysical classification (Alt.4) if they are detected below the RAO depth, if the instrumentation is capable of gathering reliable data past this depth. At other sites within SC, the remediation efforts involving MEC have been ‘to depth,’ a term used to define the limits of the instrumentation, not the RAO.

Response: Yes, anomalies retained during advanced classification that are below the RAO-specified depth will be intrusively investigated. SC DHEC will have the opportunity to comment on the Remedial Design.

SC DHEC Comment: From the February RAB meeting, it was mentioned by John Moon, the Croft State Park Ranger, that there are nesting Bald Eagles within Croft State Park. The

Department understands that this was new information but wants to ensure that this information has been followed up by the USACE to determine if appropriate ARAR(s) are necessary.

Response: Section 2.7.1.6 addresses nesting bald eagles; Table 2-3 identifies ARARs, including the Migratory Bird Treaty Act.

SC DHEC reviewed this Decision Document and provided their concurrence with the preferred alternative via letter dated March 12, 2018.

3.2 TECHNICAL AND LEGAL ISSUES

No technical or legal issues have been identified.