

FINAL
LAND USE CONTROL IMPLEMENTATION PLAN

MILITARY MUNITIONS RESPONSE PROGRAM
NATIONAL GUARD BUREAU
NON-DOD NON-OPERATIONAL DEFENSE SITES
WESTERN REGION REMEDIAL ACTIONS

MAROON CRATER ARTILLERY RANGE,
COCONINO COUNTY, ARIZONA (AZHQ-009-R-01)

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LIST OF ACRONYMS AND ABBREVIATIONS

AGC	advanced geophysical classification
ADEQ	Arizona Department of Environmental Quality
AEDB-R	Army Environmental Database – Restoration
ARAR	applicable or relevant and appropriate requirement
ARNG	Army National Guard Directorate
AZ	Arizona
AZARNG	Arizona Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMUA	Concentrated Munitions Use Area
DERP	Defense Environmental Restoration Program
DESR	Defense Explosives Safety Regulation
DDESB	Department of Defense Explosives Safety Board
DGM	digital geophysical mapping
DoD	Department of Defense
EA	EA Engineering, Science and Technology, Inc.
EM	Engineering Manual
FS	Feasibility Study
GIS	geographic information system
HRR	Historical Records Review
in.	inch
LANL	Los Alamos National Laboratory
LTM	long-term management
LUC	land use control
LUCIP	Land Use Control Implementation Plan
MC	munitions constituents
MD	munitions debris
MCAR	Maroon Crater Artillery Range
MEC	munitions and explosives of concern
MEC HA	Munitions and Explosives of Concern Hazard Assessment
mm	millimeter
MMRP	Military Munitions Response Program
MRA	Munitions Response Area
MRS	Munitions Response Site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan

LIST OF ACRONYMS AND ABBREVIATIONS (CONT.)

NDNODS	Non-Department of Defense Non-Operational Defense Site
NFA	no further action
NMRD	non-munitions related debris
O&M	operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
PA	Preliminary Assessment
PP	Proposed Plan
RAO	remedial action objective
RDX	cyclotrimethylenetrinitramine
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
SI	Site Inspection
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corp of Engineers
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
UXO	unexploded ordnance
VSP	Visual Sample Plan
WESTON®	Weston Solutions, Inc.
WP	white phosphorus

1.0 INTRODUCTION

This document describes the long-term management (LTM) activities that will be implemented for the purpose of supporting land use controls (LUCs) at the Non-Department of Defense (DoD), Non-Operational Defense Site (NDNODS) Maroon Crater Artillery Range Concentrated Munitions Use Area (CMUA) Munitions Response Site (MRS) (Army Environmental Database – Restoration [AEDB-R] Site #AZHQ-009-R-01) located in Coconino County, Arizona (AZ) (hereafter referred to as the Maroon Crater Artillery Range [MCAR] MRS). The Army National Guard Directorate (ARNG) is responsible for LTM through implementing and monitoring the LUCs described in this document, as established by the Final Record of Decision (ROD) (Weston Solutions, Inc. [WESTON], 2018b). The ARNG also coordinates with the State of Arizona Department of Environmental Quality (ADEQ) regarding regulatory issues and the United States (U.S.) Forest Service (USFS), the primary land manager. The ADEQ and USFS have concurred with the ROD and this Land Use Control Implementation Plan (LUCIP), which establishes the components of LUCs, and the roles and responsibilities for LUC monitoring. The MRS is located on USFS-managed land used for recreational purposes and livestock grazing, which is not anticipated to change. **Figure 1** shows the MRS location. A Glossary of terms is provided in **Appendix A**.

1.1 PROJECT BACKGROUND

The site-specific LUCIP for the MCAR MRS has been established under the Military Munitions Response Program (MMRP), which addresses munitions and explosives of concern (MEC), including unexploded ordnance (UXO), discarded military munitions, and munitions constituents (MC), located on current and former defense sites. The MMRP is administered under the Defense Environmental Restoration Program (DERP) by ARNG. The DERP, including the MMRP, typically follows the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). Potential remedial alternatives for the MCAR MRS were evaluated in the Final Feasibility Study (FS) Report (WESTON, 2017b). The proposed cleanup alternative, rationale for the preference, and requests for public input regarding the proposed alternative, were presented in the Proposed Plan (PP) (WESTON, 2018a) and the selected remedy was documented in the Final ROD (WESTON, 2018b).

In accordance with the ROD, the remedy selected is Alternative 4B - LUCs and Surface and Subsurface (24-inches [in.] below ground surface [bgs]) Removal of MEC using Advanced Geophysical Classification (AGC) Methods. This includes: 1) Surface and subsurface (to 24-in. bgs) removal of MEC across the accessible portions of the MCAR MRS to remove any potential remaining MEC/munitions debris (MD), and 2) LUC (educational, engineering, and legal controls) implementation as a long-term measure to address unacceptable human health risks associated with contact with the potential explosive hazard remaining on-site.

Because MD representing potential MEC was encountered during the Remedial Investigation (RI), there is the potential for human receptors to come in contact with MEC via intrusive and non-intrusive activities within the MCAR MRS. Surface and subsurface (to 24-in. bgs) removal of MEC across the accessible portions of the MRS will use AGC methods. AGC was chosen as the preferred method for removal of MEC as it is considered to be more beneficial than just digital

geophysical mapping (DGM). AGC is the latest and most advanced technology and will provide a digital record while reducing the number of intrusive investigations. However, should some areas prove to be inaccessible to AGC methods, such as around dense vegetation or in difficult terrain, analog geophysical methods (hand held metal detectors) may be used, where it is safe to do so. Areas inaccessible to all geophysical clearance methods (such as on the steep slopes of the Maroon Crater cinder cone) will be clearly delineated during the remedial action and LUCs will be implemented to address these areas.

In addition to the MEC removal documented in the ROD, the ARNG is implementing LUCs as a component of the remedy to address remaining potential risks to human health from the potential explosive hazard remaining on site at the MCAR MRS after the remedial action. LUCs will partially achieve the remedial action objective (RAO) and will comply with applicable or relevant and appropriate requirements (ARARs) identified for the MRS (WESTON, 2018b). The LUCs are intended to manage the remaining risk at the MRS through signage that informs the public on how to recognize potential munitions (**Appendix B**), updating internal maps to restrict firefighter access to the MRS to protect them from potential explosive hazards, and construction support (UXO escort) during pipeline maintenance (WESTON, 2018b). In addition, the LUCs address periodic inspection of site conditions.

The ARNG, with concurrence of the ADEQ, selected LUCs as a component of the final remedy; as unlimited land use and unrestricted human exposure are not achievable. This LUCIP describes the responsibilities and procedures for implementing, enforcing, managing and tracking, and when appropriate, modifying or terminating the LUC requirements.

The ARNG is statutorily responsible for the MRS and is the lead agency. The ARNG will centrally manage all work performed during implementation of LUCs at the MCAR MRS and will consult with the U.S. Army Corps of Engineers (USACE) for LUC implementation at this MRS. ADEQ serves as the representative of the State of Arizona providing technical oversight and regulatory guidance.

1.2 SITE DESCRIPTION AND HISTORY

The NDNODS MCAR MRS is part of the MCAR Munitions Response Area (MRA) (12,177 acres) located north of Leupp Road approximately seven miles northeast of Flagstaff, in Coconino County, AZ (**Figure 1**). The eastern and western portions of the MRS are located in the U.S. Geological Survey Merriam Crater Quadrangle and the Sunset Crater East Quadrangle, respectively. The MCAR MRA is comprised of the MCAR CMUA MRS (565 acres) and the MCAR Buffer Area MRS (11,612 acres) (**Figure 2**). The MCAR is located on land currently owned by the federal government and managed by the USFS/Coconino National Forest (WESTON, 2017b). Accessibility is unimpeded from all directions but access to portions of the MRS is limited due to steep terrain (WESTON, 2018b). The parcel requiring right-of-entry for the remedial action at the MCAR CMUA MRS is shown on **Figure 3**.

The original MCAR MRS (AZHQ-009-R-01) was used for artillery practice in the late 1940s and early 1950s. Artillery training was initially thought to have been conducted at Fort Tuthill by Battery E 158th Field Artillery Regiment during the 1930s (WESTON, 2011). However, personnel at the Fort Tuthill Military Museum indicated that no live-fire artillery training was conducted at

Fort Tuthill. Construction of Pulliam Airport after World War II restricted training activities at Fort Tuthill. These restrictions may have led to the Arizona Army National Guard (AZARNG) requesting a Special Use Permit from the USFS for an area named “Maroon Crater” to use for live-fire artillery practice.

Historical information indicates that the 158th Field Artillery Battalion trained with 105-millimeter (mm) howitzers at the MCAR MRS in 1948 under a Special Use Permit. Special Use Permits and memoranda indicate that 60-mm and 81-mm mortars and machine guns were used for training at the MCAR MRS. Historical information indicates that artillery training occurred during two-week training periods from late August, from 1948 to the early-mid 1950s. Based upon the distribution of MD observed during the Site Inspection (SI), the direction of fire was from the west or southwest portion of the MCAR MRS eastward toward Maroon Crater, an extinct volcanic cinder cone. Observed conditions are consistent with information found in permit documents (WESTON, 2012).

1.3 PREVIOUS INVESTIGATIONS

1.3.1 Preliminary Assessment

In 2008, a Final State/Territory Inventory Report (referred to as a Preliminary Assessment [PA]) identified military ranges and defense sites that were known or suspected of containing MEC (EA, 2008); however, the MCAR was not identified during the inventory. The MCAR MRS was identified during the Historical Records Review (HRR) and SI for the NDNODS Fort Tuthill Artillery Range (WESTON, 2011 and 2012). In June 2011, a PA of MCAR was completed (ARNG, 2011) and the 12,817-acre MRS was designated AEDB-R Number AZHQ-009-R-01. No investigations relating to the operations of artillery training or for MEC hazards had been performed prior to the 2011 PA.

1.3.2 Site Inspection

A SI was completed in 2011 and 2012. The HRR/SI Work Plan was the initial phase and was performed after completion of the PA. During the HRR/SI Work Plan, records searches were performed to supplement the information gathered during a survey of closed, transferred, and transferring military ranges. During the HRR/SI Work Plan preparation, photographs and information regarding artillery training at the MRS were found on display at the Fort Tuthill Military Museum. Historical photographs at the museum depict 105-mm howitzers firing at Maroon Crater with 60-mm and 81-mm mortars. Based on historical information, the direction of fire was from west to east, toward an impact area on the west face of Maroon Crater (WESTON, 2011).

Historical information obtained from AZARNG Pamphlet 870-5 (AZ National Guard, 2002) indicates that after World War II, the 480th Field Artillery Battalion (comprised of 105-mm towed howitzers) had been allocated to the 158th Regimental Combat Team in Mesa, AZ. The activation of the 158th Field Artillery Battalion in 1946 coincides with the request for a Special Use Permit and training of 105-mm howitzers at the MCAR MRS in 1948.

Prior to the SI fieldwork, historical documents and data determined that 640 acres of private property had not been used for training and was removed from within the boundary of the MRS (WESTON, 2012).

The SI fieldwork was conducted at the MRS between December 2011 and April 2012. SI field activities included visual surveys aided by hand-held metal detectors and surface soil sampling for MC. Approximately 177.97 linear miles of visual survey transects were completed within the boundary of the MRS. The visual survey included portions of the MRS that were proximal to the impact point at Maroon Crater and surrounding areas including the firing point at the western edge of the MRS (WESTON, 2012).

The field investigation identified MD comprised of 75-mm, 105-mm, 60-mm, and 4.2-in. artillery/mortar rounds. No evidence of MEC was observed during the SI field activity. During the SI, evidence of civilian use at the site was documented by the presence of isolated, expended 12-gauge, 9-mm, .22 caliber, and 7.62-mm small arms casings/bullets and other civilian debris including empty drums and partially buried remains of automotive body parts (WESTON, 2012).

A total of 21 surface soil samples (17 discrete, three quality control, and one composite) were collected from the MRS and analyzed for selected MC-related metals and explosives. The samples were collected from the sides or base of Maroon Crater where munitions detonations or significant MD finds were located and in drainages around the MRS (WESTON, 2012).

No MC was detected above the SI screening levels (the lower of the residential and non-residential Soil Remediation Levels and U.S. Environmental Protection Agency [USEPA] residential or industrial Regional Screening Levels [RSLs] for human health exposure) in any of the samples. Explosive analytes were not detected in the soil samples except for estimated (J-flagged) detections of cyclotrimethylenetrinitramine (RDX) that were reported in two ambient samples. RDX concentrations were below the SI screening level (WESTON, 2012).

The SI report recommended no further action (NFA) for MC; however, it recommended that the MCAR MRS be evaluated further based on the presence of MD from 75-mm, 105-mm, 60-mm and 4.2-in. artillery/mortar rounds (WESTON, 2017a). It also stipulated that, if MEC or MD was found during the RI, then additional soil sampling would be conducted (WESTON, 2017b).

1.3.3 Remedial Investigation

In 2016, a RI characterized the nature and extent of MEC and evaluated the potential threat posed to human health, safety, and the environment. Field activities included DGM and analog transects and surveys to identify subsurface anomalies that were intrusively investigated and/or sampled for MC.

RI field activities were conducted in the fall of 2016. For the RI, the MRS was divided into Area 1 and Area 2 because the design strategy differed between the areas based on historical and current land use and the amount of MEC/MD expected to be present. The RI field work included the following areas and survey methods:

Area 1 – 2,015.5 acres located within approximately a one-mile radius of Maroon Crater.

Area 1 was centered on the target/impact point based upon historical records and the artillery fragments found on the western and southern faces and base of Maroon Crater. Historical records and the SI results identified a high potential for the presence of munitions-related items in Area 1. Relatively flat or moderately sloping portions of Area 1 were surveyed using DGM. Portions with rugged terrain of basalt flows and steep slopes were surveyed using analog methods.

Area 2 – Approximately 10,159.5 acres comprising the remainder of the MRS exclusive of Area 1. Area 2 has variable topography and vegetation and has a lower probability for the presence of munitions items. Analog survey transects were used to characterize Area 2 for MEC.

The results of the RI confirmed the nature (type) of MD at the MRS. Of the 747 total items recovered during both the DGM and analog geophysical transects grids, 224 items were MD, 90 items were small arms, 63 items were hot rocks (e.g. rocks with an elevated iron content), 102 items were “no contact” (meaning a target was identified yet validation did not yield a target), one item was a duplicate target, and 267 items were non-munitions-related debris (NMRD). No MEC items were encountered during the RI.

The RI also confirmed the extent (distribution) of MD: a high concentration of MD was found in the target cluster area on the southern and western side of Maroon Crater and a lower concentration of MD was scattered across the remainder of the MRS (WESTON, 2017a).

Based on the results of the RI field activities and Visual Sample Plan (VSP) analysis, the following conclusions and recommendations were presented in the RI Report for the MCAR MRS:

- The MCAR MRS should be divided into two MRSs based on the concentrations of MD encountered during the SI and RI: Buffer Area MRS (11,612 acres) and CMUA MRS (565 acres).
- No MEC items and 224 MD items (unidentifiable fragments and pieces of mortars and smoke grenades) were discovered on the MCAR MRS.
- Because no MEC was encountered, no MC samples were collected.
- The risk at the MCAR Buffer Area MRS is considered acceptable for current and projected future land uses; therefore, NFA was recommended for MEC.
- Further action is recommended for MEC in the MCAR CMUA MRS.

1.3.4 Feasibility Study

The FS, which was based on the results of the SI and RI, evaluated several remedial action alternatives for the MCAR MRS. The FS identified and screened remedial technologies and process options, developed and screened alternatives, and performed a detailed comparison of alternatives. The FS included refinement of RAOs and the development and evaluation of remedial alternatives to address the remaining hazards associated with MEC.

Four remedial alternatives were developed for the MRS and include:

- Alternative 1 – No Action;
- Alternative 2 – LUCs;
- Alternative 3 – LUCs and Surface Removal of MEC;
- Alternative 4A – LUCs and Surface and Subsurface (to 24-In. bgs) Removal of MEC using DGM Methods; and
- Alternative 4B – LUCs and Surface and Subsurface (to 24-In. bgs) Removal of MEC using AGC Methods.

Alternatives 4A and 4B were presented as the preferred alternatives based on their ability to protect human health and the environment through implementation of LUCs and MEC clearance and removal (WESTON, 2018a).

The MEC remedial action consists of MEC detection, removal, and disposal technologies that would mitigate the potential explosive hazards (**Appendix B**) across the entire CMUA MRS (565 acres), where accessible, down to 24 in. bgs using either DGM (Alternative 4A) or AGC methods (Alternative 4B). MEC clearance of approximately 71 acres may not be accessible due to the steep terrain and unstable sloping cinder cone (WESTON, 2018b).

LUCs to be implemented include, educational controls, engineering controls, and legal controls. LUCs include updating geographical information system (GIS) data to accurately display the MRS boundary to protect emergency response personnel from remaining MEC. Educational controls such as fact sheets and community meetings will be developed and made available to the local population and to recreational users via hard copy at the Coconino National Forest office in Flagstaff. The educational materials could be made available on the Coconino National Forest website (WESTON, 2017b).

Construction support (UXO escort) during pipeline maintenance will be required to protect pipeline workers. Engineering controls, in the form of signs, will be placed along road access points to inform recreational users and site visitors of potential hazards in the area (**Figure 4**). A Signage Plan will be included in the Remedial Action Work Plan (WESTON, 2018b). Recognize, Retreat, Report (The 3Rs) pamphlets can be made available to the public by the USFS and could be posted on the Coconino National Forest website.

Through LTM and Five-Year Reviews, land use would be monitored and restricted, protecting human health. Land use should likewise be restricted due to the potential for subsurface MEC contamination. The preferred alternative would meet the RAOs for the MRS, satisfy the statutory preference for treatment, and provide a permanent reduction of risk.

1.3.5 Proposed Plan

The PP was finalized after a public review and comment period that ended in January 2018. The PP presented the preferred remedial alternatives for the MCAR MRS and presented Alternatives 4A and 4B, LUCs and surface and subsurface removal of MEC using DGM/AGC methods, as the

preferred alternatives. The preferred alternative for the MCAR Buffer Area MRS was NFA. No comments or requests for public meetings were received (WESTON, 2018a).

1.3.6 Record of Decision

The ROD was finalized in August 2018 and described the final remedy for the CMUA MRS: Alternative 4B, LUCs and surface and subsurface removal of MEC using AGC methods (WESTON, 2018a).

1.4 POTENTIAL HUMAN HEALTH AND ECOLOGICAL RISKS

This section summarizes the results of human health and ecological risks, using integrated data from the SI, RI, and FS.

1.4.1 Human Health Risks

Based on the screening-level risk assessment completed in the RI, MC was not detected at concentrations that pose an unacceptable risk to human health or the environment within the MCAR MRS.

Per Engineering Manual (EM) 1110-1-1200, *Conceptual Site Models for Ordnance and Explosives and Hazard, Toxic, and Radioactive Waste* an explosive hazard is the probability for a MEC item to detonate and potentially cause harm because of human activities. An explosive hazard exists if a person can come into contact with a MEC item and act upon it to cause detonation. The potential for explosive safety risk depends on the presence of three critical elements: a source (presence of MEC), a receptor (person), and interaction between the source and receptor (such as picking up the item or disturbing the item) (USACE, 2003).

Explosive hazards for the MCAR MRS were evaluated in accordance with the *Interim Munitions and Explosives of Concern Hazard (MEC HA) Assessment Methodology* (USEPA, 2008). The CERCLA hazard assessment methodology was used to design the MEC HA, a methodology for assessing the explosive hazards at a MRS. Explosive hazards at MRSs are described by Hazard Level Categories 1 through 4 based on the severity of the hazard. Hazard Level Category 1 reflects the most severe potential explosive hazard condition while Hazard Level Category 4 represents the lowest hazard. The MEC HA was used to evaluate the baseline hazard associated with the MRS based on the nature and extent of MEC and exposure risks related to the current use. The MEC HA was used to facilitate the evaluation of remedial alternatives by adjusting the input parameters to account for the potential effects of remedial alternative implementation.

Based on the current land use scenario, the MCAR MRS received a MEC HA score of 865 out of 1,000 points, which is equivalent to a baseline Hazard Level Category 1 (WESTON, 2017a). This score indicates that the MRS has a high hazard potential based on surface and near surface MEC and, the amount of MEC, pyrotechnic energetic material, and fuzed munitions. The remedial action alternative selected for implementation at the MRS (MEC removal and LUCs), reduces the MEC HA score to 540 out of 1,000 points which is equivalent to a Hazard Level Category 3 (WESTON, 2017a).

Five-Year Reviews, as required under CERCLA Section (§) 121(c) and the NCP (40 Code of Federal Regulations [CFR] §300.430(f)(4)(ii)), will be completed for the MRS to ensure that the LUCs and remedy are protective of human health.

1.4.2 Ecological Risks

The screening level risk assessment evaluates potential adverse impacts on current or future ecological receptors exposed to MC in surface soil. Potential ecological receptors include local populations and communities of terrestrial biota. The applicable screening levels for ecological effect are the USEPA Ecological Soil Screening Levels and the Los Alamos National Laboratory (LANL) (2015) EcoRisk Database minimum to no effect Ecological Screening Levels for soil. Based on the screening-level risk assessment, detected metals and explosive compounds associated with MC at the MRS were below or approximately equivalent to ecological screening levels or background (State of Arizona soil) (WESTON 2017a).

2.0 LAND USE CONTROLS

LUCs will be implemented at the MCAR MRS as depicted in **Figure 4** so that recreational use and livestock grazing can continue at the MRS. This section describes the responsibilities and procedures for LUC implementation, management, and compliance monitoring, as well as conditions that trigger modification or termination of LUCs. These descriptions are based on the guidelines for implementing LUCs found in *DoD Policy on Land Use Controls Associated with Environmental Restoration Activities* (DoD, 2001).

Land use designations are based on assumptions of potential human exposure to impacted media, which vary by land use. The frequency and duration of potential exposure, such as hours per day, days per year, and number of years varies by land use. Recreational land use (such as hiking, camping or hunting, including trespassers) exposure designation assumes that a working-age adult would have limited and occasional non-intrusive contact with the top foot of soil while walking through the property.

2.1 OBJECTIVES AND DESCRIPTIONS OF LAND USE CONTROLS

The objective of LUCs is to protect human health and the environment by managing the remaining hazards. LUCs to be implemented at the MCAR MRS include signs informing recreational users and site visitors of potential hazards (**Appendix B**) as identified on **Figure 4** (educational controls including fact sheets [3Rs] and community meetings); restricting firefighter access to the MRS; construction support (UXO escort) during pipeline maintenance; and periodic inspection of site conditions.

LUCs are intended to prevent exposures to hazards that could occur from typical land use. Currently, the MRS is used for recreational activities and livestock grazing. Due to the potential for remaining MEC hazards at the MCAR MRS, it cannot be released for unrestricted land use. Signage should be erected along road access points within the MRS to warn land users of the remaining hazards (WESTON, 2018b). A Signage Plan will be included in the Remedial Action Work Plan.

Educational controls for the USFS will include fact sheets (3Rs), community meetings, internal monitoring, such as updating internal maps with the MCAR MRS boundary for the USFS to protect fire fighters from working on fires within the MCAR MRS where MEC may still be present (WESTON, 2018b). The ARNG will provide updated MRS boundaries to the USFS for use in updating their internal maps. The ARNG will perform periodic inspections of the MRS to ensure efficacy of the LUCs as discussed further in **Section 2.4.2**.

In addition, limiting intrusive activities such that they are not performed without UXO construction support would be necessary. For example, construction support (UXO escort) during pipeline maintenance will be required to protect pipeline workers and will be provided by ARNG (WESTON, 2018b). An agreement will be negotiated between ARNG and the USFS for alerting ARNG when UXO support is required. In accordance with the Defense Explosives Safety Regulation (DESR) 6055.09, Edition 1 (DoD Explosives Safety Board [DDESB], 2019), the level of construction support is determined on a case-by-case basis and changes in relation to the probability of encountering potential MEC. Each activity occurrence would be reviewed by ARNG

to ensure the appropriate support is provided based upon the type of activity planned. In areas having a low probability of encountering MEC, UXO-qualified technicians will provide support either on an on-call basis to respond to MEC that was incidentally encountered, or on a standby basis to monitor construction activities. If the probability of encountering MEC is moderate to high, a survey for MEC using geophysical methods and, if found, removal of MEC from the construction footprint, is required.

ARNG has statutory responsibility for LTM at the MRS; therefore, ARNG will implement the LUCs with technical support from AZARNG, ADEQ, and USFS. ARNG will document any changes regarding LUCs, such as health risks associated with the potential remaining explosive hazard and land use limitations, and communicate them to ADEQ. LUCs for the MRS will remain in effect through future land leases, transfers, or conveyances until unlimited use and unrestricted human exposure are achieved, if applicable.

2.2 PROJECT SCHEDULE

The major milestones for the LUCIP are summarized in **Table 2-1**.

Table 2-1
Estimated Project Schedule for LUCs

Phase	Date
Army Draft LUCIP	April 2019
Stakeholder Draft LUCIP	August 2019
Final LUCIP	February 2020
Implementation of Controls	Fall 2021

2.3 ESTIMATING COSTS AND LUC FUNDING

The remedial cost estimate for implementing the LUCs at the MCAR MRS (Alternative 4B) is presented in Appendix B of the FS (WESTON, 2017b) and in the ROD (WESTON 2018b). The costs are based on an order-of-magnitude engineering cost estimate that is expected to be accurate within a range of plus 50% to minus 30% from the actual costs. The cost estimate is refined as more detailed information becomes available, such as when the details for the signage are finalized.

The ROD is subdivided into three parts: capital costs, annual operation and maintenance (O&M) costs, and periodic costs for 30 years, all of which sum into a Total Present Value Cost (WESTON, 2018b). The cost breakdown is as follows:

- Capital Costs: \$4,564,000
- Annual O&M Costs: \$0
- Periodic Costs: \$163,000

The present worth cost to implement the selected remedial action at the MCAR MRS (AZHQ-009-R-01) is equal to \$4,727,000. The present worth cost is the estimated total cost to implement the remedial action over time in terms of today's dollar value. For estimating purposes, it is assumed that long-term management would be conducted for 30 years with a review of the remedial action

being conducted periodically and including Five-Year Reviews. The 30-year period was used in concurrence with the NCP for cost estimating purposes only. In the context of the FS it was used for evaluating the differences in costs among the alternatives over a set time period, and does not represent a limitation on the length of the remedial action. Changes in the costs are likely to occur as a result of new information and data collected during the 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 ROD amendment. The program is projected to continue for approximately 30 years. **Table 2-2** summarizes the costs of LUCs for the MCAR MRS. The basis of these estimated costs are shown in detail in the Final FS (WESTON, 2017b).

**Table 2-2
Cost Summary**

Capital Costs	Quantity	Unit	Unit Cost	Cost
Remedial Design				
Management Plans	1	LS	\$ 107,640	\$ 107,640
Remedial Action				
LUC Implementation (Educational Controls for USFS)	1	LS	\$ 26,162	\$ 26,162
Mobilization	1	LS	\$ 65,656	\$ 65,656
Surface MEC Removal ^{1,2}	1	LS	\$ 740,330	\$ 740,330
Digital Geophysical Mapping ¹	1	LS	\$ 1,255,970	\$ 1,255,970
AGC Survey ¹	1	LS	\$ 92,959	\$ 92,959
AGC Reacquisition ¹	1	LS	\$ 9,598	\$ 9,598
Subsurface MEC Removal ¹	1	LS	\$ 18,319	\$ 18,319
Material Documented as Safe Removal	1	LS	\$ 2,473	\$ 2,473
Demobilization	1	LS	\$ 56,162	\$ 56,162
Site Management	1	LS	\$ 711,708	\$ 711,708
Explosive Safety Submission	1	LS	\$ 35,880	\$ 35,880
After Action Report	1	LS	\$ 71,760	\$ 71,760
Remedial Action Report	1	LS	\$ 139,953	\$ 139,953
Sub-Total				\$ 3,334,569
Contingency	15%			\$ 500,185
Sub-Total				\$ 3,834,755
Permitting	1%			\$ 38,348
Project Management	8%			\$ 306,780
Construction Management	10%			\$ 383,475
TOTAL CAPITAL COSTS				\$ 4,564,000

Annual Operation & Maintenance Costs					
TOTAL ANNUAL OPERATION & MAINTENANCE COSTS					\$ -
Periodic Costs					
Five-Year Inspection Using 5-Year Contracts	1	EA	\$ 14,769	\$ 14,769	
Five-Year Review Reports for 30 Years Using 5-Year Contracts	1	EA	\$ 12,426	\$ 12,426	
TOTAL PERIODIC COSTS					\$ 28,000
Present Value Analysis					
Cost Type	Year	Total Cost	Total Cost Per Year	Discount Factor (0.75%)	Present Value
Capital Cost	0	\$4,564,000	\$ 4,564,000	1.000	\$ 4,564,000
Annual Operation and Maintenance Cost	1-30	\$ -	\$ -	0.645	\$ -
Periodic Cost	5	\$ 27,195	\$ 27,195	0.935	\$ 25,432
Periodic Cost	10	\$ 30,026	\$ 30,026	0.868	\$ 26,065
Periodic Cost	15	\$ 33,151	\$ 33,151	0.806	\$ 26,713
Periodic Cost	20	\$ 36,601	\$ 36,601	0.748	\$ 27,378
Periodic Cost	25	\$ 40,411	\$ 40,411	0.694	\$ 28,059
Periodic Cost	30	\$ 44,617	\$ 44,617	0.645	\$ 28,757
TOTAL PRESENT VALUE OF ALTERNATIVE					\$ 4,727,000

¹Includes costs for archeologist escort.

²Includes costs for archeology survey of staging area and report.

2.4 ARNG REQUIREMENTS FOR LAND USE CONTROLS INSPECTIONS, REPORTING, AND ENFORCEMENT

The ARNG is responsible for LTM through implementing and monitoring the LUCs described in the ROD and this document (WESTON, 2018b). Monitoring the LUCs will include conducting periodic and Five-Year Reviews in accordance with CERCLA. Details related to this LTM are provided in the subsections that follow.

2.4.1 Long-Term Management Plan Distribution

The ARNG will ensure that the LUCIP and any future revisions to the LUCIP are maintained as part of the administrative record at the following addresses:

*Arizona Army National Guard
5636 E McDowell Rd
Phoenix, Arizona
85008*

and

*ADEQ
Records Management Center
1110 West Washington Street
Phoenix, AZ 85007*

The ARNG will ensure that the LUCIP and future revisions to the LUCIP are maintained as part of the information repository at the following address:

Cline Library, Special Collections and Archives

*Northern Arizona University
1001 S. Knoles Drive
P.O. Box 6022
Flagstaff, AZ 86011*

The findings from the Five-Year Reviews will be made available to regulatory stakeholders for review and documentation for recurring reviews will be maintained by ARNG. Primary points of contact for the public to communicate with the ARNG and receive information about the MRS are provided in **Appendix C**.

2.4.2 Five-Year Reviews

ARNG will conduct Five-Year Reviews consistent with CERCLA §121 and the NCP (40 CFR 300). CERCLA §121, as amended, states that:

“If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment is being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such Site in accordance with [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.”

The requirement was further interpreted in the NCP (300.430(f)(4)(ii) of Title 40 CFR 300), which states that:

“If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.”

The ARNG will conduct a review every five years in consultation with USFS to determine whether the remedy remains protective of human health and the environment. The purpose of a Five-Year Review is not to reconsider decisions made during selection of the remedy, as specified in the ROD, but to evaluate the implementation and performance of the selected remedy.

The ARNG will conduct the Five-Year Reviews in accordance with the most recent and applicable guidance in place at the time of the review. In January 2016, the USEPA released the most recent 5-Year Review guidance for the recommended template for use at Superfund Sites which should be utilized in preparation of the next Five-year review report for this MRS. Detailed instructions and procedures for conducting Five-Year Reviews are provided in the USEPA *Comprehensive Five-Year Review Guidance* (June, 2001) and the USEPA *Evaluation of Institutional Controls: Supplement to the Comprehensive Five-Year Review Guidance* (September, 2011). The USEPA *Comprehensive Five-Year Review Guidance* (June, 2001), including the January 2016 amendments made to Appendix E, will be followed when conducting five-year reviews.

ARNG will provide ADEQ with the Five-Year Review report. The first Five-Year Review for the MCAR MRS will be in 2023.

2.4.3 Notice of Planned Conveyance

At this time, the MCAR MRS is not planned for conveyance by the USFS. In the event that the MRS is to be conveyed to a new entity, review and application of a deed restriction may be warranted.

As the responsible entity, the ARNG, and the landowner, USFS, will ensure that provisions for limitations on land use and/or other protective actions are included in the transfer terms or conveyance documents to ensure protection of human health and the environment. Five-Year Reviews will continue regardless of land ownership and ARNG will maintain responsibility for Five-Year Reviews in perpetuity.

2.4.4 Land Use Control Effectiveness Discovery Notifications

Upon discovery of conditions at the MRS that might interfere with LUC effectiveness, ARNG will notify AZARNG, ADEQ and the USFS. ARNG will then work with ADEQ to resolve the issue and restore protectiveness.

2.4.5 Land Use Control Enforcement

If a LUC has been adversely impacted, ARNG will notify the USFS, AZARNG and ADEQ. ARNG will take informal and/or legal action to re-establish the LUCs. Alternatively, ARNG may perform remedial actions according to its response authorities under CERCLA and then seek recovery of remedial action costs from the USFS.

2.4.6 Modification or Termination of Land Use Controls

LUCs will remain in effect at MCAR MRS until the ARNG, AZARNG, USFS and ADEQ determine that they are no longer needed to protect human health and the environment. At that time, formal LUC termination documents including a revised ROD will be prepared by the ARNG in coordination with AZARNG, ADEQ and the USFS.

3.0 REFERENCES

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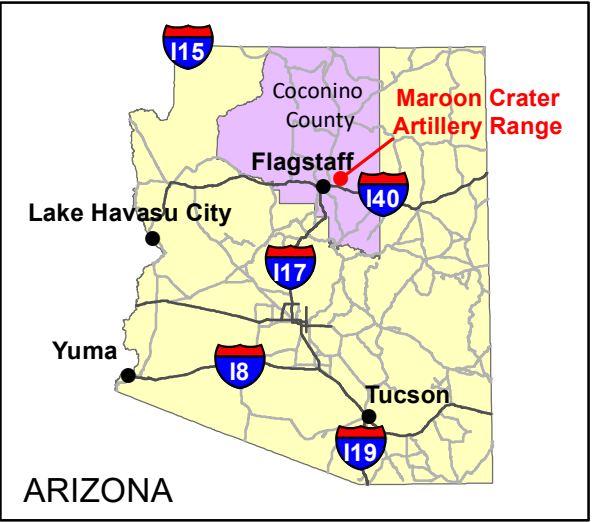
WESTON, 2017b. *Final Feasibility Study, MMRP Munitions Response Services, National Guard Bureau, Non-DoD Non-Operational Defense Sites, Remedial Investigation/Feasibility Study Program, Maroon Crater Artillery Range (AZHQ-009-R-01), Coconino County, Arizona.* September.

WESTON, 2018a. *Final Proposed Plan, Maroon Crater Artillery Range (AZHQ-009-R-01), Munitions Response Site, Coconino County, Arizona.* January.

WESTON, 2018b. *Final Record of Decision, MMRP Munitions Response Services, National Guard Bureau, Non-DoD Non-Operational Defense Sites, Remedial Investigation/Feasibility Study Program, Maroon Crater Artillery Range Concentrated Munitions Use Area (AZHQ-009-R-01), Maroon Crater Artillery Range Buffer Area (AZHQ-009-R-02), Coconino County, Arizona.* August.

FIGURES

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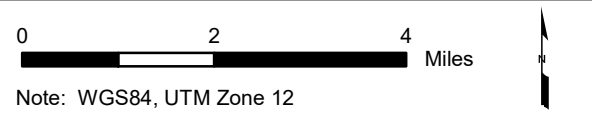


Legend

- Interstate
- US Highway
- Local Road
- Maroon Crater Artillery Range
CMUA MRS (565 acres)

Acronyms
CMUA - Concentrated Munitions Use Area
MRS - Munitions Response Site

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

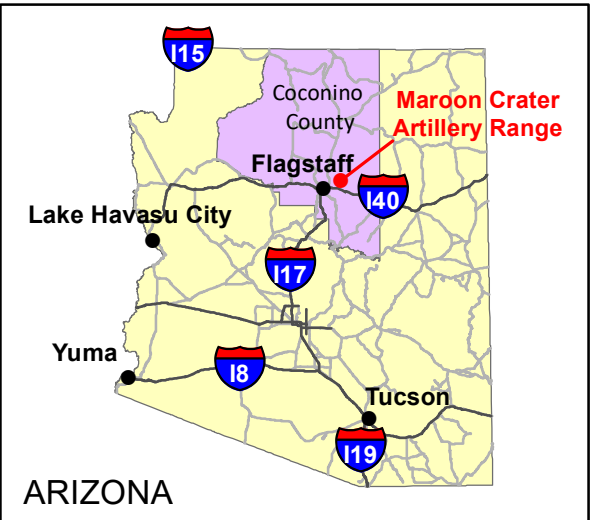
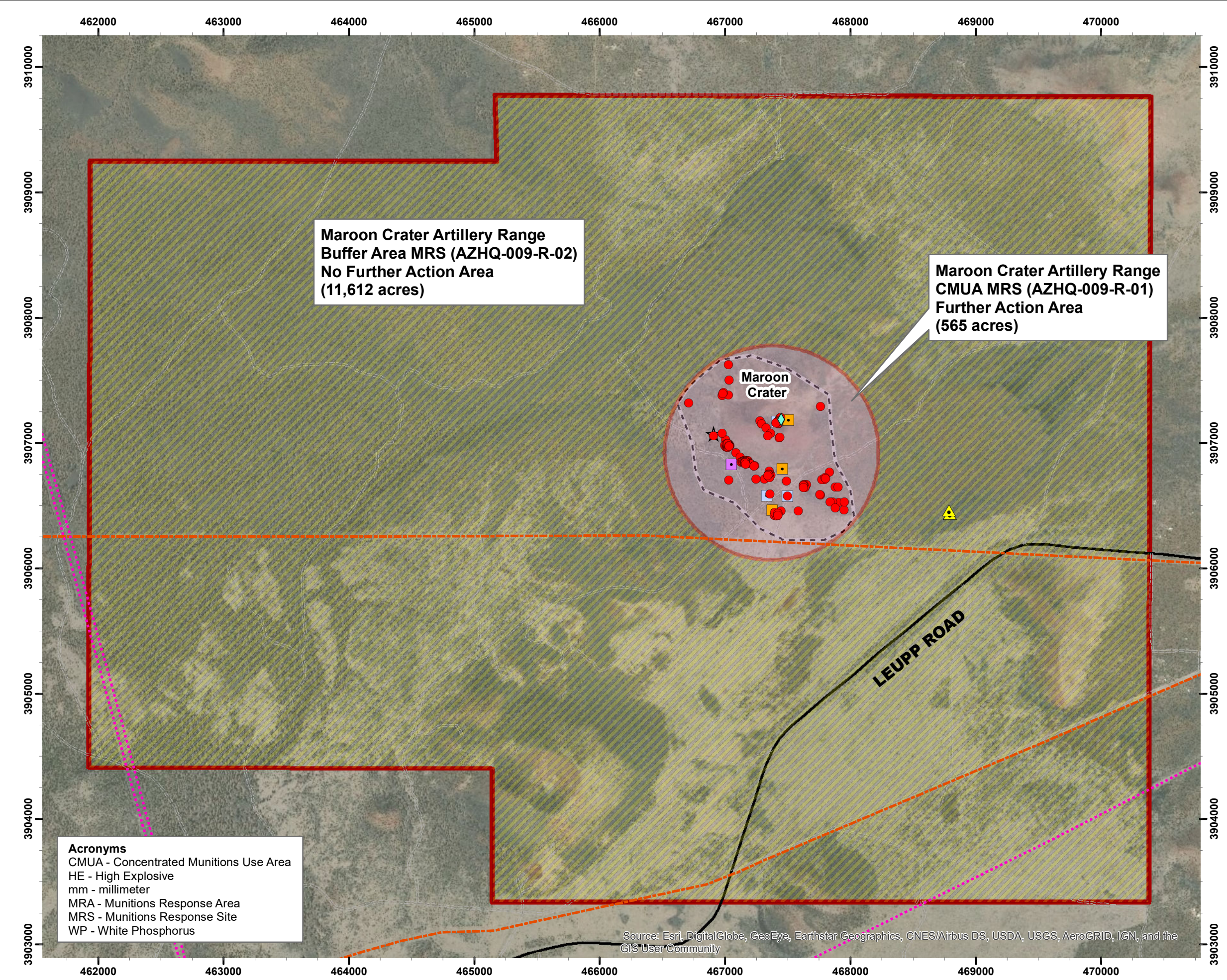


Site Location Map
Maroon Crater Artillery Range
CMUA MRS (AZHQ-009-R-01)
Flagstaff, Coconino County, Arizona

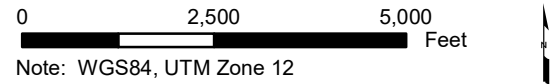


Figure 1

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- Legend**
- ◆ Blasting Cap
 - Fragment (unidentifiable origin)
 - ★ Fuze - fragments, adapter ring
 - ▲ Grenade, Smoke, M15, WP
 - 81mm Mortar - fin, tail boom
 - 4.2-inch, HE, M3, Mortar - base
 - 60mm Mortar - tail boom
 - Primary Road
 - Secondary Road
 - - - Pipe Line
 - ... Power Line
 - Maroon Crater Artillery Range CMUA MRS (AZHQ-009-R-01) Further Action Area (565 acres)
 - Maroon Crater Artillery Range Buffer Area MRS (AZHQ-009-R-02) No Further Action Area (11,612 acres)
 - Boundary - Target Area (353 acres)
 - Maroon Crater Artillery Range MRA (12,177 acres)

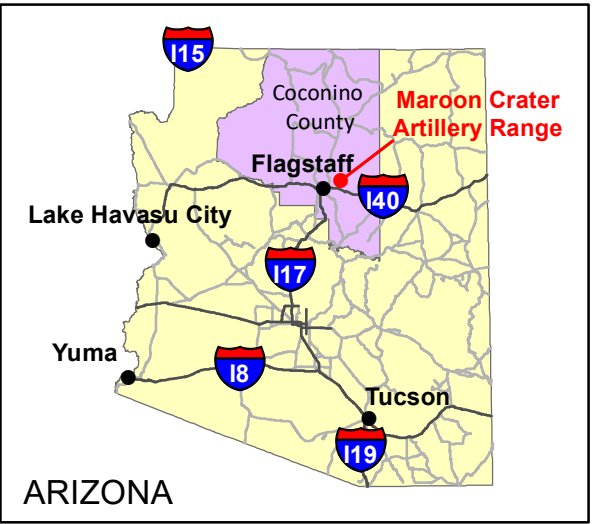
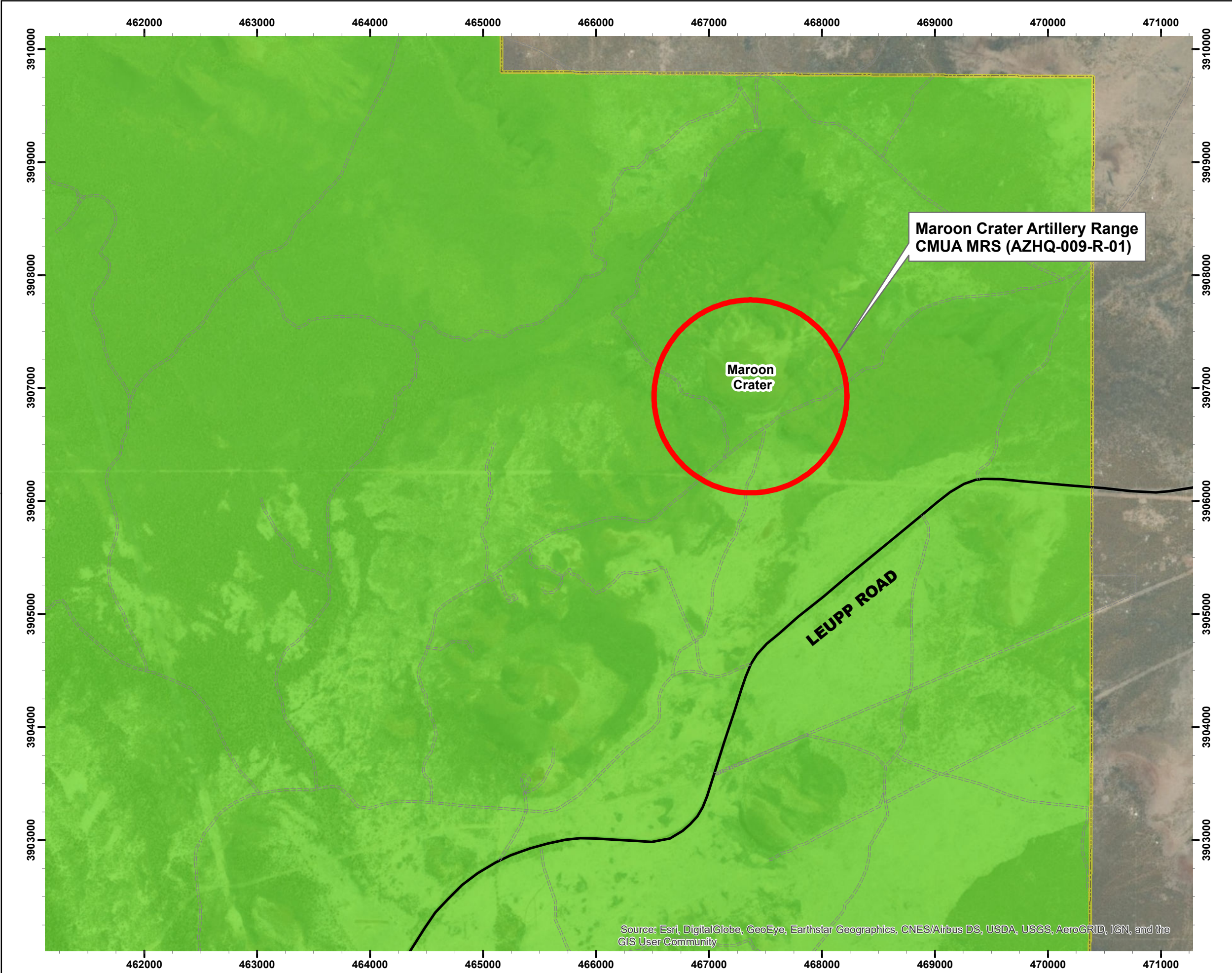


MRS and MRA Boundaries Map
Maroon Crater Artillery Range
CMUA MRS (AZHQ-009-R-01)
Flagstaff, Coconino County, Arizona



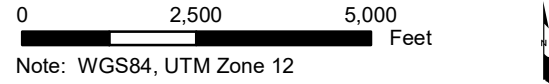
Figure 2

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- Legend**
- Primary Road
 - Secondary Road
 - Maroon Crater Artillery Range CMUA MRS (AZHQ-009-R-01) - 565 acres
 - Parcel requiring ROE to access the MRS - Federal land managed by USFS/Coconino National Forest

Acronyms
 CMUA - Concentrated Munitions Use Area
 MRS - Munitions Response Site
 ROE - right of entry
 USFS - United States Forest Service

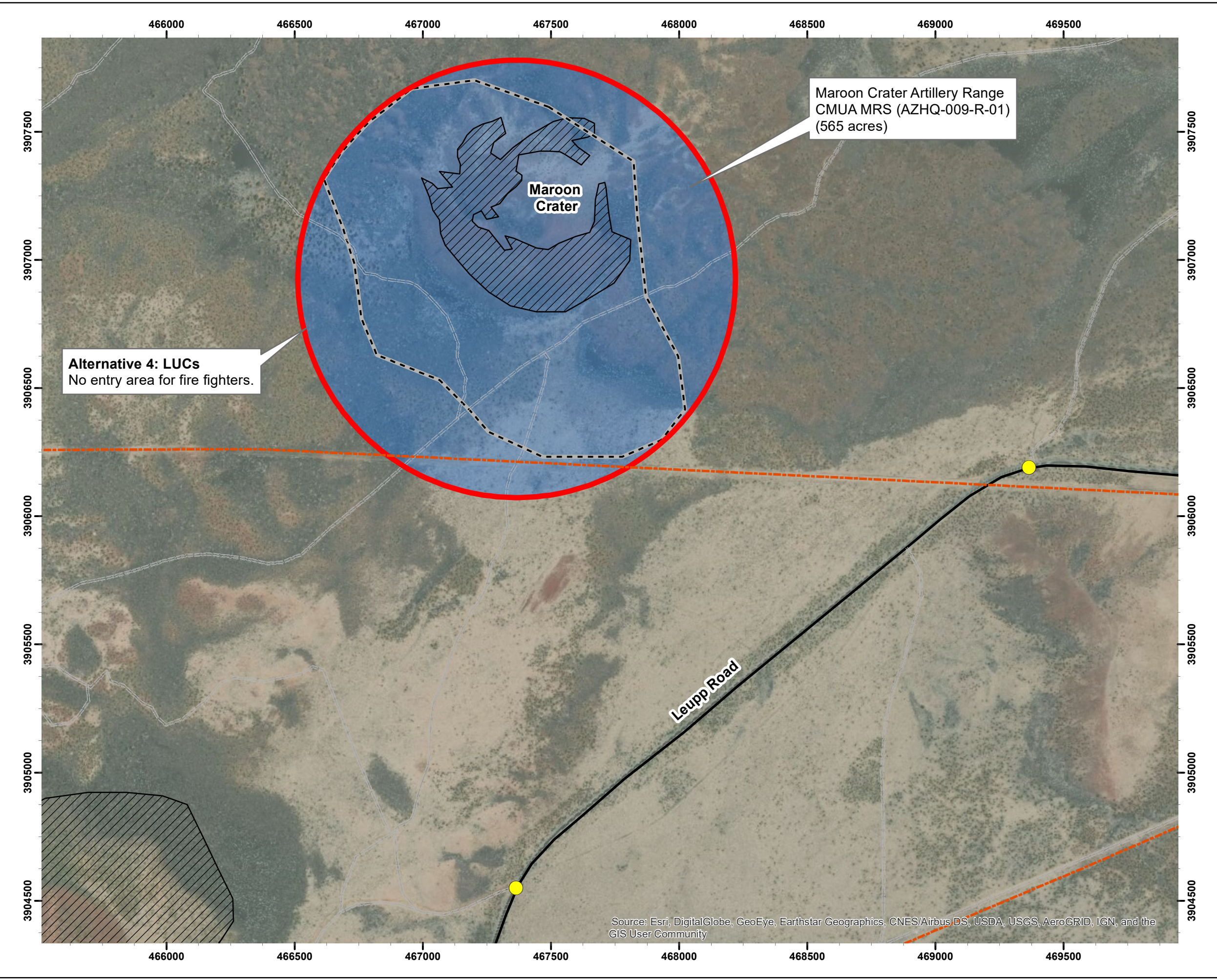


Right of Entry Map
 Maroon Crater Artillery Range
 CMUA MRS (AZHQ-009-R-01)
 Flagstaff, Coconino County, Arizona



Figure 3

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ARIZONA

Legend

- Warning Sign - Proposed Location
- Primary Road
- Secondary Road
- Pipe Line
- Surface and Subsurface Clearance using AGC or DGM Methods where Accessible (~494 of 565 acres)
- Boundary - Target Area (353 acres)
- Steep Slope Area (71 acres)
- Maroon Crater Artillery Range CMUA MRS (AZHQ-009-R-01) - 565 acres

Acronyms

AGC - advanced geophysical classification
 CMUA - Concentrated Munitions Use Area
 DGM - digital geophysical mapping
 LUC - land use control
 MRS - Munitions Response Site

0 1,200 2,400 Feet

Note: WGS84, UTM Zone 12

LUC Boundary and Proposed Sign Location Map

Maroon Crater Artillery Range
 CMUA MRS (AZHQ-009-R-01)
 Flagstaff, Coconino County, Arizona

Figure 4

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APPENDIX A

GLOSSARY

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GLOSSARY

Administrative Record – A collection of documents containing all the information and reports generated during the entire phase of investigation and cleanup at a site, which are used to make a decision on the selection of a response action under the Comprehensive Environmental Response, Compensation, and Liability Act. This file is to be available for public review and a copy maintained near the site.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) – A Federal law passed in 1980 and modified in 1986 by the Superfund Amendments and Reauthorization Act to investigate and clean up hazardous substances.

Discarded Military Munitions – Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded explosive ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of consistent with applicable environmental laws and regulations (10 United States Code [U.S.C.] 2710(e)(2)).

Explosive Safety Risk – The probability for a munitions and explosives of concern (MEC) item to detonate and potentially cause harm to people, property, the environment, or operational capability and readiness as a result of human activities. An explosive safety risk exists if a person can come into contact with a MEC item and act upon it to cause detonation. The potential for an explosive safety risk depends on the presence of three critical elements: a source (presence of MEC), a receptor or person, and an interaction between the source and the receptor (such as picking up the item or disturbing the item by plowing). There is no explosive safety risk if any one element is missing.

Feasibility Study (FS) – An evaluation of potential remedial technologies and treatment options that can be used to clean up a site.

Land Use Controls (LUCs) – Physical, legal, or administrative mechanisms that restrict the use of, or that limit access to, contaminated property to reduce risk to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and physical barriers to limit access to property, such as fences or signs. The legal mechanisms are generally the same as those used for institutional controls (ICs) as discussed in the National Oil and Hazardous Substances Pollution Contingency Plan. ICs are a subset of LUCs and are primarily legal mechanisms imposed to ensure the continued effectiveness of land use restrictions imposed as part of a remedial decision. Legal mechanisms include restrictive covenants, negative easements, equitable servitudes, and deed notices. Administrative mechanisms include notices, adopted local land use plans and ordinances, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions (Department of Defense, 2001).

Military Munitions – All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense, the United States Coast Guard, the Department of Energy, and the Army National Guard. The term includes confined gaseous, liquid, and solid propellants, explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives and chemical warfare agents, chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges, and devices and components thereof. The term does not include wholly inert items, improvised explosive devices, and nuclear weapons, nuclear devices, and nuclear components, except that the term does include non-nuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under 42 U.S.C. 2011 (Atomic Energy Act) have been completed (10 U.S.C. 2710(e)(3)(A) and (B)).

Munitions Constituents (MC) – Any materials originating from unexploded ordnance, discarded military munitions, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions (10 U.S.C. 2710(e)(3)).

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization or disposal.

Munitions and Explosives of Concern (MEC) – This term distinguishes specific categories of military munitions that may pose unique explosive safety risks, including: (1) unexploded ordnance, (2) discarded military munitions, or (3) munitions constituents (e.g., trinitrotoluene, cyclotrimethylenetrinitramine known as Royal Demolition Explosive [RDX]) present in high enough concentrations to pose an explosive hazard.

Munitions Response Site (MRS) – A discrete location within a Munitions Response Area that is known to require a munitions response.

Proposed Plan (PP) – A document that presents a proposed cleanup alternative, rationale for the preference, and requests public input regarding the proposed alternative.

Recurring Reviews – Review required by the Comprehensive Environmental Response, Compensation, and Liability Act no less than every 5 years to assure that human health and the environment are being protected by the selected remedial action, where the remedial action does not allow for unlimited use and unrestricted exposure.

Remedial Action Objective (RAO) – Objectives established for remedial actions to guide the development of alternatives and focus the comparison of acceptable remedial action alternatives, if warranted. RAOs also assist in clarifying the goal of minimizing risk and achieving an acceptable level of protection for human health and the environment.

Remedial Investigation (RI) – A study of a site that provides information supporting the evaluation for the need for a remedy and/or the selection of a remedy for a site where hazardous substances have been disposed of. The RI identifies the nature and extent of contamination at the facility.

Record of Decision (ROD) – A decision document used to select and document the remedy selection decision. The ROD documents the remedial action plan for a site or operable unit and serves the following three basic functions: (1) certifies that the remedy selection process was carried out in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act and, to the extent practicable, with the National Oil and Hazardous Substances Pollution Contingency Plan; (2) describes the technical parameters of the remedy, specifying the methods selected to protect human health and the environment, including treatment, engineering, and IC components, as well as cleanup levels; and (3) provides the public with a consolidated summary of information about the site and the chosen remedy, including the rationale behind the selection.

Unexploded Ordnance (UXO) – UXO are military munitions that:

- Have been primed, fused, armed, or otherwise prepared for action;
- Have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; or
- Remain unexploded, whether by malfunction, design, or any other cause (10 U.S.C. 101 (e)(5)).

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APPENDIX B

MUNITIONS AWARENESS

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Expected Munitions at Maroon Crater Artillery Range MRS 60-millimeter (mm) High Explosive (HE) M49A2 Mortar

Representative Photographs:



81-mm HE Mortar

Representative Photographs:



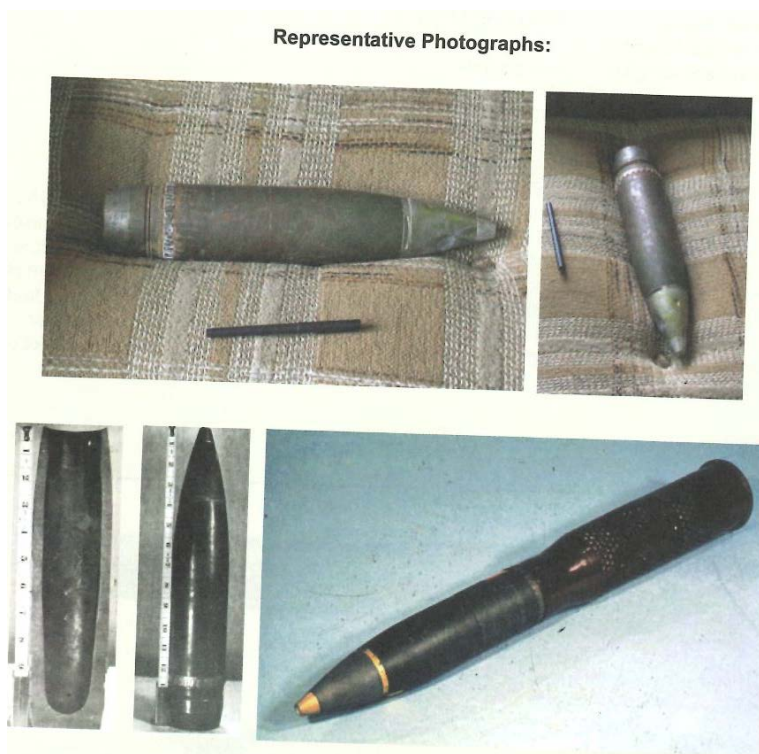
Expected Munitions at Maroon Crater Artillery Range MRS 4.2-inch HE, M3 Mortar



Photo: Bullet Picker.

http://bulletpicker.com/cartridge_-4_2-inch-he_-m3.html

75-mm HE M309A1 Artillery Round



Expected Munitions at Maroon Crater Artillery Range MRS 105-mm Illuminating M314 Artillery Round



105-mm M84B1 Smoke Artillery Round



Photo: WorthPoint.

<https://www.worthpoint.com/worthopedia/inert-wwii-105mm-m84b1-smoke-artillery-shell-with>

Expected Munitions at Maroon Crater Artillery Range MRS M15 Smoke Grenade



Photo: The Grenade Recognition Manual Vol. 1A1 by Darryl W. Lynn.
[h http://tgrm.foxed.ca/M15%20grenade.html](http://tgrm.foxed.ca/M15%20grenade.html)

**Munitions Debris Recovered at Maroon Crater Artillery Range MRS
60-mm HE M49A2 Mortar Base**



81-mm Mortar Tail Boom



Munitions Debris Recovered at Maroon Crater Artillery Range MRS 81-mm Mortar Fin



4.2-inch HE, M3 Mortar Base



**Munitions/Debris Recovered at Maroon Crater Artillery Range MRS
4.2-in. White Phosphorus (WP) Mortar Debris**



105-mm M84B1 Smoke or Leaflet Artillery Round



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Background

The former Maroon Crater Artillery Range is located north of Leupp Road and north of Flagstaff in Coconino County, Arizona. The 12,117-acre range was used for training by the Arizona National Guard (AZARNG) in 1948. Approved munitions include 105mm howitzers, 60mm and 81mm mortars, and machine guns. The former site is now on government lands.

Field work was conducted during a Site Inspection in 2012 and a Remedial Investigation in 2016. Evidence of military munitions found during these investigations include full and or partial 105mm and 75mm rounds, 81mm and 60mm mortars, 4.2-inch white phosphorous mortar rounds, and Smoke Grenades. During the Remedial Investigation, the Maroon Crater Artillery Range acreage was revised to 565 acres, as evidence of munitions was not found in the remaining 11,612 acres. The Army National Guard (ARNG) is conducting a remedial action at the 565-acre Maroon Crater Artillery Range to address any military munitions potentially present at the site. Any Unexploded Ordnance (UXO) found will be disposed of according to regulations.

Weathering may make munitions, which may be on the surface, buried, or whole or in parts, difficult to recognize. As such, area residents and park visitors should not touch, move or disturb anything encountered that may be a munition or part of one.

All munitions should be considered dangerous, regardless of how long they have been in the environment. Munitions should never be touched, moved or disturbed. Residents can help protect themselves, their families and their neighbors from the potential explosive hazards present by learning and following the 3R's of Safety.



Maroon Crater Artillery Range Information

Emergency Contact Call 911

Contact LTC James Crowley at:
(703) 601-7785
James.C.Crowley.mil@mail.mil
for additional information.

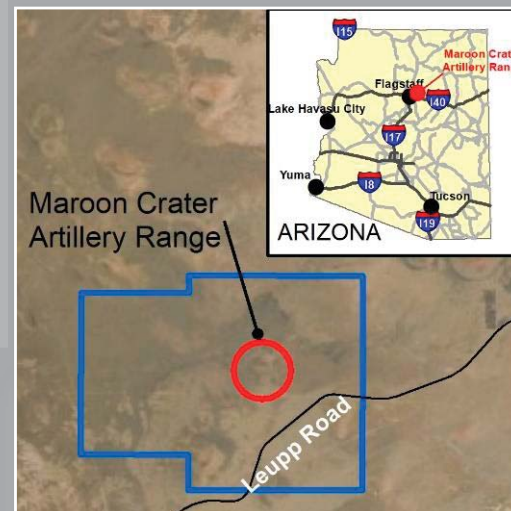
Learn and follow the 3Rs of explosives safety



Visit the US Army's Explosive Safety Education website:
<https://www.denix.osd.mil/uxosafety>

Maroon Crater Artillery Range

3Rs Safety Guide



Follow the 3Rs



Recognize

Recognize when you may have encountered a munition.

Recognizing when you may have encountered a munition is the most important step in reducing the risk of injury or death. Munitions may be encountered on land or in the water. They may be easy or hard to identify.

To avoid the risk of injury or death:

- Never move, touch or disturb a munition or a suspect munition
- Be aware that munitions do not become safer with age, in fact they may become more dangerous
- Don't be tempted to take or keep a munition as a souvenir

Munitions come in many sized, shapes and colors. Some may look like bullets or bombs while others may look like pipes, small cans or even a car muffler. Whether whole or in parts, new or old, shiny or rusty, munitions can still explode. The easiest way to avoid injury or death is to stay out of areas marked with warning signs.

Retreat

Do not touch, move or disturb it, but carefully leave the area.

Avoid death or injury by recognizing that you may have encountered a munition and promptly retreating from the area.

If you encounter what you believe is a munition, do not touch, move or disturb it. Instead, immediately and carefully leave the area by retracing your steps-going out the way you entered. Once safely away from the munition, mark the path (e.g., with a piece of clothing) so response personnel can find the munition.



Report

Immediately notify the police, if on land, or the U.S. Coast Guard, if on navigable waters.

Protect yourself, your family, your friends and your community by immediately reporting munitions or suspected munitions to the police.

Help us by providing as much information as possible about what you saw and where you saw it. This will help the police and military or civilian explosive ordnance disposal personnel find, evaluate and address the situation.

If you believe you may have encountered a munition, call **911** and report:

- The general area you encountered it
- Its general description. Remember, do not touch, move or disturb it.
- When possible, provide:
 - Its estimated size
 - Its shape
 - Any visible markings, including color

APPENDIX C

KEY CONTACTS

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KEY CONTACTS	
C.1 FEDERAL AGENCY PROJECT REPRESENTATIVES	
ARNG	
Walt Gee Army National Guard Directorate Representative ARNG-IED 111 South George Mason Drive Arlington, VA 22204	(703) 607-7980 walter.f.gee.ctr@mail.mil
John Haines Army National Guard Directorate NDNODS Program Manager ARNG-ILE-C 111 South George Mason Drive Arlington, VA 22204	(703) 607-7986 john.b.haines.ctr@mail.mil
USACE	
Jim Lukasko MMRP Program Manager U. S. Army Corps of Engineers, Sacramento District 1325 J Street Sacramento, CA 95814-2922	(916) 557-5392 james.j.lukasko@usace.army.mil
Wayne Davis USACE Representative Environmental and Munitions Design Center U.S. Army Corps of Engineers, Baltimore District 2 Hopkins Plaza, Room 09-F-05 Baltimore, MD 21201	(410) 962-3506 wayne.f.davis@usace.army.mil
Cheryl Webster USACE Project Geophysicist US. Army Corps of Engineers, Sacramento District 1325 J Street Sacramento, CA 95814-2922	(916) 557-7504 cheryl.l.webster@usace.amry.mil
AZARNG	
Kim Birdsall Restoration Program Manager Army National Guard Environmental Office 5636 East McDowell Road, Building M5350 Phoenix AZ 85008-3495	(602) 267-2498 birdsallk@emo.azdema.gov
USFS	
Joshua Peck USFS Deputy District Range Coconino National Forest, Flagstaff Ranger District 5075 US-89 Flagstaff, AZ 86004	(928) 527-8214 joshua.p.peck@usda.gov

Maria McGaha, P. E. USFS Regional Environmental Engineer 333 Broadway Blvd Albuquerque, NM 87102	(505) 842-3837 maria.mcgaha@usda.gov
--	--

C.2 STATE AGENCY PROJECT REPRESENTATIVES

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--	--

Jerry Helton ADEQ Project Manager Federal Projects Unit Arizona Department of Environmental Quality 1110 W Washington Street Phoenix, AZ 85007	(520) 209-4265 helton.jerry@azdeq.gov
--	--

Erin Davis Arizona State Historic Preservation Office Archaeological Compliance Specialist 1100 W Washington Street Phoenix, AZ 85007	(602) 542-7141 edavis@azstateparks.gov
---	--

C.3 WESTON SOLUTIONS, INC. PROJECT REPRESENTATIVES

Mark Bell Program Manager 1435 Garrison Street, Suite 100 Lakewood, CO 80215	(303) 729-6153 (office) mark.bell@westonsolutions.com
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--	--

Lara Lugo, P.G. Project Geoscientist Weston Solutions, Inc. 805 N. Last Chance Gulch Helena, MT 59601	(406) 502-1570, ext. 2503 lara.lugo@westonsolutions.com
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APPENDIX D

ANNUAL AND CERCLA FIVE-YEAR REPORTING CHECKLIST

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Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name:	Date of inspection:
Location and Region:	EPA ID:
Agency, office, or company leading the five-year review:	Weather/temperature:
Remedy Includes: (Check all that apply) ☐ Landfill cover/containment ☐ Access controls ☐ Institutional controls ☐ Groundwater pump and treatment ☐ Surface water collection and treatment ☐ Other _____ ☐ Monitored natural attenuation ☐ Groundwater containment ☐ Vertical barrier walls	
Attachments: ☐ Inspection team roster attached ☐ Site map attached	
II. INTERVIEWS (Check all that apply)	
1. O&M site manager _____ Name Title Date Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____ Problems, suggestions; ☐ Report attached _____ _____	
2. O&M staff _____ Name Title Date Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____ Problems, suggestions; ☐ Report attached _____ _____	

- 3.

Agency _____
 Contact _____

Name	Title	Date	Phone no.
Problems; suggestions; ☐ Report attached			

Agency _____
 Contact _____

Name	Title	Date	Phone no.
Problems; suggestions; ☐ Report attached			

Agency _____
Contact _____

Name	Title	Date	Phone no.
Problems; suggestions; ☐ Report attached			

Agency _____
 Contact _____

Name	Title	Date	Phone no.
Problems; suggestions; ☐ Report attached			

- 4.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)				
1.	O&M Documents ☐ O&M manual ☐ As-built drawings ☐ Maintenance logs Remarks _____	☐ Readily available ☐ Readily available ☐ Readily available	☐ Up to date ☐ Up to date ☐ Up to date	☐ N/A ☐ N/A ☐ N/A
2.	Site-Specific Health and Safety Plan ☐ Contingency plan/emergency response plan Remarks _____	☐ Readily available ☐ Readily available	☐ Up to date ☐ Up to date	☐ N/A ☐ N/A
3.	O&M and OSHA Training Records Remarks _____	☐ Readily available	☐ Up to date	☐ N/A
4.	Permits and Service Agreements ☐ Air discharge permit ☐ Effluent discharge ☐ Waste disposal, POTW ☐ Other permits _____ Remarks _____	☐ Readily available ☐ Readily available ☐ Readily available ☐ Readily available	☐ Up to date ☐ Up to date ☐ Up to date ☐ Up to date	☐ N/A ☐ N/A ☐ N/A ☐ N/A
5.	Gas Generation Records Remarks _____	☐ Readily available	☐ Up to date	☐ N/A
6.	Settlement Monument Records Remarks _____	☐ Readily available	☐ Up to date	☐ N/A
7.	Groundwater Monitoring Records Remarks _____	☐ Readily available	☐ Up to date	☐ N/A
8.	Leachate Extraction Records Remarks _____	☐ Readily available	☐ Up to date	☐ N/A
9.	Discharge Compliance Records ☐ Air ☐ Water (effluent) Remarks _____	☐ Readily available ☐ Readily available	☐ Up to date ☐ Up to date	☐ N/A ☐ N/A
10.	Daily Access/Security Logs Remarks _____	☐ Readily available	☐ Up to date	☐ N/A

IV. O&M COSTS**1. O&M Organization**

- ☐ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other _____

2. O&M Cost Records

- ☐ Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
 Original O&M cost estimate _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From _____	To _____	_____	☐ Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	☐ Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	☐ Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	☐ Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	☐ Breakdown attached
Date	Date	Total cost	

3. Unanticipated or Unusually High O&M Costs During Review Period

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☐ Applicable ☐ N/A**A. Fencing**

- 1. Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A
 Remarks _____

B. Other Access Restrictions

- 1. Signs and other security measures** ☐ Location shown on site map ☐ N/A
 Remarks _____

C. Institutional Controls (ICs)				
1.	Implementation and enforcement			
Site conditions imply ICs not properly implemented		☐ Yes	☐ No	☐ N/A
Site conditions imply ICs not being fully enforced		☐ Yes	☐ No	☐ N/A
Type of monitoring (e.g., self-reporting, drive by) _____				
Frequency _____				
Responsible party/agency _____				
Contact _____				
Name		Title	Date	Phone no.
Reporting is up-to-date		☐ Yes	☐ No	☐ N/A
Reports are verified by the lead agency		☐ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met		☐ Yes	☐ No	☐ N/A
Violations have been reported		☐ Yes	☐ No	☐ N/A
Other problems or suggestions: ☐ Report attached				

2.	Adequacy		☐ ICs are adequate	☐ ICs are inadequate
Remarks _____		☐ N/A		

D. General				
1.	Vandalism/trespassing		☐ Location shown on site map	☐ No vandalism evident
Remarks _____				

2.	Land use changes on site		☐ N/A	
Remarks _____				

3.	Land use changes off site		☐ N/A	
Remarks _____				

VI. GENERAL SITE CONDITIONS				
A. Roads ☐ Applicable ☐ N/A				
1.	Roads damaged		☐ Location shown on site map	☐ Roads adequate
Remarks _____				

B. Other Site Conditions			
Remarks _____ _____ _____ _____ _____			
VII. LANDFILL COVERS ☐ Applicable ☐ N/A			
A. Landfill Surface			
1.	Settlement (Low spots) Areal extent _____ Depth _____ Remarks _____	☐ Location shown on site map ☐ Settlement not evident	
2.	Cracks Lengths _____ Widths _____ Depths _____ Remarks _____	☐ Location shown on site map ☐ Cracking not evident	
3.	Erosion Areal extent _____ Depth _____ Remarks _____	☐ Location shown on site map ☐ Erosion not evident	
4.	Holes Areal extent _____ Depth _____ Remarks _____	☐ Location shown on site map ☐ Holes not evident	
5.	Vegetative Cover ☐ Grass ☐ Cover properly established ☐ No signs of stress ☐ Trees/Shrubs (indicate size and locations on a diagram) Remarks _____		
6.	Alternative Cover (armored rock, concrete, etc.) ☐ N/A Remarks _____		
7.	Bulges Areal extent _____ Height _____ Remarks _____	☐ Location shown on site map ☐ Bulges not evident	

8.	Wet Areas/Water Damage ☐ Wet areas ☐ Ponding ☐ Seeps ☐ Soft subgrade Remarks _____	☐ Wet areas/water damage not evident ☐ Location shown on site map Areal extent _____ ☐ Location shown on site map Areal extent _____ ☐ Location shown on site map Areal extent _____ ☐ Location shown on site map Areal extent _____
9.	Slope Instability ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability Areal extent _____ Remarks _____	
B. Benches ☐ Applicable ☐ N/A (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	Flows Bypass Bench Remarks _____	☐ Location shown on site map ☐ N/A or okay
2.	Bench Breached Remarks _____	☐ Location shown on site map ☐ N/A or okay
3.	Bench Overtopped Remarks _____	☐ Location shown on site map ☐ N/A or okay
C. Letdown Channels ☐ Applicable ☐ N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	Settlement Areal extent _____ Depth _____ Remarks _____	☐ Location shown on site map ☐ No evidence of settlement
2.	Material Degradation Material type _____ Areal extent _____ Remarks _____	☐ Location shown on site map ☐ No evidence of degradation
3.	Erosion Areal extent _____ Depth _____ Remarks _____	☐ Location shown on site map ☐ No evidence of erosion

4.	Undercutting Areal extent _____ Depth _____ Remarks _____	☐ Location shown on site map ☐ No evidence of undercutting	
5.	Obstructions Type _____ ☐ Location shown on site map Areal extent _____ Size _____ Remarks _____	☐ No obstructions	
6.	Excessive Vegetative Growth Type _____ ☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow ☐ Location shown on site map Areal extent _____ Remarks _____		
D. Cover Penetrations ☐ Applicable ☐ N/A			
1.	Gas Vents ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks _____	☐ Active ☐ Passive	
2.	Gas Monitoring Probes ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks _____		
3.	Monitoring Wells (within surface area of landfill) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks _____		
4.	Leachate Extraction Wells ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A Remarks _____		
5.	Settlement Monuments Remarks _____	☐ Located ☐ Routinely surveyed ☐ N/A	

E. Gas Collection and Treatment ☐ Applicable ☐ N/A			
1.	Gas Treatment Facilities ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse ☐ Good condition ☐ Needs Maintenance Remarks _____ _____		
2.	Gas Collection Wells, Manifolds and Piping ☐ Good condition ☐ Needs Maintenance Remarks _____ _____		
3.	Gas Monitoring Facilities (<i>e.g.</i> , gas monitoring of adjacent homes or buildings) ☐ Good condition ☐ Needs Maintenance ☐ N/A Remarks _____ _____		
F. Cover Drainage Layer ☐ Applicable ☐ N/A			
1.	Outlet Pipes Inspected ☐ Functioning ☐ N/A Remarks _____ _____		
2.	Outlet Rock Inspected ☐ Functioning ☐ N/A Remarks _____ _____		
G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A			
1.	Siltation Areal extent _____ Depth _____ ☐ N/A ☐ Siltation not evident Remarks _____ _____		
2.	Erosion Areal extent _____ Depth _____ ☐ Erosion not evident Remarks _____ _____		
3.	Outlet Works ☐ Functioning ☐ N/A Remarks _____ _____		
4.	Dam ☐ Functioning ☐ N/A Remarks _____ _____		

H. Retaining Walls		☐ Applicable ☐ N/A
1.	Deformations ☐ Location shown on site map ☐ Deformation not evident Horizontal displacement _____ Vertical displacement _____ Rotational displacement _____ Remarks _____ _____	
2.	Degradation ☐ Location shown on site map ☐ Degradation not evident Remarks _____ _____	
I. Perimeter Ditches/Off-Site Discharge		☐ Applicable ☐ N/A
1.	Siltation ☐ Location shown on site map ☐ Siltation not evident Areal extent _____ Depth _____ Remarks _____ _____	
2.	Vegetative Growth ☐ Location shown on site map ☐ N/A ☐ Vegetation does not impede flow Areal extent _____ Type _____ Remarks _____ _____	
3.	Erosion ☐ Location shown on site map ☐ Erosion not evident Areal extent _____ Depth _____ Remarks _____ _____	
4.	Discharge Structure ☐ Functioning ☐ N/A Remarks _____ _____	
VIII. VERTICAL BARRIER WALLS		☐ Applicable ☐ N/A
1.	Settlement ☐ Location shown on site map ☐ Settlement not evident Areal extent _____ Depth _____ Remarks _____ _____	
2.	Performance Monitoring Type of monitoring _____ ☐ Performance not monitored Frequency _____ ☐ Evidence of breaching Head differential _____ Remarks _____ _____	

IX. GROUNDWATER/SURFACE WATER REMEDIES		☐ Applicable	☐ N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		☐ Applicable	☐ N/A
1.	Pumps, Wellhead Plumbing, and Electrical ☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks _____ _____ _____		
2.	Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances ☐ Good condition ☐ Needs Maintenance Remarks _____ _____ _____		
3.	Spare Parts and Equipment ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks _____ _____ _____		
B. Surface Water Collection Structures, Pumps, and Pipelines		☐ Applicable	☐ N/A
1.	Collection Structures, Pumps, and Electrical ☐ Good condition ☐ Needs Maintenance Remarks _____ _____ _____		
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances ☐ Good condition ☐ Needs Maintenance Remarks _____ _____ _____		
3.	Spare Parts and Equipment ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks _____ _____ _____		

C. Treatment System		☐ Applicable	☐ N/A
1.	Treatment Train (Check components that apply) ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation ☐ Air stripping ☐ Carbon adsorbers ☐ Filters _____ ☐ Additive (e.g., chelation agent, flocculent) _____ ☐ Others _____ ☐ Good condition ☐ Needs Maintenance ☐ Sampling ports properly marked and functional ☐ Sampling/maintenance log displayed and up to date ☐ Equipment properly identified ☐ Quantity of groundwater treated annually _____ ☐ Quantity of surface water treated annually _____ Remarks _____ _____		
2.	Electrical Enclosures and Panels (properly rated and functional) ☐ N/A ☐ Good condition ☐ Needs Maintenance Remarks _____ _____		
3.	Tanks, Vaults, Storage Vessels ☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance Remarks _____ _____		
4.	Discharge Structure and Appurtenances ☐ N/A ☐ Good condition ☐ Needs Maintenance Remarks _____ _____		
5.	Treatment Building(s) ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair ☐ Chemicals and equipment properly stored Remarks _____ _____		
6.	Monitoring Wells (pump and treatment remedy) ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition ☐ All required wells located ☐ Needs Maintenance ☐ N/A Remarks _____ _____		
D. Monitoring Data			
1.	Monitoring Data ☐ Is routinely submitted on time ☐ Is of acceptable quality		
2.	Monitoring data suggests: ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining		

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

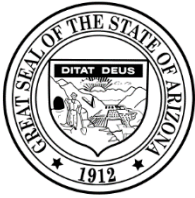
D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

APPENDIX E

STAKEHOLDER COMMENTS

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Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

October 1, 2019

FPU 20-072

Mr. James Lukasko
Project Manager
US Army Corps of Engineers
Sacramento District CESP-K-PM-H
1325 J Street
Sacramento, CA 95814

Re: Maroon Crater Artillery Range – ADEQ Review of the Stakeholder Draft Land Use Control Implementation Plan (LUCIP), Maroon Crater Artillery Range, Coconino County, Arizona.

Dear Mr. Lukasko:

The Arizona Department of Environmental Quality (ADEQ) Federal Projects Unit and ADEQ contractor UXO Pro has reviewed the above referenced draft LUCIP and have the following comments:

Comments:

The ROD and the LUCIP state that the remediation effort within the MCAR MRS will consist of surface and subsurface (to 24-in. bgs) removal of MEC across the accessible portions of the MRS using Advanced Geophysical Classification (AGC) methods.

Section 1.4 of the ROD also states, “Surface and subsurface removal of (DoD) military munitions (approximately 12 months of remedial operations) will be implemented across the entire MRS, where accessible.”

Areas within most every MRS across the U.S. have accessible areas that neither DGM, nor AGC can be accurately performed due to saturation and/or terrain that both types of technologies are subject to. What remedial actions within the MCAR MRS will be taken in these types of areas to protect human health? These types of areas are not addressed within the current LUCIP.

Thank you for the opportunity to review this document. If you have any questions regarding this correspondence, please contact me by phone at (520) 209-4265 or by e-mail at helton.jerry@azdeq.gov.

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Sincerely,

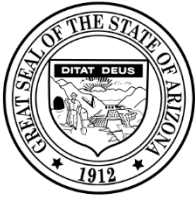
A handwritten signature in cursive script that reads "Jerry Helton".

Jerry Helton
Project Manager
Federal Projects Unit
Waste Programs Division, ADEQ

Cc: John Haines, Army National Guard (via email)
Kim Birdsall, Arizona Department of Emergency and Military Affairs (via email)
Tim Trego, Weston Solutions, Inc. (via email)
Tom Bourque, UXO Pro, Inc. (via email)

Comments for the						
Stakeholder Draft Land Use Control Implementation Plan MMRP Munitions Response Services Army National Guard Bureau Maroon Crater Artillery Range (AZHQ-009-R-01) Remedial Action, Arizona						
Comment Number	Commenter	Page(s)	Section	Line(s)	Comment	Response
TECHNICAL COMMENTS						
1	JH				The ROD and the LUCIP state that the remediation effort within the MCAR MRS will consist of surface and subsurface (to 24-in. bgs) removal of MEC across the accessible portions of the MRS using Advanced Geophysical Classification (AGC) methods. Section 1.4 of the ROD also states, "Surface and subsurface removal of (DoD) military munitions (approximately 12 months of remedial operations) will be implemented across the entire MRS, where accessible." Areas within most every MRS across the U.S. have accessible areas that neither DGM, nor AGC can be accurately performed due to saturation and/or terrain that both types of technologies are subject to. What remedial actions within the MCAR MRS will be taken in these types of areas to protect human health? These types of areas are not addressed within the current LUCIP.	Concur Areas within the MRS that are not accessible to AGC methods will be cleared using analog metal detectors, such as around dense vegetation or in areas of difficult terrain. However, it is expected that a portion of the MRS will be completely inaccessible on the slopes of Maroon Crater. For this reason, LUCs will be implemented to protect human health at the MRS after the RA is complete. The following text has been added to Section 1.1 for clarification (page 1-2, lines 2-4): Because MD representing potential MEC was encountered during the Remedial Investigation (RI), there is the potential for human receptors to come in contact with MEC via intrusive and non-intrusive activities within the MCAR MRS. Surface and subsurface (to 24-in. bgs) removal of MEC across the accessible portions of the MRS will use AGC methods. AGC was chosen as the preferred method for removal of MEC as it is considered to be more beneficial than just digital geophysical mapping (DGM). AGC is the latest and most advanced technology and will provide a digital record while reducing the number of intrusive investigations. <i>However, should some areas prove to be inaccessible to AGC methods, such as around dense vegetation or in difficult terrain, analog geophysical methods (hand held metal detectors) may be used, where it is safe to do so. Areas inaccessible to all geophysical clearance methods (such as on the steep slopes of the Maroon Crater cinder cone) will be clearly delineated during the removal action and LUCs will be implemented to address these areas.</i> Additionally, this will be covered in detail in the UFP-QAPP/Work Plan.
2	JH				End of comments.	
EDITORIAL COMMENTS						
					None.	
COMMENTS PROVIDED BY						
Initials	Name	Department/Organization	Email Address			Phone
JH	Jerry Helton	ADEQ	helton.jerry@azdeg.gov			520-209-4265

Comments for the							
Stakeholder Draft Land Use Control Implementation Plan MMRP Munitions Response Services Army National Guard Bureau Maroon Crater Artillery Range (AZHQ-009-R-01) Remedial Action, Arizona							
Comment Number	Commenter	Page(s)	Section	Line(s)	Comment	Response Code	Response
TECHNICAL COMMENTS							
1	MM	C-1			The federal contacts are Joshua Peck, District Ranger; and Maria McGaha, P.E., Regional Environmental Engineer (maria.mcgaha@usda.gov < Caution-mailto:maria.mcgaha@usda.gov > ; 505-842-3837; 333 Broadway Blvd, Albuquerque, NM 87102). Please remove Tina Williams from the contact list.	Concur	Joshua Peck and Maria McGaha have been added as Federal contacts. Tina Williams has been removed from the contact list.
2	MM				Entire document: Modify the word "removal" to "remedial"	Concur	The word "removal" has been revised to "remedial" in the text where it makes sense to do so. (For example, where the text discusses MEC removal, the word "removal" was retained in some areas).
3	MM				Map: Clearly delineate the area for ROE, and clarify symbols in the legend. There is a yellow-highlighted area and another area delineated with a border.	Concur	A new map (Figure 3) showing the parcel requiring ROE has been added for clarity. No changes have been made to the other figures other than to change the previous Figure 3 to Figure 4 and to add the steep area in the legend to Figure 4.
					End of comments.		
EDITORIAL COMMENTS							
1	MM				None.		
COMMENTS PROVIDED BY							
Initials	Name	Department/Organization	Email Address			Phone	
MM	Maria McGaha, P.E.	USFS	maria.mcgaha@usda.gov			505-842-3837	



Douglas A. Ducey
Governor

ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY



Misael Cabrera
Director

March 9, 2020

FPU 20-212

Mr. James Lukasko
Project Manager
US Army Corps of Engineers
Sacramento District CESP-K-PM-H
1325 J Street
Sacramento, CA 95814

Re: Maroon Crater Artillery Range – ADEQ Review of the Stakeholder Draft Land Use Control Implementation Plan (LUCIP), Maroon Crater Artillery Range, Coconino County, Arizona.

Dear Mr. Lukasko:

The Arizona Department of Environmental Quality (ADEQ) Federal Projects Unit and ADEQ contractor UXO Pro have reviewed the AZARNG's response to ADEQ's comments for the Maroon Crater Stakeholder Draft LUCIP, Maroon Crater Artillery Range. All comments have been addressed and ADEQ concurs with the current Draft.

Thank you for the opportunity to review this document. If you have any questions regarding this correspondence, please contact me by phone at (520) 209-4265 or by e-mail at Helton.Jerry@azdeq.gov.

Sincerely,

Jerry Helton
Project Manager
Federal Projects Unit
Waste Programs Division, ADEQ

Cc: John Haines, Army National Guard (via email)
Kim Birdsall, Arizona Department of Emergency and Military Affairs (via email)
Tim Trego, Weston Solutions, Inc. (via email)
Steven Willis, UXO Pro, Inc. (via email)

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