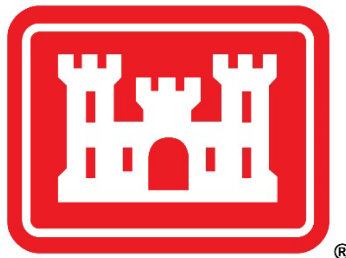


FINAL
DECISION DOCUMENT FOR
MILITARY TRAINING MUNITIONS AND EXPLOSIVES OF
CONCERN CONTAMINATED
MUNITIONS RESPONSE SITE
WITHIN
CAMP BUTNER FORMERLY USED DEFENSE SITE
PROJECT No. I04NC000911
GRANVILLE, PERSON, AND DURHAM COUNTIES, NORTH
CAROLINA



U.S. Army Corps of Engineers
U.S. Army Engineering and Support Center, Huntsville
and
U.S. Army Corps of Engineers
Savannah District

AUGUST 2022

EXECUTIVE SUMMARY

ES 1. This Decision Document is presented by the United States Army Corps of Engineers to describe the selected remedy for the Military Training Munitions and Explosives of Concern Contaminated Munitions Response Site 01 within the Camp Butner Formerly Used Defense Site, Property Number I04NC0009, in Granville, Person, and Durham Counties, North Carolina. The Military Training Munitions and Explosives of Concern Contaminated Munitions Response Site 01 is designated as Formerly Used Defense Site Project I04NC000911 (Project 11).

ES 2. Munitions Response Site 01 consists of approximately 1,429 acres within the former Camp Butner.

ES 3. The Remedial Action Objective established in the Feasibility Study and summarized in the Proposed Plan for Munitions Response Site 01 is to mitigate the unacceptable risk of an incident to occur for human receptors over the entire Munitions Response Site 01 to the detection depths of the applicable munitions of concern such that a determination can be made that there is a negligible risk of an incident to occur. The selected remedy is chosen to satisfy the Remedial Action Objective. In developing the Remedial Action Objective, current and future land uses were considered. Munitions Response Site 01 is used for military training by the National Guard. Access to this MRS is restricted and controlled, with receptors consisting of National Guard trainees, construction/utility workers, hunters and visitors.

ES 4. The selected remedy, Alternative 2, consists of Land Use Controls in the form of public education (warning signs and educational pamphlets) to limit exposure to Department of Defense military munitions that may be present in the upper 40 inches within Munitions Response Site 01. Public education will inform the anticipated receptors and surrounding community of potential explosive hazards. Warning signs will reduce the risk of interaction by alerting receptors entering the site to the explosive hazards within Munitions Response Site 01. Implementation of the selected remedy at Munitions Response Site 01 meets the Remedial Action Objective established in the Feasibility Study but does not allow for unlimited use/unrestricted exposure. Therefore, five-year reviews that evaluate the effectiveness of the selected remedy to protect human health and the environment are required. The regulator, North Carolina Department of Environmental Quality, concurs with the selected remedy.

ES 5. The selected remedy is protective of human health and the environment and is cost effective. The estimated total cost to implement the selected remedy (Alternative 2: Land Use Controls) at Munitions Response Site 01 is \$381,123.

ES 6. As described in the Proposed Plan, all considered alternatives were evaluated against the National Oil and Hazardous Substances Pollution Contingency Plan's nine criteria, which are used to evaluate the different remedial alternatives individually and against each other in order to select a remedy. The alternatives considered were: No Action (Alternative 1); Land Use Controls (Alternative 2); Surface Removal of Munitions and Explosives of Concern Using Analog Detection Methods (Alternative 3); Surface Clearance and Subsurface Removal of Munitions and Explosives of Concern to the Depth of Instrument Detection Using Digital Geophysical Mapping Methods (Alternative 4); and Surface Clearance and Subsurface Removal of Munitions and Explosives of Concern to a Depth of Detection Using Advanced Geophysical Classification Methods (Alternative 5). The No Action alternative was considered but concluded not to be protective of human health and the environment. All other alternatives were protective of human health and the environment, but the Land Use Controls alternative was the most cost effective. Munitions constituents were determined not to pose an unacceptable risk to human health and the environment. As such, no action is necessary for munitions constituents.

ES 7. The selected remedy is protective of human health and the environment by reducing receptor exposure risk to explosive hazards. Munitions Response Site 01 contains munitions and explosives of concern and munitions debris that are indicative of the potential presence of munitions and explosives of concern. The selected remedy, Land Use Controls, modifies receptor behavior to reduce receptor exposure to explosive hazards. The selected remedy satisfies the statutory requirements of Comprehensive

Environmental Response, Compensation, and Liability Act § 121 regarding the former use of the Military Training Munitions and Explosives of Concern Contaminated Munitions Response Site by the Department of Defense.

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ACRONYMS AND ABBREVIATIONS

AGC	Advanced Geophysical Classification
AOI	Area of Interest
ARAR	Applicable or Relevant and Appropriate Requirement
ARNG	Army National Guard
ASR	Archives Search Report
bgs	Below Ground Surface
BIP	Blow-In-Place
BLRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CRP	Community Relations Plan
CSM	Conceptual Site Model
DD	Decision Document
DERP	Defense Environmental Restoration Program
DGM	Digital Geophysical Mapping
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DoD	Department of Defense
DU	Decision Unit
FS	Feasibility Study
ft	Foot
FUDS	Formerly Used Defense Site
GIS	Geographic Information System
HE	High Explosive
HGL	HydroGeoLogic, Inc.
HHRA	Human Health Risk Assessment
IGD	Interim Guidance Document
ISM	Incremental Sampling Methodology
LUC	Land Use Control
MC	Munitions Constituents
MD	Munitions Debris
MDAS	Material Documented as Safe
MEC	Munitions and Explosives of Concern
mm	Millimeter
MMRP	Military Munitions Response Program

MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
NCDEQ	North Carolina Department of Environmental Quality
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NRL	Naval Research Laboratory
PP	Proposed Plan
RAB	Restoration Advisory Board
RAO	Remedial Action Objective
RC1	Range Complex 1
RC2	Range Complex 2
RI	Remedial Investigation
ROE	Right-of-Entry
SARA	Superfund Amendments and Reauthorization Act
SLERA	Screening Level Ecological Risk Assessment
SUXOS	Senior Unexploded Ordnance Supervisor
TBD	To Be Determined
TDEM	Time Domain Electromagnetic
TEC	Topographic Engineering Center
TMV	Toxicity, Mobility, or Volume
TNB	Trinitrobenzene
TNT	Trinitrotoluene
TOI	Target of Interest
TPP	Technical Project Planning
TPV	Total Present Value
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
UU/UE	Unlimited Use/Unrestricted Exposure
UXO	Unexploded Ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

PART 1 – DECLARATION

1.1 PROJECT NAME AND LOCATION

This Decision Document (DD) was developed for the Military Training Munitions and Explosives of Concern (MEC) Contaminated Munitions Response Site 01 (MRS-01), within the Camp Butner Formerly Used Defense Site (FUDS) Property No. I04NC0009 located in Granville, Person, and Durham Counties, North Carolina (Figures 1 and 2). The Camp Butner FUDS is comprised of 40,384 acres and MRS-01 is comprised of 1,429 acres. The MRS number and project number for the Military Training MEC Contaminated area are MRS-01 and I04NC000911, respectively.

Based on the information and recommendations in the Final Remedial Investigation Report, the revised Final Feasibility Study, and the Final Proposed Plan, Project 02 was delineated into nine separate projects (revising Project 02 and adding new Projects 04 through 11). This DD addresses the selected remedy for MRS-01. The other projects will be addressed in separate DDs. The names and acreages of the nine projects (MRSs) are described below:

Table 1.1 - Former Camp Butner MRA Delineation

MRS	Project	MRS Name	Acreage
MRS-01	11	Military Training MEC Contaminated	1,429
MRS-02	04	Military Training Buffer Area	391
MRS-03	05	Buffer Area	924
MRS-04	06	Central MEC Contaminated	2,202
MRS-05	07	Northern MEC Contaminated	1,807
MRS-06	08	Eastern MEC Contaminated	1,451
MRS-07	09	Western MEC Contaminated	1,385
MRS-08	10	South MEC Contaminated	1,179
MRS-09	02	No Action Area	7,148

*MRS denotes munitions response site.
MEC denotes munitions and explosives of concern.*

1.2 STATEMENT OF BASIS AND PURPOSE

The Secretary of the Army delegated program management and execution responsibilities for the FUDS Program to the U.S. Army Corps of Engineers (USACE).

This DD describes the selected remedy for MRS-01 within the Camp Butner FUDS. The selected remedy involves Land Use Controls (LUCs) in the form of public education (warning signs and educational pamphlets). The USACE made this selection in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. § 9601 et seq., and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300. The determination presented in this DD is based on information contained in the Administrative Record file for the Camp Butner FUDS.

The regulatory agency for the Camp Butner FUDS is the North Carolina Department of Environmental Quality (NCDEQ). In its letter dated August 8, 2022, NCDEQ provided written concurrence with the selected remedy.

1.3 ASSESSMENT OF PROJECT SITE

The response action selected in this DD is necessary to protect the public health and the environment. The hazards at the site include the potential for human receptors to come into contact with MEC and munitions debris (MD) at MRS-01. Environmental sampling for munitions constituent (MC) was also conducted during the RI. The remedial investigation (RI) determined there to be no unacceptable risk to human or ecological receptors as a result of MC-related contamination at MRS-01. The most likely exposure scenario is direct interaction between receptors (i.e., Army National Guard (ARNG) trainees, construction/utility workers, hunters, and visitors) and residual MEC potentially present at MRS-01. Recreational hunting and military operation activities are anticipated to be conducted on the ground surface and to a depth of 15 ft below ground surface (bgs). Based on the results of the RI and previous investigations, both MEC and MD were identified within MRS-01 (HGL, 2016).

1.4 DESCRIPTION OF SELECTED REMEDY

The selected remedy consists of LUCs that effectively limit exposure to potential munitions remaining in MRS-01. Both warning signs and educational pamphlets would inform human receptors of the hazards present through the “3Rs” (Recognize, Retreat, and Report) munitions safety awareness program. Costs would include initial installation of signs and development of the educational materials, and annual maintenance to replace and repair damaged signs and distribute the educational pamphlets.

1.5 STATUTORY DETERMINATIONS

Based on the information currently available, the selected remedy for MRS-01, LUCs, achieves the RAO, is protective of human health and the environment, and satisfies the statutory requirements of CERCLA § 121 with regards to the former use by the DoD. The selected remedy is protective of human health and the environment through modification of receptor behavior, complies with Federal and State requirements that are applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy does not satisfy the statutory preference for treatment but is appropriate given the high costs of the alternatives that involve treatment; current and future use of MRS-01 for military purposes; and Camp Butner Training Center’s access restrictions that inform persons of the hazards and reporting procedures associated with MEC.

The selected remedy for MRS-01 will not allow for unlimited use/unrestricted exposure (UU/UE). Accordingly, USACE must conduct statutory reviews every five years after initiation of the remedial action to assure that human health and the environment are being protected by the selected remedy.

1.6 DATA CERTIFICATION CHECKLIST

The following information is included or otherwise addressed in this DD. Additional information can be found in the Administrative Record file for this site.

- Information on MEC and MD encountered at the project site;
- A summary of the risk assessment for MC-related contamination;
- Explanation of how source materials constituting threats will be addressed with LUCs;

- Current and reasonably anticipated future land use assumptions for MRS-01;
- Estimated costs associated with implementation of the selected remedy; and
- Key factors that led to the determination of LUCs as the selected remedy.

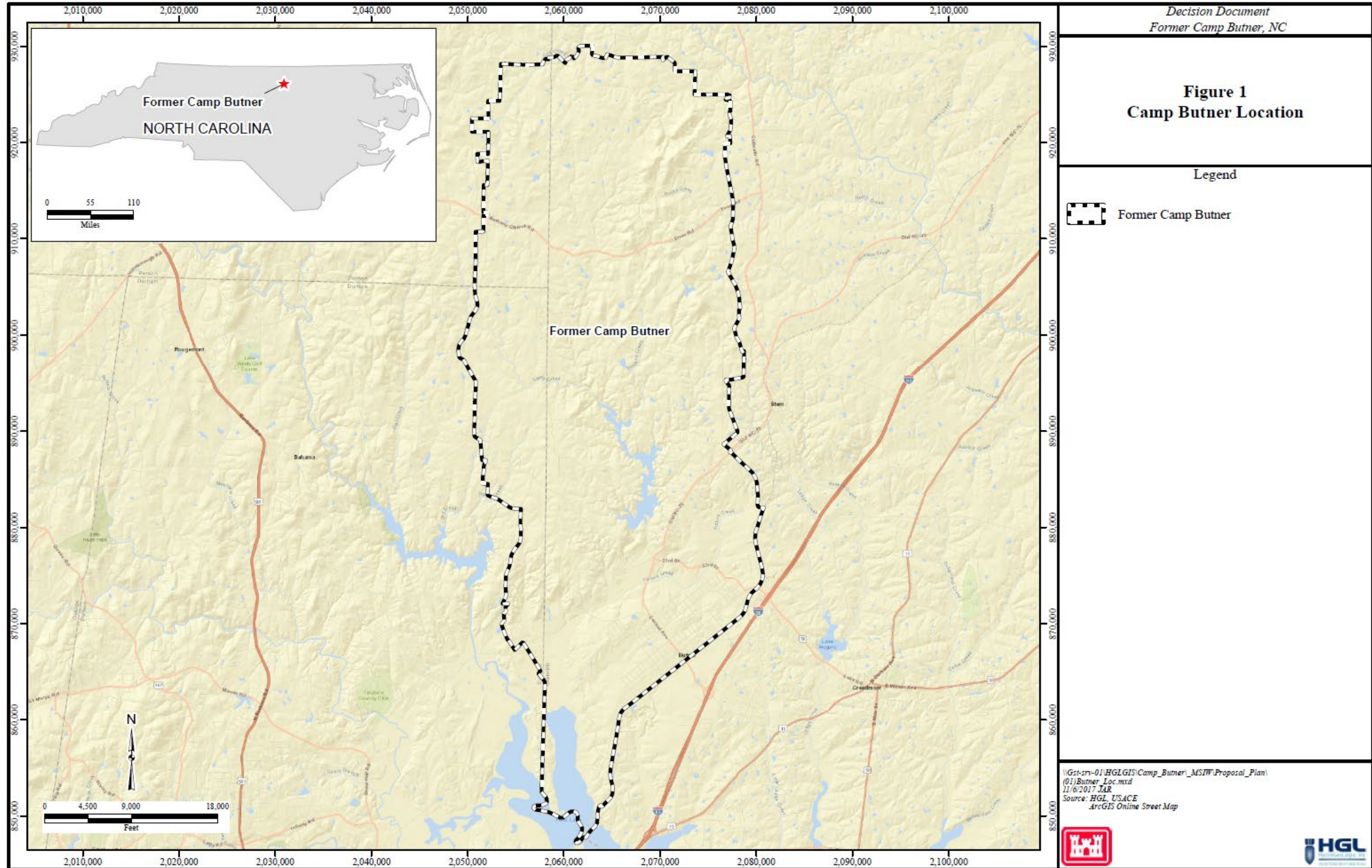
Previous investigations and risk assessment during the RI concluded that MC-related contamination is not present at MRS-01. For this reason, the following information does not apply and is not included in this DD:

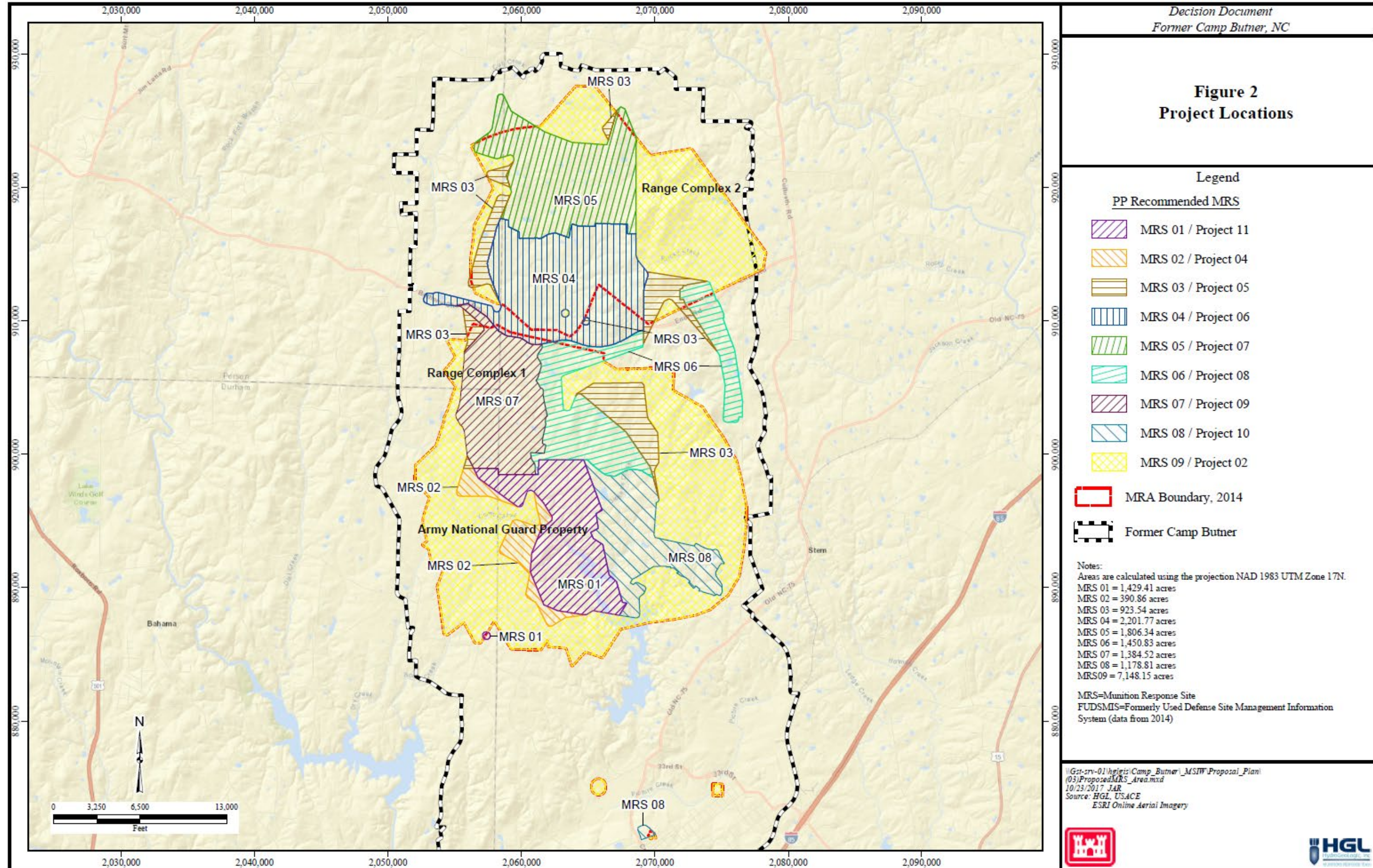
- Cleanup levels established for chemicals of concern and the basis for these levels.

1.7 AUTHORIZING SIGNATURE

This DD presents LUCs as the selected remedy for FUDS, Project No. I04NC000911 (MRS-01), Military Training MEC Contaminated, located at the Camp Butner FUDS in Granville, Person, and Durham Counties, North Carolina. The U.S. Army is the lead agency under the Defense Environmental Restoration Program at Camp Butner FUDS, and USACE has mission execution authority for the Formerly Used Defense Sites (FUDS) Program. USACE has developed this DD consistent with CERCLA, as amended, and the NCP. This DD will be incorporated into the larger Administrative Record file for the Camp Butner FUDS, which is available for public view at the South Granville Public Library, Creedmoor, NC 27522. This DD, which presents the selected remedy of LUCs for MRS-01 with a cost estimate of \$381,123, is approved by the undersigned, pursuant to the CEMP-CED (200-1a) Memorandum, “Re-delegation of Assignment of Mission Execution Functions Associated with Department of Defense Lead Agent Responsibilities for the Formerly Used Defense Sites Program,” dated July 8, 2022, which includes delegation of approval authority for DDs for a FUDS response action with an estimated cost of up to \$5 million.

	20 September 2022	
LARRY McCALLISTER, PhD, PE, PMP, SES	DATE	
Programs Director		





PART 2 – DECISION SUMMARY

2.1 PROJECT NAME, LOCATION, AND BRIEF DESCRIPTION

The Camp Butner FUDS is located 15 miles north of Durham, North Carolina, and encompasses approximately 40,384 acres in Granville, Person, and Durham Counties. Most of the Camp Butner FUDS property is used for agricultural purposes, but also includes residential development, recreational areas, and North Carolina Army National Guard operated training facilities at which Army National Guard Soldiers train, and undeveloped wooded areas (HGL, 2016). The site addressed in this DD is the Camp Butner FUDS Project No. I04NC000911 (MRS-01) which consists of 1,429 acres in the eastern and north-central portion of the Army National Guard (ARNG) property as shown in Figure 2. The ARNG Area of Interest (AOI) is currently owned by the North Carolina ARNG, is operated as the Camp Butner Training Center, and does not contain privately owned parcels.

Access to MRS-01 is restricted, with the MRS located inside the Camp Butner Training Center. Current land use includes military training for National Guard trainees and hunting. Current and reasonably foreseeable future receptors at the MRS include National Guard trainees, construction/utility workers, hunters, and visitors. Potential interactions with MEC would primarily be associated with surface activities; however, some intrusive activities are anticipated (recreational and training activities utility construction, and general construction). Intrusive actions, such as construction, are anticipated at the MRS to a maximum depth of 15 ft bgs. The RI concluded that MEC and MD found in or around MRS-01 in surface and subsurface soils confirm the potential for the presence of MEC. Therefore, some level of remedial action is necessary to mitigate unacceptable risks associated with exposure to MEC potentially present at MRS-01 (HGL, 2016).

2.2 PROJECT HISTORY AND ENFORCEMENT ACTIVITIES

Camp Butner was primarily established to train infantry, artillery, and engineering combat troops for deployment and redeployment overseas during World War II. The installation was active from 1942 until 1946; however, training was only conducted through 1943. Construction of Camp Butner was authorized by the War Department on February 12, 1942. The camp was officially active on August 4, 1942, and occupied approximately 40,384 acres. The various acres compiling Camp Butner FUDS were acquired by the War Department by:

- 40,201 acres acquired in fee;
- 128.4 acres acquired in 82 easements;
- 2.5 acres acquired in licenses; and
- 52.4 acres acquired in 26 leased tracts (USACE, 1993).

The acquired acreage was owned by multiple private owners and consisted of rural, agricultural, undeveloped wooded, commercial, and residential land use parcels. Camp Butner was established to train infantry divisions and miscellaneous artillery and engineer units. Camp Butner was declared excess by the War Department on January 31, 1947. The installation included approximately 15 live-fire ammunition training ranges, a grenade range, a 1,000-inch range, a gas chamber, and a flame thrower training pad. Munitions used at the site included small arms, 2.36-inch rockets, rifle and hand grenades, 37-millimeter (mm) through 155mm high explosive (HE) projectiles, 60 and 81mm mortars, and antipersonnel practice mines. Training activities also included the use of demolition items such as trinitrotoluene (TNT) and various initiating and priming materials. Following World War II, the camp was closed, limited ordnance

clearances were performed, and the property was conveyed to the National Guard, the State of North Carolina, local municipalities, and private owners.

MRS-01 falls within a portion of the ARNG AOI, which is located in the center of the Camp Butner FUDS, contained an artillery impact area, two mortar ranges, and several small arms ranges. All range fans remain within site boundaries, and some range fans overlap with others within the complex. Munitions types identified at this MRS included small arms, 2.36-inch rockets; hand grenades; rifle grenades; 37 mm, 40 mm, 57 mm, 105 mm, and 155 mm projectiles; and 60 mm and 81 mm mortars. Training ranges located inside this complex included: Central Artillery Impact Area, Rifle Ranges, Landscape 1000-inch .22 caliber Range, AA 1000-inch .22 caliber Range, Pistol Range, AT 1000-inch .22 caliber Range, MG 1000-inch .30 caliber Range, 37 mm Range, 60 mm/81 mm Mortar Range 1, and 60 mm/81 mm Mortar Range 2.

2.3 PREVIOUS INVESTIGATIONS AND REMOVAL ACTIONS

The following subsections summarize the findings of historical reports developed for the Camp Butner FUDS that relate to MRS-01, which consists of the areas investigated during the RI as shown in Figure 2. The following information is presented to summarize current site conditions and historical site investigation activities and findings, and to provide background for the discussion on the implementation of LUCs at MRS-01.

2.3.1 Archives Search Report, 1993 and 2003 Supplement

An Archives Search Report (ASR) was completed by the USACE, Rock Island District for the Camp Butner FUDS in September of 1993. The Final ASR summarizes the known nature and extent of MEC contamination as of 1993 and identified several areas requiring further evaluation. A supplement to the 1993 ASR was completed in 2003 in support of preparing the Military Munitions Response Range Inventory (HGL, 2016).

The ASR supplement identified the ARNG AOI as situated in the southwestern portion of RC1 and reportedly contained an artillery impact area, two mortar ranges, and several small arms ranges. All range fans remain within site boundaries, and some range fans overlap with others within the complex. Munition types expected and/or identified for the ARNG AOI included small arms, 2.36-inch rockets; rifle grenades; 37mm, 57mm, 105mm, and 155mm projectiles; and 60mm and 81mm mortars.

The ASR Supplement also reported that no known clearances have been conducted within the ARNG AOI at the time of finalization (HGL, 2012b). The Topographic Engineering Center (TEC) conducted a Geographic Information System (GIS)-based historical photographic analysis in 2001 evaluating 1943, 1945, and 1949 aerial photography to identify features related to former military use (e.g., crater fields, targets, ground scars, etc.) and areas potentially contaminated with MEC and MC-related contamination. HydroGeoLogic, Inc. (HGL) generated an Interpreted Impact Area during the work planning phase and investigated these areas during the RI field effort (HGL, 2012b).

2.3.2 Engineering Evaluation/Cost Analysis, 2001-2004

The Engineering Evaluation/Cost Analysis (EE/CA) addressed the Flame Thrower Range, RC1, Range Complex 2 (RC2), and Hand Grenade Range at the Camp Butner FUDS. At RC1 and RC2, 77 acres were evaluated and divided into approximately 330 grids of 0.25 acres each. Grids were distributed throughout suspected former munitions use areas within RC1 and RC2. Intrusive results provided evidence that identified actual impact and munitions use areas. A total of 13 MEC and 1,485 MD items were recovered during the EE/CA. Munitions identified at these MRSs included:

- 37 mm, 40 mm, 57 mm, 105 mm, and 155mm projectiles;
- 60 mm and 81 mm mortars;
- 2.36-inch rockets; and
- Hand grenades and rifle grenades.

During the EE/CA investigation, findings made by a property owner at the Lakeview Subdivision, which is within RC1, resulted in the allocation of sampling grids at this location. Based on the intrusive results, which included the demolition of a 37 mm projectile, a Time Critical Removal Action (TCRA) was conducted at the Lakeview Subdivision (HGL, 2016).

2.3.3 Time Critical Removal Actions, 2002/2003 and 2003/2004

A TCRA was conducted at the 26-acre Lakeview Subdivision (within RC1 and outside of Project 11) in tandem with the 2001 EE/CA investigation to remove the immediate and imminent danger to public safety posed by the presence of munitions and explosives of concern (MEC). The TCRA was conducted between November 2002 and March 2003 and included land survey, brush clearance, intrusive removal action (RA), and post-removal digital geophysical mapping (DGM). The TCRA included clearing of all metallic items comparable in mass or larger than a 37mm projectile in the top 6 inches of soil. During the clearance, six MEC items were recovered and destroyed. None of the recovered MEC items were within MRS-01. Items destroyed were the following:

- An electric blasting cap,
- Mk II hand grenade,
- 37 mm HE projectile,
- M1 A1 Mine fuze,
- 2.36-inch rocket motor with fuze, and
- 2.36-inch HE warhead.

The DGM survey indicated the potential for additional MEC contamination. As a result, the EE/CA report recommended an additional RA for the property (HGL, 2016).

USACE conducted a second TCRA between June 2003 and May 2004. Approximately 13 acres were cleared around a residential property where HE projectiles had been encountered. This area is not within MRS-01. Although MD was prevalent, no MEC was recovered (HGL, 2016).

2.3.4 Groundwater Well MC Sampling and Characterization, 2004 - 2005

USACE Wilmington District conducted a drinking water well sampling event in RC1 as well as other areas of Camp Butner in August 2004 and documented the findings in the Final Drinking Well Sampling Report (January 2005). All groundwater samples collected for this event were analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/polychlorinated biphenyls (PCBs), explosives, target analyte (TAL) metals, total organic halogens, and total recoverable petroleum hydrocarbons (TRPH). Perchlorate was detected in 12 of 23 drinking water wells (ranging from 0.079 to 10.3 ug/L) including the off-site location (used for comparison purposes as it was located outside of the Camp Butner FUDS boundary). The perchlorate detections were compared to the U.S. Environmental Protection Agency (USEPA) preliminary remediation goal (PRG) of 3.6 ug/L, with 2 of the 12 detections exceeding the PRG. One homeowner with highest detection perchlorate detection (10.3

ug/L) confirmed the use of Bulldog Soda fertilizer at his residence, which contains naturally occurring perchlorate.

Lead was detected at 9 of 23 drinking water wells (ranging from 5.9 to 39.9 ug/L) including the off-site location. The lead detections were compared to the Federal Maximum Contaminant Level (MCL) of 15 ug/L, with 2 of the 9 detections exceeding the MCL (one unfiltered sample location and one filtered sample location). Lead typically adsorbs to sediment, and these detected concentrations may have been the result of elevated turbidity present in the samples. Other detected parameters above project screening levels included: bis(2-ethylhexyl)phthalate (2 locations); chloroform (1 location); alpha-chlordane (1 location); gamma-chlordane (1 location); heptachlor epoxide (1 location); iron (10 locations); and manganese (15 locations). Groundwater analytical results did not indicate that former DoD activities at the Camp Butner FUDS had impacted the groundwater quality; however, perchlorate and lead concentrations detected in the groundwater warranted supplemental investigation (HGL, 2016). The supplemental investigation was conducted in 2006 and is documented in the MC Sampling Report (August 2006).

2.3.5 Munitions Constituents Sampling, Analysis, and Evaluation of FUDS, 2006

A supplemental investigation for MC was conducted at the Camp Butner FUDS, to include RC1, in 2006 and is documented in the Munitions Constituents Sampling Report (August 2006). The objective of the investigation was to evaluate MC potentially present at six FUDS locations. The sampling effort included the collection of 15 soil samples (including one background) and three surface water samples, which were biased to heavy use target/impact areas (impact craters), firing points, and low order detonations/exposed explosives locations. These samples were analyzed for TAL metals, explosives, and perchlorate. Various metals were detected in soil samples collected from the FUDS property. However, these concentrations were lower than results from the background/off-site sample (Aluminum, arsenic, chromium, iron, lead, manganese, and vanadium). The report concluded metals detected are not due to MC/MEC due to the presence in background sample results. In addition, impact from MEC use on the surface water was not discernable and the regional geology supported the natural occurrence as a potential source of metals detected in the soil and surface water. The MC Report results indicated explosive compounds and perchlorate were not detected in the soil or surface water (HGL, 2016).

2.3.6 Interim Removal Actions, 2008, 2009, 2010

Portions of the Lakeview Subdivision (within RC1 and outside of Project 11) that were previously only cleared to a depth of 6 inches were cleared to depth of detection. In addition, RA activities were completed at more than 250 parcels (average parcel was approximately 1.75 acres). Land parcel grids investigated were distributed throughout RC1 and RC2. RA activities were generally focused on existing residential dwellings. Intrusive results indicated the presence of former impact and munitions-use areas. MEC recovered included 37 mm, 57 mm, 105 mm, and 155 mm projectiles; 60 mm and 81 mm mortars; 2.36-inch rockets; and hand grenades and rifle grenades (HGL, 2016).

2.3.7 Remedial Investigation, 2016

During the RI field investigation, transects of DGM data were collected to develop anomaly densities. Based on the identified anomaly densities, full coverage grid surveys were completed within the ARNG AOI. A total of 49.3 miles of geophysical transects, 29 miles of reconnaissance transects, and 89 intrusive investigation grids were completed within the ARNG AOI, which surrounds MRS-01.

A total of 1,382 targets were selected for intrusive investigation; 6 targets were investigated and determined to pose an explosive hazard, and 657 items were classified as MD items (HGL, 2016). The 6 items determined to be MEC were discovered within the ARNG AOI and within the current MRS-01 boundary. An overview of MRS-01 specific results can be found in Section 2.7.

Eleven Incremental Sampling Methodology (ISM) surface soil samples were collected within the ARNG AOI in areas of high anomaly density and analyzed for explosives and metals. Two ISM surface soil sample locations were re-sampled within the ARNG AOI and re-analyzed for explosives. The original and re-sampled results were pooled into one dataset. The laboratory analysis revealed that metals/explosives detected in surface soil do not pose a threat to human health, and that no unacceptable ecological risk from MC-related contamination exists in surface soil (HGL, 2016).

2.4 CERCLA ENFORCEMENT ACTIVITIES

To date, there have been no CERCLA-related enforcement activities at the MRS-01.

2.5 COMMUNITY PARTICIPATION

Community participation in the process leading to this DD falls into three categories: 1) dissemination of information to the community; 2) stakeholder involvement in the technical project planning (TPP) process; and 3) community participation. These three areas are described in more detail below.

2.5.1 Information Dissemination

The following activities were conducted to disseminate information to the community near the Camp Butner FUDS:

- A public record repository for the Camp Butner Administrative Record was established at the South Granville Public Library.
- A public information session (public meeting) was held during a Restoration Advisory Board (RAB) meeting on April 26, 2012, at the Butner Town Hall. The purpose of the public meeting was to provide an overview of the RI/FS work planned for the Camp Butner FUDS. A public notice was published in the local newspaper to announce the public information session.
- A CRP was prepared and finalized by USACE contractors to manage community participation in August 2012 for the Camp Butner FUDS (HGL, 2012a). The CRP was completed to encourage two-way communication between USACE and the community surrounding the Camp Butner FUDS. The CRP included plans to disseminate information to the public via direct mailings, public meetings, and the establishment of a data repository.
- A second public meeting was held on April 18, 2013, at the Butner Town Hall. The purpose was to discuss the planned activities to be conducted during the RI/FS fieldwork in May of 2013. The meeting allowed for the exchange of information between USACE and the community regarding site activities. Public notice was provided in the local newspaper announcing the second public meeting.
- A third public meeting was held on April 16, 2018, at the Butner Town Hall to present the findings of the RI and FS, and to discuss the preferred alternative presented in the Proposed Plan (PP). This public meeting encouraged public feedback on the PP during the public comment period being held from March 26, 2018, to April 30, 2018.

- Five RAB meetings were held on April 26, 2012; April 25, 2013; May 6, 2014; June 1, 2016; and November 28, 2017 at the Butner Town Hall Multi-Purpose Room, to provide the public with a status update, to present the results and recommendations of the 2016 Final RI Report (HGL, 2016) and 2017 Final FS Report (HGL, 2018a), respectively. The RAB is still active but has not met since 2017.

2.5.2 Technical Project Planning

The initial TPP Meeting was held on November 10, 2011. Participants (stakeholders) were provided with an overview of the TPP process, the site history, project objectives, the proposed remedial approach, data quality objectives, and the project schedule. Officials from public offices (regulators, law enforcement, fire departments, elected officials, utilities, etc.) whose departments may be affected by the activities at the Camp Butner FUDS were invited to participate in the TPP process for the investigation of the project site. Stakeholders then worked with the USACE to identify concerns related to ordnance activities at the Camp Butner FUDS, to agree upon a general approach to further investigation(s), and to reach a consensus on a site closeout statement. Further communication with the stakeholders took place during subsequent TPP Meetings held on September 5, 2012, and May 6, 2014.

2.5.3 Community Participation

Public meetings were held on April 26, 2012, April 18, 2013, and April 16, 2018 at the Butner Town Hall. Based on the results and conclusions of the RI, the presence of MEC is confirmed for MRS-01. For these reasons, evaluation of MRS-01 in a FS was necessary. USACE recommended Alternative 2, LUCs in the form of public education (warning signs and educational pamphlets), as the preferred alternative in the PP (HGL, 2018b). The PP was made available to the public between March 26, 2018, and April 30, 2018 for public review and comment. Part 3 of this DD documents the feedback received during the public comment period.

2.6 SCOPE AND ROLE OF RESPONSE ACTION

The selected remedy must be protective of the receptors associated with reasonably anticipated future land use. Current and future land use throughout MRS-01 is military training use. The final response action for this site, as described in this DD, is focused on educating and making current and future receptors (National Guard Trainees, construction/utility workers, hunters, and visitors) aware of possible munitions related hazards within MRS-01.

2.7 PROJECT CHARACTERISTICS

2.7.1 Conceptual Site Model

A conceptual site model (CSM) is a representation of a site and its environment that is used to facilitate understanding of the site and the potential contaminant exposure pathways that might be present. The CSM describes potential contamination sources and their known or suspected locations, human and/or ecological receptors present, and the possible interactions between the two. The CSM summarizes which potential receptor “exposure pathways” for MEC and MC-related contamination are (or may be) “complete” and which are (and are likely to remain) “incomplete.” An exposure pathway is considered incomplete unless all the following elements are present: (a) a source of MEC or MC-related contamination; (b) a receptor that might be affected by that contamination; and (c) a method for the

receptor to be exposed to (i.e., come into contact with) the contamination. If all these elements are present, an exposure pathway is considered complete.

Following completion of the RI, the MEC CSM for the recommended MEC contaminated areas of the Camp Butner FUDS was created to reflect the status of MEC exposure pathways using the results of the investigations. The MEC CSM for the project site indicated that MEC is potentially present in surface and subsurface soil at the MEC contaminated portions of the ARNG AOI (which includes MRS-01). MEC present at the surface or subsurface soil would provide a source of MEC for a complete exposure pathway (HGL, 2016).

MRS-01 is located within the ARNG AOI. Current land use within MRS-01 is military and recreational use as the entire acreage of MRS-01 is within the Camp Butner Training Center, operated by the ARNG. It is anticipated that future land use will remain the same. The current and future receptors at the site are National Guard Trainees, construction/utility workers, hunters, and visitors. The presence of a known/suspected source of MEC and possible receptors means that potentially complete exposure pathways are present at the site that could result in these identified current or future receptors being exposed to explosive hazards at the project site.

The MEC exposure pathways are summarized in Table 2.1. Because no MC-related contamination was detected above screening levels during the RI, all MC exposure pathways are incomplete and are not included in the CSM.

Table 2.1 - MEC Conceptual Site Model

Primary Source	Munitions Items Identified	Current/ Future Land use	Current/Future Receptors	Receptor/ Interaction Exposure Route	Pathway Complete/ Incomplete
Military Training MEC Contaminated MRS	MEC: 37mm projectile 57mm projectile 60mm HE mortars Hand Grenade Located at 0-18 inches bgs MD: 3.25" Target Rocket 30 mm HE Projectile 37mm projectile 57mm projectile (AP-T, HE) 60mm mortar (fins, frag, tail boom, expended fuze) 75mm projectile (base) 81mm mortar (fin, frag, tail boom) Rifle Grenade (illumination-spent, frag) Slap Flare T-bar fuze Unknown mortar frag (fins and booms) Located at 0-30 inches bgs Unknown Fragmentation located at 0-40 inches bgs	Military Training	National Guard Trainees, construction and utility workers, hunters, and visitors	Handling or stepping on surface munitions; and contacting subsurface munitions during intrusive activities (such as digging), anticipated to depths of 12-inches bgs	Complete

2.7.2 MRS Overview

MRS-01 is the Military Training MEC Contaminated MRS which is approximately 1,429 acres in size within the 4,824-acre ARNG property investigated during the RI. The 1,429 acres associated with MRS-01 were used for military training as part of the Camp Butner FUDS according to previous investigations and historical aerial photographic analysis.

MEC and MD were identified within MRS-01 during the RI. Access to the area is controlled, and the current/future site activities consist of military training, hunting, and potential construction activities.

2.7.3 Potential Contamination Sources

The ARNG AOI was evaluated for potential contamination sources by considering past investigations, information of previous land use, munitions found or suspected, and the current land use. MEC and MD were found within the ARNG AOI (which surrounds MRS-01) and within MRS-01 during the RI field effort. Previous investigations and analysis confirmed the presence of MEC and MD contamination within MRS-01.

2.7.4 Sampling Strategy

2.7.4.1 Investigation of Munitions and Explosives of Concern

To support MEC characterization during the RI, DGM transect, reconnaissance surveys, and intrusive investigations were completed within the ARNG AOI. A total of 26.6 miles of DGM transects, 0.13 miles of reconnaissance transects, and 877 intrusive targets were investigated within MRS-01. Of the intrusively investigated targets: six were determined to pose an explosive hazard, 668 targets resulted in MD items, 106 were classified as miscellaneous cultural debris, and 97 targets were described by the field teams as “same as” another nearby target, or were noted as geology, false positives, QC seeds, or no finds.

Table 2.2 summarizes the RI field activities completed at the ARNG AOI that lie within MRS-01. Table 2.3 summarizes the intrusive results at the ARNG AOI that lie within MRS-01.

Table 2.2 - Summary of RI Field Activities Completed

Activity Description	Unit	Quantity
Site Acreage	Acres	1,429.4
DGM Transects	Miles	26.6
DGM Grids	Each	49
Analog Transects	Miles	0.83
Reconnaissance Transects	Miles	0.13
Intrusive Targets	Each	877

Table 2.3 - Summary of RI Intrusive Investigation Results

Anomaly Type	No. Items Found	Description
MEC	6	60mm HE mortar (2), Hand Grenade, HE (4)
MD	668	Fragments
Miscellaneous Debris	106	Farm Debris – Barbed wires, cans, bolts, wires, nails, chain links, etc.
Other	97	geology, No Contacts, No Finds, seeds

2.7.4.2 Investigation of Munitions Constituents

Following the completion of the DGM surveys and intrusive investigation activities, HGL completed environmental sampling activities in biased locations to determine if MC-related contamination was present. Based on the analytical results, a Baseline Risk Assessment (BLRA) was conducted to characterize the nature and extent of potential releases and to assess whether the MC present poses a potential risk to human health.

As summarized in the RI Report, the presence of two explosives analytes were reported in all sample locations. Two explosives (2,4-dinitrotoluene [DNT] and 2,6- DNT) were detected in all samples, including the background samples. For data quality control, select sample locations from each MRS and background areas were re-collected as confirmation samples and re-analyzed for explosives using an alternate laboratory (TestAmerica) from the laboratory used in the analyses conducted in July and August

2013 (Microbac). The re-analyzed results were treated as duplicate results of the original samples. Because of anomalous 2,4-DNT and 2,6-DNT results in the background soil samples, all background locations and select sample locations from each MRS were resampled for explosives analysis in October 2013. Based on the evaluation of all analytical data packages, it was determined that both the initial and re-sampled explosives results were usable. The results of the MC investigation at the ARNG AOI conducted during the RI are described in further detail below.

- May 2013 - 11 ISM soil samples collected; 100-foot (ft) by 100-ft ISM decision units (DU), 36 increments each, analyzed for explosives and select metals.
- October 2013 - Two ISM soil samples; 100-ft by 100-ft ISM DUs, 36 increments each, analyzed for explosives only.
- Explosives analysis was conducted by Method 8330B and select metals analysis for copper, lead, antimony, and zinc was conducted by method 6010B.
- Based on the conclusion that no MC is present on site at levels that present a risk to human health or the environment, there is no MC contamination identified in surface soils. Therefore, no sampling of additional media such as sediment, surface water, subsurface soils, or groundwater was necessary.

Concentrations from the May 2013 sampling exceeded health-based screening values but were either non-detect or below the screening levels for the October 2013 sampling. The screening level risk estimates were in the middle or the lower end of the target risk range (10^{-6} to 10^{-4}) and the uncertainty analysis determined that the anomalous data from the May 2013 sampling event caused an overestimation of the site risk evaluation. Because the October 2013 re-sampling results did not replicate the May 2013 sampling results, it was concluded that explosives contamination at RC1, RC2, and ARNG AOI does not pose an unacceptable risk to human health (HGL, 2018a).

2.7.5 Known or Suspected Sources of Contamination

Six items classified as MEC were recovered during the RI within the MRS-01 boundary which lies within the ARNG AOI. The MEC items were recovered between ground surface and 18 inches bgs and were identified as 60mm mortars and High Explosives (HE) hand grenades. Historical investigations recovered various MEC and MD items between ground surface and 40 inches bgs. Explosively hazardous MEC remains within MRS-01 in surface and subsurface soils to a maximum depth of 40 inches bgs. During RI activities, ISM and background soil samples were collected throughout the Camp Butner FUDS MRSs. Analytical results and subsequent risk assessment determined that no MC-related contamination at the Camp Butner FUDS MRSs pose a risk to anticipated human or ecological receptors (HGL, 2016).

2.7.6 Types of Contamination and Affected Media

Anticipated contamination at MRS-01 consists of MEC that may present explosively hazardous conditions within MRS-01. The contaminated media include surface and subsurface soils to a depth of 40 inches bgs.

2.7.7 Location of Contamination and Exposure Routes

DGM transects, analog transects, reconnaissance surveys, and subsequent intrusive investigations confirmed the presence of MEC within MRS-01. The maximum suspected depth of munitions contamination anticipated at the MRS is 40 inches bgs. Based on the current and future land use, the receptors at the MRS include National Guard trainees, construction/utility workers, hunters, and visitors.

These receptors are anticipated to potentially encounter MEC located on the surface or contact subsurface MEC during intrusive activities, such as digging. Unless physically moved by human activities, the munitions contamination potentially remaining within the surface and subsurface soils of MRS-01 is unlikely to migrate from its current location, or to other media.

As described above, no significant MC-related contamination was detected at the Camp Butner FUDS during the RI. For this reason, exposure pathways for MC-related contamination are incomplete for the site.

2.8 CURRENT AND POTENTIAL FUTURE LAND AND WATER USES

2.8.1 Land Use

Current land use within MRS-01 is military training and some hunting. It is anticipated that future land use will remain consistent with current land use. The presence of a known source of MEC and possible receptors means that a complete exposure pathway for MEC is present at MRS-01. The residual munitions at the site result in an unacceptable risk for current or future human receptors at MRS-01.

2.8.2 Groundwater and Surface Water Uses

Groundwater and nearby surface water could potentially be used for domestic, irrigation, or drinking water sources for the area; however, no source for MC-related contamination was identified at the Camp Butner FUDS during the RI. Based on the RI conclusions, there are no complete exposure pathways for groundwater or surface water identified for MC-related contamination at MRS-01.

2.9 SUMMARY OF PROJECT RISKS

2.9.1 Human Health Risks

2.9.1.1 Risks from Munitions and Explosives of Concern

Evaluation of previous investigation findings and data collected during the RI identified an area within the Camp Butner FUDS as MEC contaminated. After completion of the RI, the MEC contaminated area was delineated into nine projects based on land use and munition types. MEC and MD have been identified within MRS-01 during previous investigations and the RI. The MEC contamination identified confirms an explosive safety hazard to current and future receptors within MRS-01 (HGL, 2018a).

Based on the presence of MEC at the project site, the complete MEC exposure pathways in surface and subsurface soil at MRS-01 is confirmed for current and future receptors.

Land use at MRS-01 consists of military training, and the expected current and future receptors at the MRS are National Guard trainees, construction/utility workers, hunters, and visitors. Receptors would likely be limited to primarily surface with some shallow intrusive (0 to 12 inches bgs) activity. Munitions contamination is not expected to occur at depths greater than 40 inches bgs. Receptors within the sites will remain consistent throughout the foreseeable future and future land use will potentially include both intrusive and non-intrusive activities (HGL, 2018a).

2.9.1.2 Risks from Munitions Constituents

A BLRA, conducted during the RI in accordance with USACE and U.S. Environmental Protection Agency (USEPA) guidance, included a human health risk assessment (HHRA) and a screening level ecological risk assessment (SLERA). The HHRA evaluated current and potential future receptors that

could contact soil at the project site. As discussed, soil samples were collected throughout the Camp Butner FUDS, and analyzed for explosives and select metals (antimony, copper, lead, and zinc). The screening level risk estimates were in the middle or on the low end of the target risk range (10-6 to 10-4) and the uncertainty analysis determined that the anomalous data from the May 2013 sampling event caused an overestimation of the site risk evaluation. Therefore, all results indicate that MC-related contamination in the Camp Butner FUDS soil does not pose a threat to human health. MC-related contamination exposure pathways are considered incomplete and the baseline HHRA indicates that MC-related contamination does not pose a risk to current or future human receptors.

2.9.2 Ecological Risks

Based on the site history, the potential contaminants of ecological concern include antimony, copper, lead, zinc, and explosives. The SLERA, conducted as a part of the BLRA, evaluated potential threats to terrestrial plants, soil invertebrates, terrestrial wildlife (mammals and birds) to contaminants at the ARNG AOI. This evaluation considered exposure of upper trophic level receptors through the food web. Conclusions of the SLERA included the following:

- The initial screening of maximum concentrations to benchmark values identified antimony, copper, lead, zinc, 1,3,5-trinitrobenzene (TNB), and 2,6-DNT as contaminants of potential ecological concern.
- Copper, lead, and zinc were retained for food web analysis with respect to birds and mammals.
- Lead contamination in soil at the ARNG AOI was determined to pose a minimal threat to herbivorous birds, carnivorous birds, and mammals. Lead does not pose a threat to plants or soil invertebrates within the site.
- Antimony, copper, zinc, and explosives do not pose a threat to ecological receptors.

The SLERA evaluated potential threats to plants, soil invertebrates, mammals, and birds from exposure to the contaminants of potential ecological concern identified for the ARNG AOI. As documented in the Final RI Report, no actionable ecological risk was identified for the ARNG AOI (HGL, 2016). Based on this conclusion, no ecological risks are anticipated within MRS-01.

2.9.3 Basis for Response Action

The RI results were sufficient to characterize MRS-01. The RI identified MEC and MD within the portions of the ARNG AOI that compose the delineated Military Training MEC Contaminated MRS. These results were used to define the MEC contaminated area at the Camp Butner FUDS and to support the development and future execution of a response action within MRS-01. Accordingly, a remedial action is necessary to protect the human health or welfare and the environment from the threat of explosive hazards, but not from MC.

2.10 REMEDIAL ACTION OBJECTIVES

RAOs are both site-specific and contaminant-specific and define the conditions determined by the project team to be protective of human health and the environment. The RAO for MRS-01 addresses the goals for reducing exposure to MEC within the Military Training MEC Contaminated MRS to ensure protection of human health and the environment. It was determined during the RI that MC-related contamination does not present a risk to human health or the environment. Therefore, no RAO for MC-related contamination has been established.

The RAO established in the FS, and summarized in the PP for MRS-01, is to mitigate the unacceptable risk of an incident to occur for ARNG users over 1,429 acres to the detection depths of the applicable munitions of concern such that a determination can be made that there is a negligible risk of an incident to occur.

No regulatory guidelines have been promulgated specifying an acceptable risk level associated with MEC contamination. In lieu of such guidelines, the acceptable risk level is defined herein as achieving the intent of the RAO. During the development of this DD, each alternative was evaluated to determine if it meets the proposed RAO.

2.11 DESCRIPTION OF ALTERNATIVES

Five remedial alternatives were evaluated during the 2018 FS, based on the nature, extent, and analysis of MEC contamination, intended future land uses, and RAOs. The preferred alternative was identified as Alternative 2, Land Use Controls. A description of each of the alternatives developed for consideration is presented below.

Five-Year Reviews, as outlined in Section 121(c) of CERCLA, as amended by the SARA, and Section 300.430(f)(ii) of the NCP, are required for sites (at minimum of every 5 years) where hazardous substances, pollutants, or contaminants remain above levels that allow UU/UE following implementation of the remedy.

2.11.1 Alternative 1: No Action

2.11.1.1 Remedy Components

Under Alternative 1, no action would be taken to address the MEC that remain at MRS-01.

2.11.1.2 Common Elements and Distinguishing Features

The No Action alternative means that no remedial action would be implemented to reduce DoD military munitions that potentially remain at the site. This alternative would involve continued use of the site in its current condition. Under CERCLA, evaluation of a No Action alternative is required pursuant to the NCP to provide a baseline for comparison with other remedial technologies and alternatives. Alternative 1 does not implement any remedy to reduce potential risk. Therefore, it does not provide long-term protection of human health and the environment.

Estimated Capital Cost: \$0

Estimated Maintenance Cost for 30 years: \$0

Estimated Five-Year Review Costs for 30 years: \$0

2.11.1.3 Expected Outcomes

This alternative would involve continued use of the site in its current condition and would not alter the explosive hazards present in the MRS.

2.11.2 Alternative 2: Land Use Controls (LUCs)

2.11.2.1 Remedy Components

The components of Alternative 2 would include:

- Educational pamphlets, including development and distribution; and
- Warning signs, including development and installation.

2.11.2.2 Common Elements and Distinguishing Features

LUCs are administrative institutional controls and/or physical measures (engineering controls) to prevent or limit exposure of receptors to MEC. Deed notices, zoning ordinances, special use permits, and restrictions on excavation are examples of institutional controls. Physical barriers and access restrictions (for example, fencing, locked gates, and warning signs) or activity restrictions (prohibiting intrusive activities) are examples of engineering controls. LUCs can be cost effective, reliable, and immediately effective, and can be implemented either alone or in conjunction with other remedial components. Inspections and monitoring typically are required to document the long-term effectiveness of LUCs.

Alternative 2 includes making educational pamphlets available to the receptors that have access to the site (National Guard trainees, construction/utility workers, hunters, and visitors). The pamphlet would inform the receptors of potential explosive hazards and safety precautions to be taken to avoid contact with MEC. Additionally, warning signs would be installed with the intent of limiting exposure to MEC by informing site users about the potential hazards at the site. Clearance would not be conducted prior to proceeding with this alternative. Costs would include those for purchasing and installing warning signs and developing and distributing educational pamphlets. There are no applicable or relevant and appropriate requirements (ARARs) identified for this alternative. The period of performance of Alternative 2 is perpetuity and when the actual length of time cannot be determined, EPA policy allows for 30-year estimates. This timeframe limit is utilized for the purposes of cost estimation. Alternative 2 would not allow UU/UE following completion of the remedy, thus Five-Year Reviews would be required.

Long-term effectiveness of this alternative is limited because of the limited ability to prevent receptors from exposure to MEC hazards, and the potential for signs to be removed or damaged.

Estimated Capital Cost: \$131,339

Estimated Maintenance Cost for 30 years: \$48,224

Estimated Five-year Review Costs for 30 years: \$201,560

2.11.2.3 Expected Outcomes

This alternative would involve continued use of the site in its current condition. The alternative will reduce the probability of human encounters with MEC and the probability of an encounter resulting in an unintended detonation of MEC. The alternative will not allow UU/UE following completion of the remedy and thus would require Five-Year Reviews.

2.11.3 Alternative 3: Surface Clearance of MEC with Analog Detection Methods and LUCs

2.11.3.1 Remedy Components

The components of Alternative 3 would include:

- Conducting a surface clearance of MEC throughout MRS-01;
- Educational pamphlets, including development and distribution; and
- Warning signs, including development and installation.

2.11.3.2 Common Elements and Distinguishing Features

The primary component of Alternative 3 is surface removal of MEC from MRS-01. Surface clearance at MRS-01 would result in a reduction in hazards on the ground surface; however, hazards would remain within the subsurface soils of the MRS. Field tasks associated with Alternative 3 would include surveying, vegetation clearance, surface clearance, investigation and removal of anomalies potentially

representing MEC using analog magnetometers, and disposal of any MEC, material potentially presenting an explosives hazard (MPPEH), or MD. Vegetation cutting/clearance would only be conducted where necessary to complete surface clearance operations. Surface clearance would be completed by qualified unexploded ordnance (UXO) technicians using analog magnetometers, such as the Schonstedt GA-52Cx, or equivalent. For the purposes of cost estimation, this alternative assumes that there would be seven clearance teams composed of two UXO Technician IIs, and one UXO Technician III (team leader) each, with oversight provided by one Senior UXO Supervisor (SUXOS), one UXO Quality Control Specialist (UXOQCS), and one UXO Safety Officer (UXOSO) completing the work over 40-hour workweeks. Any MEC encountered during the surface clearance would be blow-in-place (BIP). If acceptable to move, MEC would potentially be consolidated for demolition. It is assumed that on-call explosives would be used for one demolition event per week of investigation. MEC items would be guarded by an unarmed security guard during nonworking hours. All MD recovered would be inspected, verified, certified as material documented as safe (MDAS), containerized, and shipped to an approved off-site facility for disposal. All areas disturbed during surface clearance activities would be restored and re-seeded. Similar to Alternative 2, educational pamphlets would be developed and distributed, and signs would be installed in and around MRS-01. When the actual length of time cannot be determined, policy allows for 30-year estimates.

Estimated Capital Cost: \$ 16,949,586

Estimated Maintenance Cost for 30 years: \$39,142

Estimated Five-year Review Costs for 30 years: \$201,560

2.11.3.3 Expected Outcomes

This alternative would involve continued use of the site in its current condition. The alternative will reduce the probability of human encounters with MEC and the probability of an encounter resulting in an unintended detonation of MEC. The alternative will not allow UU/UE following completion of the remedy and thus would require Five-Year Reviews.

2.11.4 Alternative 4: Surface and Subsurface Removal of MEC to a Depth of Detection Using DGM Detection Methods

2.11.4.1 Remedy Components

The components of Alternative 4 would include:

- Surface clearance and subsurface removal of MEC to a Depth of Detection using DGM Detection Methods.

2.11.4.2 Common Elements and Distinguishing Features

The primary component of Alternative 4 is surface clearance and subsurface removal of MEC from MRS-01 to a Depth of Detection (Table 2.5). Based on land use, the estimated maximum depth of intrusive activities to potentially occur within the MRS is limited to surface and near surface soils (0 to 12 inches bgs) with potential for construction activities that could intrude deeper. The minimum depth of removal as required to meet the RAO will then be 12-inches bgs. Therefore, surface clearance and subsurface removal of MEC to a depth of 12-inches at MRS-01 would result in a significant reduction in accessible, potentially explosive hazards. As for cost, Alternative 4 retains the highest cost because it includes surface clearance and subsurface clearance of MEC throughout the entirety of MRS-01 to 40 inches bgs utilizing DGM detection methods.

Field tasks associated with Alternative 4 would include vegetation clearance, surface clearance, DGM surveys, intrusive investigation, and removal of anomalies potentially representing subsurface MEC to a depth of detection using DGM methods, as well as disposal of any hazards (i.e., MEC, UXO, discarded military munitions [DMM]), MPPEH, or MD recovered in the search for MEC. DGM technology has been proven effective at detecting metallic subsurface anomalies; however, these detections do not differentiate between munitions items and harmless metallic debris. DGM methods are technically feasible but extremely difficult in most locations. MEC items encountered during the clearance would be BIP. Post-BIP sampling of soil for explosives residue would be conducted following detonation of MEC items.

It was anticipated in the Proposed Plan that surface clearance and subsurface removal of MEC under this alternative would allow UU/UE.

Estimated Capital Cost: \$87,027,593

Estimated Maintenance Cost for 30 years: \$0

Estimated Five-year Review Costs for 30 years: \$0

2.11.4.3 Expected Outcomes

It is anticipated that surface and subsurface removal of MEC under this alternative would reduce exposure to hazards to a low likelihood of a potential MEC encounter (and that would allow UU/UE). Therefore, additional remedies like LUCs, including warning signs and educational pamphlets, would not be necessary. Five-Year Reviews would not be required. The depths at which MEC is detected and removed, the presence of an obstruction or identified data gaps would be evaluated, post-remedial action, to verify that RAOs were protective and whether UU/UE is achieved.

2.11.5 Alternative 5: Surface and Subsurface Removal of MEC to a Depth of Detection Using Advanced Classification Methods

2.11.5.1 Remedy Components

The primary component of Alternative 5 would include:

- Surface and subsurface removal of MEC to a depth of detection using advanced geophysical classification methods.

2.11.5.2 Common Elements and Distinguishing Features

Alternative 5 would consist of conducting surface and subsurface removal of MEC to depth of detection using Advanced Geophysical Classification (AGC) methods. Similar to Alternative 4, Alternative 5 would involve DGM surveys; however, subsurface metallic anomalies would be further characterized using AGC methods prior to intrusive investigation. The implementation of AGC would differentiate between munitions items and non-hazardous metallic debris. Implementation of AGC would reduce the required intrusive investigations resulting in lower costs and time to complete the removal action. Similar to DGM, AGC would result in a digital record that can be easily verified. The depth of clearance under this alternative would meet the requirements of the RAO and eliminate the need for educational pamphlets, signage, and Five-Year Reviews. Long-term reliability associated with this alternative is considered high because of the effectiveness of the detection technology, and the permanence associated with subsurface MEC removal. Alternative 5 would reduce the risk posed by MEC.

Field tasks associated with Alternative 5 would include vegetation clearance, surface clearance, dynamic survey, classification of anomalies using AGC, and removal of anomalies classified as targets of interest (TOIs) using AGC methods, and disposal of any MEC and MD. AGC is technically feasible but extremely difficult based on vegetation, terrain, structures (e.g., buildings, slabs) and infrastructure (e.g., roads, parking lots, utilities). If classification was not feasible, standard DGM or analog methods would be used with approval by USACE.

MEC items encountered during the clearance would be BIP. Post-BIP sampling of soil for explosives residue would be conducted following demilitarization of MEC. It was anticipated in the Proposed Plan that surface clearance and subsurface removal of MEC under this alternative would allow UU/UE.

Estimated Capital Cost: \$24,661,405

Estimated Maintenance Cost for 30 years: \$0

Estimated Five-year Review Costs for 30 years: \$0

2.11.5.3 Expected Outcomes

It is anticipated that surface and subsurface removal of MEC under this alternative would reduce to a low likelihood of a potential MEC encounter (and that would allow UU/UE). Therefore, additional remedies like LUCs, including warning signs and educational pamphlets, would not be necessary. Five-Year Reviews would not be required. The depths at which MEC is detected and removed, and the presence of an obstruction or identified data gaps would be evaluated, post-remedial action, to verify that RAOs were protective and whether UU/UE is achieved.

2.12 COMPARATIVE ANALYSIS OF ALTERNATIVES

The remedial action alternatives were compared and evaluated using nine NCP criteria during the detailed analysis of alternatives in the FS. The nine criteria fall into three groups: threshold criteria, primary balancing criteria, and modifying criteria. A description and purpose of the three groups follows:

- **Threshold criteria** - Requirements that each alternative must meet to be eligible for selection.
- **Primary balancing criteria** - which are used to weigh major trade-offs among alternatives.
- **Modifying criteria** - which was fully considered after public comment was received on the PP. In the final balancing of trade-offs between alternatives upon which the final remedy selection is based, modifying criteria, such as community acceptance, are of equal importance to the balancing criteria.

Table 2.4 describes each of these criteria that were used to evaluate the remedial alternatives for MRS-01. In addition, during the development of this DD, the alternatives were evaluated relative to the acceptable end states to determine their effectiveness for achieving the RAO for MRS-01. A summary of the detailed analysis of the remedial alternatives using the nine evaluation criteria as presented in the FS and PP are included in Table 2.5 for threshold criteria, Table 2.6 for primary balancing criteria, and Table 2.7 for a summary of the cost estimates for Alternatives 2 - 5.

Table 2.4 - Evaluation Criteria for Superfund Remedial Alternatives

Criteria	Threshold	Overall Protectiveness of Human Health and the Environment determines whether an alternative eliminates, reduces, or controls threats to public health and the environment through institutional controls, engineering controls, or treatment.
		Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) evaluates whether the alternative meets Federal and State environmental statutes, regulations, and other requirements that have been determined to be applicable or relevant and appropriate to the site, or whether a waiver is justified.
	Primary Balancing	Long-term Effectiveness and Permanence considers the ability of an alternative to maintain protection of human health and the environment over time.
		Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants through Treatment evaluates an alternative's use of treatment to reduce the harmful effects of contaminants, their ability to move in the environment, and the amount of contamination present.
		Short-term Effectiveness considers the length of time needed to implement an alternative and the risks the alternative poses to workers, residents, and the environment during implementation.
		Implementability considers the technical and administrative feasibility of implementing the alternative, including factors such as the relative availability of goods and services.
		Cost includes estimated capital and annual operations and maintenance costs, as well as present worth cost. Present worth cost is the total cost of an alternative over time in terms of today's dollar value. Cost estimates are expected to be accurate within a range of +50 to -30 percent.
	Modifying	State/Support Agency Acceptance considers whether the State agrees with the analyses and recommendations, as described in the FS and PP.
		Community Acceptance considers whether the local community agrees with analyses and preferred alternative. Comments received on the PP are an important indicator of community acceptance.

2.12.1 Overall Protection of Human Health and the Environment

The protectiveness criterion was evaluated in terms of possible future human interaction with MEC. Each alternative was also evaluated in terms of whether it would reduce the amount of munitions contamination within MRS-01, and the effects it would have on the existing environment.

Alternative 1, No Action, is not protective of human health and the environment. This alternative provides no source reduction, no reduction of future risk, and no protection to human receptors.

Alternative 2, LUCs, would restrict digging and minimize possible receptor interaction by providing warning of MEC contaminated soils, thus reducing the potential for contaminant exposure. Signs can be effective in reducing access to an area but are dependent on the cooperation of landowners, government personnel, contractors, subcontractors, and authorized visitors for implementation. Alternative 2 provides protection to human receptors by modifying behaviors to potentially reduce exposure to MEC at an acceptable level of risk. Although explosive hazards have been confirmed at MRS-01, the area is restricted access under ARNG control. Although there would still be risk to potential future receptors

conducting intrusive activities, Alternative 2 is considered overall protective of human health and the environment.

Alternative 3, surface removal and LUCs, provides protection to human receptors at an acceptable level of risk for MEC remaining in the subsurface, where intrusive activities may result in receptors contacting MEC. Alternative 3 provides overall protection.

Alternatives 4 and 5 would provide surface clearance and subsurface removal of MEC throughout the MRS. Complete removal of MEC under this alternative would eliminate risks associated with residual explosive hazards within MRS-01 to levels that would allow UU/UE. Therefore, Alternatives 4 and 5 would meet the threshold criteria of overall protection of human health and the environment.

Alternative 1 provides the least overall protection of human health and the environment. Alternatives 4 and 5 provide the most overall protection of human health and the environment. Alternative 2 and 3 are more protective than alternative 1. Alternative 3 provides more protection by through surface clearance but given the lack of surface finds in recent history, that is minimal.

2.12.2 Compliance with ARARs

No location-specific or chemical-specific ARARs have been identified for the Camp Butner FUDS. One action-specific ARAR, Subpart X 40 CFR 264.601, would be triggered if consolidated shot or consolidated and blow activities conducted during implementation of a remedial action. This ARAR would not apply to Alternatives 1 and 2 since no removal activities would occur, and thus no consolidated shot activities would be conducted. Alternatives 3, 4 and 5 would comply with this ARAR and this criterion would be achieved.

Table 2.5 - Evaluation of Alternatives Using Threshold Criteria

	Criterion	No Action Alternative 1	Land Use Controls Alternative 2	Surface Removal with Land Use Controls Alternative 3	MEC Removal with DGM (UU/UE) Alternative 4	MEC Removal with AGC (UU/UE) Alternative 5
Threshold Criteria	Overall Protection of Human Health and the Environment	Does not provide overall protection of human health and the environment.	Does provide overall protection of human health and the environment.	Does provide overall protection of human health and the environment.	Does provide overall protection of human health and the environment.	Does provide overall protection of human health and the environment.
	Compliance with ARARs	No ARARs apply to the Alternative	No ARARs apply to the Alternative	Does comply with 40 CFR 264.601 (Miscellaneous Treatment Units).	Does comply with 40 CFR 264.601 (Miscellaneous Treatment Units).	Does comply with 40 CFR 264.601 (Miscellaneous Treatment Units).

2.12.3 Long-Term Effectiveness and Permanence

The long-term effectiveness and permanence criterion evaluates the degree to which an alternative permanently reduces or eliminates the potential for a MEC exposure hazard. Alternatives 4 and 5 both provide a complete reduction of source area TMV and. Alternative 2 is likely effective in the short-term; however, long-term effectiveness is dependent on the maintenance of the educational signs and replenishment of educational materials. Alternative 3 provides some effectiveness by removing surface MEC; however, long-term effectiveness is considered to be low and Alternatives 2 and 3 are dependent on landowner participation for installation of signage and compliance with public education. Alternatives 4 and 5 were determined to provide the greater long-term effectiveness and permanence because they would significantly reduce the risk due to possible MEC. Although the presence of MEC at MRS-01 has been confirmed, Alternative 2 was determined to provide adequate effectiveness and permanence because access to the area is restricted and the receptors present at the Camp Butner Training Center are trained to recognize munitions items and respond appropriately. The reasonably foreseeable land use is not anticipated to change.

2.12.4 Reduction of Toxicity, Mobility, or Volume through Treatment

This criterion addresses the statutory preference for selecting remedies that employ treatment technologies that permanently and significantly reduce TMV of the MEC. Alternatives 4 and 5 provide the greatest reduction of TMV through treatment as a result of subsurface removal of the source to the maximum anticipated depth of MEC contamination. Alternatives 1 and 2 offer no reduction in TMV through treatment of contaminants. Alternative 3 provides a partial reduction of TMV through treatment as a result of surface only removal of MEC.

2.12.5 Short-term Effectiveness

Alternative 1 presents no short-term effectiveness. Alternative 2 is considered to be effective in the short-term by reducing the likelihood of exposure to MEC. Alternative 3 has some short-term effectiveness and also presents risks to workers implementing the removal. Alternatives 4 and 5 are determined to have the least short-term effectiveness because of the time required for removal of MEC. The lag time increases risks to receptors on the site. Due to the increased likelihood of MEC detonation during implementation of Alternatives 4 and 5, trained technicians must perform the work.

2.12.6 Implementability

There are no implementability limitations associated with Alternative 1. Alternative 2 requires coordination and cooperation with the NC ARNG. Alternatives 3, 4 and 5 are all technically and administratively feasible but require specialized personnel and equipment to implement and require the development of detailed work plans. Steep-sloped areas as well as buildings and roads will affect the implementability of Alternatives 4 and 5 because it becomes impractical to try to clear under buildings and roads.

Table 2.6 - Evaluation of Alternatives Using Primary Balancing Criteria

	Criterion	No Action Alternative 1	Land Use Controls Alternative 2	Surface Removal with Land Use Controls Alternative 3	MEC Removal with DGM (UU/UE) Alternative 4	MEC Removal with AGC (UU/UE) Alternative 5
Primary Balancing Criteria	Long-Term Effectiveness & Permanence	No reduction of MEC hazards.	Although there would be no reduction of MEC hazards, education can increase awareness and appropriate responses to safety hazards. Requires implementation by USACE. Educational pamphlets and signage aimed at making the public aware of potential hazards will reduce the risk of exposure. A limitation is that educational pamphlets and signage may not be effective for all persons.	Effective if surface MEC is present at the MRS-01 but does not reduce subsurface MEC. Provides protectiveness for surface activities, but MEC hazards could remain in the subsurface.	Effective at removing (surface and subsurface) MEC located within MRS-01.	Effective at removing (surface and subsurface) MEC located within MRS-01.
	Reduction of Toxicity, Mobility, and Volume through Treatment	No reduction of MEC hazards.	No reduction of MEC hazards.	Reduction of MEC hazards. Identified surface MEC hazards are removed from the site. Involves treatment through the destruction of MEC.	Reduction of MEC hazards. Involves treatment through the destruction of MEC.	Reduction of MEC hazards. Involves treatment through the destruction of MEC.
	Short-Term Effectiveness	Not effective	No short-term risks to workers, community, or the environment as compared to Alternatives 3, 4, and 5. Provides short term protection due to increased awareness.	During field activities to remove surface MEC, there will be risks to workers, the community, and the environment.	During field activities to remove subsurface and surface MEC, there will be risks to workers, the community, and the environment.	During field activities to remove subsurface and surface MEC, there will be risks to workers, the community, and the environment.
	Implementability	Readily implementable.	Technically and administratively feasible. Information readily available and easily developed into educational materials. Requires public involvement. Requires coordination with NC ARNG	Requires qualified technicians with specialized (but readily available) equipment and training. Requires work plan and ROE access. Requires coordination with NC ARNG.	Requires qualified technicians (but readily available). Requires work plans and ROE access. Requires coordination with NC ARNG.	Requires qualified technicians (but readily available). Requires work plans and ROE access. Requires coordination with NC ARNG.
	Cost	\$0	\$381,123	\$17,190,288	\$87,027,593	\$24,661,405

2.12.7 Cost

The cost criterion evaluates the financial cost to implement the alternative. The cost criterion includes direct, indirect, and long-term operation and maintenance costs. Direct costs are those costs associated with the implementation of the alternative. Indirect costs are those costs associated with administration, oversight, and contingencies. These costs were adapted from costs associated with similar activities on site and cost estimates prepared for other similar sites. These costs do not include government administration and oversight for the respective activities.

The costs associated with Alternative 1 is \$0 since no action would be taken at MRS-01. Alternative 2 is less costly than Alternative 4 and 5, which would be the costliest to implement. Alternative 4 has the highest cost because it includes surface clearance and subsurface clearance of MEC throughout MRS-01 to 40 inches bgs utilizing DGM detection methods. The scope of work for Alternative 5 is identical to Alternative 4. However, AGC methods would be used in Alternative 5. AGC methods reduce the number of subsurface anomalies that require intrusive investigation and, therefore, reducing the labor, time, and cost required to complete the field activities. For this reason, Alternative 5 is considered more cost effective than Alternative 4.

Table 2.7 – Alternative Cost Estimate Summary

Evaluated Alternatives	Estimated Costs	
<i>2 – Land Use Controls (Selected Remedy)</i>	<i>Capital Cost</i>	<i>\$131,339</i>
	<i>O&M</i>	<i>\$249,784</i>
	<i>Total Cost</i>	<i>\$381,123</i>
3 – Surface Removal and Land Use Controls	Capital Cost	\$16,949,586
	O&M	\$240,702
	Total Cost	\$17,190,288
4 – MEC Removal with DGM	Capital Cost	\$87,027,593
	O&M	\$0
	Total Cost	\$87,027,593
5 – MEC Removal with AGC	Capital Cost	\$24,661,405
	O&M	\$0
	Total Cost	\$24,661,405

2.12.8 State Acceptance

The regulatory agency, NCDEQ, concurs with the selected remedy, LUCs.

2.12.9 Community Acceptance

The public comment period was held subsequent to presentation of the PP to the public. No comments were received.

2.12.10 Evaluation Summary

The five alternatives were evaluated in terms of the NCP criteria, including threshold factors, balancing factors, and modifying factors. Alternatives 4 and 5 are considered the most effective alternatives for reducing potential risk from explosive hazards within the site. Alternative 2 would reduce exposure to MEC or unintended detonation of MEC. There is still potential for receptors (Army National Guard trainees, construction/workers, hunters, and visitors) to access MRS-01, but the alternative will reduce the risk of exposure or unintended detonation of MEC. Alternative 3 would provide a partial reduction in TMV through treatment and disposal; with MEC remaining in the subsurface; and is lower in cost than Alternatives 4 and 5. Alternatives 4 and 5 would remove MEC contamination from the areas where it has the highest probability of being located, mitigating the explosive hazard due to MEC presence, and reducing risk to potential receptors. Both Alternatives 4 and 5 utilize DGM technology, which has been proven effective at identifying subsurface metallic anomalies. However, the additional use of AGC methods to differentiate between munitions items and non-hazardous metallic debris further reduces the level of effort associated with intrusive investigation under Alternative 5. The costs associated with Alternatives 4 and 5 are relatively high. Costs associated with Alternative 5 would be reduced by using AGC methods. Completion of Alternatives 4 and 5 would allow UU/UE, warranting no action for MRS-01.

MRS-01 exclusive land use is military training and recreational hunting and is completely encompassed within the Camp Butner Training Center. As such, access to the MRS is restricted and controlled and the current and future receptors consist of National Guard trainees, construction/utility workers, hunters, and visitors. Following a comparison of all alternatives retained for detailed analysis, Alternative 2 is considered the most effective, cost-efficient, and appropriate alternative for reduction of receptor exposure to MEC hazards that may remain at the MRS. MRS-01 will continue to be operated by the ARNG as an active small arms weapons training center. Although MEC was recovered from the MRS-01 during the RI, access to the MRS is restricted and receptors allowed within MRS-01 by the Camp Butner Training Center are aware of the hazards and reporting procedures associated with MEC contamination. The receptors present within MRS-01 would be protected from unacceptable risks by the implementation of Alternative 2.

2.13 SELECTED REMEDY

Upon comparison of the alternatives and lack of feedback provided during the public comment period following the PP, USACE selected Alternative 2, Land Use Controls for implementation at MRS-01. LUCs will be protective of human health and the environment, can be completed in a timely manner within a reasonable cost, and can be readily implemented.

2.13.1 Rationale for the Selected Remedy

By implementing LUCs in MRS-01, Alternative 2 would achieve an acceptable level of overall protectiveness of human health and the environment and meet the RAO because access to the MRS is restricted, and receptors allowed within MRS-01 by the Camp Butner Training Center are aware of the hazards and reporting procedures associated with MEC. Alternative 2 would mitigate exposure to residual MEC from the areas where it has the highest probability of being located and achieving a low likelihood

the receptor will be injured by interaction with MEC. Completion of Alternative 2 would not allow UU/UE.

The costs associated with Alternative 2 are relatively low and easily implemented. Following a comparison of all alternatives retained for detailed analysis, Alternative 2, while not the most effective, is cost-efficient and appropriate for reduction of potential for receptors to come into contact with MEC that may remain at MRS-01.

2.13.2 Description of the Selected Remedy

The selected remedy (LUCs) would minimize possible receptor interaction by warning of potential explosive hazards present, thus reducing the potential for receptor exposure. Signs can be effective in reducing access to an area and are dependent on the cooperation of the landowners (North Carolina Army National Guard) for implementation. An educational pamphlet incorporating the 3Rs (Recognize, Retreat, Report) would be created to inform land users within the MRS of potential explosive hazards and safety precautions to be taken to avoid contact with MEC.

2.13.3 Estimated Remedy Costs

The information in the selected remedy cost estimate summary table (Table 2.8) is based on the best available information regarding the anticipated scope of the remedial alternative. Changes in the cost element are likely to accrue as a result of new information. Major changes may be documented in the form of a memorandum in the Administrative Record file, or a DD amendment. This is an order-of-magnitude cost estimate that is expected to be within +50 to -30 percent of the actual project cost.

Table 2.8 – Selected Remedy Cost Estimate Summary

Alternative 2: Land Use Controls (LUCs)	Cost
Capital Cost	\$131,339
Annual Cost	\$48,224
Periodic Cost	\$201,560
Total Cost of Alternative	\$381,123
USEPA’s total Present Value (TPV) Analysis	
TPV at 7 percent Discount Rate	\$221,900
Lower End TPV Range at -30 percent	\$144,235
Upper End of TPV Range at +50 percent	\$332,850

TPV cost estimates are considered accurate to within -30 percent to +50 percent of actual costs. Time frames vary among alternatives and are based on the projected operation periods for active engineering remedial components and the time required to achieve RAOs. Discount rate of 7 percent per USEPA, 2000 guidance was used to estimate TPV.

2.13.4 Estimated Outcomes of the Selected Remedy

With the implementation of the selected remedy, the outcome achieves the criteria of overall protection of human health and the environment, although there is no source reduction.

2.14 STATUTORY DETERMINATIONS

The results of the RI fieldwork at the ARNG AOI support USACE's determination that there is an unacceptable risk associated with receptor exposure to MEC at MRS-01. The selected remedy is protective of human health and the environment by use of LUCs in the form of public education (warning signs and educational pamphlets) that minimize possible receptor interaction by warning of potential explosive hazards present, thus reducing the potential for receptor exposure. LUCs are acceptable for MRS-01 because access to the area is restricted (used for National Guard military training and recreational hunting) and the receptors present at the Camp Butner Training Center are trained to recognize munitions items and respond appropriately. Implementation of Alternative 2 at MRS-01 would meet the RAO of reducing exposure through limiting interaction of human receptors with surface and subsurface MEC. No ARARs were identified, and the selected remedy meets the statutory requirements of CERCLA § 121 and the NCP. Based on the information currently available, the selected remedy is protective of human health and the environment and cost-effective. Since the selected remedy will not allow for UU/UE, USACE will conduct statutory reviews every five years after initiation of the selected remedy to ensure that the remedy remains protective of human health and the environment.

With regard to MC, USACE determined that MC is not present at levels that pose a risk to receptors; therefore, no remedial action is necessary to ensure the protection of human health and the environment.

2.15 DOCUMENTATION OF SIGNIFICANT CHANGES FROM PREFERRED ALTERNATIVE OF PROPOSED PLAN

No changes have been made since the presentation of Alternative 2, LUCs, as the preferred alternative for MRS-01 in the PP. The selected remedy described in this DD (LUCs) is appropriate for implementation at MRS-01.

PART 3 – RESPONSIVENESS SUMMARY

3.1 OVERVIEW

In March 2018, the Final PP for the Camp Butner FUDS MRA was issued. A public meeting was held on April 16, 2018, for the nine proposed MRSs evaluated during the RI and presented in the PP, including the Military Training MEC Contaminated, MRS-01. The public comment period was held from March 26, 2018, to April 30, 2018.

3.2 PUBLIC COMMENTS AND LEAD AGENCY RESPONSES

No comments were received from the public on the PP. In its letter dated August 8, 2022, NCDEQ provided written concurrence with the selected remedy.

3.3 TECHNICAL AND LEGAL ISSUES

There were no technical or legal issues raised during development of this DD.

REFERENCES

- Code of Federal Regulations (CFR), 2012. Part 300, National Oil and Hazardous Substances Pollution Contingency Plan. April.
- HydroGeoLogic, Inc. (HGL), 2012a. Final Community Relations Plan Remedial Investigation/Feasibility Study at the Military Munitions Response Sites Former Camp Butner Granville, Person, and Durham Counties, North Carolina. August.
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- U.S. Army Corps of Engineers (USACE), 1993. Archives Search Report, Findings for the former Butner, North Carolina, Project Number I04NC000902. September.
- USACE, 2019. Final Feasibility Study Range Complex 1, Range Complex 2, Army National Guard and Flame Thrower Range Munitions Response Sites, Former Camp Butner, Granville, Person, and Durham Counties, North Carolina. Revision 1. March.
- USACE, 2020. Final Proposed Plan for Camp Butner Formerly Used Defense Site (FUDS) Projects I04NC000902, 04, 05, 06, 07, 08, 09, 10 and 11. Former Camp Butner Granville, Person, and Durham Counties, North Carolina. Revision 2. January.
- USEPA, 2000. A Guide to Developing and Documenting Cost Estimates During the Feasibility Study, Office of Solid Waste and Emergency Response, Washington, D.C., EPA540-R-00-002, July.