



UNITED STATES MARINE CORPS  
MARINE CORPS INSTALLATIONS NATIONAL CAPITAL REGION  
MARINE CORPS BASE QUANTICO  
3250 CATLIN AVENUE  
QUANTICO, VIRGINIA 22134-5001

MCINCR-MCBQO 5090.1  
B 041

DEC 15 2022

MARINE CORPS INSTALLATIONS NATIONAL CAPITAL REGION-MARINE CORPS BASE ORDER  
5090.1

From: Commander, Marine Corps Installations National Capital Region-Marine  
Corps Base Quantico  
To: Distribution List

Subj: MARINE CORPS INSTALLATIONS NATIONAL CAPITAL REGION-MARINE CORPS BASE  
QUANTICO LUNGA RECREATION AREA OPERATIONS

Ref: (a) MCBO 11015.2D  
(b) MCBBu1 11015  
(c) MCINCR-MCBQO 5560.2E  
(d) Provost Marshall Instruction 2-20

Encl: (1) Interim Land Use Control Plan Lunga Recreation Area

1. Situation. The Lunga Recreation Area was closed in 2012 due to munitions findings associated with historical range activity. As part of the remediation efforts, the area was divided into four Munition Response Sites (MSR). These sites are Unexploded Ordnance (UXO) 34, UXO 35, UXO 38, and UXO 39 as shown in Figure 1.1 of enclosure (1). The remediation has been conducted for UXO 34 and UXO 35 and approval has been given to operate those areas under the Interim Land Use Control (LUC) Plan. UXO 38 and UXO 39 remain closed and under active remediation.

2. Mission

a. To establish guidelines and responsibilities for the operation of the Lunga Recreation Area in accordance with the Interim Land Use Control Plan.

b. To ensure that the Interim Land Use Control Plan is promulgated throughout Marine Corps Base Quantico (MCBQ).

3. Execution

a. Commander's Intent and Concept of Operations

(1) Commander's Intent. To provide outdoor recreational activities for authorized patrons aboard MCBQ at the Lunga Recreation Area.

(2) Concept of Operations

(a) Recreational Activities. All recreational activities at the Lunga Recreation area will comply with the Interim Land Use Control Plan (enclosure 1).

1. Camping. Camping is allowed in designated campsites only. Campsites must be reserved through MCCA. Tent stakes may not be longer than eight (8) inches. Fires are allowed in designated fire rings only; no digging for fire pits or other holes at the recreation area is

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

DEC 15 2022

allowed. Fires will be prohibited during Marine Corps Installations National Capital Region-Marine Corps Base Quantico (MCINCR-MCBQ) Fire Condition Classes 4 and 5. No standing trees or shrubs will be cut down for firewood. Campfires and cooking fires are restricted to designated fire rings and above-ground grill locations. The use of generators is not permitted.

2. Boating and Fishing. Boating is restricted to electric motors only. Boats with both gas and electric motors are allowed to utilize the electric motor only with the gas engine fully out of the water. No secondary fuel containers are allowed in boats. No anchoring (including the use of power poles) of any boats at the bottom of Lunga Reservoir is allowed; patrons should avoid any disturbance of the sediments at the bottom of the reservoir during boating and fishing activities. The boating requirements will be identified to patrons as part of the safe boater test when renting boats for use on the reservoir. Boaters must check the flagpole at the boat launch area, and if the active range use flag is flying, then boaters shall not pass the Safety Danger Zones buoys within the reservoir. All boaters and anglers must adhere to policies and procedures outlined in references (a) and (b) and must check in and out via the iSportsman website <https://quantico.isportsman.net>. Magnet fishing is strictly prohibited. Gas-powered maintenance and emergency/rescue boats are allowed.

3. Swimming/Wading. Swimming and wading are not authorized within the reservoir or anywhere in the recreation area. This restriction shall apply to both patrons and their pets.

4. Running/Hiking. Running and hiking activities will be limited to established roads and trails.

(b) Roles and Responsibilities

1. Marine Corps Community Services (MCCS)

a. Establish outdoor recreational programs and services at the Lunga Recreation Area for military members and qualified DoD civilians and their families. Ensure that all programs and services comply with the Interim Land Use Control Plan (enclosure 1).

b. Provide staffing and equipment to support the programs and services at the Lunga Recreation Area.

c. MCCS will conduct a visual inspection of each designated campsite after each rental to ensure the backfill layer (6 inches) has not been compromised (for example, a hole dug through the backfill) or eroded. If the backfill layer is compromised, MCCS will address this by adding additional backfill or mitigating the impact otherwise as a maintenance item.

d. Provide a Lunga Safety Brochure to Lunga Recreation Area visitors. Ensure that the brochure is available (at the Camp Store and Office; and kiosk within the Oak Camping Area), that the content communicates potential munitions hazards, and is provided to all Lunga Recreation Area visitors as part of check-in and recreation area entry. Ensure that the MCCS Lunga Park website and the MCBQ iSportsman website contain the brochure available for viewing and download.

DEC 15 2022

e. Provide Park Information, fees, and charges brochure to Lunga Recreation Area visitors. Ensure that the brochure is available (at the Camp Store and Office) and that the restrictions regarding camping, boating, fishing, swimming, and wading are identified to camp patrons and visitors as part of the check-in, registration, and recreation area entry. Ensure that the MCCA Lunga Park website contains the brochure available for viewing and download. Ensure that the safe boater test (when using motorboats) communicates the no anchoring (including the use of power poles) at the bottom of the reservoir requirement. Ensure that the boat motors over ten (10) horsepower will be operated at idle speed only on the reservoir.

f. Ensure Lunga Recreation Areas staff have received Munitions Safety Awareness Training provided by Safety Division.

## 2. Natural Resources and Environmental Affairs (NREA)

a. Incorporate the Lunga Recreation Area into the MCBQ Fish and Wildlife Management Program.

b. Conservation Law Enforcement Officers (CLEOs) will enforce all hunting, fishing, and boating regulations per references (a) and (b). CLEOs will enforce all violations pertaining to natural and cultural resources and environmental protection regulations.

c. Ensure the Lunga Recreation Area Safety Brochure is provided on the MCBQ iSportsman website for viewing and download.

d. Review Excavation Permit Request Forms for the Lunga Recreation Area to ensure that the notice of the potential munitions items, associated land use restrictions, and the need for on-site UXO construction support is identified through the MCBQ NREA Branch approval of the form.

3. Provost Marshals Office (PMO). Shall be responsible for motor vehicle traffic supervision and enforcement, drug countermeasures, and serious criminal convictions as outlined in references (c) and (d).

## 4. Range Control

a. Notify MCCA staff when training areas adjacent to the Lunga Recreation Area are in use.

b. Post the range flag located near the boat ramp at the Lunga Recreation Area when adjacent training areas are in use. Coordinate with MCCA staff to ensure that the range flag is posted prior to allowing users access to the reservoir.

c. Ensure Range Management buoys, flags, and associated access control marker system within the reservoir is present and working.

## 5. Safety

a. Ensure UXO Munitions Safety Awareness Training is provided and documented for MCCA and other MCBQ staff working at the Lunga Recreation Area per enclosure (1).

DEC 15 2022

b. Maintain copies of emergency MCBQ Explosive Ordnance Disposal Support calls to the Lunga Recreation Area for any investigation/removal of potential Munitions and Explosives of Concern items.

c. Review all construction support plans for intrusive work conducted at the Lunga Recreation Area to ensure compliance with the Land Use Controls or any applicable Explosives Safety Determination Requests (ESSDR) or Explosives Safety Submissions (ESS).

4. Administration and Logistics. The Lunga Recreation Area will be under the operational control of the AC/S Marine Corps Community Services.

5. Command and Signal

a. Command. This Order is applicable to all activities assigned to MCINCR-MCBQ and subordinate commands.

b. Signal. This Order is effective on the date signed.

  
MICHAEL L. BROOKS

DISTRIBUTION: A



**Final**

**Interim Land Use Control Plan**

**Lunga Recreation Area**

Marine Corps Installations National Capital Region – Marine Corps Base Quantico  
Quantico, Virginia

August 2020

**ENCLOSURE ( 1 )**

---



**Final**

**Interim Land Use Control Plan  
Lunga Recreation Area**

Marine Corps Installations National Capital Region – Marine Corps Base Quantico  
Quantico, Virginia

August 2020

Prepared for NAVFAC Washington  
by CH2M HILL, Inc.  
Herndon, Virginia  
Contract N62470-16-D-9000  
CTO JU15



**ENCLOSURE (1)**

---

# Contents

<b>Acronyms and Abbreviations</b> .....	<b>vii</b>
<b>1 Introduction</b> .....	<b>1-1</b>
1.1 Ongoing and Future Munitions Response Program Activities.....	1-1
1.2 Summary of Historical Recreation Area Uses.....	1-2
<b>2 Course of Action Selection and Required Land Use Controls</b> .....	<b>2-1</b>
<b>3 Definition of Interim Land Use Controls</b> .....	<b>3-1</b>
3.1 Interim Land Use Control Objectives.....	3-1
3.2 Interim Land Use Control Areas.....	3-1
3.3 Interim Land Use Control Implementation.....	3-2
3.3.1 Controls on Intrusive Activities.....	3-2
3.3.2 Controls on Surface Access.....	3-2
3.3.3 Engineering Controls.....	3-3
3.3.4 Institutional Controls.....	3-5
3.4 Unexploded Ordnance Construction Support.....	3-6
3.4.1 Emergency Utility Repairs.....	3-6
3.4.2 Other Ground Disturbing Activities.....	3-7
3.4.3 Tree Management.....	3-7
3.4.4 Reservoir Water Level and Drought Monitoring.....	3-8
3.5 Inspection Activities.....	3-9
3.5.1 Tree and Exposed Root Ball Survey.....	3-9
3.5.2 Camping Backfill Inspection.....	3-10
3.5.3 Annual Inspection Checklist.....	3-10
3.6 Lunga Advisory Council Meetings.....	3-11
<b>4 Schedule</b> .....	<b>4-1</b>
<b>5 References</b> .....	<b>5-1</b>

## Exhibit

- 1 Land Use Control Types and Responsible Party

## Appendixes

- A Course of Action Memo
- B Suggested Language for Safety Brochure
- C Munitions Safety Awareness Training for Lunga Recreation Area Staff
- D Annual Inspection Checklist

## Tables

- 1-1 Camping Sites Previously Located at Lunga Recreation Area
- 2-1 Course of Action 5 Description - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)
- 3-1 Tree Management Summary Table

**Figures**

- 1-1 Lunga Recreation Area Boundary and Major Features
- 3-1 Interim Land Use Control Areas
- 3-2 Interim Land Use Control Boundary Lines
- 3-3 Gate Location: Grassy Area South of Camp Store and Office
- 3-4 Gate Location: East of Lunga Road at Intersection with Former Tank Trail
- 3-5 Gate Locations: West of Lunga Road at Intersection for Recreation Road and Back Entrance to FBI Academy
- 3-6 Eastern and Western Shoreline Areas: Potential for Recreational Use Restrictions (Drought/Low Water Conditions)
- 3-7 Tree and Exposed Root Ball Survey Area

**ENCLOSURE (1)**



# Acronyms and Abbreviations

3R	<u>R</u> ecognize, <u>R</u> etreat, and <u>R</u> eport
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COA	Course of Action
dbh	diameter breast height
EOD	Explosive Ordnance Disposal
ESS	Explosives Safety Submission
ESSDR	Explosives Safety Submission Determination Request
FBI	Federal Bureau of Investigation
LUC	Land Use Control
MCINCR	Marine Corps Installations National Capital Region
MCSC	Marine Corps Systems Command
MCBQ	Marine Corps Base Quantico
MCCS	Marine Corps Community Services
MEC	munitions and explosives of concern
MPPEH	Material Potentially Presenting an Explosive Hazard
MRP	Munitions Response Program
MRS	munitions response site
msl	mean sea level
NAVFAC	Naval Facilities Engineering Command
Navy	Department of the Navy
NIRIS	Naval Installation Restoration Information Solution
NREA	Natural Resources and Environmental Affairs
ROD	Record of Decision
RV	recreational vehicle
TA	Training Area
UXO	Unexploded Ordnance

**ENCLOSURE ( 1 )**

# Introduction

This document presents the Interim Land Use Control (LUC) Plan for Lunga Recreation Area located at Marine Corps Installations National Capital Region (MCINCR) - Marine Corps Base Quantico (MCBQ) in Quantico, Virginia. **Figure 1-1** presents the major features in and around the recreation area as well as the four munitions response sites (MRSs) (UXO 034 Lunga Recreation Area South, UXO 035 Lunga Reservoir, UXO 038 Lunga Recreation Area Central, and UXO 039 Lunga Recreation Area North) undergoing investigation and cleanup through the Department of the Navy's (Navy's) Munitions Response Program (MRP). The Lunga Advisory Council (composed of members from MCBQ G-F Installation and Environment, Quantico Area Counsel Office, Natural Resources and Environmental Affairs [NREA], Explosives Safety Office, Range Management, Marine Corps Community Services [MCCS], Public Works, Federal Bureau of Investigation [FBI] Academy, and Naval Facilities Engineering Command [NAVFAC] Washington Environmental Restoration) has been developed to assemble the stakeholders and support the reopening of Lunga Recreation Area. This document is intended for use and application by the Council and their representatives to implement, manage, and monitor the interim LUCs specified herein. **Exhibit 1** presents a condensed summary of the engineering and institutional controls and the responsible party for installing, implementing, and maintain the specified control.

Lunga Recreation Area was closed to recreational use in 2012 because of munitions findings associated with historical range activities in the 1940s and 1950s (CH2M, 2017). The purpose of this document is to provide specific interim LUCs, including roles and responsibilities associated with the interim LUCs, in support of the reopening of the southern parcel and the reservoir of Lunga Recreation Area for recreational use. The southern parcel and the reservoir within the broader Lunga Recreation Area consist of the footprints of UXO 034 (Lunga Recreation Area South) and UXO 035 (Lunga Reservoir), respectively, as identified on **Figure 1-1**. The remediation efforts conducted and interim LUCs developed herein strive to provide the same recreational features and usage as was available before the 2012 closure to the greatest extent possible.

The foundational basis for the interim LUCs identified herein is the *Technical Memorandum: Potential Courses of Action for Reopening of Lunga Recreation Area, Marine Corps Base Quantico, Quantico, Virginia* (CH2M, 2017), hereafter referred to as the Course of Action (COA) Memo. The COA Memo presented six different COAs for the reopening of Lunga Recreation Area for recreational use and was specifically focused on the southern parcel. The COAs were developed to cover a wide range of land use options, estimated costs, and project durations. The selected COA (as agreed to by the stakeholders) was COA 5: Lunga Recreation Area Reopened at Munition Response Site UXO 034 (Access to Reservoir available; Camping Available)<sup>1</sup> and is further described in **Section 2**. Additional detail regarding historical munitions use and the Navy's MRP cleanup activities at Lunga Recreation Area are also presented within the COA Memo. The COA Memo is provided as **Appendix A** to this document.

## 1.1 Ongoing and Future Munitions Response Program Activities

All four MRSs within Lunga Recreation Area continue to be actively investigated and remediated through various phases of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process. UXO 038 (Lunga Recreation Area Central) and UXO 039 (Lunga Recreation Area North) will remain closed to recreational use until further notice. Ongoing and future investigation and cleanup activities at these four MRSs may require periodic, short-term closures to recreational use within portions of the reopened southern parcel and reservoir because of explosive arcs and safety considerations. These activities will be coordinated with the Lunga Advisory Council as discussed in **Section 3.6**.

The LUCs in this document are identified as *interim* and are for Base needs only. The final LUCs will not be officially or legally defined until the conclusion of the CERCLA process and the development of the Record of

---

<sup>1</sup> Selection of COA 5 based on Interim Progress Report meetings with Base leadership held at Lejeune Hall on July 13, 2017 and Lunga Park on May 14, 2018.

Decision (ROD) through the MRP. The interim LUCs will be implemented until the ROD and associated final LUCs are identified and implemented.

## 1.2 Summary of Historical Recreation Area Uses

Lunga Recreation Area (also referred to as Lunga Park) was a multi-purpose recreation area used for camping, boating, fishing, picnicking, and other recreational activities within the Guadalcanal portion of MCBQ. Primary patrons of the Lunga Recreation Area were military members and United States Department of Defense civilians in addition to members of the general public. Lunga Recreation Area was closed to recreational use in 2012 because of munitions findings. The major recreation features based on the 2012 pre-closure land use are presented on **Figure 1-1** and consist of the following:

- **Lunga Reservoir:** A manmade reservoir created from the construction of the Lunga Dam. Lunga Reservoir is approximately 520 acres; approximately 320 acres are within the recreation area, with the remainder of the reservoir being within active Training Areas (TAs) 10B and 10C.<sup>2</sup> The reservoir was historically used for boating and fishing activities. Swimming and wading in the reservoir was prohibited.
- **Camping Areas:** Camping areas were identified at seven locations consisting of the Oak Area, Group Camping Area 1, Cedar Area, Single Group Area, Pine Area, Hickory Area, and Group Camping Area 2. A total of 70 camping sites were identified within these camping areas as detailed in **Table 1-1** consisting of 45 tent and group camping sites and 25 recreational vehicle (RV) camping sites. The RV camping sites are identified based on full utility hookups (electric, water, and sewer) or partial utility hookups (electric and water).

**Table 1-1. Camping Sites Previously Located at Lunga Recreation Area**

Camping Area	Tent	Group	Full RV (Electric, Water, and Sewer)	Partial RV (Electric and Water)	Total Camping Sites
Oak Area	5	0	2	2	9
Group Camping Area 1	0	9	0	0	9
Cedar Area	8	0	11	4	23
Single Group Area	0	1	0	0	1
Pine Area	13	0	5	1	19
Hickory Area/Group Camping Area 2	0	9	0	0	9
<b>Total</b>	<b>26</b>	<b>19</b>	<b>18</b>	<b>7</b>	<b>70</b>

- **Picnicking Areas:** These include the Maple Area, FBI Recreation Area, and Civilian Workers Recreation Area.
- **Other recreation area uses:**
  - Seven picnicking pavilions were spread throughout the recreation area for group use.
  - A boat dock was located at the southern end of the reservoir near the Lunga Dam for boat rentals (rowboats, canoes, kayaks, paddleboats, aquacycles, and motorboats) and docking.
  - A fishing pier was located west of the Cedar Area, extending southward into the reservoir.
  - The Quantico Rod and Gun Club had a group gathering area west of the Cedar Area and Single Group Area. This area has been used for fishing competitions and group picnics, including supporting wounded veterans.

**ENCLOSURE (1)**

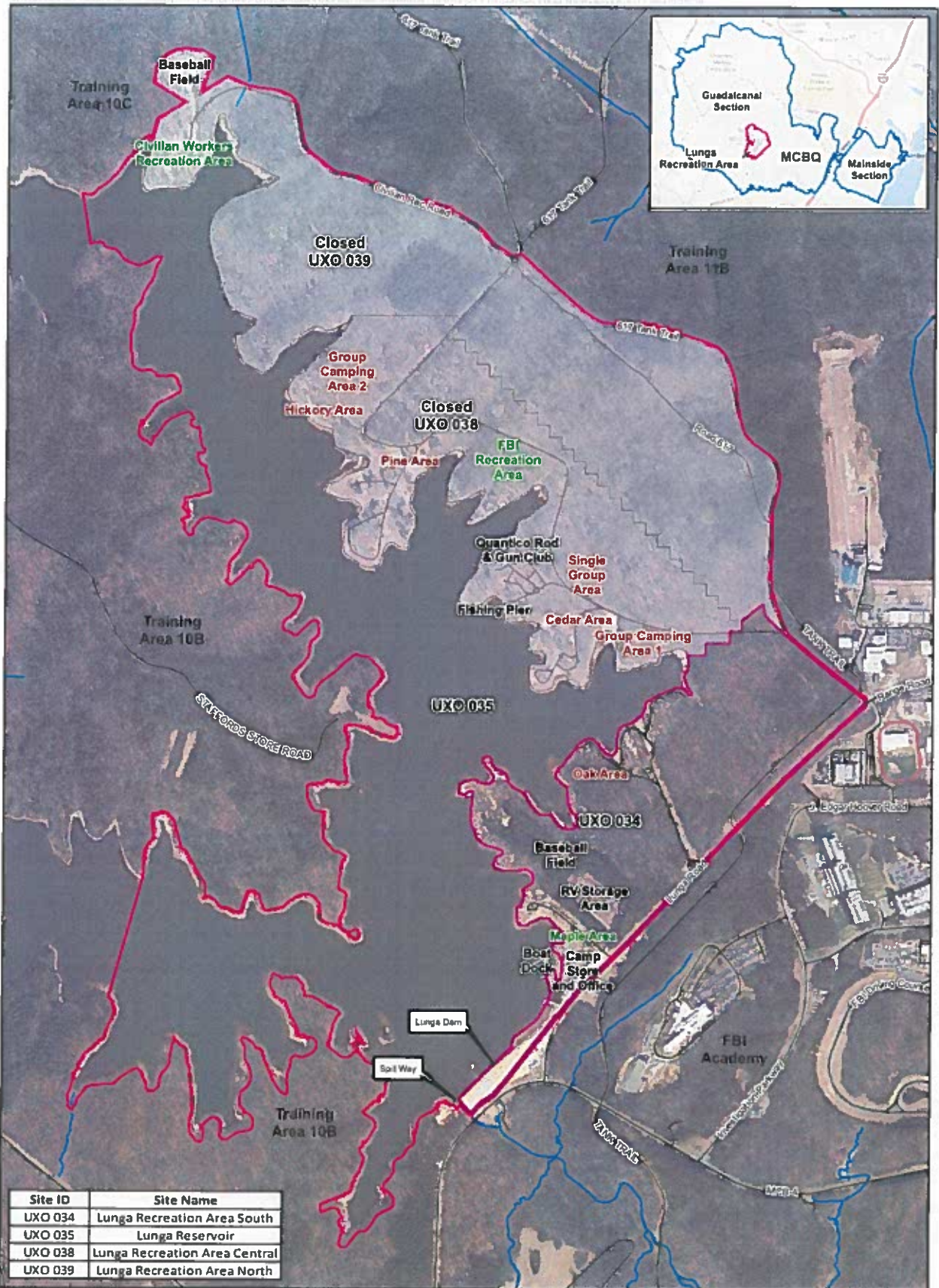
<sup>2</sup> TAs for operational Marine Corps training are managed by the MCBQ Range Management Branch. Some portions of the TAs are periodically used for hunting and other limited recreational use access as determined by the MCBQ Range Management Branch.

- One nature/fitness trail, approximately 1.5 miles long, extending from the Maple Area to the Hickory Area and generally following along the shoreline and camp roadway within the recreation area.
- Two baseball fields were present in the recreation area: one located northwest of the Maple Area and the second located northwest of the Civilian Workers Recreation Area.
- Six playground areas were present within the recreation area, generally located at or adjacent to the camping or picnicking areas.
- A camp store and office were located at the Maple Area.
- An RV storage area consisting of a gravel, fenced-in parking lot was utilized as a longer-term parking area for RVs northeast of the Maple Area.

Lunga Recreation Area is bounded to the west and southwest by TA-10B; to the northwest by TA-10C; and to the north, east, and south by TA-11B and the FBI Academy. The TAs and associated boundaries are identified for military training purposes and managed by the MCBQ Range Management Branch.

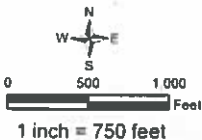
Specific to the reopening of the southern parcel (UXO 034) and the reservoir (UXO 035), the following recreation features within these two parcels are identified (**Figure 1-1**):

- Oak camping area including the associated playground area
- Maple picnicking area including the associated playground area
- Camp store and office
- RV storage area
- Baseball field northwest of the RV storage area
- Portion of the nature and fitness trail from the Maple picnicking area within the southern parcel
- Access to Lunga Reservoir including use of the boat dock located at the southern end of the reservoir near the Lunga Dam



Site ID	Site Name
UXO 034	Lunga Recreation Area South
UXO 035	Lunga Reservoir
UXO 038	Lunga Recreation Area Central
UXO 039	Lunga Recreation Area North

- Legend**
- Roads
  - Stream
  - Area Closed for Recreational Use
  - UXO 034 Boundary
  - Lunga Recreation Area
  - "Brown Text" = Camping Area
  - "Green Text" = Picknicking Area
  - "Black Text" = Other Recreational Uses



**Figure 1-1**  
 Lunga Recreation Area Boundary and Major Features  
 Lunga Recreation Area Interim Land Use Control Plan  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia

Aerial Imagery - Commonwealth of Virginia, 2017

ch2m

# Course of Action Selection and Required Land Use Controls

The COA selected by the stakeholders through the COA Memo process was COA 5: Lunga Recreation Area Reopened at Munitions Response Site UXO 034 (Access to Reservoir available; Camping Available).<sup>3</sup> In simple terms, the implementation of this COA and application of interim LUCs outlined herein will permit access to the portion of Lunga Recreation Area consisting of UXO 034 (Lunga Recreation Area South) and UXO 035 (Lunga Reservoir) for recreational use as illustrated in Table 2-1. Under this COA, the remaining parcels of Lunga Recreation Area consisting of UXO 038 (Lunga Recreation Area Central) and UXO 039 (Lunga Recreation Area North) will remain closed to recreational use until further notice. The future reopening of the remaining parcels and associated LUCs will be developed once the investigation and cleanup efforts are complete.

Table 2-1. Course of Action 5 Description - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)

Description	Surface and Subsurface Conditions Risk Assumptions (After COA Completion)	Recreation Area Uses and Land Use Controls Required
Lunga Recreation Area is reopened at UXO 034 for recreational use (surface use and limited subsurface use) including shoreline and reservoir water access next to UXO 034.	<p><u>UXO 034:</u>            Surface - Explosive hazard mitigated to acceptable conditions            Subsurface - Explosive hazard mitigated to acceptable conditions</p> <p><u>UXO 035 Shoreline Area:</u>            Surface - Explosive hazard mitigated to acceptable conditions            Subsurface - Explosive hazard mitigated to acceptable conditions</p>	<p>Surface and Limited Subsurface uses only. Picnicking and activities such as camping with no intrusive activities below specified depth (likely 1 to 1.5 feet bgs; 12 to 18 inches bgs). Access to reservoir for fishing or boating available. The RV storage area can be used.</p> <ol style="list-style-type: none"> <li>1. Fence and signage along perimeter of UXO 034 to restrict access to adjacent FBI Academy, UXO 038, and UXO 039.</li> <li>2. No intrusive activities into subsurface below specified depth (likely 1 to 1.5 feet bgs; 12 to 18 inches bgs) without dig permit and onsite UXO construction support in the form of avoidance or subsurface clearance as needed.</li> <li>3. Designated Camping Areas Backfill: Placement of clean backfill at designated campsite areas within the Oak Camping Area identified to enhance protectiveness in areas with likely frequent subsurface penetration (due to tent stakes).</li> <li>4. Risk communication for recreational users through brochure and/or other documentation (for example, signs and posters) describing potential munitions hazards.</li> <li>5. Long-term inspection of downed trees for munitions items in root balls, also long-term inspection of signs and fences.</li> <li>6. Given water access to reservoir, installation of signage on non-UXO 034 shoreline areas to restrict access including the UXO 038 shoreline, the UXO 039 shoreline, and the active TAs on the west side of the reservoir.</li> </ol>

**Notes:**

bgs = below ground surface

UXO = unexploded ordnance

<sup>3</sup> Selection of COA 5 based on Interim Progress Report meetings held with Base leadership at Lejeune Hall on July 13, 2017 and Lunga Park on May 14, 2018.



# Definition of Interim Land Use Controls

This section describes the interim LUCs that stakeholders will implement and the long-term responsibilities for monitoring, management, and inspection/documentation at Lunga Recreation Area. LUCs are physical, legal, and/or administrative mechanisms that restrict access and specific activities. LUC mechanisms for MRSs containing munitions and explosives of concern (MEC) are typically the following types (Navy, 2018):

- **Engineering Controls:** Engineering controls are designed to contain and/or reduce contamination, and/or physical barriers intended to limit access to property. Some examples of engineering controls include fences, signs, guards, and landfill caps.
- **Institutional Controls:** Institutional controls include a variety of administrative and/or legal devices to maintain the land use restrictions and the effectiveness of any engineering controls. Institutional controls are imposed to ensure that the engineering controls stay in place, or where there are no engineering controls, to ensure a restriction on land use. Some examples of institutional controls include permits (such as construction or excavation permits), reporting on LUC maintenance, public notices for community outreach (such as brochures or a public notice in newspaper), property easements, restrictive covenants, and zoning restrictions.

## 3.1 Interim Land Use Control Objectives

The objectives of the interim LUCs to be implemented at UXO 034 (Lunga Recreation Area South) and UXO 035 (Lunga Reservoir) are to do the following:

- Restrict activities within areas possibly containing MEC to prevent exposure that could result in an explosion, causing injury or death.
- Provide a long-term maintenance and inspection program to ensure the integrity of the interim LUCs is maintained and documented.

## 3.2 Interim Land Use Control Areas

Three LUC areas are defined under this plan (Figure 3-1). Each of these areas is established based on the interim LUC restrictions identified within each area. The previous munitions cleanup efforts anticipated land use, and physical features were considered in the selection of these areas as detailed below. These LUC areas include both terrestrial and aquatic portions of the Lunga Recreation Area and Lunga Reservoir.

- **LUC Area 1:** Represents areas where surface and subsurface munitions cleanup have been completed, resulting in clearance to 12 inches in depth. This LUC Area is 148 acres and consists primarily of the terrestrial and shoreline areas of UXO 034 in addition to the shoreline areas of Lunga Reservoir adjacent to UXO 038 (Lunga Recreation Area Central) and UXO 039 (Lunga Recreation Area North) as presented on Figure 3-1. LUC Area 1 represents a consolidated area based on the following cleanup activities:
  - Multiple removal actions completed at UXO 034 between 2012 and 2019.
  - A removal action completed along the shallow water eastern shoreline of Lunga Reservoir in 2018 and 2019.
  - A removal action and UXO construction support performed in support of repairs and upgrades performed at the Lunga Dam as part of a U.S. Army Corps of Engineers construction project in 2016.
- **LUC Area 2:** Represents areas where surface munitions cleanup only has been completed (no subsurface clearance performed). This LUC Area is 53 acres and consists primarily of western shoreline areas of Lunga Reservoir adjacent to TA-10B and TA-10C. Secondly, this LUC Area also includes a small strip of area east of

Lunga Road at UXO 034 and known, manmade features within UXO 034 (for example, an RV storage area) where surface use is considered acceptable. LUC Area 2 represents a consolidated area based on the following cleanup activities and presence of manmade structures:

- Operational range sustainment surface clearance efforts along the shallow water shoreline adjacent to TA-10B and TA-10C performed in 2018. Note that additional surface clearance was conducted within the reservoir shoreline areas of the TAs west of the UXO 035 boundary; however, this is not relevant to this Interim LUC Plan herein.
- A surface clearance removal action performed in 2018 within the TA “wedge” located between Lunga Road and the boundary for the FBI Academy. This wedge area is outside of the Lunga Recreation Area MRS boundary and is designated as an active TA under control of the Range Management Branch. On 10 June 2020, the MCBQ stakeholders agreed to allow access to this area for maintenance of overhead utility lines and the recreation area septic system, as well as open public space as needed.
- Manmade structures and features within UXO 034 associated with the support of Lunga Recreation Area where no previous subsurface munitions cleanup has been performed due to inaccessibility. Surface use is considered acceptable within the following areas:
  - RV Storage Area: No clearance/removal action has been performed in this area. The surface of the storage area is covered with a packed gravel layer estimated to be 4 inches to 7 inches thick (based on a limited November 2016 field measurement).
  - Camp Store, Camp Office, and Supporting Maintenance Buildings: No clearance/removal action has been performed under the footprints of these buildings.
  - Lunga Road: No clearance/removal action has been performed under the asphalt-paved surface of Lunga Road.
- **LUC Area 3:** Represents the deeper, central portions of the Lunga Reservoir where no surface or subsurface munitions cleanup has been completed. Water access to the reservoir surface (for example, boating) in this area is acceptable. Surface and/or subsurface access to ground surface of the reservoir bottom in this area is unacceptable. This LUC Area is 230 acres.

### 3.3 Interim Land Use Control Implementation

To achieve the objectives, the interim LUCs will be implemented to control intrusive activities, surface access, and boundaries as described in Sections 3.3.1, 3.3.2, and 3.3.3, respectively.

#### 3.3.1 Controls on Intrusive Activities

Because of the vertical limitations of the removal actions and cleanup efforts conducted, intrusive activities deeper than 12 inches bgs will require onsite UXO construction support in the form of avoidance or subsurface clearance of metallic anomalies within LUC Area 1. Intrusive activities performed 12 inches bgs or less will not require any restrictions in LUC Area 1.

Within LUC Areas 2 and 3, any intrusive activities below grade will require onsite UXO construction support in the form of avoidance or subsurface clearance of metallic anomalies. Refer to Section 3.4 for additional details on UXO construction support requirements.

#### 3.3.2 Controls on Surface Access

Because there has been no surface or subsurface clearance conducted within LUC Area 3, there will be no intentional surface access to the ground, shoreline, or lake bottom without onsite UXO construction support in the form of avoidance or surface clearance of metallic anomalies. Access to this area of the Lunga Reservoir via boat or other craft is acceptable; however, it must be done at designated and approved access points only.



Surface use within LUC Areas 1 and 2 is considered acceptable based on previous surface clearance efforts completed or manmade structures at the surface (for example, asphalt-paved roadway) as identified in Section 3.2.

### 3.3.3 Engineering Controls

Engineering controls, consisting of fencing and/or signage, will be utilized in four specific areas to restrict access to select areas of Lunga Recreation Area. As previously noted, UXO 038 (Lunga Recreation Area Central) and UXO 039 (Lunga Recreation Area North) will remain closed to recreational use until further notice. In addition, the TAs are identified for military training purposes and managed by the MCBQ Range Management Branch; access to the TAs will be a coordinated, daily management effort by NREA and the Range Management Branch via the MCBQ iSportsman website (<https://quantico.isportsman.net/>). The four defined boundary control lines are as follows (Figure 3-2):

- **Boundary Control Line 1.** Consists of fencing and signage that will be installed and maintained to restrict access to UXO 038 (Lunga Recreation Area Central) and UXO 039 (Lunga Recreation Area North) from UXO 034 (Lunga Recreation Area South). The total linear distance of Boundary Control Line 1 is 1,021 feet.
- **Boundary Control Line 2.** Consists of signage that will be placed to restrict access to UXO 038 (Lunga Recreation Area Central) and UXO 039 (Lunga Recreation Area North) via shoreline access from Lunga Reservoir (UXO 035). The total linear distance of Boundary Control Line 2 is 17,235 feet.
- **Boundary Control Line 3.** Consists of signage that will be placed to restrict access to active TA-10B and TA-10C via shoreline access from Lunga Reservoir (UXO 035). The total linear distance of Boundary Control Line 3 is 31,860 feet.
- **Boundary Control Line 4.** Consists of fencing and signage that will be placed to restrict access to the FBI Academy located east and northeast of UXO 034 (Lunga Recreation Area South). This boundary control line will be located east of Lunga Road approximately 10 feet east of the utility poles/overhead lines with the exception of the grassy area south of the camp store and office where the line will be approximately 40 feet east of the utility poles/overhead lines. The total linear distance of Boundary Control Line 4 is 5,141 feet.

#### Fencing

A 6-foot-high chain link security fence will be placed and maintained along Boundary Control Lines 1 and 4. Vehicle access gates 12 feet wide and equipped with padlocks will be placed at four locations along the fence line as presented on Figures 3-2 through Figure 3-5 and summarized as follows moving south to north along Lunga Road:

- Within the grassy area south of the camp store and office and east of Lunga Road. A zoom-in of this gate location is shown on Figure 3-3.
- East of Lunga Road where the former Tank Trail intersects Lunga Road. This gate location is shown on Figure 3-4.
- West of Lunga Road where the gravel surface for Recreation Road begins near the back access entrance to the FBI Academy. This gate location is shown on Figure 3-5.
- West of Lunga Road at the back access entrance to the FBI Academy. This gate location is shown on Figure 3-5.

Gates will be secured and managed by Range Management Branch; keys will be issued to personnel as required to support clearance and training operations.

#### Signage Details

Signs will be placed every 250 feet unless specifically defined below. All signage identified will be fabricated as follows:

- High-performance reflective vinyl bonded to 0.080-gauge aluminum

- Ultraviolet resistant
- Minimum 18-inch by 24-inch sign dimensions
- Red and black on a white background
- All letters a minimum of 1 inch high, Microsoft Sans Serif

The following text will be placed on the signs for Boundary Control Line 1 (estimated 5 signs). The signs will be installed on the fencing as identified above:

**STOP. DO NOT PROCEED; POSSIBLE MUNITIONS HAZARDS BEYOND FENCE LINE**

If access required, contact MCBQ NREA:

Phone 703-784-4030

For Additional Information, refer to MCINCR-MCBQ Order 5090.6

The following text will be placed on the signs for Boundary Control Line 2 (estimated 69 signs). The signs will be installed on posts within the ground:

**STOP. DO NOT PROCEED; POSSIBLE MUNITIONS HAZARDS WITHIN THIS AREA**

If access required, contact MCBQ NREA:

Phone 703-784-4030

For Additional Information, refer to MCINCR-MCBQ Order 5090.6

The following text will be placed on the signs for Boundary Control Line 3 (estimated 127 signs). The signs will be installed on posts within the ground:

**STOP. DO NOT PROCEED; ACTIVE IMPACT AREA**

Shoreline Fishing Requires Check in Through iSportsman

If further access required, contact Range Control at 703-784-5321/5322

Reference: MCINCR-MCBQ Order 3570.1

The following text will be placed on the signs on the fencing for Boundary Control Line 4 (estimated 21 signs). The signs will be installed on the fencing as identified above:

**STOP. DO NOT PROCEED; POSSIBLE MUNITIONS HAZARDS BEYOND FENCE LINE. FBI SECURE AREA.**

If access required, contact MCBQ Range Control at 703-784-5321/5322.

For Additional Information, refer to MCINCR-MCBQ Order 5090.6

In addition to the on-fence signage identified for Boundary Control Lines 1 through 4, two groups of signs will be located within UXO 034 to communicate root ball exposure warnings and boating notifications (Figure 3-2).

A total of 17 Root Ball Warning Signs will be installed on posts within the ground in three areas of UXO 034 to notify recreation users of potential hazards associated with uprooted trees. Five signs are proposed in the Maple Area extending to the northwest, spaced approximately 350 feet apart; 5 signs in the Oak Area including the Oak Area access road, spaced approximately 275 feet apart; and 8 signs along the west side of Lunga Road, spaced approximately 350 feet apart. The following text will be placed on the Root Ball Warning Signs:

Warning – If tree is fallen with exposed roots, please do not disturb exposed area.

If you see UXO, note the location and contact Range Control at 703-784-5321/5322

A total of two Boating Notification Signs will be installed on posts within the ground or onto existing structures (for example, the existing wooden railing) to notify boaters of access restrictions to other shoreline areas of Lunga Reservoir including the TAs on the western shoreline. One sign will be placed at the boat dock and one at the launch ramp located west of the camp store and office. The following text will be placed on the Boating Notification Signs:

Boaters will comply with all boating rules for Lunga Reservoir. All boating and fishing activities will comply with the check-in/check-out requirements of iSportsman. Please address any questions to recreation area staff members.

### Safety Danger Zone Buoys and Flags

The far western portions of Lunga Reservoir outside the UXO 035 boundary (shown on the southwestern and northwestern corners of **Figure 3-2**) are within the active TAs and, at times, covered by Safety Danger Zones for military weapons. The Range Management Branch controls access to this area using existing buoys, flags, and associated access control markers within the reservoir. The Range Management Branch is responsible for raising and lowering the warning flag to notify personnel when the area is closed to boaters. NREA will place buoys on the reservoir to restrict boating access to these portions of the reservoir as determined by the Range Management Branch.

### Designated Camping Area Backfill (Oak Camping Area)

Clean backfill will be placed and maintained at designated campsites within the Oak Camping Area as explained in **Section 2** and **Appendix A**. The placement of clean backfill was an added measure requested by the United States Environmental Protection Agency to enhance protectiveness in areas with likely frequent subsurface penetration (because of tent stakes). A total of 6 inches of clean backfill will be placed in the broader area of the nine campsites within the Oak Camping Area.<sup>4</sup>

### 3.3.4 Institutional Controls

Institutional controls will be implemented to ensure proper administrative and communication controls are achieved, as follows:

- **Safety Brochure for Lunga Recreation Area Visitors.** Restrictions for site use and site access will be incorporated into a Safety Brochure to be provided to all visitors to Lunga Recreation Area. Communication of munitions safety awareness (3Rs for Recognize, Retreat, and Report of potential munitions items) for visitors will be identified within this Safety Brochure. The Safety Brochure will be provided to new visitors at the camp store and office used for new visitor registration and check-in. In addition, a kiosk containing the Safety Brochure will be available at the Oak Camping Area. The Safety Brochure is assumed to be similar to the Lunga Park Safety Brochure available in 2012, before closing of the recreation area. The revised Safety Brochure will also be published on the MCCS Lunga Park website (<https://www.quantico.usmc-mccs.org/recreation/>) and the MCBQ iSportsman website (<https://quantico.isportsman.net/>) upon recreation area reopening. **Appendix B** contains the suggested "Munitions at Lunga Recreation Area" section for inclusion within the updated Safety Brochure to be developed by MCCS upon recreation area reopening. The revised Safety Brochure developed by MCCS will be provided to NAVFAC Washington for review and concurrence before issuance to the public, to ensure the munitions hazards are effectively communicated. NAVFAC Washington will fund and coordinate a risk communications review of materials to be disseminated to the public by the Navy and Marine Corps Public Health Center.
- **Registration and Other Visitor Communication Outreach.** It is assumed that MCCS will provide an updated Lunga Park Information, Fees, and Charges Brochure to park visitors upon recreation area reopening (in addition to the updated Safety Brochure). The revised Lunga Park Information, Fees, and Charges Brochure will also be published on the MCCS Lunga Park website upon recreation area reopening. The following restrictions are anticipated to be included within this updated brochure (most of these were included in the 2012 version of the brochure before the closing of the recreation area):
  - **Camping:** Camping is allowed in designated campsites only (within the Oak Camping Area). Fires are allowed in designated fire rings only; no digging for fire pits or other holes at the recreation area is allowed. Campfires and cooking fires are restricted to designated fire rings and above ground grill locations.

<sup>4</sup> COA 5 identified 16 inches of clean backfill for the campsites within the Oak Camping Area; however, 6 inches of backfill has been selected herein because of constructability concerns with the placement of the backfill and concerns with damaging existing trees because of root and tree trunk covering at 16 inches thickness.

- Boating and Fishing: No anchoring of any boats at the bottom of Lunga Reservoir is allowed; patrons should avoid any disturbance of the sediments at the bottom of the reservoir during boating and fishing activities. Boat motors over 10 horsepower will be operated at idle speed only on the reservoir. The boating requirements will be identified to patrons as part of the safe boater test when renting motorboats for use on the reservoir. Boaters must check the flagpole at the boat launch area, and if the active range use flag is flying, then boaters shall not pass the Safety Danger Zones buoys within the reservoir. Boaters and shoreline anglers must check in and out via iSportsman website (<https://quantico.isportsman.net/>).
- Swimming/Wading: Swimming and wading are not authorized within the reservoir or anywhere at the recreation area.
- Munitions Safety Awareness Training for Lunga Recreation Area Staff. Munitions safety awareness training (3Rs for potential munitions items) will be provided to MCCA and other MCBQ staff working at Lunga Recreation Area. Appendix C contains a suggested resource for munitions safety awareness training for Lunga Recreation Area staff.
- Interim LUCs recorded in the Naval Installation Restoration Information Solution (NIRIS) LUC Tracker. The interim LUCs identified for Lunga Recreation Area will be entered by NAVFAC Washington into the NIRIS LUC Tracker web-based management tool for administrative management and tracking by the Project Manager.
- Excavation Permit Request Form. MCBQ requires an excavation permit request form through the MCBQ Public Works Branch for any excavation activities. This permit process will be used as another administrative mechanism to provide potential excavators and construction staff notice of the potential munitions items, associated land use restrictions, and the need for onsite UXO construction support (depending on the depth and area of excavation). The MCBQ NREA Branch will identify this information during their review and approval of the excavation permit request form (Box 5.g. of the form).
- Incorporation into MCBQ Installation Master Plan. The land use restrictions associated with Lunga Recreation Area will be incorporated into the next version of the Installation Master Plan for MCBQ, to ensure long-term planning considers the potential for munitions and associated land use restrictions identified herein (MCBQ, 2015).<sup>5</sup>
- Issuance of Marine Corps Base Order. The notice that the southern parcel of Lunga Recreation Area is reopened for recreational use and this Interim LUC Plan will be promulgated throughout MCBQ through a Marine Corps Base (MCINCR-MCBQ) Order issued by the MCBQ Base Commander. This step will help to ensure that the interim LUCs associated with Lunga Recreation Area are communicated throughout the different organizations within MCBQ.

### 3.4 Unexploded Ordnance Construction Support

All projects with an intrusive component within the LUC areas identified on **Figure 3-1** will be subject to MCBQ approval through the excavation permit process specified in **Section 3.3.4**. Activities will proceed under the appropriate explosives safety requirements specified within an approved Explosives Safety Submission Determination Request (ESSDR) or Explosive Safety Submission (ESS) as warranted based on the activity.

#### 3.4.1 Emergency Utility Repairs

Emergency utility repairs will be performed under the requirements of an ESSDR prepared for and approved by Marine Corps Systems Command (MCSC) in accordance with Marine Corps Order 8020.10 (Marine Corps Explosives Safety Management Program), June 10, 2015. The following techniques will be used for emergency utility repairs:

---

<sup>5</sup> The most recent Installation Master Plan for MCBQ was completed October 1, 2015.

- **Onsite Construction Support.** When emergency utility repairs are conducted in previously disturbed soil above existing underground utilities, UXO personnel will be onsite to provide oversight of soil excavation. At least one UXO-qualified person will be onsite continuously during ground-intrusive activities to observe excavation and other ground-disturbing activities. Ground disturbance may be conducted by non-UXO-qualified personnel using mechanical excavation methods and/or hand tools. If the UXO-qualified person observes suspected MEC/material potentially presenting an explosive hazard (MPPEH), MCBQ Explosive Ordnance Disposal (EOD) personnel will be notified. Suspected MEC/MPPEH will not be handled or otherwise disturbed.
- **Anomaly Avoidance.** If emergency utility pole installation is required, UXO personnel will conduct anomaly avoidance to select a location with no subsurface anomalies.
- **Intrusive Investigation.** If an anomaly-free location cannot be found for an emergency utility pole installation, manual excavation of soil will be conducted to expose the anomaly source to determine whether it is suspected MEC. The UXO team performing this work will be composed of at least one UXO Technician, a Senior UXO Supervisor, and a UXO Safety Officer.

### 3.4.2 Other Ground Disturbing Activities

The following requirements for an ESSDR or ESS apply to LUC Areas 1, 2, and 3 (Figure 3-1):

- **LUC Area 1:** An ESSDR or ESS will not be required for intrusive activities completed to a depth of 12 inches bgs or less (i.e., the top 1 foot); no UXO construction support will be required for this interval. For intrusive activities deeper than 12 inches bgs, an ESSDR and anomaly avoidance is required, or if anomaly avoidance cannot be implemented, then an ESS and onsite UXO construction support to investigate and remove subsurface anomalies at the location of the intrusive activity is required.
- **LUC Area 2:** An ESSDR or ESS and onsite UXO construction support will be required for any intrusive activities within this area (regardless of depth). An ESSDR and onsite UXO construction support is required for any intrusive investigation where anomaly avoidance can be implemented. If anomaly avoidance cannot be implemented, an ESS and onsite UXO construction support to investigate and remove subsurface anomalies at the location of the intrusive activity is required.
- **LUC Area 3:** As discussed in Section 3.3.2, there will be no intentional surface access within LUC Area 3 without onsite UXO construction support in the form of avoidance or surface clearance of metallic anomalies. An ESSDR or ESS and onsite UXO construction support will be required for any intrusive activities within this area (regardless of depth). An ESSDR and onsite UXO construction support is required for any intrusive investigation where anomaly avoidance can be implemented. If anomaly avoidance cannot be implemented, an ESS and onsite UXO construction support to investigate and remove subsurface anomalies at the location of the intrusive activity is required.

Detailed anomaly avoidance and/or construction support procedures will be described in the ESSDR or ESS based on project-specific requirements. The ESSDR or ESS will be prepared in accordance with the most current version of the Marine Corps Order 8020.10 (Marine Corps Explosives Safety Management Program). The ESSDR must be approved by MCSC before ground-disturbing activities begin. The ESS must be approved by the Department of Defense Explosives Safety Board or receive Service Approval from MCSC before ground-disturbing activities may begin.

### 3.4.3 Tree Management

The following UXO construction support requirements will be followed for ongoing tree management activities as part of this Interim LUC Plan related to the southern parcel and summarized in Table 3-1. The purpose of this section is to provide stakeholders involved in maintenance of the recreation area guidance for scenarios requiring UXO construction support and the necessity for an ESS or ESSDR accordingly.

- Scenario 1 (above grade tree management): No subsurface impacts
  - No onsite UXO construction support required.

- **Basis of Decision** – It is highly unlikely UXO will be found within a tree trunk. Therefore, all above grade tree management will not require onsite UXO construction support regardless of tree diameter. MCBQ NREA forestry management practices must be followed.
- Scenario 2 (below grade tree management): If the tree is 3 inches diameter breast height (dbh) or less AND the subsurface soil disturbance is less than 12 inches bgs:
  - No onsite UXO construction support is required.
  - **Basis of Decision** – Trees/saplings 3 inches dbh and smaller were removed during the munitions removal actions and the surrounding subsurface was scanned and cleared. Therefore, intrusive actions less than 12 inches bgs do not require UXO construction support.
- Scenario 3 (below grade tree management): If the tree is 3 inches dbh or less AND the subsurface soil disturbance is greater than 12 inches bgs:
  - Onsite UXO construction support is required.
  - **Basis of Decision** – Although trees/saplings 3 inches dbh and smaller were removed during the munitions removal actions and the subsurface scanned and cleared, the reliable vertical depth of the remediation is limited to 12 inches bgs. Therefore, any intrusive actions below 12 inches bgs require UXO construction support.
- Scenario 4 (below grade tree management): If the tree diameter is greater than 3 inches (breast height):
  - Onsite UXO construction support is required.
  - **Basis of Decision** – A tree greater than 3 inches dbh may not have been removed during the munitions removal actions and may have resulted in an inaccessible zone around and below the tree trunk during this time. Therefore, the removal of all trees with a diameter greater than 3 inches dbh requires UXO construction support regardless of the depth of subsurface soil being impacted around it.

Table 3-1. Tree Management Summary Table

Subsurface Disturbance			Tree Diameter		Is Onsite UXO Construction Support Required?	Notes
None (surface only)	Less than 12 inches bgs	Greater than 12 inches bgs	Less than 3 inches dbh	Greater than 3 inches dbh		
X			X		No	Scenario 1
X				X	No	Scenario 1
	X		X		No	Scenario 2
		X	X		Yes	Scenario 3
	X			X	Yes	Scenario 4
		X		X	Yes	Scenario 4

### 3.4.4 Reservoir Water Level and Drought Monitoring

The water level elevation of Lunga Reservoir will be measured (in feet mean sea level [msl]) and recorded on a weekly basis to assist with understanding water-level fluctuations within the reservoir and identifying drought conditions.<sup>6</sup> Munitions cleanup activities have been performed on the Eastern Shoreline Area and Western Shoreline Area of Lunga Reservoir as illustrated on Figure 3-6. These cleanup activities provide protection against potential explosive safety concerns that exist within the Lunga Reservoir and support the recreational use of the shoreline and reservoir as detailed within this plan. However, under severe drought conditions, the reservoir

<sup>6</sup> The responsible party for this weekly measurement is identified in Exhibit 1. NAVFAC Washington will also evaluate the option of installing an automated water level sensing system for the reservoir to allow all the Lunga Advisory Council members the ability to obtain “real time,” remote water level data via secure website.

water level may drop and the edge of water may recede resulting in the exposure of reservoir areas that have not undergone munitions cleanup efforts (portions of LUC Area 3).

Therefore, two Buffer Points (#1 and #2) have been identified as presented on **Figure 3-6** (inset) to provide recreation area staff an easy visual guide for water level assessment. The Buffer Points have been identified in order to maintain protective conditions along the reservoir shoreline based on a lateral buffer between the cleared and non-cleared areas of LUC Area 3 when the reservoir is open for recreational use. Buffer Point #1 is for the Eastern Shoreline and Buffer Point #2 is for the Western Shoreline. Additional rationale on Buffer Points #1 and #2 is provided below:

- **Buffer Point #1 (Eastern Shoreline Area):** Surface and subsurface MEC clearance efforts were within this area to an elevation of 283 feet msl via controlled lowering of the reservoir. An elevation of 284.5 feet msl has been selected to provide a buffer for this LUC Area. The elevation of 284.5 feet msl will offer 15 feet of lateral distance between the edge of the water to the non-cleared area in the reservoir adjacent to the boat dock. The boat dock area is selected as an important point of reference because it is the area most likely for boat launches and returns given the previous (and assumed future) use of this area for rentals, and the proximity of the adjacent boat ramp located south of the boat dock area. In addition, elevation 284.5 feet msl is estimated to provide a lateral buffer of 8 feet to 150 feet along the remainder of the eastern shoreline depending on the variable ground surface slopes.
- **Buffer Point #2 (Western Shoreline Area):** Surface clearance within this area was completed; the estimated extent of the surface clearance is presented on **Figure 3-6**. Because surface clearance activities in this area were not completed to a consistent ground surface elevation, a buffer point was approximated for this area based on the comparison of aerial photography features (for example, the lateral extent of surface clearance vs. the lateral extent of the edge of water) in conjunction with known elevation/slope relationships. An elevation of 286 feet msl has been selected to provide a buffer for this area. The elevation of 286 feet msl is estimated to provide a lateral buffer (from the edge of the water to the non-cleared area of LUC Area 3) of 5 feet to 110 feet along the western shoreline depending on the variable ground surface slopes.

NAVFAC Washington will install two fixed points of reference on the boat dock (Buffer Points #1 and #2) as shown on **Figure 3-6** to provide recreation area staff an easy visual guide for water level assessment. The relationship of the reservoir water level at these two buffer points (water level above or below the respective buffer point) will also be noted on a weekly basis during the water level elevation measurement.

As detailed in **Section 3.6**, if the edge of water within the reservoir recedes to or is close to either of these buffer points, the Lunga Advisory Council will meet and discuss potential short-term recreational use restrictions for the shoreline and reservoir. For example, if the edge of water in the reservoir recedes to Buffer Point #2 (estimated at 286 feet msl), it would be prudent for the Lunga Advisory Council to discuss restrictions on recreational access and use of the Western Shoreline Area adjacent to the TA-10B and TA-10C areas. If the edge of water in the reservoir then continues to recede to Buffer Point #1 (284.5 feet msl), then it would be prudent for the Lunga Advisory Council to discuss restrictions on recreational access and use of the Eastern Shoreline Area, in addition to the Western Shoreline Area.

## 3.5 Inspection Activities

NAVFAC Washington will conduct annual inspections under the MRP to ensure the interim LUCs are being appropriately implemented and any maintenance items identified for repair and correction.

### 3.5.1 Tree and Exposed Root Ball Survey

Once per year, NAVFAC Washington will conduct a tree and exposed root ball survey across UXO 034 (**Figure 3-7**). The purpose of this survey will be to identify locations where a tree with diameter of 3 inches or greater has fallen over and the underlying root ball has been exposed at the surface; the exposed root ball may be a source of potential MEC as this area was inaccessible to previous investigation and removal activities. This survey will be performed across the entire, accessible land area of UXO 034 per **Figure 3-7**, and any exposed root balls will be



identified by grid identification and handheld Global Positioning System for northing and easting coordinates. A photo of any associated exposed root balls will be recorded and the location will be flagged with survey flagging for follow-up inspection.

Any exposed root balls identified during the annual survey will then be subsequently investigated by a UXO team under an ESS to determine if any metallic anomalies are present within the root ball and to remove the anomaly (if the source of the anomaly is potentially MEC). Any anomalies that are not potential MEC, such as metallic cultural debris or munitions fragments with no explosive hazard, will not be removed during this investigation. The inspection of any MPPEH and demilitarization of any MPPEH/MEC items will be performed in accordance with the ESS. Note the survey and investigation for potential MEC items does not include any scope for addressing physical hazards of the fallen tree or the root ball to recreational users; any efforts required to cut the tree or fill a hole at the exposed root ball to avoid creating a slip, trip, or fall hazard will be the responsibility of MCCS.

The results of the NAVFAC Washington annual root ball survey and investigation/demilitarization of any MPPEH and MEC items will be documented in the Annual Inspection Checklist (**Appendix D**) as detailed in **Section 3.5.3**.

### 3.5.2 Camping Backfill Inspection

MCCS will conduct a visual inspection of each designated campsite after each rental to ensure the backfill layer (6 inches) has not been compromised (for example, a hole dug through the backfill) or eroded. If the backfill layer is compromised, MCCS will address by adding additional backfill or mitigating the impact otherwise as a maintenance item.

### 3.5.3 Annual Inspection Checklist

An Annual Inspection Checklist (**Appendix D**) will be completed during the annual inspection by NAVFAC Washington. The major elements of the inspection as presented in the checklist are:

1. **Engineering Controls.** Inspection of the fencing and signage specified in **Section 3.3.3**, to determine if interim LUCs are in-operation and if any repairs or modifications are needed. In addition, the backfill placed within the designated campsites at the Oak Camping Area will be inspected for any substantial erosion or loss of the 6 inches of backfill thickness.
2. **Institutional Controls**
  - a. Check that the Safety Brochure is being provided to Lunga Recreation Area Visitors and that the content is consistent with the requirements presented in **Appendix B**. To ensure that the brochure is available and being provided to all Lunga Recreation Area visitors as part of check-in and recreation area entry. Also to check that the MCCS Lunga Park website and MCBQ iSportsman website contain the brochure available for viewing and download.
  - b. Check that the Lunga Park Information, Fees, and Charges Brochure is being provided to Lunga Recreation Area Visitors and that the restrictions regarding camping, boating, fishing, swimming, and wading are identified to camp patrons and visitors as part of check-in, registration, and recreation area entry. Also to ensure that the MCCS Lunga Park website contains the brochure available for viewing and download. The safe boater test (when using motorboats) will be reviewed to ensure the no anchoring at the bottom of the reservoir requirement is communicated.
  - c. Document that Munitions Safety Awareness Training for Lunga Recreation Area Staff is being completed. To document that the safety awareness training is available and being provided to MCCS and other MCBQ staff working at Lunga Recreation Area.
  - d. Check the NIRIS LUC Tracker to ensure that the interim LUCs are identified. To confirm that the interim LUCs identified herein have been memorialized within the NIRIS LUC Tracker web-based management tool.
  - e. Review the Excavation Permit Request Forms to determine that the notice of potential munitions items was identified. To confirm if any excavation permit request forms were submitted for Lunga Recreation



Area and, if so, that the notice of the potential munitions items, associated land use restrictions, and the need for onsite UXO construction support has been identified through the MCBQ NREA Branch approval of the form.

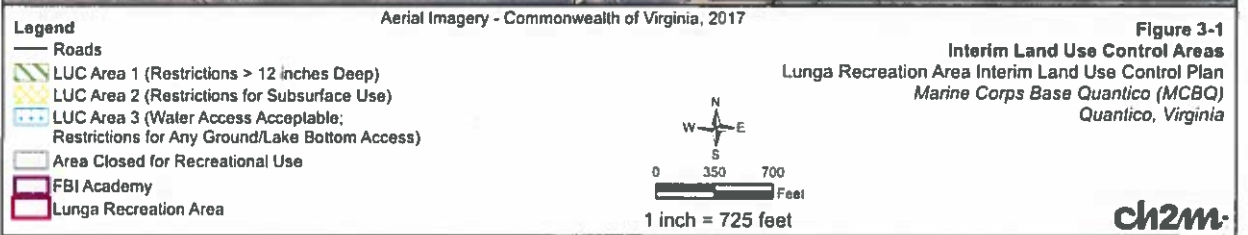
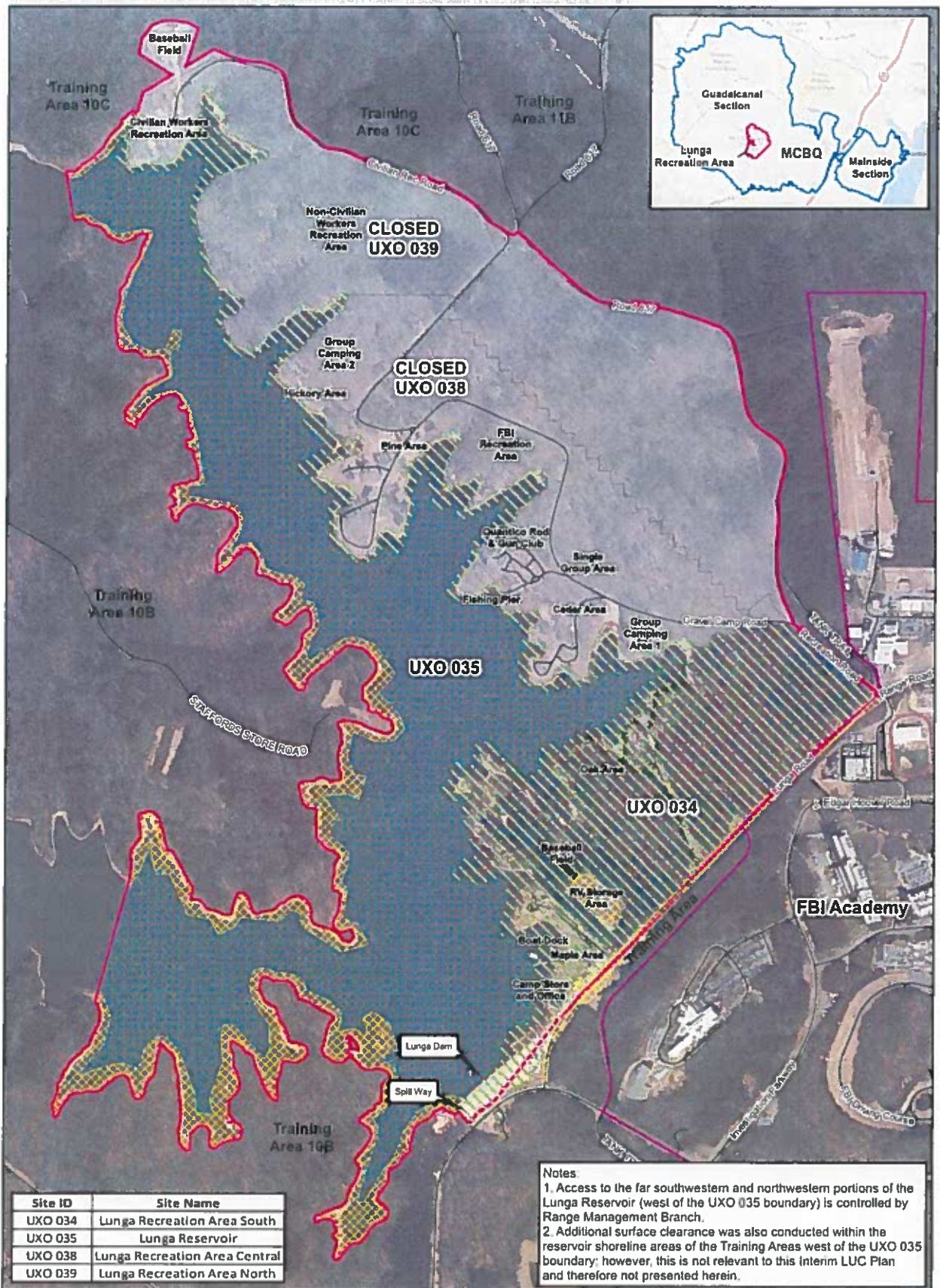
- f. Review MCBQ Installation Master Plan to ensure that interim LUCs have been documented. To confirm if the Master Plan has been updated for MCBQ and, if so, have the appropriate land use restrictions been identified.
  - g. Confirm Marine Corps Base Order is in place. To confirm that a Marine Corps Base (MCINCR-MCBQ) Order has been issued and distributed by the MCBQ Base Commander with the land use restrictions and Interim LUC Plan herein.
3. Review Emergency MCBQ EOD Support Requests. To identify if MCBQ EOD support was required at Lunga Recreation Area with any investigation and removal of potential MEC items.
  4. Document Tree and Exposed Root Ball Survey and Investigation Results. To document the completion of the tree and exposed root ball survey and results of the metallic anomaly investigation by the UXO team.
  5. Review Actual Camping Use. To ensure that camping is only being performed in designated areas (Oak Camping Area within UXO 034).
  6. Reservoir Water Level and Drought Monitoring: To ensure reservoir water level data in feet msl is measured and recorded, and confirm fixed reference points (Buffer Points) on boat dock are visible.
  7. Safety Danger Zone Buoys and Flags: To ensure Range Management buoys, flags, and associated access control marker system within the reservoir are present and working.

### 3.6 Lunga Advisory Council Meetings

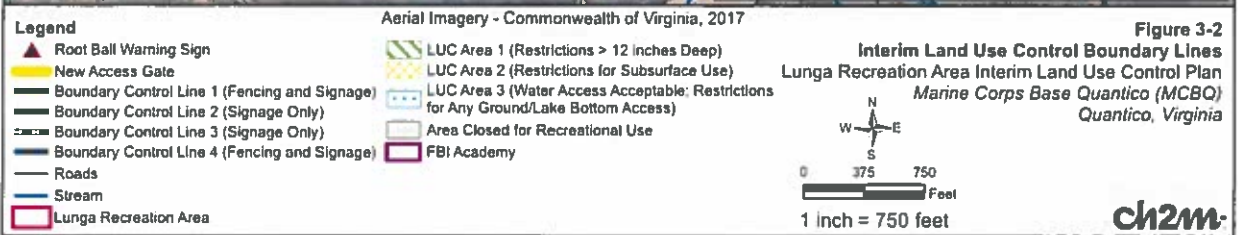
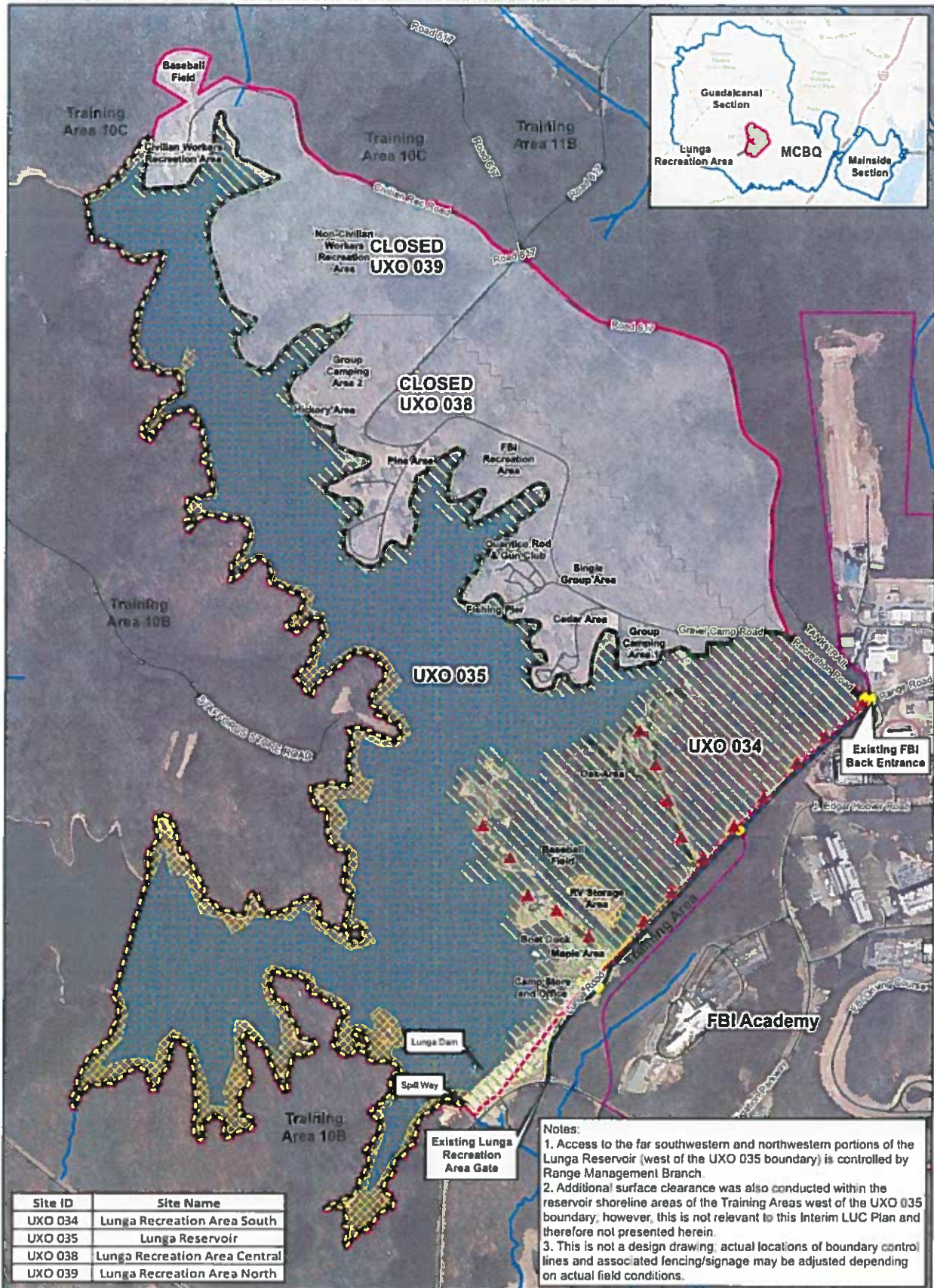
Upon reopening of the southern parcel and reservoir, the Lunga Advisory Council will meet at least semiannually during the period the interim LUCs are in effect to discuss the status of the implementation of the interim LUCs and any improvements related to the interim LUCs or the Interim LUC Plan herein. One of these meetings will occur within 60 days of the completion and submittal of the Annual Inspection Checklist.

The Lunga Advisory Council will also meet on an as-needed basis to discuss or coordinate other activities at Lunga Recreation Area that may impact the interim LUCs or the reopened southern parcel and reservoir. Some examples of these activities are provided as follows:

- Severe drought conditions exist and therefore the water level in the reservoir exposes or is close to exposing the area in LUC Area 3 which has undergone no munitions cleanup efforts. This determination will be based on observations regarding the edge of water in the reservoir relative to Buffer Point #2 (estimated at 286 feet msl) for the Western Shoreline Area and Buffer Point #1 (284.5 feet msl) for the Eastern Shoreline Area. Short-term recreational use restrictions for shoreline and reservoir uses may be required in this circumstance.
- Explosive safety considerations for MRP investigation and cleanup activities at adjacent UXO 038 and UXO 039 result in periodic, short-term closures for recreational use within portions of the reopened southern parcel and reservoir.
- Explosive safety considerations for MRP investigation and cleanup activities within UXO 035 (Lunga Reservoir) result in periodic, short-term closures for recreational use within portions of the reopened southern parcel and reservoir.
- MRP investigation activities for soil and groundwater sampling within UXO 034 require small portions within the reopened southern parcel to be closed for limited, short-term periods to allow for sample collection. Although no explosive safety considerations are anticipated for this work, these short-term closures may be required to minimize interactions and impacts with park users and patrons during sampling implementation.







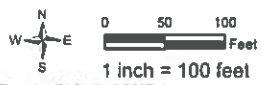




Aerial Imagery - Commonwealth of Virginia, 2017

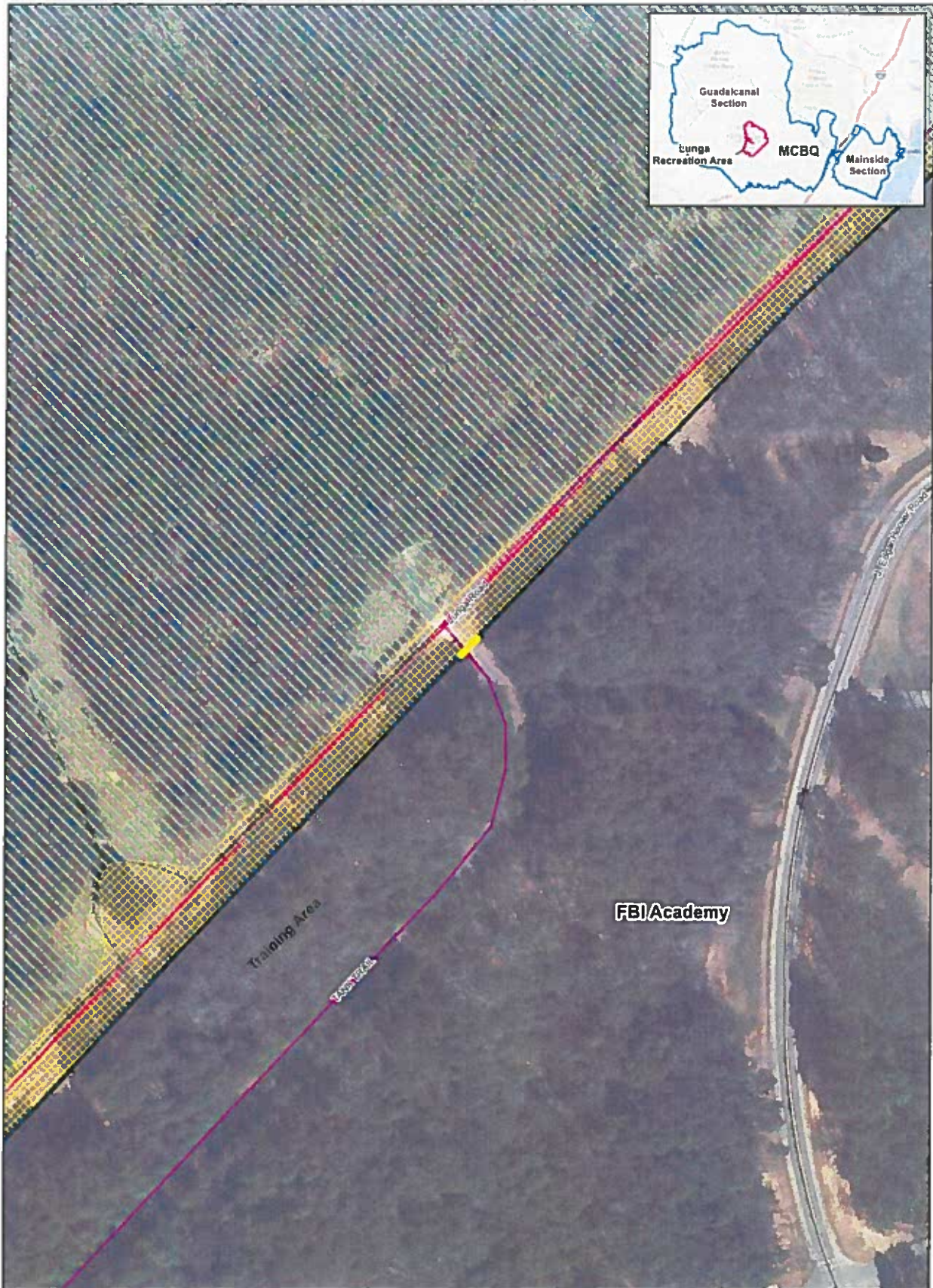
- Legend**
- New Access
  - Boundary Control Line 4 (Fencing and Signage)
  - Roads
  - Stream
  - Lunga Recreation
  - LUC Area 1 (Restrictions > 12 Inches Deep)
  - LUC Area 2 (Restrictions for Subsurface Use)
  - LUC Area 3 (Water Access Acceptable; Restrictions for Any Ground/Lake Bottom Access)
  - FBI Academy

**Figure 3-3**  
**Gate Location: Grassy Area**  
**South of Camp Store and Office**  
 Lunga Recreation Area Interim Land Use Control Plan  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia



ch2m

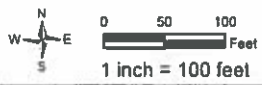




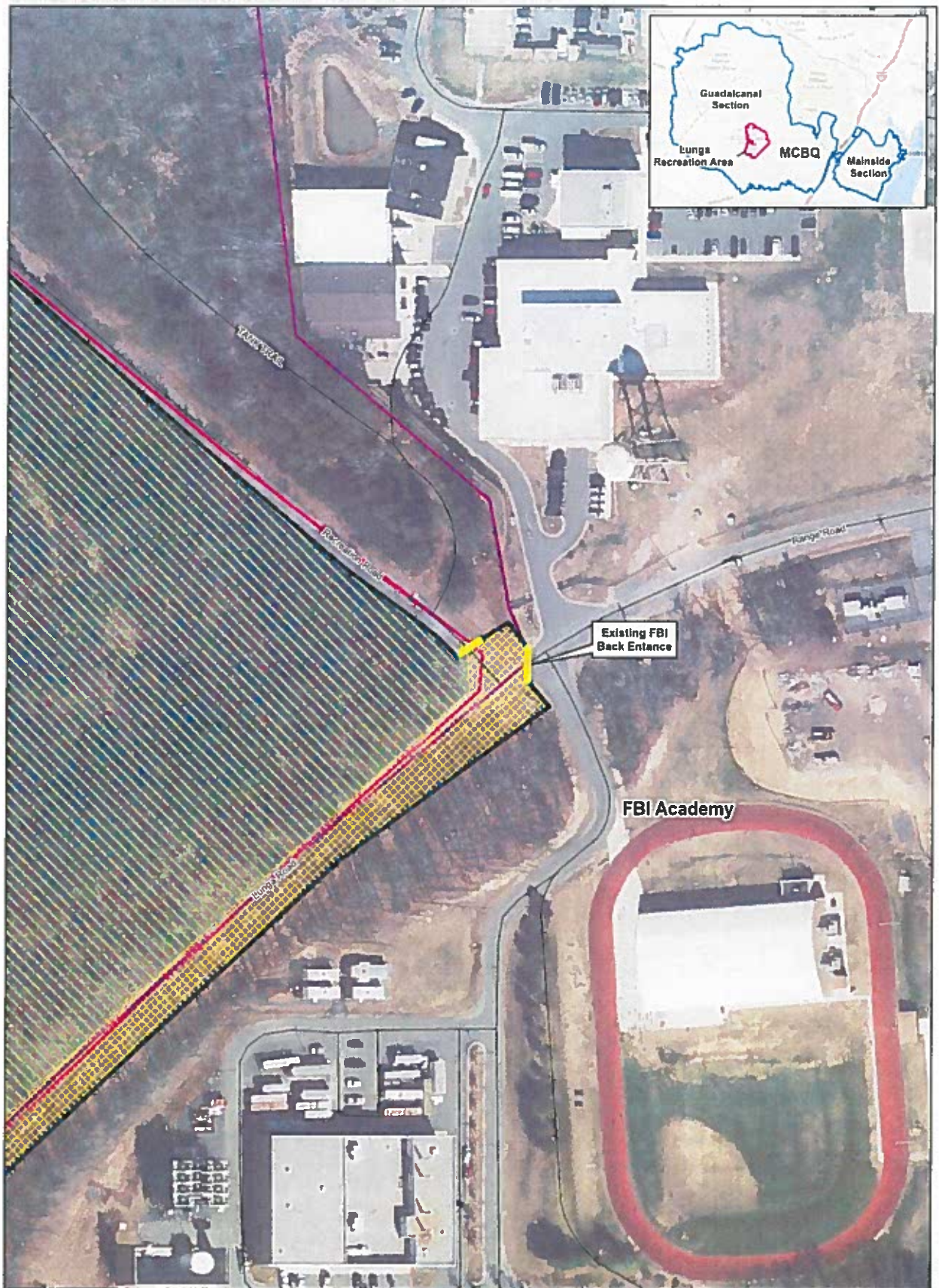
Aerial Imagery - Commonwealth of Virginia, 2017

- Legend**
- New Access Gate
  - Boundary Control Line 4 (Fencing and Signage)
  - Roads
  - Lunga Recreation Area
  - FBI Academy
  - LUC Area 1 (Restrictions > 12 inches Deep)
  - LUC Area 2 (Restrictions for Subsurface Use)

**Figure 3-4**  
**Gate Location: East of Lunga Road at**  
**Intersection with Former Tank Trail**  
 Lunga Recreation Area Interim Land Use Control Plan  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia







- Legend**
- New Access Gate
  - Boundary Control Line 4 (Fencing and Signage)
  - Roads
  - Lunga Recreation Area
  - FBI Academy
  - LUC Area 1 (Restrictions > 12 inches Deep)
  - LUC Area 2 (Restrictions for Subsurface Use)

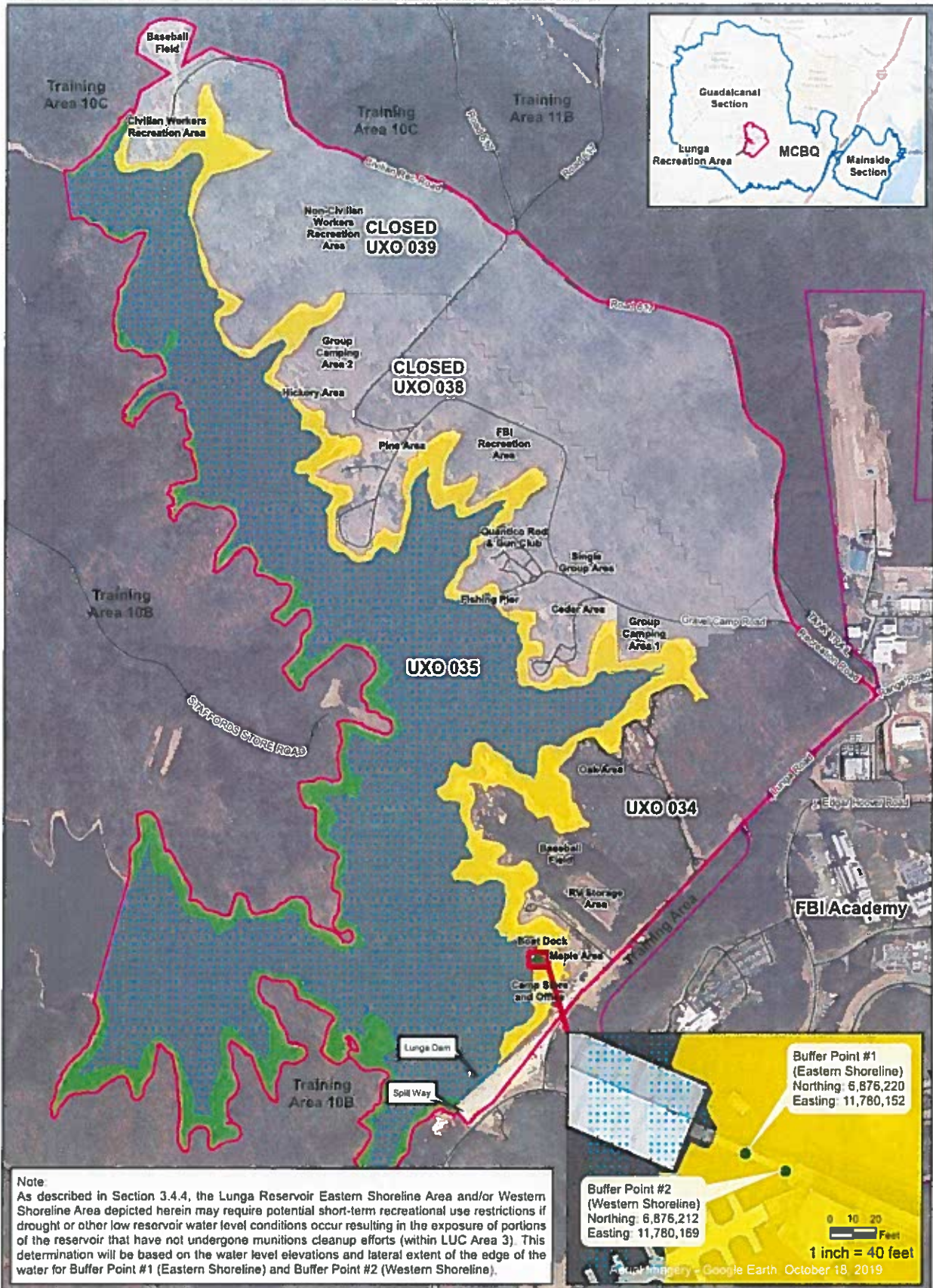
Aerial Imagery - Commonwealth of Virginia, 2017

**Figure 3-5**  
 Gate Locations: West of Lunga Road at Intersection for  
 Recreation Road and Back Entrance to FBI Academy  
 Lunga Recreation Area Interim Land Use Control Plan  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia



**ch2m**









**Figure 3-7**  
**Tree and Exposed Root Ball Survey Area**  
 Lunga Recreation Area Interim Land Use Control Plan  
 Marine Corps Base Quantico (MCBO)  
 Quantico, Virginia

Aerial Imagery - Commonwealth of Virginia, 2017

**Legend**  
 Tree and Exposed Root Ball Survey  
 UXO 034



ch2m



SECTION 4

# Schedule

The timing for reopening the southern parcel and reservoir for recreational use with implementation of the interim LUCs identified herein will be dependent on the completion of ongoing removal action activities at UXO 034 and UXO 035, installation of the interim LUCs described herein, and regulatory review and finalization of associated documentation.

SECTION 5

# References

CH2M HILL, Inc. (CH2M). 2017. *Technical Memorandum: Potential Courses of Action for Reopening of Lunga Recreation Area, Marine Corps Base Quantico, Quantico, Virginia*. November 17, 2017.

Department of the Navy (Navy). 2018. *Department of the Navy Environmental Restoration Program Manual*.

Marine Corps Base Quantico (MCBQ). 2015. *Marine Corps Base Quantico Final Master Plan*. October 1.

[https://www.ncpc.gov/files/projects/2015/Marine\\_Corps\\_Base\\_Quantico\\_Final\\_Master\\_Plan\\_Master\\_Plan\\_Addendum\\_Part\\_1\\_MP67\\_Feb2016.pdf](https://www.ncpc.gov/files/projects/2015/Marine_Corps_Base_Quantico_Final_Master_Plan_Master_Plan_Addendum_Part_1_MP67_Feb2016.pdf).

Exhibit

**ENCLOSURE ( 1 )**

Exhibit 1 - Land Use Controls and Responsible Party  
Lunga Recreation Area, Interim Land Use Control Plan  
Marine Corps Base Quantico, Quantico, Virginia

Land Use Control (LUC)	Type of LUC	Land Use Control Types and Responsible Party Section within Interim LUC Plan	Responsible Party for LUC Implementation
Fencing and Signage for Boundary Control Line 1	Engineering	3.3.3	NAVFAC Washington Environmental Restoration
Signage for Boundary Control Line 2	Engineering	3.3.3	NAVFAC Washington Environmental Restoration
Fencing and Signage for Boundary Control Line 3	Engineering	3.3.3	NAVFAC Washington Environmental Restoration
Fencing and Signage for Boundary Control Line 4	Engineering	3.3.3	NAVFAC Washington Environmental Restoration
Root Ball Warning Signs	Engineering	3.3.3	NAVFAC Washington Environmental Restoration
Boating Notification Signs	Engineering	3.3.3	Range Management Branch
Safety Danger Zone Buoys and Flags	Engineering	3.3.3	NAVFAC Washington Environmental Restoration
Camping Area Backfill (Oak Camping Area)	Institutional	3.3.4	MCCS, NAVFAC Washington (review and coordination with Navy and Marine Corps Public Health Center only)
Lunga Park Information, Fees, and Charges Brochure	Institutional	3.3.4	MCCS
Munitions Safety Awareness Training for Lunga Recreation Area Staff	Institutional	3.3.4	MCCS, Public Works Branch, FBI Academy, and NREA. Signature page(s) for completed training will be maintained by JMCS.
LUCs recorded in the Naval Installation Restoration Information Solution (NIRIS) LUC Tracker	Institutional	3.3.4	NAVFAC Washington Environmental Restoration
Excavation Permit Request Form	Institutional	3.3.4	Public Works Branch and NREA
Incorporation into MCBQ Installation Master Plan	Institutional	3.3.4	MCBQ G F Installation and Environment and Marine Corps Combat Development Command (through National Capital Planning Commission review and approval process)
Issuance of Marine Corps Base Order	Institutional	3.3.4	MCBQ G F Installation and Environment, Eastern Area Counsel, and Marine Corps Combat Development Command
Type of Activity for Uneuplodged Ordnance Construction Support (Emergency Utility Repairs ESSDR: Development and approval by JMCS)		Section within Interim LUC Plan	Responsible Party for Support Implementation
Emergency Utility Repairs (Previously Disturbed Soil): UXO Construction Support (On Site)		3.4.1	NAVFAC Washington Environmental Restoration
Emergency Utility Repairs (Emergency Utility Pole Installation): Anomaly Avoidance		3.4.1	MCBQ EOD and/or MCBQ contracted UXO Personnel
Emergency Utility Repairs (Emergency Utility Pole Installation): Intrusive Investigation Required		3.4.1	MCBQ EOD and/or MCBQ contracted UXO Personnel
Other Ground Disturbing Activity (ESSDR or ESS Required)		3.4.2	Type of explosive safety documentation (ESSDR or ESS) and responsible party determined based on the nature and entity performing the ground disturbing activity. For example, new building construction would be required to have an ESSDR or ESS as appropriate with UXO personnel provided by construction contractor performing the work
		Inspection Activities	
	Inspection Item	Section within Interim LUC Plan	Responsible Party for Inspection Item
Review Water Level and Drought Monitoring Data (Weekly)		3.4.4	MCCS
Tree and Exposed Root Ball Survey (Annual)		3.5.1	NAVFAC Washington Environmental Restoration
Investigation of Root Balls Identified during Annual Survey for MEC		3.5.1	NAVFAC Washington Environmental Restoration
Camping Backfill Inspection: Conduct a visual inspection of each designated campsite after each rental to ensure backfill layer has not been compromised		3.5.2	MCCS
Annual Inspection Checklist Completion		3.5.3	NAVFAC Washington Environmental Restoration
Repairs to Engineering Controls identified during Annual Inspection		3.5.3	NAVFAC Washington Environmental Restoration
Revisions to Institutional Control identified during Annual Inspection. Safety Brochure for Lunga Recreation Area Visitors, if required		3.5.3	MCCS
Revisions to Institutional Control identified during Annual Inspection: Lunga Path Information, Fees, and Charges Brochure, if required		3.5.3	MCCS
Revisions to Institutional Control identified during Annual Inspection: Munitions Safety Awareness Training for Lunga Recreation Area Staff, if required		3.5.3	MCCS, Public Works Branch, FBI Academy, and NREA
Revisions to Institutional Control identified during Annual Inspection: LUCs recorded in the Naval Installation Restoration Information Solution (NIRIS) LUC Tracker, if required		3.5.3	NAVFAC Washington Environmental Restoration
Revisions to Institutional Control identified during Annual Inspection: Excavation Permit Request Form, if required		3.5.3	Public Works Branch and NREA
Revisions to Institutional Control identified during Annual Inspection: Incorporation into MCBQ Installation Master Plan, if required		3.5.3	MCBQ G F Installation and Environment and Marine Corps Combat Development Command
Revisions to Institutional Control identified during Annual Inspection: Issuance of Marine Corps Base Order, if required		3.5.3	MCBQ G F Installation and Environment, Eastern Area Counsel, and Marine Corps Combat Development Command

Notes:

- EOD = MCBQ Explosive Ordnance Disposal Unit
- ESS = MCBQ Explosives Safety Office
- ESS = Explosives Safety Submission
- ESSDR = Explosives Safety Submission Determination Request
- FBI = Federal Bureau of Investigation

- MCBQ = Marine Corps Base Quantico
- MCCS = Marine Corps Community Services
- MCS = Marine Corps System Command
- NAVFAC = Naval Facilities Engineering Command
- NREA = MCBQ Natural Resources and Environmental Affairs Branch
- UXO = Uneuplodged Ordnance

Appendix A  
Course of Action Memo

# Potential Courses of Action for Reopening of Lunga Recreation Area, Marine Corps Base Quantico, Quantico, Virginia

PREPARED FOR: Vicki Waranoski, NAVFAC Washington  
PREPARED BY: Jeff Woodward, CH2M HILL, Inc. (CH2M)  
DATE: November 17, 2017

## 1. Introduction

This Technical Memorandum (TM) presents a comparison of associated costs and timelines of six potential Courses of Action (COAs) for the reopening of Lunga Recreation Area for recreational use. Lunga Recreation Area (also referred to as Lunga Park) is located on the Guadalcanal Section of Marine Corps Base Quantico (MCBQ) in Quantico, Virginia, as shown on **Figure 1**. Lunga Recreation Area was closed to recreational use in 2012 due to munitions findings associated with historical range activities in the 1940s and 1950s. The purpose of this TM is to provide Navy and MCBQ representatives and stakeholders of Lunga Recreation Area a comparison of six COAs for reopening the recreation area given the current status of the Munitions Response Program (MRP) activities at Munitions Response Sites (MRSs) at (or immediately adjacent to) Lunga Recreation Area. This TM was prepared for Naval Facilities Engineering Command (NAVFAC) Washington, NAVFAC Headquarters, MCBQ, Marine Corps Community Services (MCCS), and other stakeholders as identified by NAVFAC Washington and MCBQ.

This TM has been developed by CH2M as requested by NAVFAC Washington under the Comprehensive Long-term Environmental Action – Navy Contract N62470-11-D-8012, Contract Task Order JU12. Information and input received during the July 13, 2017 interim progress meeting with representatives of NAVFAC Washington and MCBQ have been incorporated into this TM.

## 2. Lunga Recreation Area Boundaries and Major Features

**Figure 1** presents the boundary of Lunga Recreation Area and the major features of the recreation area as provided in the MCCS website for Lunga Park and associated maps (see **Attachments 1 through 3**).<sup>1</sup> Primary patrons of the Lunga Recreation Area were military members and United States Department of Defense (DoD) civilians. The major recreation features as presented on **Figure 1** consist of the following:

- **Lunga Reservoir:** A man-made reservoir created from the construction of the Lunga Dam. Lunga Reservoir is approximately 520 acres; approximately 320 acres are within the recreation area (the remainder of the reservoir is within active Training Areas (TA) 10B and 10C).<sup>2</sup> The reservoir was historically used for boating and fishing activities. Swimming in the reservoir was prohibited.

---

<sup>1</sup> These include the following documents: Lunga Park Information, Fees, and Charges; Lunga Park Map; and Lunga Park Safety Brochure. These were accessed from the MCCS Lunga Park website (<http://www.quantico.usmc.mccs.org/index.cfm/recreation/lunga-park/>) and downloaded on October 2, 2012. These three documents are provided as **Attachments 1 through 3** to this TM.

<sup>2</sup> Training Areas for operational Marine Corps training are managed by the MCBQ Range Management Branch. Some portions of the Training Areas are periodically used for hunting and other limited recreational use access as determined by the MCBQ Range Management Branch in accordance with Marine Corps Order 3550.10, July 7, 2005.

- **Camping Areas:** Camping areas were identified at six locations consisting of the Oak Area, Cedar Area, Pine Area, Hickory Area (Group Camping Area 2), Group Camping Area 1, and Single Group Area. A total of 45 individual tent camping sites were identified at these camping areas.
- **Picnicking Areas:** These include the Maple Area, Federal Bureau of Investigation (FBI) Recreation Area, and Civilian Workers Recreation Area.
- **Other recreation area uses:**
  - Seven picnicking pavilions were spread throughout the recreation area for group use.
  - A boat dock was located near the southern end of the reservoir near the Lunga Dam for boat rentals (rowboats, canoes, kayaks, paddleboats, aquacycles, and motorboats) and docking.
  - A fishing pier was located west of the Cedar Area, extending southward into the reservoir.
  - Recreational vehicle (RV) camping sites were identified throughout the recreation area with hookups to utilities (water, sewer, and electric). A total of 25 RV camping sites were present within the recreation area.
  - The Quantico Rod and Gun Club had a group gathering area west of the Cedar Camping Area and Single Group Area. This area has been used for fishing competitions and group picnics, including supporting wounded veterans.<sup>3</sup>
  - One nature/fitness trail, approximately 1.5 miles long, was identified from the Maple Area to the Hickory Area, generally following along the shoreline and camp roadway within the recreation area.
  - Two baseball fields were present in the recreation area: one located northwest of the Maple Area and the second located northwest of the Civilian Workers Recreation Area.
  - Six playground areas were present within the recreation area, generally located at or adjacent to the camping or picnicking areas.
  - A camp store and office were located at the Maple Area.
  - An RV storage area consisting of a gravel, fenced-in parking lot was utilized as a longer-term parking area for RVs northeast of the Maple Area.

Lunga Recreation Area is bounded to the west and southwest by TA10B; to the northwest by TA10C; and to the north, east, and south by TA11B and the FBI Academy. The TAs and associated boundaries are identified for military training purposes by the MCBQ Range Management Branch.

### 3. Historical Munitions Use and Munitions Response Program Activities at Lunga Recreation Area

#### 3.1 Historical Munitions Use

Figure 2 presents the historical range firing fans overlain on the Lunga Recreation Area boundary. The major features presented on Figure 2 are described in detail below:

- **Former Range 2:** This range was a former artillery and mortar range located within TA10 designated for use of all Division weapons in the Marine Corps inventory including artillery, mortars, and rockets (Tetra Tech, 2013). Former Range 2 was used starting in 1943 and continuing through the

<sup>3</sup>As identified for the Quantico Rod and Gun Club at: <http://www.mcrc.marines.mil/News/News-Article-Display/Article/519214/quantico-rod-and-gun-club-hosts-picnic-honoring-wounded-veterans/> and <http://qrgc.org/> (accessed June 19, 2017)

mid-1950s. Former Range 2 was identified as a line-of-sight range, meaning that targets and impact areas were visible from the firing positions. The firing direction for Former Range 2 was toward the northwest, with a firing line identified along Lunga Road and a potential firing line identified on the FBI Academy (Tetra Tech, 2013). Most of the core recreation area features are overlain by the Former Range 2 firing fan, including Lunga Reservoir, camping areas, and picnicking areas. The main impact area for Former Range 2 was identified on the west side of Lunga Reservoir (mainly in TA10B) and a potential impact area was identified in the area used as the Pine Area and FBI Recreation Area, including a portion of the Lunga Reservoir (Tetra Tech, 2013).

- Former Range 1: The firing fan for this former range only covers a very small area of Lunga Recreation Area to the far northwest (i.e., the baseball field located north of the Civilian Worker Recreation Area). This range was estimated to be used from 1943 to the 1960s (USACE, 2001a; USACE, 2001b). Details about original range use are limited, but it was reportedly large enough for artillery and mortar firing. In 1953, the shape of the range changed, suggesting a period of use as a rifle range. The firing direction of this former range is assumed to be to the northwest (USACE, 2001a; USACE, 2001b; CH2M, 2016c).

The DoD created the Military Munitions Response Program in 2001 through the Defense Environmental Restoration Program. The Navy refers to its program as the MRP. The MRP addresses environmental health and safety hazards from unexploded ordnance (UXO), discarded military munitions, and munitions constituents (MC). The term MRS is used to identify individual MRP sites.

Figure 2 presents the locations of four MRSs generally comprising the footprint of Lunga Recreation Area (CH2M, 2016a; CH2M, 2016c; Tetra Tech, 2013). These MRSs comprise approximately 685 acres, collectively:

- UXO 034 – Lunga Recreation Area South: This MRS is 98 acres and generally encompasses the southern portion of Lunga Recreation Area, including Lunga Dam, the camp store, office, Maple Area, Oak Area, and Lunga Reservoir shoreline. Most MRP investigation and munitions cleanup since the recreation area closing in 2012 has occurred in UXO 034. The Former Range 2 Firing Line is identified along the southeastern boundary of this MRS on current Lunga Road.
- UXO 038 – Lunga Recreation Area Central: This MRS is 109 acres and generally encompasses a number of the major recreation area features including the Cedar Area, Pine Area, Hickory Area, FBI Recreation Area, Group Camping Areas, and Lunga Reservoir shoreline. The potential impact area for Former Range 2 is located primarily in UXO 038.
- UXO 039 – Lunga Recreation Area North: This MRS is 158 acres and contains the fewest recreation area features and the least length of Lunga Reservoir shoreline (approximately 5,700 feet) as compared to UXO 034 and UXO 038. In addition, unlike the other MRSs (UXO 034, UXO 035, and UXO 038), only a small portion of UXO 039 (35 acres) falls within the Former Range 2 firing fan. Four acres of UXO 039 also fall within the Former Range 1 firing fan on the far northern edge of the MRS. The only major recreation area features within UXO 039 consist of the Civilian Worker Recreation Area in the far northwest of the MRS and a baseball field.
- UXO 035 – Lunga Reservoir: This MRS encompasses 320 acres of the Lunga Reservoir and abuts the three land-based MRSs along the eastern shoreline. Although the entire reservoir acreage is 520 acres, this MRS does not include portions of the reservoir to the far northwest and southwest where the shoreline consists of TA10B and TA10C.

In addition to the four MRSs primarily associated with Lunga Recreation Area, another MRS, UXO 033 – FBI Training Area 8, is approximately 400 acres and located immediately to the southeast of Lunga Recreation Area (Figure 2). UXO 033 currently contains the FBI Academy and several wooded areas. The Former Range 2 Firing Line and Potential Range 2 Firing Line are both located within UXO 033. The



wooded areas in the far western portion of this MRS are easily and freely accessible from Lunga Recreation Area (via Lunga Road) along the southern boundary of UXO 034.

## 3.2 Munitions Response Program Status

This section provides a summary of munitions-related findings and MRP status at each of the four MRSs at the Lunga Recreation Area, in addition to UXO 033. Specifically, the presence and recovery of Munitions and Explosives of Concern (MEC) and Material Potentially Presenting an Explosive Hazard (MPPEH) are presented. All MRSs identified in this section are in the Remedial Investigation (RI) phase of the Comprehensive Environmental Response, Compensation, and Liability Act regulatory process.

### 3.2.1 UXO 034 (Lunga Recreation Area South)

The following MRP activities have been performed at UXO 034:

- **Site Inspection (SI) in 2012:** A limited surface survey was performed along transect lines within the MRS to assess the potential for explosive hazards and support clearance for a conventional digital geophysical mapping (DGM) survey (using a Geonics EM61 sensor) for subsurface metallic anomalies potentially representing munitions items. A total of 24 MEC/MPPEH items, consisting of 2.36-inch rockets, 81-millimeter (mm) rocket fins, and ground signals, were identified and recovered during the surface survey. Limited DGM transects, completed primarily in the more intensively used portions of the MRS (for example, playground and picnic areas), identified 309 subsurface anomalies potentially representing munitions items. Based on the surface survey findings of MEC/MPPEH items, a Time Critical Removal Action (TCRA) was planned for the MRS (Tetra Tech, 2013).
- **TCRA in 2012:** Surface and subsurface munitions clearance activities were performed using handheld magnetometers across 88.5 acres<sup>4</sup> resulting in more than 500 MEC/MPPEH items recovered, including 30 live MEC items such as rockets, flares, rifle grenades, and mortars (Shaw, 2013) at a maximum depth of 1 foot. The remaining 9.5 acres of this MRS, consisting of the area associated with the Lunga Dam at the southern portion of the MRS and the RV storage area, were not part of this TCRA. Based on quality control (QC) issues identified by NAVFAC Washington and MCBQ, additional TCRA activities were conducted in 2013.
- **TCRA in 2013:** Surface and subsurface munitions clearance activities were performed using handheld magnetometers, resulting in a total of 35 MEC/MPPEH items recovered. Surface clearance was performed over a total of 83.7 acres.<sup>5</sup> The area associated with the Lunga Dam at the southern portion of the MRS in addition to the RV storage area and peninsula area at the western edge of the MRS was not part of this TCRA. Subsurface clearance was limited to only 1.26 acres (maximum investigation/ removal depth of 2 feet), at which time the TCRA was suspended because of the unexpectedly high anomaly counts. MEC/MPPEH items recovered included 2.36-inch rockets, 3.5-inch rockets, a 60-mm mortar, a 155-mm illumination candle projectile, grenades (hand and rifle), and ground signals (USAE, 2013a; USAE, 2013b).
- **Phase 1 Remedial Investigation (RI) in 2014 and 2015:** Surface clearance was performed at areas not previously cleared (primarily consisting of the Lunga Dam and peninsula area). Conventional DGM (using a Geonics EM61 sensor) was completed at 91 acres across the MRS, resulting in the identification of 14,334 subsurface anomalies potentially representing munitions items; seven acres were inaccessible because of unacceptable slopes or other constraints. Advanced Geophysical

<sup>4</sup> Although the acreage identified in the Shaw (2013) report was 91 acres and this value includes the RV storage area in the maps provided, the report text indicates the RV storage area was not surface or subsurface cleared. The RV storage area is estimated at 2.5 acres. Therefore, the total clearance area is assumed to be 88.5 acres.

<sup>5</sup> The total site area identified in the USAE reports and figures was 91.3 acres. Although a total acreage of clearance of 87.5 acres combined is identified in the respective USAE report text, the figures within these reports indicate a total clearance area of 83.7 acres when considering the exclusion of the RV storage area (estimated at 2.5 acres) and peninsula area (estimated at 5.1 acres) specified as excluded within the figures.

Classification (AGC) measurements and evaluations on these DGM anomalies indicated 10,722 anomalies required intrusive investigation as potential targets of interest (potential munitions items) or anomalies that could not be classified. The remaining 3,612 anomalies were not identified for intrusive investigation as they were not classified as potential targets of interest. The dig list developed for the 10,722 anomalies was the basis for a Non-Time Critical Removal Action (NTCRA) for UXO 034 (CH2M, 2016b).

- **NTCRA in 2015 and 2016:** The NTCRA was initiated in accordance with the Action Memorandum signed August 19, 2015 (CH2M, 2015) by Gilbane Federal, Inc. (Gilbane). The NTCRA consisted of intrusive investigation and removal of anomalies identified within the dig list (CH2M, 2016b) to a depth of 2 feet. Mag and dig intrusive investigation and removal using a magnetometer also was identified for areas that were inaccessible to DGM during the Phase 1 RI. Based on preliminary documentation available for the NTCRA, as of March 15, 2017, a total of 11,299 individual anomalies were intrusively investigated (consisting of the 10,722 anomalies on the dig list in addition to 577 anomalies completed for QC and quality assurance purposes). A total of 3,035 individual anomalies were not intrusively investigated (not classified as potential targets of interest). A total of 236 MEC items (including individual target locations and mag and dig areas) were recovered in addition to 4,322 munitions debris (MD) items. The 2.36-inch rocket was the most common MEC item recovered. Additional documentation regarding the NTCRA will be presented in Gilbane's pending Construction Completion Report.
- **Advanced Geophysical Classification Data Usability Assessment in 2017:** Based on the intrusive investigation results obtained during the NTCRA and the Phase 1 RI AGC measurements and evaluations, an AGC Data Usability Assessment (DUA) was completed (CH2M, 2017). A summary of the AGC findings identified:

- **Spatial Limitations:** The DUA boundary was defined by the MRS boundary. Within UXO 034, there were numerous exclusion areas for AGC evaluation because of obstructions, saturated instrument response, and high anomaly density grids that were completed during the NTCRA with mag and dig. No AGC evaluations were performed for these exclusion areas.

The vertical limit of the survey is defined by the maximum reliable depth of the most challenging munitions item (37-millimeter [mm] projectile). The maximum depth of reliable detection was 1.3 feet (15.6 inches) for the 37-mm projectile in its worst-case orientation and position.

- **Residual Risk Estimates:** The evaluation of intrusive investigation results and AGC predictions revealed some inconsistencies, indicating the potential for residual risk (potential explosive hazard) at UXO 034. An estimate of a total of 4 MEC items may potentially be present at UXO 034 consisting of 3 MEC items within the set of 3,035 uninvestigated targets and 1 MEC item within the set of 10,974 investigated targets. The primary factors contributing to this residual risk consist of the following: recovery by Naval Surface Warfare Center Indian Head Explosive Ordnance Disposal Technology Division of a MEC item at a target classified and projected to be non-MEC; evidence of inconsistent intrusive investigation results with AGC predictions; and QC seeds not recovered during the intrusive investigation.

A total of approximately 800 MEC/MPPEH items have been removed from UXO 034 during the MRP activities identified above.

### 3.2.2 UXO 038 (Lunga Recreation Area Central)

The following MRP activities have been performed at UXO 038:

- **SI in 2012:** A limited surface survey was performed along transect lines within the MRS to assess the potential for explosive hazard and support clearance for a conventional DGM survey (using a Geonics EM61 sensor) for subsurface metallic anomalies potentially representing munitions items. No munitions-related items were discovered. Limited transect DGM performed primarily in the

more intensively used portions of the MRS (for example, campgrounds, playgrounds, and picnic areas) identified 464 subsurface anomalies potentially representing munitions items (Tetra Tech, 2013).

- **TCRA in 2014:** Surface munitions clearance activities were performed using handheld magnetometers over 33.8 acres located primarily in the more intensively used portions of the MRS (for example, campgrounds, playgrounds, and picnic areas); no MEC was encountered. MD was recovered consisting of munitions fragments from 37-mm projectiles, 60-mm mortars, 81-mm mortars, 105-mm projectiles, 155-mm projectiles, rifle grenade flares, and expended fuzes, resulting in a total of 675 pounds of material documented as safe (MDAS) that was disposed of offsite (USAE, 2014).
- **RI in 2015 and 2016:** A conventional DGM survey (using a Geonics EM61 sensor) was performed across of the entire MRS. Surface clearance in preparation for DGM was performed over 74.2 acres, generally corresponding to the area not cleared during the TCRA in 2014. No MEC or MPPEH was encountered and no MD was identified during the survey. DGM identified 28,314 subsurface anomalies potentially representing munitions items, equating to a site-wide average anomaly density of 265 anomalies per acre (Resolution Consultants, 2016).

No intrusive investigations have been performed to date at UXO 038.

### 3.2.3 UXO 039 (Lunga Recreation Area North)

The following MRP activities have been performed at UXO 039:

- **SI in 2012:** A limited surface survey was performed along transect lines within the MRS to assess the potential for explosive hazard; no munitions-related items were identified. No DGM was performed (Tetra Tech, 2013).
- **Phase 1 RI in 2016 and ongoing:** An RI consisting of conventional DGM survey (using a Geonics EM61 sensor) and intrusive investigation for potential munitions items was initiated in September 2016 and is ongoing as of October 26, 2017 (CH2M, 2016a). Surface clearance activities in preparation for the DGM were completed across 30 acres of the 158-acre MRS. Surface clearance and 100 percent DGM coverage was performed in the 10-acre Civilian Workers Recreation Area. The remaining 20 acres of surface clearance and DGM consisted of limited transect and grid coverage DGM within the remainder of the MRS (148 acres). Two MPPEH items (expended flares) inspected and verified as MDAS were recovered during the surface clearance activities. DGM results indicate 2,056 subsurface anomalies potentially representing munitions items in the approximately 10-acre area identified as the Civilian Workers Recreation Area in the far western portion of the site. In addition, 2,139 subsurface anomalies potentially representing munitions items were also identified in 20 grids located in the Non-Civilian Workers Recreation Area in the central and eastern portion of the site. An intrusive investigation to determine the nature of these anomaly sources (as potential munitions items or other) is ongoing.

No intrusive investigations have been performed to date at UXO 039.

### 3.2.4 UXO 035 (Lunga Reservoir)

No investigation or cleanup activities have been performed within UXO 035 through the MRP. In 2013, Naval Surface Warfare Center Panama City performed underwater geophysics using sensors for 315 acres of the 320-acre MRS as part of a research and development exercise. The area of coverage within the reservoir varied by geophysical sensor type. Geophysical sensors used for the detection of underwater anomalies (contacts) within the reservoir consisted of Laser Scalar Gradiometer and Electromagnetic Induction data collected with a Geonics EM61, in addition to acoustic sensors (used to support bathymetry measurements). The geophysical and acoustic measurements were collected from different autonomous

undersea vehicles and unmanned underwater vehicle platforms. The maximum water depth within the reservoir was approximately 40 feet.

Results of the exercise indicated that a significant number of underwater anomalies potentially representing munitions items (identified as contacts of interest), primarily in the shallow regions of the southern and eastern sections of the reservoir. Over 3,000 underwater anomalies were identified with approximately 500 high-confidence, underwater anomalies, potentially representing munitions items.

### 3.2.5 UXO 033 (Federal Bureau of Investigation Training Area 8)

The following MRP activity has been performed at UXO 033:

- **SI in 2012:** A limited surface survey was performed along transect lines within the MRS to assess the potential for explosive hazard and support clearance for a DGM survey for subsurface metallic anomalies potentially representing munitions items (Tetra Tech, 2013). A total of 26 MEC and MPPEH items were identified during the surface survey activities, including a 0.5-pound block of trinitrotoluene (TNT) classified as MEC and MPPEH consisting of ground signals, pyrotechnics, and illumination mortar rounds. Of these items, seven were recovered within 600 feet of UXO 034, including the 0.5-pound block of TNT. A conventional DGM survey (using a Geonics EM61 sensor) with limited transect coverage identified 133 subsurface anomalies potentially representing munitions items.

No further MRP activities have been performed at UXO 033 since 2012.

## 4 Potential Courses of Action for Reopening of Lunga Recreation Area

Six potential COAs for reopening Lunga Recreation Area were developed per request by NAVFAC Washington. Note that underwater removal actions for munitions items within UXO 035 (Lunga Reservoir) are not included as an element within any of the six COAs; removal actions identified within UXO 035 will be performed in exposed shoreline/reservoir bottom areas. COAs identified with "Camping Available" assume insertion of tent stakes into the ground (intrusive penetration into the subsurface). COAs identified with "No Camping" assume no camping activities as the COA will result in surface-use only (no intrusive penetration by tent stakes into the subsurface). COAs identified with "No Access to Reservoir" indicates that the Lunga Reservoir and immediate shoreline area will not be accessible for any recreational activities such as boating or beach use; access to the reservoir will be restricted by physical barriers (fencing) and signage.

**Table 1** presents a comparison of the six potential COAs listed below:

1. UXO 034 as Incompatible Land Use (this portion of Lunga Recreation Area remains closed indefinitely)
2. Lunga Recreation Area Reopened at UXO 034 (No Camping and No Access to Reservoir)
3. Lunga Recreation Area Reopened at UXO 034 (Camping Available but No Access to Reservoir)
4. Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; No Camping)
5. Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)
6. Lunga Recreation Area Reopened at UXO 034, UXO 038, and UXO 039 (Access to Reservoir Available; Camping Available)

In addition to the COA number and COA name, the following items are provided within **Table 1** for comparison between the COAs:

- **Description:** Provides a narrative description of what the COA entails, including the major field elements.

- **Residual Risk Assumptions - Surface and Subsurface Conditions:** Provides a statement regarding the acceptability or unacceptability of explosive hazard in the surface and subsurface as a result of the implementation of the COA.
- **Land Use Controls (LUCs) Required:** Identifies the LUCs required for the implementation of the COA and associated limitations for overall land use within the COA area.
- **Recreation Area Uses:** Provides examples of recreation area uses as a result of completing the COA based on previous Lunga Recreation Area uses prior to closure (for example, picnicking and camping).
- **Yes/No Comparison of Major Land Use Considerations:** Provides Yes or No statements regarding major land use considerations for comparison between the COAs including surface use, subsurface use, reservoir access, and RV storage area use.
- **Estimated Cost Range:** Provides cost estimates (-30 percent/+50 percent) for each COA as specified within **Table 1**. Additional information regarding these cost estimates is provided within **Attachment 4**.
- **Estimated Duration for Reopening (Months):** Provides the estimated timeframe in months to reopen Lunga Recreation Area for each COA. Additional schedule information regarding these timeframes is provided within **Attachment 5**.
- **Estimated Date for Reopening:** Based on the schedule information presented in **Attachment 5**.

The resulting condition and spatial extent for each of the six COAs is illustrated within **Figures 3 through 8**. **Figure 9** presents a graphic with each COA identified and the estimate cost range.

## 5. References

- CH2M HILL, Inc. (CH2M). 2015. *Action Memorandum for Munitions Response Site UXO 034, Lunga Recreation Area Training Area 10, Operable Unit 27, Marine Corps Base Quantico, Quantico, Virginia*. September. July (signature August 19, 2015).
- CH2M. 2016a. *Draft Uniform Federal Policy Quality Assurance Project Plan, Remedial Investigation (Phase 1), Munitions Response Site UXO 034, Operable Unit 36 – Lunga Recreation Area North*. February. (Considered Final May 20, 2016).
- CH2M. 2016b. *Technical Memorandum: Final Results of Digital Geophysical Mapping and Final Munitions Classification Results at Munitions Response Site UXO 034, Operable Unit 27, Marine Corps Base Quantico, Quantico, Virginia*. August 26 (considered Final October 14, 2016).
- CH2M. 2016c. *Final Site Management Plan, Fiscal Year 2017, Marine Corps Base Quantico, Quantico, Virginia*. December.
- CH2M, 2017. *Final Advanced Geophysical Classification Data Usability Assessment for Munitions Response Site UXO 034 (Lunga Recreation Area South), Marine Corps Base Quantico, Quantico, Virginia*. November.
- Resolution Consultants. 2016. *Phase II Munitions Response Program, Remedial Investigation Report. Lunga Recreation Area, UXO 034, OU 35, Marine Corps Base Quantico VA*. April 13.
- Shaw Environmental and Infrastructure, Inc. (Shaw). 2013. *Draft After Action Report, Surface and Subsurface Clearance of Materially Potentially Presenting and Explosive Hazard, Munitions Response Program UXO 034 – Lunga Recreation Area – Decision Unit 1, Marine Corps Base Quantico, Quantico, Virginia*. February.

Tetra Tech. 2013. *Site Inspection Report for UXO 033 – FBI Academy Training Area 8 and UXO 034 – Lunga Recreation Area Training Area 10 Munitions Response Sites. Marine Corps Base Quantico Virginia.* July.

United States Army Corps of Engineers (USACE). 2001a. *Archive Search Report, Marine Corps Base Quantico.* September.

USACE. 2001b. *Final Range Identification and Preliminary Range Assessment, Marine Corps Base Quantico.* September.

USA Environmental, Inc. (USAE). 2013a. *Draft After Action Report for DU1-A, Munitions Response Program, UXO 034 – Lunga Recreational Area, Marine Corps Base Quantico, Quantico, Virginia.* September.

USAE. 2013b. *Draft After Action Report for DU1-B, Munitions Response Program, UXO 034 – Lunga Recreational Area, Marine Corps Base Quantico, Quantico, Virginia.* September.

USAE. 2014. *Draft After Action Report for OU35 (DU2), Munitions Response Program, UXO 034 – Lunga Recreational Area, Marine Corps Base Quantico, Quantico, Virginia.* April.

Table

Table 1 - Potential Courses of Action for Reopening of Lunga Recreation Area  
 Mamie Corps Base Quantico (MFCBQ), Quantico, Virginia

Course of Action (COA)	Name	Description	Residual Risk Assumptions - Surface and Subsurface Conditions	Land Use Controls (LUCs) Required	Recreation Area Uses	Surface Use Acceptable?	Subsurface Use Acceptable?	Recreation Access?	RV Storage Area Use?	Estimated Cost Range	Estimated Duration for Reopening (months from May 2017)	Estimated Date for Reopening
1	U1D 014 is Incompatible Land Use (the portion of Lunga Recreation Area remains B30C2 undisturbed)	U1D 014 is incompatible land use under DOD UST 6055. 09M No. 7. U1D 014 would remain closed. Difficulties to recreational users for U1C or for management assumed for this COA. (Monthly assumes current condition is the long term condition for U1D 014)	Many determination that site use is incompatible with recreational use due to presence of munitions	U1D 014 is unavailable for recreational use	No	No	No	No	No	\$0	Not Applicable (no reopening)	None
2	Lunga Recreation Area Reopened at U1D 014 (No Camping and No Access to Reservoir)	Lunga Recreation Area is reopened at U1D 014 for limited recreational use (surface use only). No surface MFCB activities, remaining L213 targets at U1D 014 not intensively investigated. TCDA is not field elements. 1. Site Restoration: Filling and leveling of previous intrusive investigation locations. 2. U1C Installation: Fence and signage along entire perimeter of U1D 014 restricting access to adjacent MRS U1D 015, U1D 031, U1D 038, and U1D 039. 3. Infrastructure Repair: Includes timeframe for MFCB to complete repairs of buildings and infrastructure prior to recreation area reopening. Replace playground equipment. No action or feedback for RV Storage Area.	Surface: Employee hazard investigated to acceptable conditions through actions completed to date) Subsurface: Although substantial mitigation of potential explosive hazard has been attained from previous removal actions, potential for explosive hazard remains within subsurface (primarily associated with remaining targets). Explosive hazard conditions assumed unacceptable in subsurface	1. Fence and signage along entire perimeter of U1D 014 restricting access to adjacent MRS, U1D 015, U1D 031, U1D 038, and U1D 039 2. No intrusive activities into subsurface without dog permit and on-site U1D support as the form of avoidance or subsurface clearance as needed. For example, any intrusive activities such as digging a live well, repairing a water line, or ponding in a tent stake would require a dog permit. U1D on-site U1D support includes and/or other documentation for example, signs and posters) detailing potential munitions hazards. 3. Long term inspection of downed trees for munitions items in root balls per MFCB Plan. Also long term inspection of signs and fences.	Surface uses only. Permitted only, no camping or activities involving intrusive activities below existing grade. No access to reservoir. RV Storage Area can be used.	Yes	No	No	Yes	\$1,431,000 -30%=\$469,000 +50%=\$1,862,000	14	Jul 18
3	Lunga Recreation Area Reopened at U1D 014 (Camping Available, No Access to Reservoir)	Lunga Recreation Area is reopened at U1D 014 for recreational use (surface use and limited subsurface use). TCDA intensive investigation completed for remaining L213 targets at U1D 014. TCDA is not field elements. 1. TCDA intensive investigation for remaining L213 targets at U1D 014 2. Site Restoration: Filling and leveling of all intrusive investigation locations 3. Decontaminated Camping Area at Backfill: Placement of clean backfill (1.5 ft or 18 inches thick) to camping areas (0.3 acres) identified at U1D 014 (0.4k Camping Area) to enhance protection in areas with likely frequent subsurface penetration (due to tent stakes) 4. U1C Installation: Fence and signage along entire perimeter of U1D 014 restricting access to adjacent MRS U1D 015, U1D 031, U1D 038, and U1D 039 5. Infrastructure Repair: Includes timeframe for MFCB to complete repairs of buildings and infrastructure prior to recreation area reopening. Replace playground equipment. No action or feedback for RV Storage Area.	Surface: Employee hazard investigated to acceptable conditions through actions completed to date) Subsurface: Explosive hazard investigated to acceptable conditions	1. Fence and signage along entire perimeter of U1D 014 restricting access to adjacent MRS, U1D 015, U1D 031, U1D 038, and U1D 039 2. No intrusive activities into subsurface below specified depth (daily 1 to 1.5 ft; 12 to 18 inches long) without dog permit, and on-site U1D support in the form of avoidance or subsurface clearance as needed for example, digging a shallow live well or ponding (tent stake) to 1 ft; 12 (12 inches deep) acceptable; digging a well to 4 ft; 18 inches deep) for utility line installation would require on-site U1D support as additional to dog permit. 3. Risk communication for recreational users through backfill and/or other documentation for example, signs and posters) detailing potential munitions hazards. 4. Long term inspection of downed trees for munitions items in root balls per MFCB Plan. Also long term inspection of signs and fences.	Surface and limited subsurface uses only. Permitted activities such as camping with no intrusive activities below specified depth (daily 1 to 1.5 ft; 12 to 18 inches deep). No access to reservoir. RV Storage Area can be used.	Yes	Yes, Limited	No	Yes	\$1,286,000 -30%=\$1,500,000 +50%=\$2,679,000	17	Oct 18



Table 1 - Potential Courses of Action for Reopening of Lunga Recreation Area  
Marine Corps Base Quantico (MCBQ), Quantico, Virginia

Course of Action (COA)	Name	Description	Residual Risk Assumptions Surface and Subsurface Conditions	Land Use Controls (LUC) Required	Recreation Area Uses	Surface Use Acceptable?	Subsurface Use Acceptable?	Reservoir Access?	RV Storage Area Use?	Estimated Cost Range	Estimated Duration for Reopening (Months from May 2017)	Estimated Date for Reopening
4	Lunga Recreation Area Reopened at UTO 014 (Access to Reservoir Available, No Camping)	<p>Lunga Recreation Area is reopened at UTO 014 for limited recreational use (surface use only) including shoreline and reservoir water access next to UTO 014. No further HTEEA activities at UTO 014. 1,035 targets are not actively investigated. TCRA is performed at UTO 014. UTO 014 (only in shoreline frontage along western edge of field elements).</p> <p>1. TCRA at UTO 015, Shoreline Area, DGM of uncovered shoreline area (water level lowered by Lunga Dam), surface clearance and removal of potential munitions from in frontage of UTO 014 only (not shoreline area of adjacent UTO 018 and UTO 019, or active range on west side of reservoir).</p> <p>2. Site Restoration: Filling and leveling of previous intrusion investigation locations completed at UTO 014. No filling or restoration performed in UTO 015.</p> <p>3. LUC Installation: Fence and signage along perimeter of UTO 014 to restrict access to adjacent MRS, UTO 031 (Firm Training Area 8), UTO 018 (Lunga Recreation Area Central), and UTO 019 (Lunga Recreation Area North) Installation of signage on non UTO 014 shoreline areas.</p> <p>4. Infrastructure Repair: Includes timeframe for MC3 to complete repairs of buildings and infrastructure prior to recreation area reopening. Replace playground equipment.</p> <p>No action or followup for RV Storage Area (UTO 014)</p>	<p>UTO 014: Explosive hazard mitigated to acceptable conditions (through action completed to date) Subsurface: Although substantial mitigation of potential explosive hazard has been achieved from UTO 014, there is still potential for explosive hazard remaining within subsurface (for example, buried munitions). Explosive hazard conditions are deemed unacceptable in subsurface.</p> <p>UTO 015 Shoreline Area: Subsurface: Explosive hazard mitigated to acceptable conditions</p>	<p>1. Fence and signage along perimeter of UTO 014 to restrict access to adjacent MRS, UTO 031 (Firm Training Area 8), UTO 018 (Lunga Recreation Area Central), and UTO 019 (Lunga Recreation Area North) UTO 015 (Lunga Reservoir) boundary with UTO 014 assumed to meet required fencing, signage, or other restrictions.</p> <p>2. No intrusive activities into subsurface without dig permit and on site UTO support in the form of a provider or subsurface cleaner as needed for example, any intrusive activities such as digging a fire trench, or opening a dig permit and on-site UTO support would require a dig permit and on-site UTO support.</p> <p>3. Risk communication for recreational users through brochure and/or other documentation (for example, signs and posters) describing potential munitions hazards.</p> <p>4. Long term inspection of downed trees for munitions items in root balls per Interim LUC Plan. Also long term inspection of signs and fences.</p> <p>5. Green water access to reservoir, installation of signage on non UTO 014 shoreline areas to restrict access including UTO 018 shoreline, UTO 019 shoreline, and Active Training Area on the west side of the reservoir.</p>	<p>Surface uses only. Permitted only, no camping or activities involving intrusive activities below existing grade. Access to reservoir for fishing or boating available. RV Storage Area can be used.</p>	Yes	No	Yes	Yes	\$2,092,000 30%- \$1,473,000 +50%- \$3,113,000	16	Sep 18
5	Lunga Recreation Area Reopened at UTO 014 (Access to Reservoir Available, Camping Available)	<p>Lunga Recreation Area is reopened at UTO 014 for recreational use (surface use and limited subsurface use) including shoreline and reservoir water access next to UTO 014. TCRA intrusive investigation completed for remaining 3,035 targets at UTO 014. TCRA is performed at UTO 015, Shoreline Area (only in shoreline frontage along western edge of UTO 014).</p> <p>Field Elements:</p> <p>1. TCRA at UTO 015, Shoreline Area, DGM of uncovered shoreline area (water level lowered by Lunga Dam), surface clearance and intrusive investigation of targets within uncovered shoreline area (for removal of potential munitions items) in frontage of UTO 014 only (not shoreline area of adjacent UTO 018 and UTO 019, or active range on west side of reservoir).</p> <p>2. TCRA intrusive investigation for remaining 3,035 targets at UTO 014.</p> <p>3. Site Restoration: Filling and leveling of all intrusion investigation locations completed at UTO 014. No restoration within UTO 015.</p> <p>4. Designated Camping Area Baffle: Placement of clean backfill (3 ft or 15 inches thick) to camping areas (0.3 acres) identified at UTO 014 (Oak Camping Area) to enhance protectiveness in areas with likely frequent subsurface penetration (due to tent stakes).</p> <p>5. LUC Installation: Fence and signage along perimeter of UTO 014 to restrict access to adjacent MRS, UTO 031, UTO 018, and UTO 019.</p> <p>6. Infrastructure Repair: Includes timeframe for MC3 to complete repairs of buildings and infrastructure prior to recreation area reopening. Replace playground equipment.</p> <p>No action or followup for RV Storage Area (UTO 014)</p>	<p>UTO 014: Explosive hazard mitigated to acceptable conditions (through action completed to date) Subsurface: Explosive hazard mitigated to acceptable conditions</p> <p>UTO 015 Shoreline Area: Subsurface: Explosive hazard mitigated to acceptable conditions</p>	<p>1. Fence and signage along perimeter of UTO 014 to restrict access to adjacent MRS, UTO 031, UTO 018, and UTO 019. UTO 015 boundary with UTO 014 assumed to not require fence, signage, or other restrictions.</p> <p>2. No intrusive activities into subsurface below specified depth (likely 3 to 3.5 ft, 12 to 18 inches) without dig permit and on site UTO support in the form of avoidance or subsurface clearance as needed (for example, digging a shallow fire pit or pounding a stake to 3 ft bps (12 inches bps)). Acceptable, digging a trench to 4 ft bps (18 inches bps) for utility line installation would require on site UTO support in addition to dig permit.</p> <p>3. Risk communication for recreational users through brochure and/or other documentation (for example, signs and posters) describing potential munitions hazards.</p> <p>4. Long term inspection of downed trees for munitions items in root balls per Interim LUC Plan. Also long term inspection of signs and fences.</p> <p>5. Green water access to reservoir, installation of signage on non UTO 014 shoreline areas to restrict access including UTO 018 shoreline, UTO 019 shoreline, and Active Training Area on the west side of the reservoir.</p>	<p>Surface and limited subsurface uses only. Permitted and activities such as camping with no intrusive activities below specified depth (likely 3 to 3.5 ft bps, 12 to 18 inches bps). Access to reservoir for fishing or boating available. RV Storage Area can be used.</p>	Yes	Yes, limited	Yes	Yes	\$2,832,000 30%- \$1,846,000 +50%- \$3,946,000	18	Nov 18

Table 1 - Potential Courses of Action for Reopening of Lunga Recreation Area  
Marine Corps Base Quantico (MCBQ), Quantico, Virginia

Course of Action (COA)	Name	Description	Residual Risk Assumptions - Surface and Subsurface Conditions	Land Use Controls (LUCs) Required	Recreation Area Users	Surface Use Acceptable?	Subsurface Use Acceptable?	Reservoir Access?	RV Storage Area Use?	Estimated Cost Range	Estimated Duration (months) from May 2017	Estimated Date for Reopening
6	Lunga Recreation Area Reopened at UTO 014, UTO 018, and UTO 019 (Access to Reservoir available; Camping Available)	<p>Lunga Recreation Area is reopened at UTO 014, UTO 018, and UTO 019 for (surface use and limited subsurface use) including (shoreline and near water access) next to UTO 014, UTO 018, and UTO 019. TEA is investigation completed for remaining UTO 018 and UTO 019. TEA is performed at UTO 015 Shoreline Area (shoreline frontage along western edge of UTO 014, UTO 018, and UTO 019).</p> <p>Field Elements:</p> <ol style="list-style-type: none"> <li>TEA at UTO 015 Shoreline Area. DCA of unexcavated shoreline area (water level lowered by Lunga Dam), surface clearance and active investigation of targets within unexcavated shoreline area (for removal of potential munitions items) in frontage of UTO 014, UTO 018, and UTO 019 (not shoreline area of active range on west side of reservoir).</li> <li>TEA intrusive investigation for remaining UTO 015 targets at UTO 014.</li> <li>TEA at UTO 018. Intrusive investigation for 20,314 targets representative of potential APPX 11 has identified during JMS-Webb RI in 2015 and 2016.</li> <li>TEA at UTO 019. Will be performed in two areas: (1) Cruden Workers Recreation Area (CWRA), and (2) Non-Crudan Workers Recreation Area (NCWRA) per below.</li> <li>CWRA. Intrusive investigation at 1,813 targets identified in 2017 RI.</li> <li>NCWRA. Performance of surface clearance across entire NCWRA (148 acres). No intrusive investigation in NCWRA.</li> </ol> <p>5. Site Restoration. Filling and leveling of all intrusive investigation locations completed at UTO 014, UTO 018, and UTO 019. No restoration within UTO 015.</p> <p>6. Designated Camping Areas Backfill. Placement of clean backfill (1.3 ft or 16 inches thick) to camping areas (0.3 acres) identified at UTO 014 (DCA Camping Area) to enhance protection in areas with high frequent subsurface penetration (due to tent stakes).</p> <p>7. LUCs Installation. Fence and signage along perimeter to restrict access to adjacent MIES UTO 013 only. Installation of signage on active training areas, shoreline.</p> <p>8. Infrastructure Repair. Includes timeframe for MICS to complete repairs of buildings and infrastructure prior to recreation area reopening (in UTO 014, UTO 018, and UTO 019). Replace playground equipment.</p> <p>No action or fieldwork for RV Storage Area (UTO 014).</p>	<p>UOT 015: Explosive hazard mitigated to acceptable conditions (through actions completed to date). Subsurface: Explosive hazard mitigated to acceptable conditions.</p> <p>UOT 018: Explosive hazard mitigated to acceptable conditions. Subsurface: Explosive hazard mitigated to acceptable conditions.</p> <p>UOT 019: Explosive hazard mitigated to acceptable conditions (through actions completed to date plus proposed actions). Subsurface: Explosive hazard mitigated to acceptable conditions in CWRA. Explosive hazard (if present) mitigated in NCWRA.</p> <p>UOT 015, 018, 019: Shoreline Area: Surface: Explosive hazard mitigated to acceptable conditions. Subsurface: Explosive hazard mitigated to acceptable conditions.</p>	<p>1. Fence and signage along perimeter to restrict access to adjacent MIES UTO 013 only.</p> <p>2. Intrusive Activities: A. MIES Access (5550) UTO 019 NCWRA: no intrusive activities below specified depth (likely 1 to 1.5 ft bgs; 12 to 18 inches bgs). Access to reservoir for fishing or boating available from all three sites (UTO 014, UTO 018, and UTO 019). RV Storage Area can be used below fire pit or surrounding tent stake to 11 ft bgs (12 inches bgs) acceptable; digging a trench to 4 ft bgs (14 inches bgs) for utility line installation would require on-site UTO support in addition to dig permit. B. UTO 019 NCWRA: no intrusive activities into MIES below fire pit or surrounding tent stake to 11 ft bgs (14 inches bgs) acceptable; digging a trench to 4 ft bgs (14 inches bgs) for utility line installation would require on-site UTO support in addition to dig permit. C. MIES: no intrusive activities into MIES below fire pit or surrounding tent stake to 11 ft bgs (14 inches bgs) acceptable; digging a trench to 4 ft bgs (14 inches bgs) for utility line installation would require on-site UTO support in addition to dig permit. D. For example, any intrusive activities such as digging a fire pit, preparing a water line, or pouring in a tent stake would require a dig permit and on-site UTO support. E. Bus communication for recreational users through brochures and/or other documentation (for example, signs and posters) describing potential munitions hazards. F. Long term inspection of damaged sites for munitions items on foot balls per status UIC Plan. Also long term inspection of signs and fences. G. Given water access to reservoir, installation of signage on active training areas on the west side of the reservoir to restrict access to that area.</p>	<p>All Areas except UTO 019 NCWRA. Surface and Limited Subsurface uses only. Protecting and activities such as camping with no intrusive activities below specified depth (likely 1 to 1.5 ft bgs; 12 to 18 inches bgs). Access to reservoir for fishing or boating available from all three sites (UTO 014, UTO 018, and UTO 019). RV Storage Area can be used below fire pit or surrounding tent stake to 11 ft bgs (12 inches bgs) acceptable; digging a trench to 4 ft bgs (14 inches bgs) for utility line installation would require on-site UTO support in addition to dig permit. Camping areas within NCWRA based on previous Lunga Recreation Area uses. No camping or activities involving intrusive activities below existing grade.</p>	<p>Yes</p>	<p>Yes</p>	<p>Yes</p>	<p>Yes</p>	<p>\$17,344,874</p>	<p>33</p>	<p>Feb 20</p>

Table 1 - Potential Courses of Action for Reopening of Lunga Recreation Area  
Marine Corps Base Quantico (M/CBQ), Quantico, Virginia

Course of Action (COA)	Name	Description	Residual Use Assumptions - Surface and Subsurface Conditions	Land Use Controls (LUCs) Required	Recreation Area Users	Surface Use Acceptable?	Subsurface Use Acceptable?	RV Storage Area Users?	Estimated Cost Range	Estimated Duration for Reopening (month from May 2017)	Estimated Date for Reopening
COA	Course of Action										
CWIA	Civilian Workers Recreation Area										
DDO WFT	U.S. Department of Defense Instruction										
Flaps	feet below ground surface										
Flaps	in feet below ground surface										
Flaps	and Use Controls										
MCCS	Marine Corps Community Services										
MRS	Marine Response Site										
MOBQA	Non-Civilian Workers Recreation Area										
NTCEA	Non-Time Critical Removal Action										
RI	Remedial Investigation										
RV	Recreational Vehicle										
TCEA	Time Critical Removal Action										
U10	Unexploded Ordnance										
U10 011	MMS U10 011 (FB Academy Training Area 8)										
U10 014	MMS U10 014 (Lunga Recreation Area South)										
U10 015	MMS U10 015 (Lunga Reservoir)										
U10 018	MMS U10 018 (Lunga Recreation Area Central)										
U10 019	MMS U10 019 (Lunga Recreation Area North)										

1. All COAs assume that the CERCLA regulatory process will be followed for any of the MRSs (outside and in addition to the actions identified in the RI Environmental Remediation Program Phase 2). Ongoing Lunga Dam repair work will be assumed to be completed and will not impact Lunga Recreation Area reopening COA selected.

2. Schedule durations for all COAs assume no substantive conflicts, changes, or delays in key project technical documents to be completed. Data usability Assessment, After Action Report, Construction Completion Report, Interim Land Use Control Plan, and Brochure (for recreational users).

3. COAs with U10-015 Shoreline Area TCEA will have the additional benefit of range sustainability for the adjacent Training Areas on the West Side of Lunga Reservoir (as these range cleanup activities will be performed at the same time and under the same contract as the U10-015 Shoreline Area TCEA). The (011) and schedule durations for these range sustainability activities at the active Training Area are not included herein.

4. Costs presented are based on Class IV Cost Estimates (30 percent/-50 percent) for COAs 1 through 3 (for contractor completed work). Costs for COA 6 are based on Navy "Normalization of Data" Database (NORM) projections fiscal Year 2018 and beyond, does not include fiscal Year 2017 costs or awards.

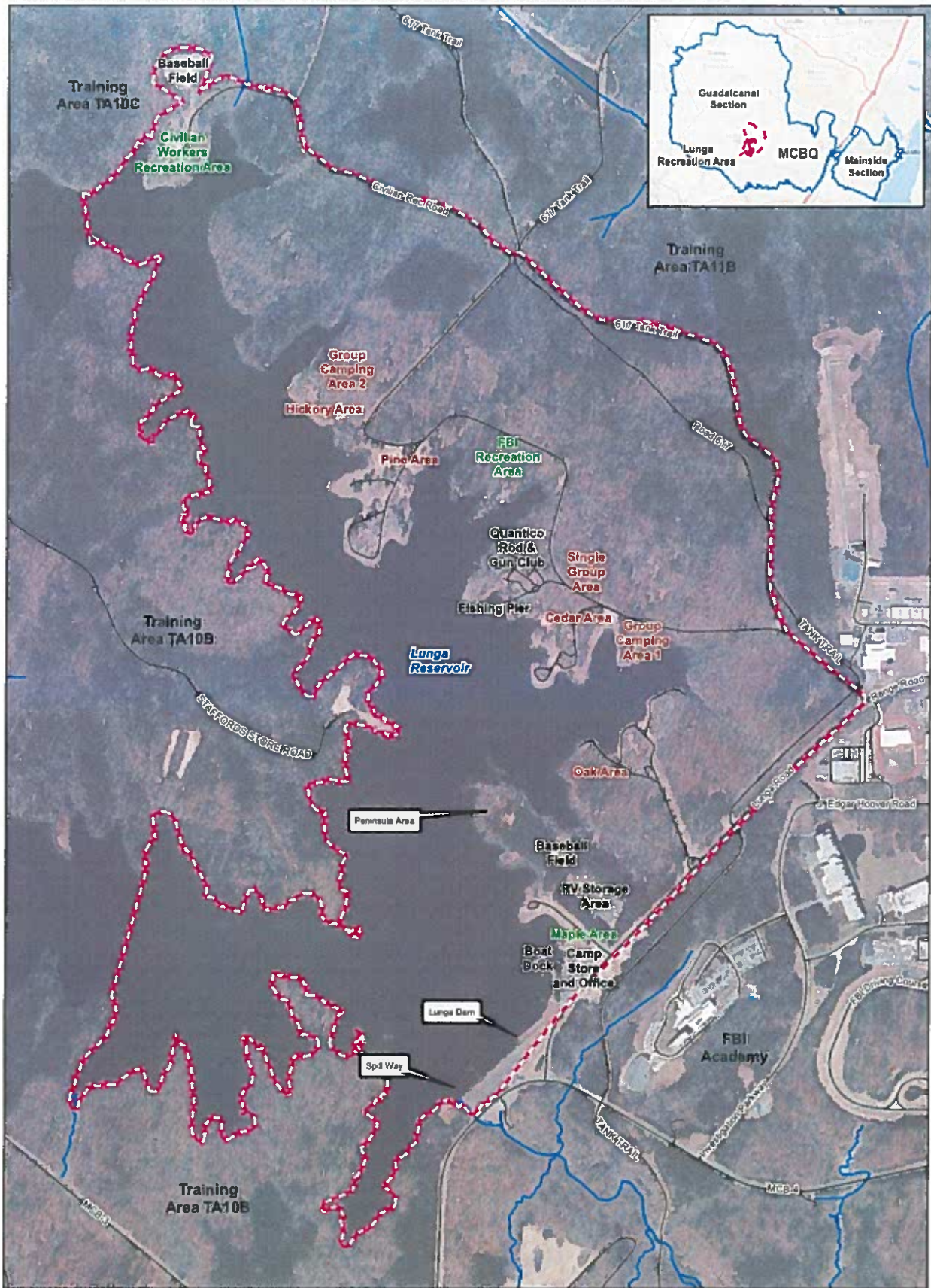
5. M/CBQ infrastructure repair costs are also not included for any COA.

RV  
TCEA  
U10  
U10 011  
U10 014  
U10 015  
U10 018  
U10 019

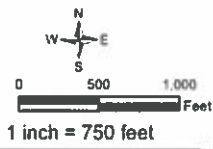
Recreational Vehicle  
Time Critical Removal Action  
Unexploded Ordnance  
MMS U10 011 (FB Academy Training Area 8)  
MMS U10 014 (Lunga Recreation Area South)  
MMS U10 015 (Lunga Reservoir)  
MMS U10 018 (Lunga Recreation Area Central)  
MMS U10 019 (Lunga Recreation Area North)

Figures

**ENCLOSURE (1)**



- Legend**
- Roads
  - Stream
  - - - Lunga Recreation Area

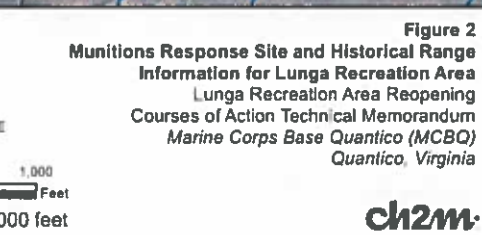
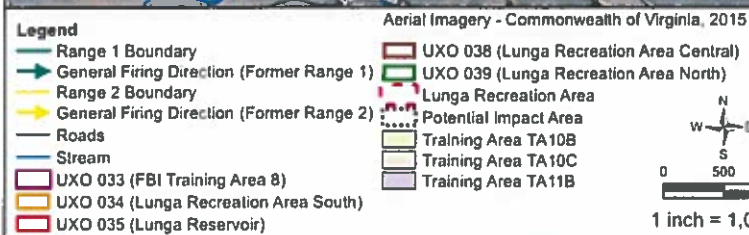
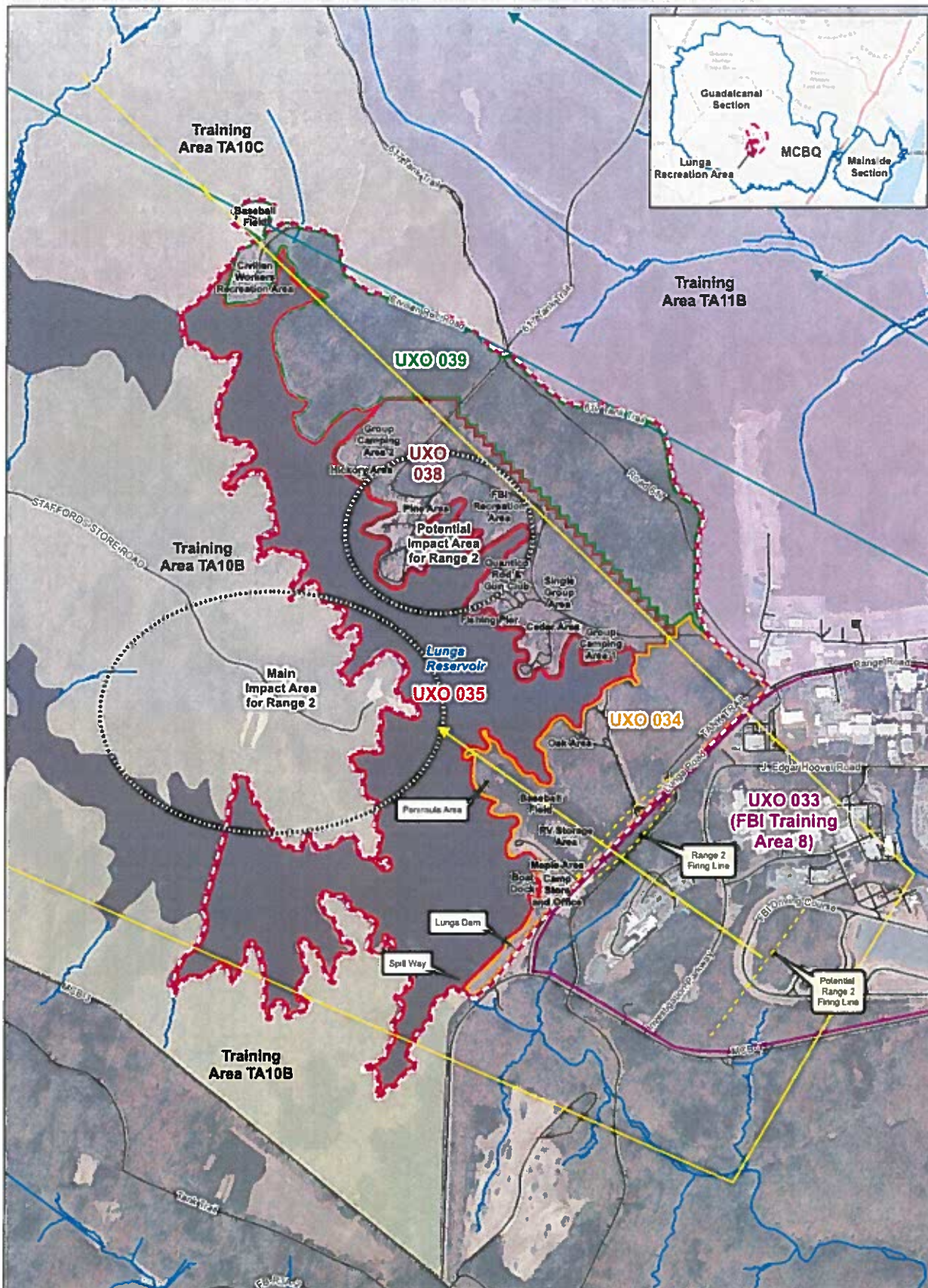


Aerial Imagery - Commonwealth of Virginia, 2015

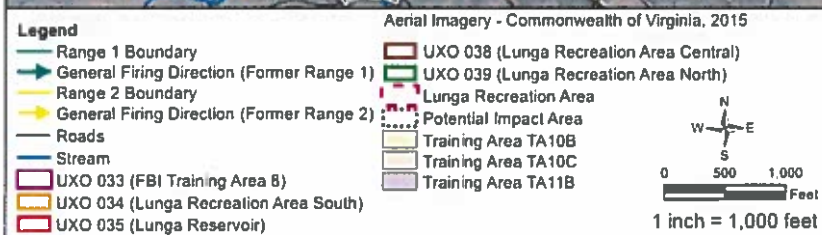
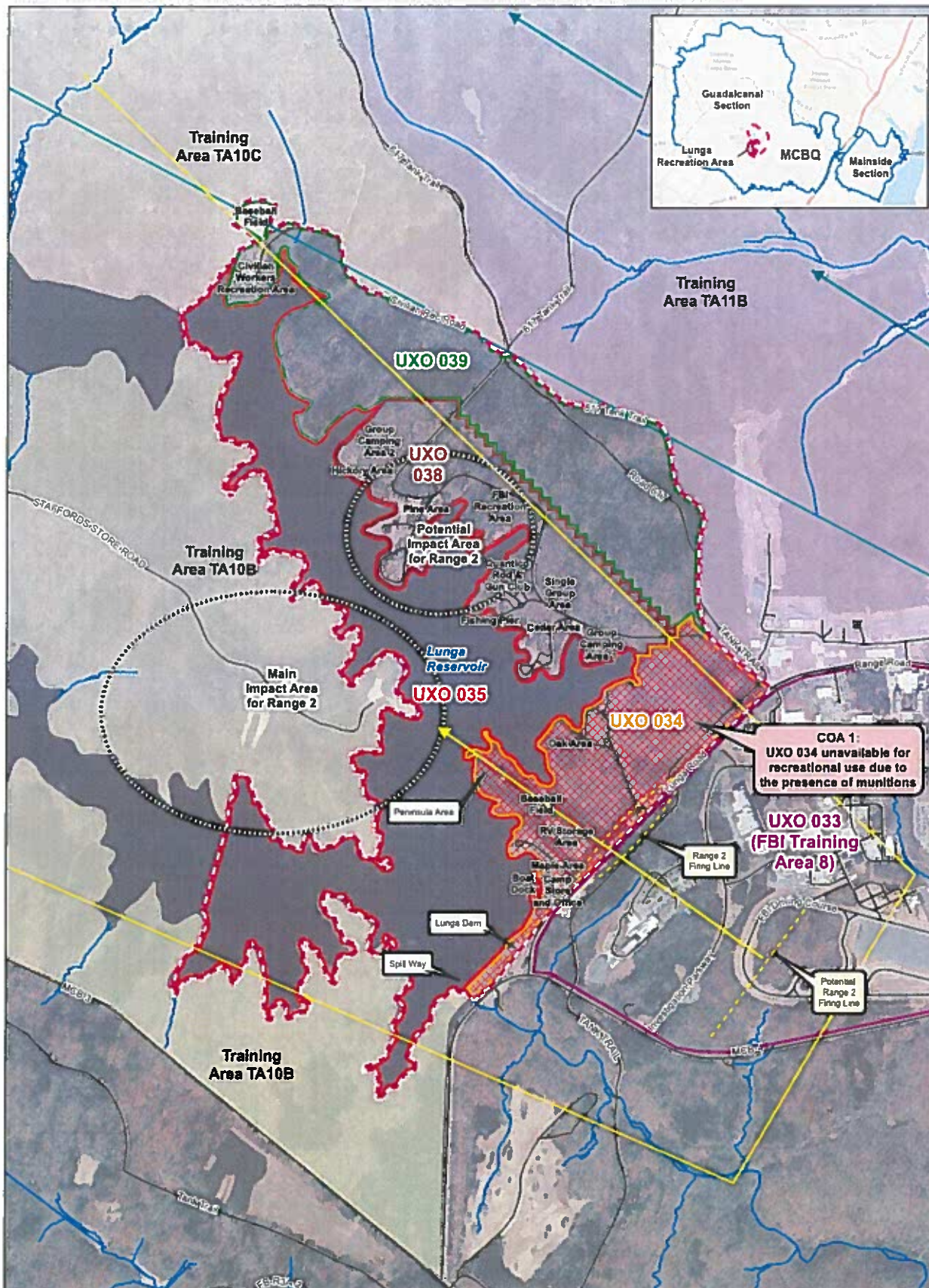
**Figure 1**  
 Lunga Recreation Area Boundary and Major Features  
 Lunga Recreation Area Reopening  
 Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia

ch2m





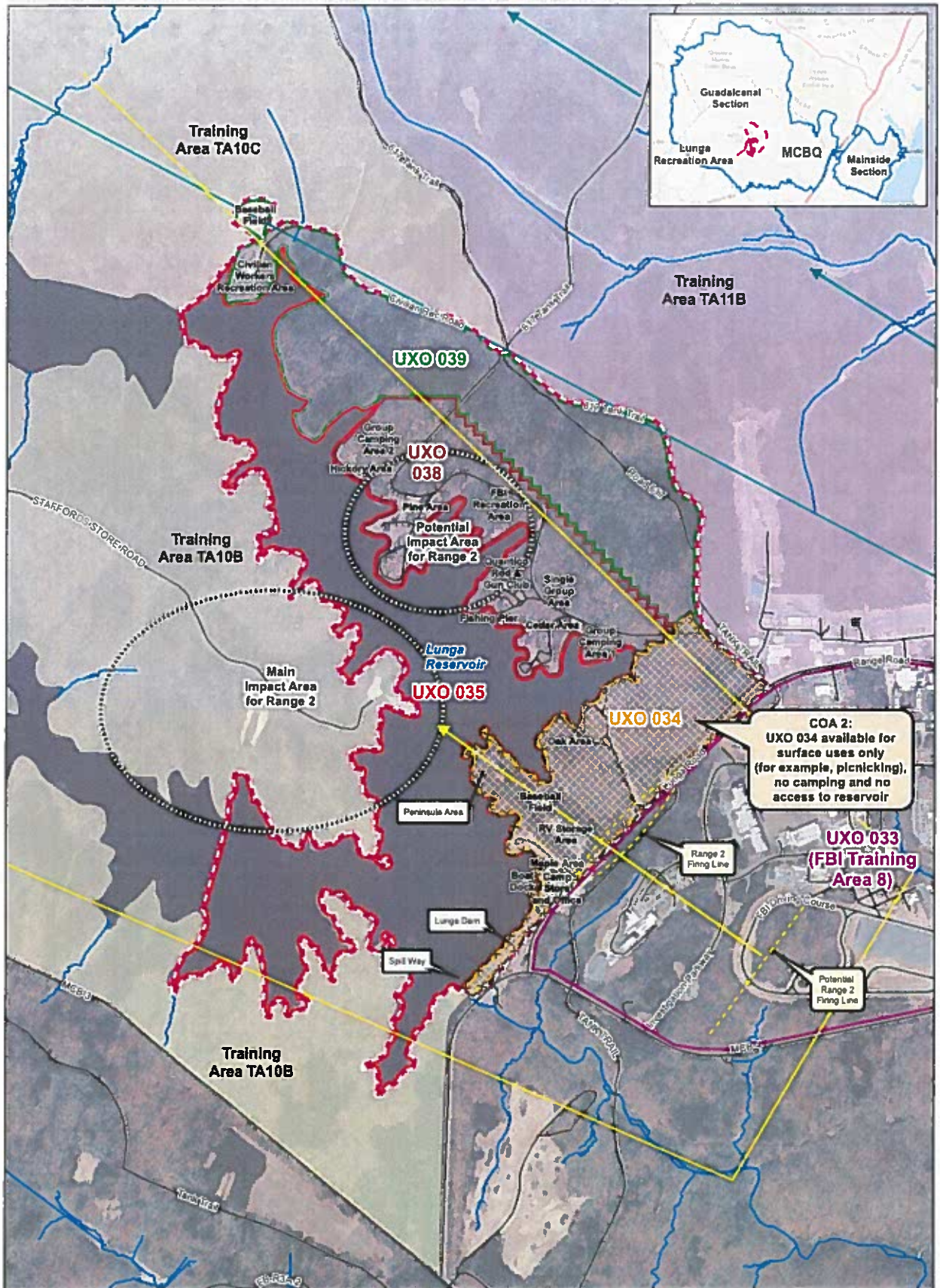




**Figure 3**  
**Course of Action 1**  
**- UXO 034 as Incompatible Land Use**  
 Lunga Recreation Area Reopening  
 Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia

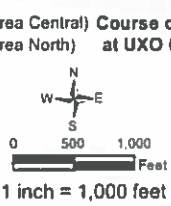
ch2m





Aerial Imagery - Commonwealth of Virginia, 2015

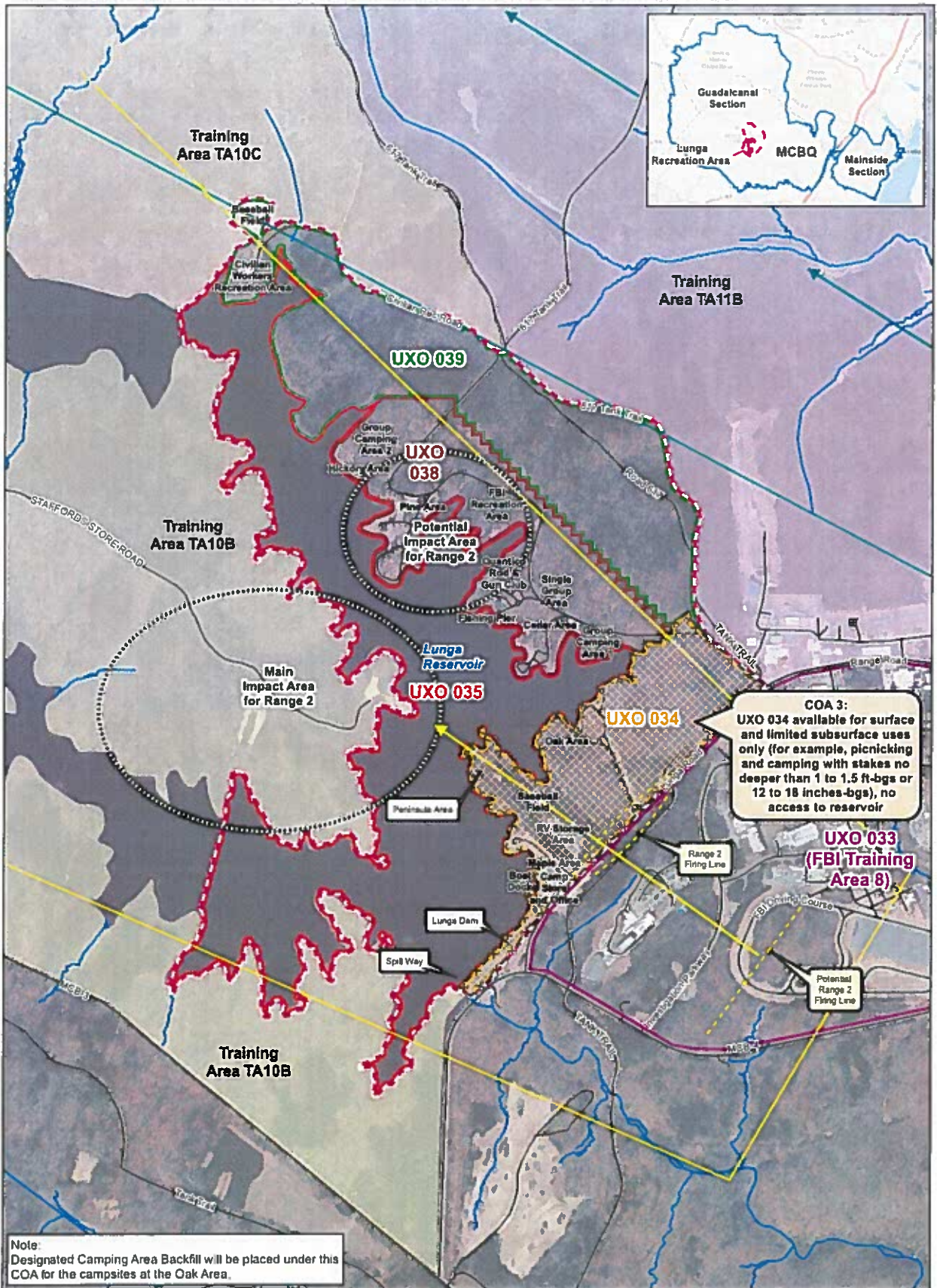
- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>— Range 1 Boundary</li> <li>→ General Firing Direction (Former Range 1)</li> <li>— Range 2 Boundary</li> <li>→ General Firing Direction (Former Range 2)</li> <li>— Roads</li> <li>— Stream</li> <li>— UXO 033 (FBI Training Area 8)</li> <li>— UXO 034 (Lunga Recreation Area South)</li> <li>— UXO 035 (Lunga Reservoir)</li> </ul> | <ul style="list-style-type: none"> <li>— UXO 038 (Lunga Recreation Area Central)</li> <li>— UXO 039 (Lunga Recreation Area North)</li> <li>— Lunga Recreation Area</li> <li>— Potential Impact Area</li> <li>— Training Area TA10B</li> <li>— Training Area TA10C</li> <li>— Training Area TA11B</li> <li>— Fence and Signage</li> </ul> |
|--|--|



**Figure 4**  
**Course of Action 2 – Lunga Recreation Area Reopened at UXO 034 (No Camping and No Access to Reservoir)**  
 Lunga Recreation Area Reopening  
 Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia







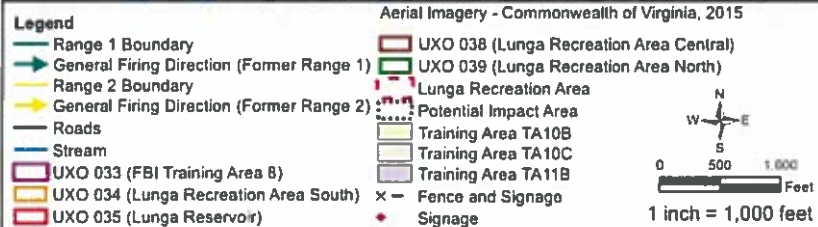
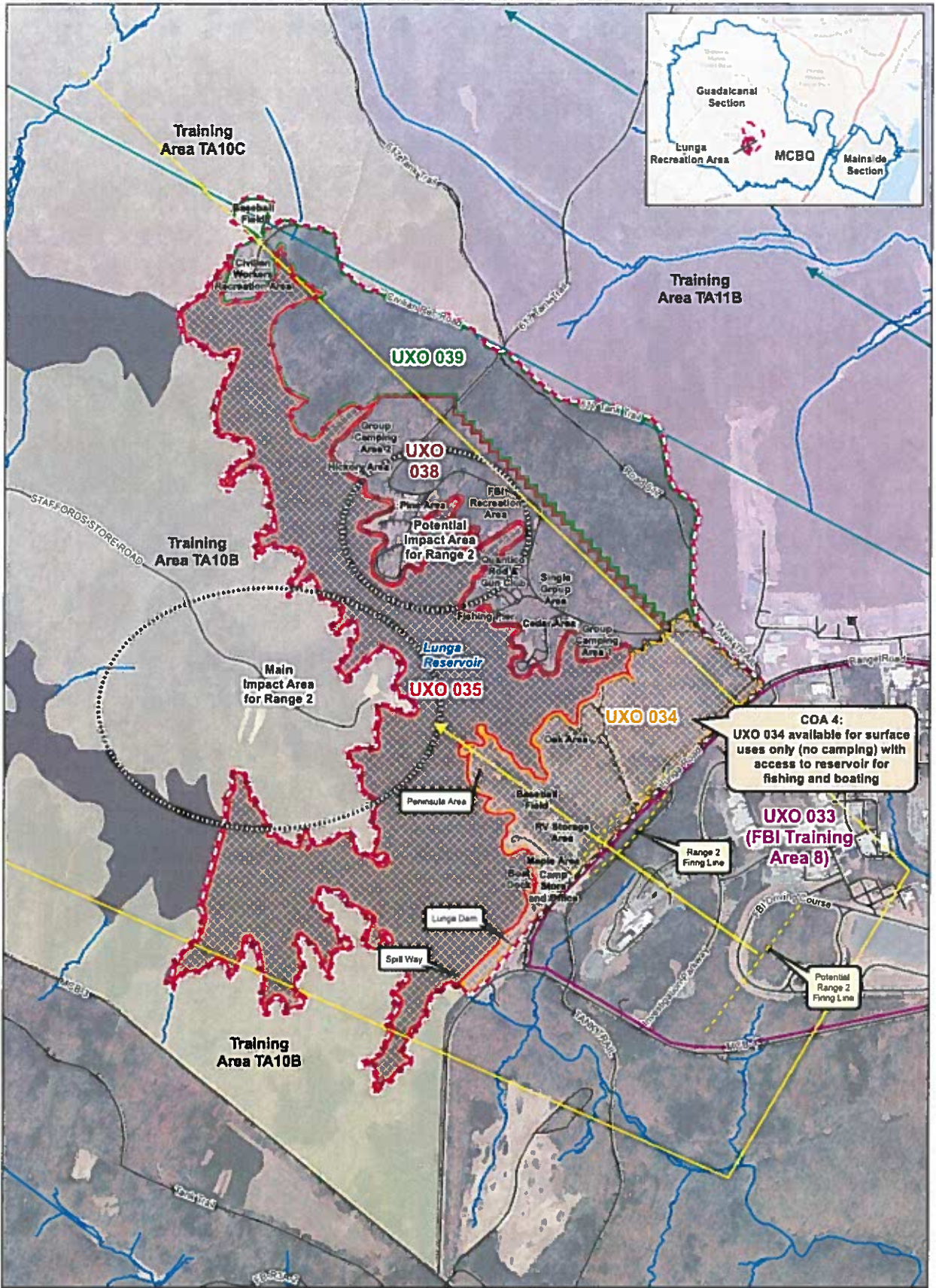
**Legend**

- Range 1 Boundary
- General Firing Direction (Former Range 1)
- Range 2 Boundary
- General Firing Direction (Former Range 2)
- Roads
- Stream
- UXO 033 (FBI Training Area 8)
- UXO 034 (Lunga Recreation Area South)
- UXO 035 (Lunga Reservoir)
- UXO 038 (Lunga Recreation Area Central)
- UXO 039 (Lunga Recreation Area North)
- Lunga Recreation Area
- Potential Impact Area
- Training Area TA10B
- Training Area TA10C
- Training Area TA11B
- Fence and Signage

**Figure 5**  
**Course of Action 3 – Lunga Recreation Area Reopened at UXO 034 (Camping Available and No Access to Reservoir)**  
 Lunga Recreation Area Reopening  
 Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia

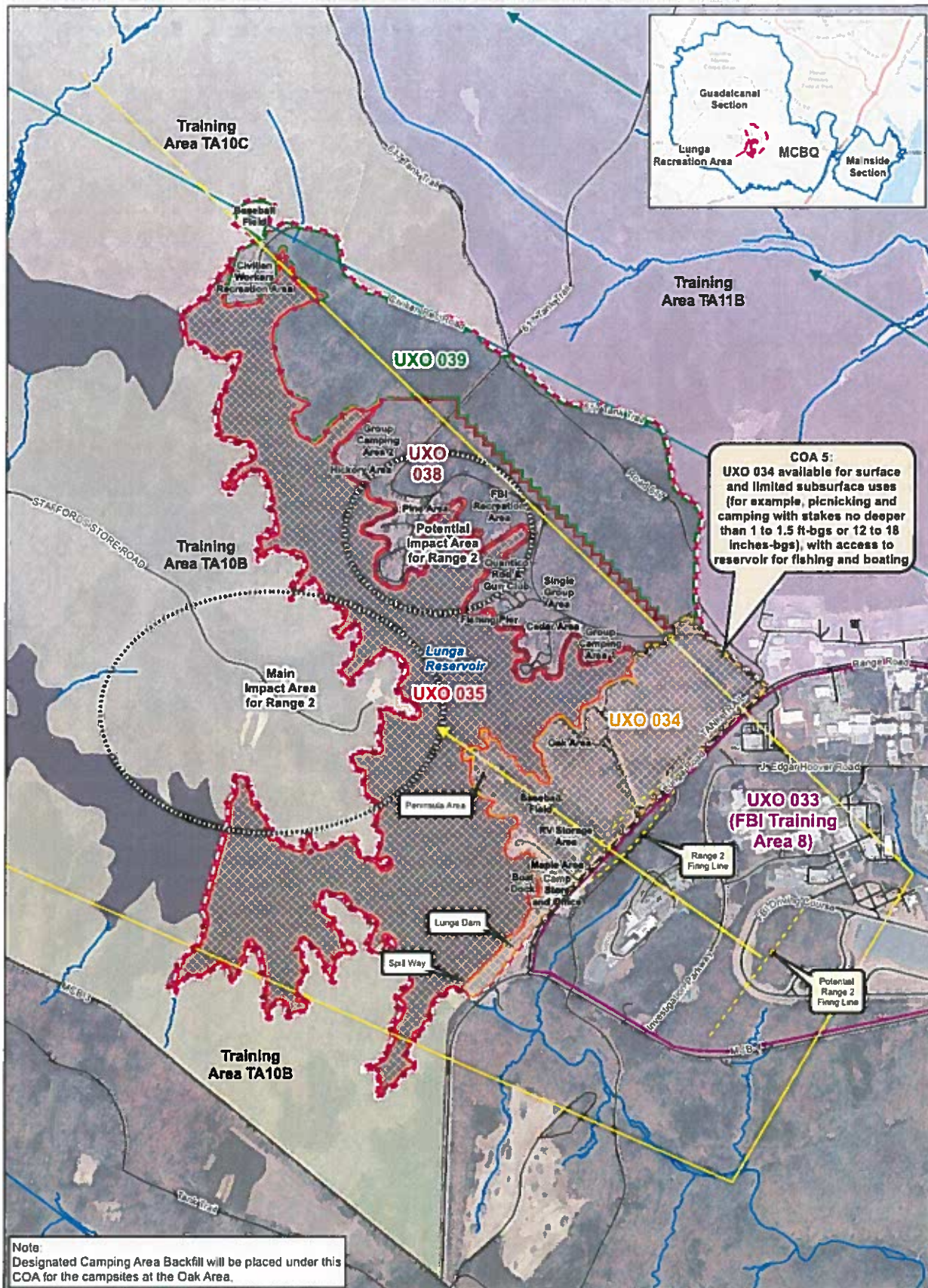
Scale: 1 inch = 1,000 feet





**Figure 6**  
**Course of Action 4 – Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; No Camping)**  
 Lunga Recreation Area Reopening  
 Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia





**Legend**

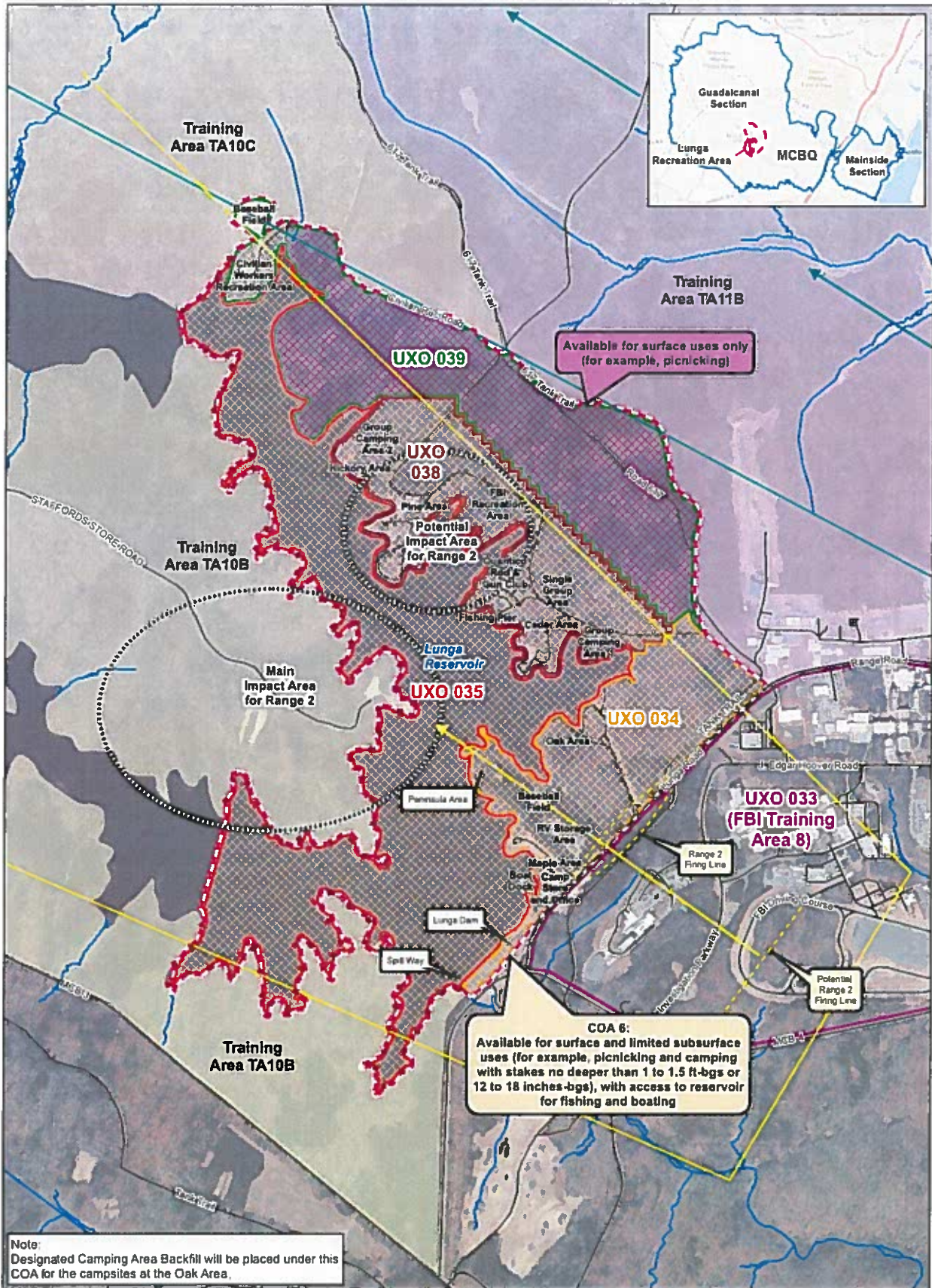
— Range 1 Boundary	UXO 038 (Lunga Recreation Area Central)
→ General Firing Direction (Former Range 1)	UXO 039 (Lunga Recreation Area North)
— Range 2 Boundary	Lunga Recreation Area
→ General Firing Direction (Former Range 2)	Potential Impact Area
— Roads	Training Area TA10B
— Stream	Training Area TA10C
UXO 033 (FBI Training Area 8)	Training Area TA11B
UXO 034 (Lunga Recreation Area South)	x - Fence and Signage
UXO 035 (Lunga Reservoir)	• Signage

**Figure 7**  
**Course of Action 5 – Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)**  
 Lunga Recreation Area Reopening  
 Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ)  
 Quantico, Virginia

1 inch = 1,000 feet

**ch2m**





**Legend**

— Range 1 Boundary	▭ UXO 038 (Lunga Recreation Area Central)
→ General Firing Direction (Former Range 1)	▭ UXO 039 (Lunga Recreation Area North)
— Range 2 Boundary	▭ Lunga Recreation Area
→ General Firing Direction (Former Range 2)	▭ Potential Impact Area
— Roads	▭ Training Area TA10B
— Stream	▭ Training Area TA10C
▭ UXO 033 (FBI Training Area 8)	▭ Training Area TA11B
▭ UXO 034 (Lunga Recreation Area South)	× - Fence and Signage
▭ UXO 035 (Lunga Reservoir)	• Signage

Aerial Imagery - Commonwealth of Virginia, 2015

0 500 1000 Feet  
1 inch = 1,000 feet

**Figure 8**  
**Course of Action 6 – Lunga Recreation Area Reopened at UXO 034, UXO 038, and UXO 039 (Access to Reservoir Available; Camping Available)**  
Lunga Recreation Area Reopening  
Courses of Action Technical Memorandum  
Marine Corps Base Quantico (MCBQ)  
Quantico, Virginia



Figure 9: Potential Courses of Action for Reopening of Lunga Recreation Area: Estimated Costs

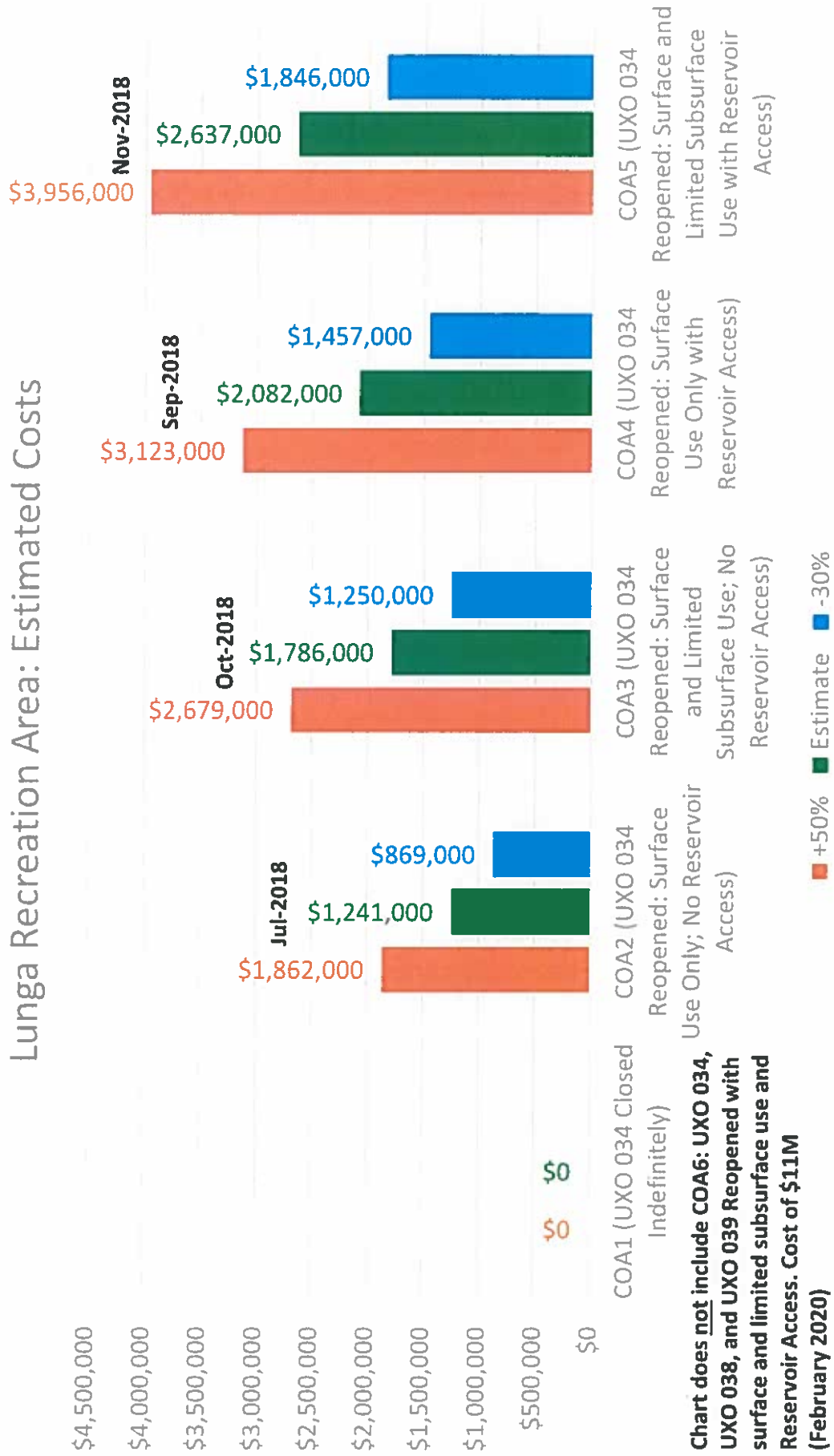


Chart does not include COA6: UXO 034, UXO 038, and UXO 039 Reopened with surface and limited subsurface use and Reservoir Access. Cost of \$11M (February 2020)

Attachment 1

**ENCLOSURE ( 1 )**



## Rental Fees

### BOATS

Fees for all watercraft include all necessary safety gear. Gas mixture is included with motorboats.

	Per Hour	1/2 Day	Per Day	Overnight
<b>Rowboats</b>				
Military	\$6.00	\$11.00	\$16.00	\$16.00
DoD/Civilian	\$7.00	\$13.00	\$21.00	\$21.00
<b>Canoes and Kayaks</b>				
Military	\$6.00	\$11.00	\$16.00	\$16.00
DoD/Civilian	\$7.00	\$13.00	\$21.00	\$21.00
<b>Paddleboats and Aquacycles</b>				
Military	\$6.00			
DoD/Civilian	\$7.00			
<b>Motorboats</b>				
Military	\$9.00	\$22.00	\$36.00	\$46.00
DoD/Civilian	\$10.00	\$25.00	\$46.00	\$56.00



### PAVILIONS

\$75.00 per day, Big Oak pavilion, by reservation only.  
\$50.00 per day, all other pavilions, by reservation only.

### CAMPITES

	Per Night	Military	DoD	Civilian
Water/Sewer/Elect 30/50 amp Hookup		\$21.00	\$26.00	\$26.00
Water/Elect 30/50 amp Hookup		\$16.00	\$21.00	\$21.00
Tent		\$7.00	\$11.00	\$11.00
Youth, Group Camping		\$3.00/person for Mil/DoD		

### MISCELLANEOUS

	Per Day
Dunk Tank	\$50.00
Supercooker	\$25.00

All rental items are available for on-site use only. Horseshoes, volleyballs, and softball equipment are available for check-out at no charge.

## Camping Regulations

- Patrons must have a military, DoD, FBI, or DEA identification card to utilize campground. Sponsors are responsible for their guests. An authorized adult user must accompany patrons under age 18.
- Camping is allowed in designated campsites only. No group camping in (numbered) family camp sites; individual camping in group sites or tent camping in full hookup sites. Maximum occupancy per site is six persons and two vehicles.
- All campers will check in and out with park staff. When the store is closed, campers will register at the information board outside the office door and pay the established user fees, in the office.
- Organized, recognized youth groups may utilize the group camp area by reservation. Call for fees and reservations.
- The maximum period of occupancy shall be ten days. Extensions may be granted on a day-by-day basis depending on anticipated usage.
- All campers will police their areas prior to departure. Trash will be placed in proper receptacles and will not be buried or placed in fire rings. Group campers will utilize the dumpsters at each area.
- Music will be played at a moderate level. Quiet hours are from 2100 to 0600.
- Fires are allowed in fire rings only. Fires may be restricted due to weather conditions.
- Swimming is not authorized anywhere at Lunga Park.
- Dogs and pets must remain on a leash.
- Individuals age 16 and older must have a valid Virginia State Fishing license; and MCB Quantico fishing permit in their possession to fish at Lunga.
- Dead wood on the ground may be used for firewood. Cutting live foliage or transporting wood off MCB Quantico is prohibited.
- Persons authorized in accordance with current base regulations may consume beer. Other alcoholic beverages must have written approval from the Base Commander.
- Lunga Park is with n the FBI Practical Problems training area. FBI students will be armed with blank weapons. The area will not be closed and will not interfere with your camping.
- Boats on trailers will only be launched at the boat ramp. Motors over 10 hp will be operated at idle speed only. No personal watercraft (jet skis), swimming, or skiing allowed. You must check at the boat ramp for live fire conditions beyond the buoys.
- Please avoid parking or driving on the grass or in campsites.



## Information, Fees, and Charges

703-784-5270

[www.quantico.usmc-mccs.org/Lunga](http://www.quantico.usmc-mccs.org/Lunga)



## Lunga Hours

### SPRING

Mid April - Memorial Day

Day	General Store	Boat Issue
Monday	Closed	Closed
Tuesday	Closed	Closed
Wednesday	1100-1900	Closed
Thursday	1100-1900	Closed
Friday	1100-1900	Closed
Saturday	0700-1900	0700-1800
Sunday	1100-1900	1100-1800

### SUMMER

Memorial Day - Labor Day

Day	General Store	Boat Issue
Monday	Closed	Closed
Tuesday	0800-1600	Closed
Wednesday	0800-1900	1100-1800
Thursday	0800-1900	1100-1800
Friday	0800-1900	1100-1800
Saturday	0700-2000	0700-1900
Sunday	1100-1900	1100-1800

### FALL

Labor Day - Columbus Day

Day	General Store	Boat Issue
Monday	Closed	Closed
Tuesday	Closed	Closed
Wednesday	1100-1900	Closed
Thursday	1100-1900	Closed
Friday	1100-1900	Closed
Saturday	0700-1900	0700-1800
Sunday	1100-1900	1100-1800

### WINTER

Columbus Day - Mid April

The General Store and Boat Issue are closed. The office is open for campsite reservations Monday through Friday, 0700-1530. For more information call 703-784-5270.

## Additional Information

The park is open from dawn to dark for picnicking, fishing, and nature trail walks. Camping is available year-around.

Since this is a family campground, please adhere to the speed limit (15 mph - road, 5 mph - campground) and quiet hours (2100-0600).

Pavilions are available by reservation from dawn-to-dark, with fee and registration.

Pets must be leashed.

Swimming is NOT allowed.

Dead wood may be gathered as firewood for your campsite.

Please call security police at 703-784-2251, if you need after-hours assistance.



### ELIGIBILITY

To reserve or rent Lunga's pavilions or equipment, you must be at least 18 years old, and Active Duty, Retired Military, Reservists, FBI, DEA, or DoD Civilian at MCB Quantico.

### RESERVATION/REGISTRATION REQUIREMENTS

Boat issue, camping, pavilion, and RV site reservations are available at the General Store, or by calling 703-784-5270. Tent sites are on a first-come, first-serve basis, and must be occupied. Youth group camping and pavilion use are by reservation only.

RV sites are available by reservation for a maximum of ten days per month. Full and partial RV hookup sites have a sign on the number post if they are reserved. Longer stays may be authorized in the winter.

After-hours check-in is available for campers at the information board. Please fill out the envelope, enclose the appropriate fee and place in the office door slot. (Note: If you have never visited with us before, please ensure that you complete all the information so that we can enter your data into our computer records.)

## Fishing

Fishing is allowed from dawn to dark from the park shoreline only. Areas outside park boundaries are within base training areas and are strictly off limits. The covered dock is closed during off-season, and fishing is not permitted during that time.

### ELIGIBILITY

Fishing at Lunga is open to all military or civilian personnel at MCB Quantico.

### REQUIREMENTS

A Virginia State license and MCB Quantico permit are required for ages 16 to 64. If the General Store is closed, base permits can be purchased at the Quantico Marine Corps Exchange for \$10 per year or \$2 for five days.

People age 15 and younger, age 65 or older, or who have a permanent disability, are not required to purchase a base permit.

Fish found in Lunga Reservoir are: bass, bluegill, crappie, pickerel, walleye, catfish, and white and yellow perch. Bass 12" to 15" must be returned to the water immediately. The creel limit on crappie is 25 and bass is 5. Check base and state regulations for additional information. Base regulations can be obtained at the Game Check Station.

Additional source for state and local fishing information: [www.digit.virginia.gov/fishing](http://www.digit.virginia.gov/fishing)

## Boating

Authorized patrons only. A liability waiver must be signed for each boat issued. Patrons must pass a safe boater test when using motorboats. Life jackets must be worn at all times, jet skis, water skiing, and swimming are not allowed.

Personal boats on trailers may be launched at the boat ramp at no charge. Motors over 10 hp will be operated at IDLE SPEED ONLY.

All boaters must check at the boat ramp for five fire conditions past the buoys.

Boats without lights are not allowed on the lake after dark. The lake is patrolled by the local game wardens.

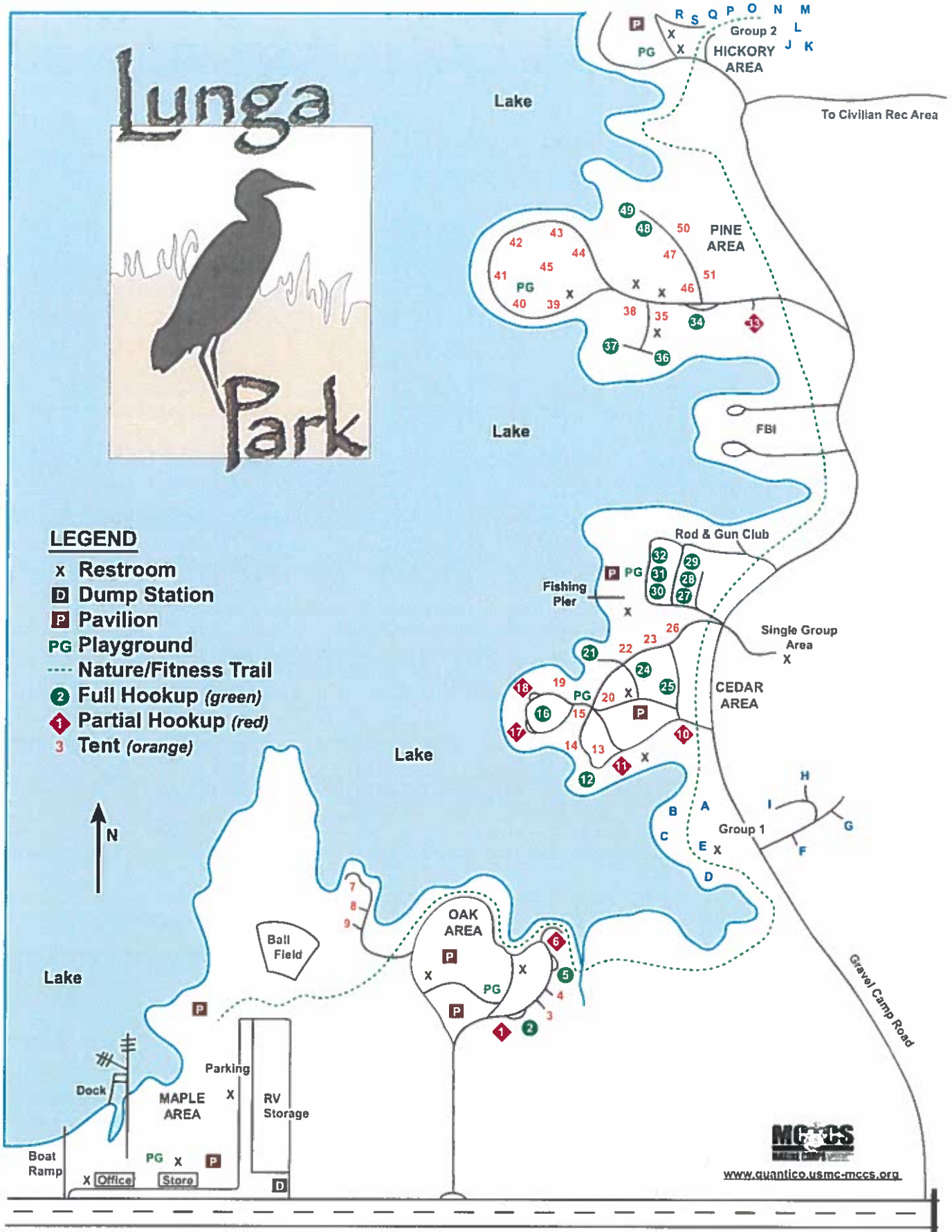


# Attachment 2



**LEGEND**

- x Restroom
- D Dump Station
- P Pavilion
- PG Playground
- Nature/Fitness Trail
- 2 Full Hookup (green)
- 1 Partial Hookup (red)
- 3 Tent (orange)



J. Edgar Hoover Rd

**LUNGA PARK and RECREATION AREA**

Barricade

**ENCLOSURE (1)**

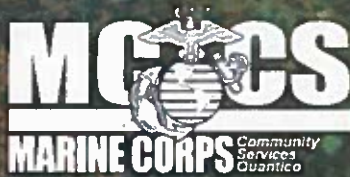
Attachment 3



# Safety

703-784-5270

[www.quantico.usmc-mccs.org](http://www.quantico.usmc-mccs.org)



ENCLOSURE (1)



# Welcome to



While you're enjoying your stay at Lunga Park, we want you to be as safe as possible and to be aware of potential hazards associated with outdoor recreation - particularly in this area! Most hazards may be avoided just by staying in well-maintained areas.

## ENCLOSURE



### Plants

Poison Ivy is a very common plant on the base. It can cause a severe rash in most people, and is highly toxic if ingested.

Smoke from burning poison ivy can also cause dermatitis and internal problems. Poison ivy grows as a low ground cover, small shrub, or vine that climbs up trees, shrubs, and fences.

The plant is easily identified by its three irregularly shaped leaflets coming from a single stalk. The vine of older plants is thick and woody and has a hair appearance because of the numerous tendrils used to cling to trees. Being aware of its appearance is the best way to avoid getting the rash.



## Explosive Ordinances

Lunga Park is part of the Quantico Marine Corps Base, and was utilized as a training area before becoming a recreational area over 40 years ago.

Over the years, training missions throughout Quantico have been modified and relocated. The end result is that ordinance may be encountered anywhere aboard the Base, including here at Lunga Park.

Even though it has been over 40 years, ordinance has the capability of percolating up to the surface.

It is important to remember that explosive ordinance was designed to destroy material and kill or maim people. Regardless of its age, this ordinance retains its lethality. Trained professional can make assessments and remove any explosive hazards. Report found ordinance to the authorities (Lunga staff or Military Police) immediately. NEVER touch, remove, or disturb any ordinance or suspected ordinance items yourself!



## Swimming

For the safety of all patrons, there is

**ABSOLUTELY NO SWIMMING ALLOWED IN LUNGA RESERVOIR.**

Swimming, wading, skiing, jet skis, and wind surfers are NOT AUTHORIZED at Lunga Reservoir. The bottom of the lake is deep mud that can easily entrap swimmers. Old ordinance percolating to the lake bottom can also be an issue. Please stay out of the water at all times!

## Snakes

Over 20 species of snakes have been recorded at MCB Quantico, though only one venomous species, the copperhead, is native to the area.

Nearly all snakes, including non-venomous species, will inflict a painful bite if they feel threatened. All snake bites should be treated by a physician.

To avoid being bitten, common sense should be followed:

- Don't disturb or try to kill snakes (that's when most snake bites occur)
- Look carefully before putting your hands or feet in places you cannot see
- Don't crawl into thickets without looking carefully
- Look carefully before sitting on rocks or logs
- Use caution when moving brush piles and other objects that are lying on the ground
- Don't fool around or show off with venomous snakes



## Arachnids

Chiggers and itch mites are very small arachnids that can cause a great deal of itching and discomfort to their victim. The tiny, reddish adult chigger is just visible to the naked eye, while the larval stage that bites people is even smaller. Chiggers insert their mouth parts into the skin to draw out fluids. When full, they drop off and leave a swelling that itches intensely.



Itch mites are whitish and are also just visible to the naked eye. The adult female burrows into the skin to feed and lay eggs. The bite itches and commonly becomes infected. Chiggers and itch mites are reportedly abundant in blackberry thickets, weedy areas, and other dense vegetation. When used as directed, applying a DEET-based insect repellent to the skin and a permethrin-based insecticide to clothing is an effective deterrent to chiggers and mites.



## Ticks

As the most commonly encountered hazardous pest aboard MCB Quantico, ticks are active from early spring through late fall. Besides causing a persistent, itchy swelling, several species of ticks carry diseases that may be transmitted to humans through their bites. Disease causing micro-organisms reside in the gut of the tick for all or part of their life cycle and are passed to humans and other hosts while the tick is attached and feeding.



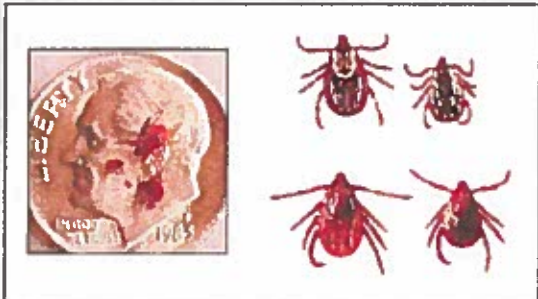
Using a DEET-based insect repellent on the skin and a permethrin-based insecticide on clothing is effective in preventing tick bites.

Other precautions that can help reduce chances of being bitten include:

- Tucking pant legs into socks or boots, shirts into pants
- Taping the area where pants and boots meet
- Checking yourself frequently for infestations

If bitten:

- Remove attached ticks promptly by grasping the tick by the head with tweezers and gently pulling them free
- Do not apply hot matches, nail polish, or chemicals to the tick
- Do not squeeze or crush the body, as this may expel micro-organisms from the tick's gut
- Clean the bite area with soap and water, or alcohol and watch it for several days for signs of rash or infection
- If a rash or other symptoms develop, see a physician



## Additional Information

The park is open from dawn to dark for picnicking, fishing, and nature trail walks. Camping is available year-round, by contacting the Lunga office.

Since this is a family campground, please adhere to the speed limit (15 mph - road, 5 mph - campground) and quiet hours (2100-0600). Pets must be leashed.

**Lunga Office 703-784-5270**

**After-hours Assistance  
Security Battalion 703-784-2251**

**Emergencies 911**

## Lunga Park Hours

### SPRING (Mid April - Memorial Day)

	General Store	Boat Issue
Mon	Closed	Closed
Tue	Closed	Closed
Wed-Fri	1100-1900	Closed
Saturday	0700-1900	0700-1900
Sunday	1100-1900	1100-1900

### SUMMER (Memorial Day - Labor Day)

	General Store	Boat Issue
Mon	Closed	Closed
Tue	0800-1630	Closed
Wed-Fri	0800-1900	1100-1900
Sat	0700-2000	0700-2000
Sun	1100-1900	1100-1900

### FALL (Labor Day - Columbus Day)

	General Store	Boat Issue
Mon	Closed	Closed
Tue	Closed	Closed
Wed-Fri	1100-1900	Closed
Sat	0700-1900	0700-1900
Sun	1100-1900	1100-1900

### WINTER (Columbus Day - Mid April)

The General Store and Boat Issue are closed. The office is open for campsite reservations Monday through Friday, 0700-1530. For more information call 703-784-5270.

Revised 11/09

Attachment 4

**ENCLOSURE (1)**

Attachment 4: Courses of Action Cost Estimate Summary  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

COA Number	COA Description	COA Estimate and Range		
		Estimate	-30%	+50%
1	This COA assumes no costs; that the current condition is the long-term condition of UXO 034 and that the current LUCs (for example, existing signage) is appropriate to restrict access and site use. UXO 034 is unavailable for recreation use.	\$0	\$0	\$0
2	Lunga Recreation Area is reopened at UXO 034 for limited recreational use (surface use only). No further NTCRA activities; remaining 3,035 targets at UXO 034 are not intrusively investigated. TCRA is not performed at UXO 035 Shoreline Area.	\$1,241,000	\$869,000	\$1,862,000
3	Lunga Recreation Area is reopened at UXO 034 for recreational use (surface use and limited subsurface use). TCRA intrusive investigation completed for remaining 3,035 targets at UXO 034. TCRA is not performed at UXO 035 Shoreline Area.	\$1,786,000	\$1,250,000	\$2,679,000
4	Lunga Recreation Area is reopened at UXO 034 for recreational use (surface use only) and reservoir water access next to UXO 034. No further NTCRA activities at UXO 034; remaining 3,035 targets are not intrusively investigated. TCRA is performed at UXO 035 Shoreline Area (only in shoreline frontage along western edge of UXO 034).	\$2,082,000	\$1,457,000	\$3,123,000
5	Lunga Recreation Area is reopened at UXO 034 for recreational use (surface use and limited subsurface use) including shoreline and reservoir water access next to UXO 034. TCRA intrusive investigation completed for remaining 3,035 targets at UXO 034. TCRA is performed at UXO 035 Shoreline Area (only in shoreline frontage along western edge of UXO 034).	\$2,637,000	\$1,846,000	\$3,956,000
6	Lunga Recreation Area is reopened at UXO 034, UXO 038, and UXO 039 for recreational use (surface use and limited subsurface use) including shoreline and reservoir water access next to UXO 034, UXO 038, and UXO 039. TCRA intrusive investigation completed for remaining 3,035 targets at UXO 034. TCRA intrusive investigations completed at UXO 038 and UXO 039. TCRA is performed at UXO 035 Shoreline Area (in shoreline frontage along western edge of UXO 034, UXO 038, and UXO 039).	\$11,385,000	Not Applicable	Not Applicable

Refer to Attachments 4-1 through 4-6 for additional detail

Attachment 4-1: Course of Action 1 - UXO 034 as Incompatible Land Use (this portion of Lunga Recreation Area remains closed indefinitely)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum

**Description:** This COA assumes no costs; that the current condition is the long-term condition of UXO 034 and that the current LUCs (for example, existing signage) is appropriate to restrict access and site use. UXO 034 is unavailable for recreation use.

Task	Units	Quantity	Unit Rate	Subtotal	Comments
<i>Planning Activities</i>					
**None			\$ -	\$ -	
Subtotal				\$ -	
<i>Fieldwork Activities</i>					
**None			\$ -	\$ -	
Subtotal				\$ -	
<i>Reporting Activities</i>					
**None			\$ -	\$ -	
Subtotal				\$ -	
Subtotal of Planning, Fieldwork, and Reporting Activities				\$ -	
Project Management (10 percent of Planning, Fieldwork, and Reporting Activities)				\$ -	
Contingency of 5 percent (on Planning, Fieldwork, and Reporting Activities)				\$ -	
<b>Total</b>				\$ -	



Attachment 4-2: Course of Action 2 - Lunga Recreation Area Reopened at UXO 034 (No Camping and No Access to Reservoir)  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Description: This COA assumes that Lunga Recreation Area is reopened at UXO 034 for limited recreational use (surface use only). No further NTCRA activities; remaining 3,035 targets at UXO 034 are not intrusively investigated. TCRA is not performed at UXO 035 Shoreline Area.

Task	Units	Quantity	Unit Rate	Subtotal	Comments
<b>Planning Activities</b>					
Work Planning	1	Lump	\$ 10,000	\$ 10,000	For fence and signage installation along UXO 034. Assume existing ESS will be used to support fieldwork (no costs for new ESS).
Permitting	1	Lump	\$ 5,000	\$ 5,000	For fence and signage installation along UXO 034. Dig permits and other associated permits to complete fence and signage installation.
Subtotal				\$ 15,000	
<b>Fieldwork Activities</b>					
Fence and Signage Installation	15,149	Feet	\$ 58	\$ 878,793	Assumes 8 foot chain link security fence along perimeter of UXO 034 (15,149 feet) with 12-foot wide vehicle access gates every 500 feet (14 gates) on non-shoreline area (6,981 feet) and signs every 250 feet (61 signs). Any fence post intrusive installation performed under UXO avoidance with UXO escort. 180 feet per day. 85 days (42 days with 2 install teams).
Long-Term Inspection of Downed Trees for Munitions Items (in rootballs) and Signs and Fences	30	Year	\$ 5,000	\$ 150,000	For periodic inspection and any downed trees and underlying rootballs for munitions items (UXO Technician). Also annual inspection of fencing and signage. Period of 30 years.
Subtotal				\$ 1,028,793	
<b>Reporting Activities</b>					
Survey and Documentation of Fence and Signage Installation	1	Lump	\$ 10,000	\$ 10,000	Survey of location of fencing, signage, and appropriate features (gates) and contractor documentation of construction completion in accordance with Work Plan
Interim LUC Plan	1	Lump	\$ 20,000	\$ 20,000	Completion of Interim LUC Plan to document LUCs for UXO 034 and inspection/documentation mechanisms to ensure LUCs remain in-place
Risk Communication Brochure	1	Lump	\$ 5,000	\$ 5,000	For providing to new recreational users upon reopening of Lunga Recreation Area
Subtotal				\$ 35,000	
Subtotal of Planning, Fieldwork, and Reporting Activities				\$ 1,078,793	
Project Management (10 percent of Planning, Fieldwork, and Reporting Activities)				\$ 107,879	
Contingency of 5 percent (on Planning, Fieldwork, and Reporting Activities)				\$ 53,940	
<b>Total</b>				<b>\$ 1,240,613</b>	

Other Notes:

1. No costs for site restoration (filling of existing intrusive investigation locations at UXO 034) are assumed under this estimate as this is already funded.
2. No costs for management of MEC or MPPEH are included in this estimate.
3. No costs for repair or replacement of fences or signage are included in this estimate for the long term inspection phase.
4. No costs for MCCS Infrastructure Repairs are included in this estimate.

Attachment 4-3: Course of Action 3 - Lunga Recreation Area Reopened at UXO 034 (Camping Available; No Access to Reservoir)  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Description: This COA assumes Lunga Recreation Area is reopened at UXO 034 for recreational use (surface use and limited subsurface use). TCRA intrusive investigation completed for remaining 3,035 targets at UXO 034. TCRA is not performed at UXO 035 Shoreline Area.

Task	Units	Quantity	Unit Rate	Subtotal	Comments
<i>Planning Activities</i>					
Work Planning		Lump	\$ -	\$ -	Assume work is done under existing Gilbane Work Plan and ESS; new Work Plan/ESS not required.
Permitting	1	Lump	\$ 5,000	\$ 5,000	For fence and signage installation along UXO 034 in addition to intrusive investigation. Dig permits and other associated permits to complete fence and signage installation; and intrusive investigation.
Subtotal				\$ 5,000	
<i>Fieldwork Activities</i>					
Fence and Signage Installation	15,149	Feet	\$ 58	\$ 878,793	Assumes 8 foot chain link security fence along perimeter of UXO 034 (15,149 feet) with 12-foot wide vehicle access gates every 500 feet (14 gates) on non-shoreline area (6,981 feet) and signs every 250 feet (61 signs). Any fence post intrusive installation performed under UXO avoidance with UXO escort. 180 feet per day; 85 days (42 days with 2 install teams).
Long-Term Inspection of Downed Trees for Munitions Items (in rootballs) and Signs and Fences	30	Year	\$ 5,000	\$ 150,000	For periodic inspection and any downed trees and underlying rootballs for munitions items (UXO Technician) at UXO 034. Also annual inspection of fencing and signage. Period of 30 years.
Mobilization of UXO Team	1	Each	\$ 18,210	\$ 18,210	Mobilization of 9 person team consisting of 7 person UXO dig/disposal team and 2 person SUXOS/UXOQCS team
Mobilization of Survey Team	1	Each	\$ 1,500	\$ 1,500	Mobilization of 2 person survey team
Survey of Intrusive Investigation Targets	31	Day	\$ 3,004	\$ 93,124	3,035 targets. Assume 31 days duration for 1 Survey Team (100 targets per day)
Intrusive Investigation of Targets	31	Day	\$ 8,581	\$ 266,011	3,035 targets. Assume 31 days duration for 1 UXO Team (100 targets per day).
MEC Demolition and Destruction	3	Day	\$ 8,581	\$ 25,743	One MEC item per field day (31 field days for 31 MEC items). Assume 3 days for 1 UXO Team (11 MEC items per day).
JIT Explosives Delivery	3	Day	\$ 1,000	\$ 3,000	3 deliveries during 31 field days for MEC demolition and destruction.
MDAS Inspection and Disposal	3	Day	\$ 8,581	\$ 25,743	0.5 pounds per dig (1,517 pounds). 3 days for UXO Team to inspect, process, and dispose (off-site) of MDAS at 700 pounds per day
Designated Camping Areas Backfill	1	Lump	\$ 26,077	\$ 26,077	Placement of clean backfill (1.3 ft or 16 inches thick) to 9 campsite areas identified at UXO 034 (Oak Camping Area). Each campsite conservatively assumed 40 ft by 40 ft (1,600 ft <sup>2</sup> ); total area of 14,400 ft <sup>2</sup> or 0.3 acres for 9 campsites. Unit rate herein derived from APTIM email of October 26, 2017 of \$565,000 for 6.5 acres (\$86,923 per acre).

Attachment 4-3: Course of Action 3 - Lunga Recreation Area Reopened at UXO 034 (Camping Available; No Access to Reservoir)  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Task	Units	Quantity	Unit Rate	Subtotal	Comments
<b>Subtotal</b>				\$ 1,488,201	
<b>Reporting Activities</b>					
Survey and Documentation of Fence and Signage Installation	1	Lump	\$ 10,000	\$ 10,000	Survey of location of fencing, signage, and appropriate features (gates) and contractor documentation of construction completion in accordance with Work Plan
Interim LUC Plan	1	Lump	\$ 20,000	\$ 20,000	Completion of Interim LUC Plan to document LUCs for UXO 034 and inspection/documentation mechanisms to ensure LUCs remain in-place
Risk Communication Brochure	1	Lump	\$ 5,000	\$ 5,000	For providing to new recreational users upon reopening of Lunga Recreation Area
Construction Completion Report	1	Lump	\$ 15,000	\$ 15,000	To closeout TCRA with NAVFAC Washington per contract requirements (only for the work identified as part of this COA).
After Action Report	1	Lump	\$ 10,000	\$ 10,000	To closeout ESS with MARCORSSCOM (only for the work identified as part of this COA).
<b>Subtotal</b>				\$ 60,000	
<b>Subtotal of Planning, Fieldwork, and Reporting Activities</b>				\$ 1,553,201	
<b>Project Management (10 percent of Planning, Fieldwork, and Reporting Activities)</b>				\$ 155,320	
<b>Contingency of 5 percent (on Planning, Fieldwork, and Reporting Activities)</b>				\$ 77,660	
<b>Total</b>				\$ 1,786,182	

**Other Notes:**

1. No costs for site restoration (filling of existing intrusive investigation locations at UXO 034) are assumed under this estimate as this is already funded.
2. No costs for management of MEC or MPPEH are included in this estimate for the 30 year long-term inspection phase.
3. No costs for repair or replacement of fences or signage are included in this estimate for the long term inspection phase.
4. No costs for vegetation clearance are included for performing the intrusive investigation at UXO 034 (site conditions assumed acceptable for access).
5. No costs for MCCS Infrastructure Repairs are included in this estimate.

**Attachment 4-4: Course of Action 4 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir available; No Camping)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**

Description: This COA assumes Lunga Recreation Area is reopened at UXO 034 for recreational use (surface use only) and reservoir water access next to UXO 034. No further NTCRA activities at UXO 034; remaining 3,035 targets are not intrusively investigated. TCRA is performed at UXO 035 Shoreline Area (only in shoreline frontage along western edge of UXO 034).

Task	Units	Quantity	Unit Rate	Subtotal	Comments
<b>Planning Activities</b>					
Work Planning	1	Lump	\$ 40,000	\$ 40,000	Work Plan for completion of TCRA at UXO 035 Shoreline Area including new ESS. Includes any appropriate health and safety documentation including appropriate sequencing and notifications for Lunga Dam coordination to reduce reservoir water level elevation to 279 ft-msl.
Permitting	1	Lump	\$ 10,000	\$ 10,000	For fence and signage installation along UXO 034 in addition to intrusive investigation in UXO 035. Dig permits and other associated permits to complete fence and signage installation; permits required for reservoir access (erosion control); and permits for intrusive investigation.
Subtotal				\$ 50,000	
<b>Fieldwork Activities</b>					
Fence and Signage Installation	6,981	Feet	\$ 61	\$ 425,073	Assumes 8 foot chain link security fence along perimeter of UXO 034 not including the reservoir (6,981 feet) with 12-foot wide vehicle access gates every 500 feet (14 gates) and signs every 250 feet (28 signs). Any fence post intrusive installation performed under UXO avoidance with UXO escort. 180 feet per day; 39 days (19 days with 2 install teams).
Long-Term Inspection of Downed Trees for Munitions Items (in rootballs) and Signs and Fences	30	Year	\$ 5,000	\$ 150,000	For periodic inspection and any downed trees and underlying rootballs for munitions items (UXO Technician) at UXO 034. Also annual inspection of fencing and signage. Period of 30 years.
Mobilization of Survey Team	1	Each	\$ 1,500	\$ 1,500	Mobilization of 2 person survey team. TCRA boundary and survey control.
Survey of TCRA Boundary and Control	2	Day	\$ 3,004	\$ 6,008	2 days for 2 person survey team with SUXOS support for TCRA boundary and survey control.
Mobilization of Vegetation Clearance Subcontractor	1	Each	\$ 3,000	\$ 3,000	Mobilization of two person vegetation clearance with mechanized equipment for clearance of vegetation in exposed shoreline of reservoir.
Vegetation Clearance of UXO 035 Shoreline Area	8	Day	\$ 5,554	\$ 44,432	Assumes 0.33 of overall acreage in UXO 035 exposed shoreline (32 acres) requires vegetation clearance of typically submerged or deadfall vegetation (11 acres at 1.5 acres per day or 8 days).
Mobilization of UXO Team	1	Each	\$ 18,210	\$ 18,210	Mobilization of 9 person team consisting of 7 person UXO dig/disposal team and 2 person SUXOS/UXOQCS team. Surface clearance.
Surface Clearance of UXO 035 Shoreline Area	11	Day	\$ 8,581	\$ 94,391	Surface clearance of UXO 035 exposed shoreline (32 acres) at 3 acres per day (11 days). 8,000 pounds of metallic debris (at 250 pounds per acre).
Mobilization of DGM Team	1	Each	\$ 5,858	\$ 5,858	Mobilization of 2 person DGM team. DGM of UXO 035 shoreline area.
DGM of UXO 035 Shoreline Area	16	Day	\$ 5,104	\$ 81,664	DGM of 32 acres of UXO 035 exposed shoreline at 2 acres per day (16 days). Assumes entire area GPS accessible.
Mobilization of Survey Team	2	Each	\$ 1,500	\$ 3,000	Mobilization of 2 person survey team. DGM targets for intrusive investigation.
Survey of DGM Targets for Intrusive Investigation	21	Day	\$ 6,008	\$ 126,168	Assume 6,400 DGM targets at 200 targets per acre based on previous UXO 034, UXO 038, and UXO 039 DGM results. Assume 21 days duration for 2 Survey Teams (150 targets per day per team; or 300 targets per day). Assumes entire area GPS accessible.
Mobilization of UXO Team	1	Each	\$ 18,210	\$ 18,210	Mobilization of 9 person team consisting of 7 person UXO dig/disposal team and 2 person SUXOS/UXOQCS team. Intrusive investigation.



Attachment 4-4: Course of Action 4 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir available; No Camping)  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Task	Units	Quantity	Unit Rate	Subtotal	Comments
Intrusive Investigation of Targets in UXO 035 Shoreline Area	64	Day	\$ 8,581	\$ 549,184	6,400 targets at 100 targets per day (64 days) for 1 UXO team.
MEC Demolition and Destruction	6	Day	\$ 8,581	\$ 51,486	One MEC item per field day (64 field days for 64 MEC items). Assume 6 days for 1 UXO Team (11 MEC items per day).
JIT Explosives Delivery	6	Each	\$ 1,000	\$ 6,000	6 deliveries during 64 field days for MEC demolition and destruction.
MDAS Inspection and Disposal	5	Day	\$ 8,581	\$ 42,905	0.5 pounds per dig (3,200 pounds). 5 days for UXO Team to inspect, process, and dispose (off-site) of MDAS at 700 pounds per day.
Signage Installation (Non-UXO 034 Shoreline Areas)	171	Each	\$ 310	\$ 53,010	Install signage on non-UXO 034 shoreline area within UXO 035 to restrict access (UXO 038 shoreline, UXO 039 shoreline, and active Training Areas on west side of reservoir). Total shoreline length of 42,580 feet. 171 signs at 1 sign every 250 feet. Signs installed on existing trees or above ground features; no intrusive signpost installation or UXO avoidance with UXO escort assumed. Assume 20 signs per day (9 days).
<b>Subtotal</b>				<b>\$ 1,680,099</b>	
<i>Reporting Activities</i>					
Survey and Documentation of Fence and Signage Installation	1	Lump	\$ 15,000	\$ 15,000	Survey measurements of location of fencing, signage, and appropriate features (gates) and contractor documentation of construction completion in accordance with Work Plan. Includes both fences and signage on UXO 034; and signage installed on non-UXO 034 shoreline areas.
Interim LUC Plan	1	Lump	\$ 20,000	\$ 20,000	Completion of Interim LUC Plan to document LUCs for UXO 034 and inspection/documentation mechanisms to ensure LUCs remain in-place
Risk Communication Brochure	1	Lump	\$ 5,000	\$ 5,000	For providing to new recreational users upon reopening of Lunga Recreation Area
Construction Completion Report	1	Lump	\$ 20,000	\$ 20,000	To closeout TCRA with NAVFAC Washington per contract requirements
After Action Report	1	Lump	\$ 20,000	\$ 20,000	To closeout ESS with MARCORSSYS/COM
<b>Subtotal</b>				<b>\$ 80,000</b>	
<b>Subtotal of Planning, Fieldwork, and Reporting Activities</b>				<b>\$ 1,810,099</b>	
<b>Project Management (10 percent of Planning, Fieldwork, and Reporting Activities)</b>				<b>\$ 181,010</b>	
<b>Contingency of 5 percent (on Planning, Fieldwork, and Reporting Activities)</b>				<b>\$ 90,505</b>	
<b>Total</b>				<b>\$ 2,081,614</b>	

Other Notes:

1. No costs for site restoration (filling of existing intrusive investigation locations at UXO 034) are assumed under this estimate as this is already funded.
2. No costs for management of MEC or MPPEH are included in this estimate for the 30 year long-term inspection phase.
3. No costs for repair or replacement of fences or signage are included in this estimate for the long-term inspection phase.
4. The exposed sediment surface within UXO 035 Shoreline Area for the TCRA is assumed to be accessible and stable for personnel and vehicle access.
5. No costs for MCCS Infrastructure Repairs are included in this estimate.

Attachment 4-5: Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir available; Camping Available)  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Description: This COA assumes Lunga Recreation Area is reopened at UXO 034 for recreational use (surface use and limited subsurface use) including shoreline and reservoir water access next to UXO 034. TCRA intrusive investigation completed for remaining 3,035 targets at UXO 034. TCRA is performed at UXO 035 Shoreline Area (only in shoreline frontage along western edge of UXO 034).

Task	Units	Quantity	Unit Rate	Subtotal	Comments
<b>Planning Activities</b>					
Work Planning	1	Lump	\$ 40,000	\$ 40,000	Work Plan for completion of TCRA at UXO 035 Shoreline Area including new ESS. Includes any appropriate health and safety documentation including appropriate sequencing and notifications for Lunga Dam coordination to reduce reservoir water level elevation to 279 ft-msl. For UXO 034 NTCRA, assume work is done under existing Gilbane Work Plan; new Work Plan and ESS not required.
Permitting	1	Lump	\$ 10,000	\$ 10,000	For fence and signage installation along UXO 034 in addition to intrusive investigation in UXO 034 and UXO 035. Dig permits and other associated permits to complete fence and signage installation; permits required for reservoir access (erosion control); and permits for intrusive investigation.
Subtotal				\$ 50,000	
<b>Fieldwork Activities</b>					
Fence and Signage Installation	6,981	Feet	\$ 61	\$ 425,073	Assumes 8 foot chain link security fence along perimeter of UXO 034 not including the reservoir (6,981 feet) with 12-foot wide vehicle access gates every 500 feet (14 gates) and signs every 250 feet (28 signs). Any fence post intrusive installation performed under UXO avoidance with UXO escort. 180 feet per day; 39 days (19 days with 2 install teams).
Long-Term Inspection of Downed Trees for Munitions Items (in rootballs) and Signs and Fences	30	Year	\$ 5,000	\$ 150,000	For periodic inspection and any downed trees and underlying rootballs for munitions items (UXO Technician) at UXO 034. Also annual inspection of fencing and signage. Period of 30 years.
UXO 034 NTCRA					
Mobilization of UXO Team	1	Each	\$ 18,210	\$ 18,210	Mobilization of 9 person team consisting of 7 person UXO dig/disposal team and 2 person SUXOS/UXOQCS team.
Mobilization of Survey Team	1	Each	\$ 1,500	\$ 1,500	Mobilization of 2 person survey team.
Survey of Intrusive Investigation Targets	31	Day	\$ 3,004	\$ 93,124	3,035 targets. Assume 31 days duration for 1 Survey Team (100 targets per day).
Intrusive Investigation of Targets	31	Day	\$ 8,581	\$ 266,011	3,035 targets. Assume 31 days duration for 1 UXO Team (100 targets per day).
MEC Demolition and Destruction	3	Day	\$ 8,581	\$ 25,743	One MEC item per field day (31 field days for 31 MEC items). Assume 3 days for 1 UXO Team (11 MEC items per day).
JIT Explosives Delivery	3	Day	\$ 1,000	\$ 3,000	3 deliveries during 31 field days for MEC demolition and destruction.
MDAS Inspection and Disposal	3	Day	\$ 8,581	\$ 25,743	0.5 pounds per dig (1,517 pounds). 3 days for UXO Team to inspect, process, and dispose (off-site) of MDAS at 700 pounds per day.

Attachment 4-5: Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir available; Camping Available)  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Task	Units	Quantity	Unit Rate	Subtotal	Comments
Designated Camping Areas Backfill	1	Lump	\$ 26,077	\$ 26,077	Placement of clean backfill (1.3 ft or 16 inches thick) to 9 campsite areas identified at UXO 034 (Oak Camping Area). Each campsite conservatively assumed 40 ft by 40 ft (1,600 ft <sup>2</sup> ); total area of 14,400 ft <sup>2</sup> or 0.3 acres for 9 campsites. Unit rate herein derived from APTIM email of October 26, 2017 of \$565,000 for 6.5 acres (\$86,923 per acre).
UXO 035 Shoreline Area					
Mobilization of Survey Team	1	Each	\$ 1,500	\$ 1,500	Mobilization of 2 person survey team. UXO 035 Shoreline Area TCRA boundary and survey control.
Survey of TCRA Boundary and Control	2	Day	\$ 3,004	\$ 6,008	2 days for 2 person survey team with SUXOS support for TCRA boundary and survey control.
Mobilization of Vegetation Clearance Subcontractor	1	Each	\$ 3,000	\$ 3,000	Mobilization of two person vegetation clearance with mechanized equipment for clearance of vegetation in exposed shoreline of reservoir.
Vegetation Clearance of UXO 035 Shoreline Area	8	Day	\$ 5,554	\$ 44,432	Assumes 0.33 of overall acreage in UXO 035 exposed shoreline (32 acres) requires vegetation clearance of typically submerged or deadfall vegetation (11 acres at 1.5 acres per day or 8 days).
Mobilization of UXO Team	1	Each	\$ 18,210	\$ 18,210	Mobilization of 9 person team consisting of 7 person UXO dig/disposal team and 2 person SUXOS/UXOQCS team. Surface clearance.
Surface Clearance of UXO 035 Shoreline Area	11	Day	\$ 8,581	\$ 94,391	Surface clearance of UXO 035 exposed shoreline (32 acres) at 3 acres per day (11 days). 8,000 pounds of metallic debris (at 250 pounds per acre).
Mobilization of DGM Team	1	Each	\$ 5,858	\$ 5,858	Mobilization of 2 person DGM team.
DGM of UXO 035 Shoreline Area	16	Day	\$ 5,104	\$ 81,664	DGM of 32 acres of UXO 035 exposed shoreline at 2 acres per day (16 days). Assumes entire area GPS accessible.
Mobilization of Survey Team	1	Each	\$ 1,500	\$ 1,500	Mobilization of 2 person survey team. DGM targets for intrusive investigation.
Survey of DGM Targets for Intrusive Investigation	21	Day	\$ 6,008	\$ 126,168	Assume 6,400 DGM targets at 200 targets per acre based on previous UXO 034, UXO 038, and UXO 039 DGM results. Assume 21 days duration for 2 Survey Teams (150 targets per day per team; or 300 targets per day). Assumes entire area GPS accessible.
Mobilization of UXO Team	1	Each	\$ 18,210	\$ 18,210	Mobilization of 9 person team consisting of 7 person UXO dig/disposal team and 2 person SUXOS/UXOQCS team. Intrusive investigation.
Intrusive Investigation of Targets in UXO 035 Shoreline Area	64	Day	\$ 8,581	\$ 549,184	6,400 targets at 100 targets per day (64 days) for 1 UXO team.
MEC Demolition and Destruction	6	Day	\$ 8,581	\$ 51,486	One MEC item per field day (64 field days for 64 MEC items). Assume 6 days for 1 UXO Team (11 MEC items per day).
JIT Explosives Delivery	6	Each	\$ 1,000	\$ 6,000	6 deliveries during 64 field days for MEC demolition and destruction.
MDAS Inspection and Disposal	5	Day	\$ 8,581	\$ 42,905	0.5 pounds per dig (3,200 pounds). 5 days for UXO Team to inspect, process, and dispose (off-site) of MDAS at 700 pounds per day.

Attachment 4-5: Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir available; Camping Available)  
Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Task	Units	Quantity	Unit Rate	Subtotal	Comments
Signage Installation (Non-UXO 034 Shoreline Areas)	171	Each	\$ 310	\$ 53,010	Install signage on non-UXO 034 shoreline area within UXO 035 to restrict access (UXO 038 shoreline, UXO 039 shoreline, and active Training Areas on west side of reservoir). Total shoreline length of 42,580 feet. 171 signs at 1 sign every 250 feet. Signs installed on existing trees or above ground features; no intrusive signpost installation or UXO avoidance with UXO escort assumed. Assume 20 signs per day (9 days).
<b>Subtotal</b>				<b>\$ 2,138,007</b>	
<b>Reporting Activities</b>					
Survey and Documentation of Fence and Signage Installation	1	Lump	\$ 15,000	\$ 15,000	Survey of location of fencing, signage, and appropriate features (gates) and contractor documentation of construction completion in accordance with Work Plan. Includes both fences and signage on UXO 034; and signage installed on non-UXO 034 shoreline areas.
Interim LUC Plan	1	Lump	\$ 20,000	\$ 20,000	Completion of Interim LUC Plan to document LUCs for UXO 034 and inspection/documentation mechanisms to ensure LUCs remain in-place
Risk Communication Brochure	1	Lump	\$ 5,000	\$ 5,000	For providing to new recreational users upon reopening of Lunga Recreation Area
Construction Completion Report	1	Lump	\$ 35,000	\$ 35,000	To closeout UXO 034 TCRA and UXO 035 Shoreline Area TCRA with NAVFAC Washington per contract requirements
After Action Report	1	Lump	\$ 30,000	\$ 30,000	To closeout ESS(s) with MARCORSSCOM
<b>Subtotal</b>				<b>\$ 105,000</b>	
<b>Subtotal of Planning, Fieldwork, and Reporting Activities</b>				<b>\$ 2,293,007</b>	
<b>Project Management (10 percent of Planning, Fieldwork, and Reporting Activities)</b>				<b>\$ 229,301</b>	
<b>Contingency of 5 percent (on Planning, Fieldwork, and Reporting Activities)</b>				<b>\$ 114,650</b>	
<b>Total</b>				<b>\$ 2,636,958</b>	

**Other Notes:**

1. No costs for site restoration (filling of existing intrusive investigation locations at UXO 034) are assumed under this estimate as this is already funded.
2. No costs for management of MEC or MPPEH are included in this estimate for the 30 year long-term inspection phase.
3. No costs for repair or replacement of fences or signage are included in this estimate.
4. The exposed sediment surface within UXO 035 Shoreline Area for the TCRA is assumed to be accessible and stable for personnel and vehicle access.
5. No costs for vegetation clearance are included for performing the intrusive investigation at UXO 034 (site conditions assumed acceptable for access).
6. No costs for MCCS Infrastructure Repairs are included in this estimate.



Attachment 4-6: Course of Action 6 - Lunga Recreation Area Reopened at UXO 034, UXO 038, and UXO 039 (Access to Reservoir available; Camping Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum

Description: This COA assumes Lunga Recreation Area is reopened at UXO 034, UXO 038, and UXO 039 for recreational use (surface use and limited subsurface use) including shoreline and reservoir water access next to UXO 034, UXO 038, and UXO 039. TCRA intrusive investigation completed for remaining 3,035 targets at UXO 034. TCRA intrusive investigations completed at UXO 038 and UXO 039. TCRA is performed at UXO 035 Shoreline Area (in shoreline frontage along western edge of UXO 034, UXO 038, and UXO 039).

Task	Units	Quantity	Unit Rate	Subtotal	Comments
<i>Planning Activities</i>					
<b>Subtotal</b>			\$	-	
<i>Fieldwork Activities</i>					
<b>Subtotal</b>			\$	-	
<i>Reporting Activities</i>					
<b>Subtotal</b>			\$	-	
<b>Subtotal of Planning, Fieldwork, and Reporting Activities</b>			\$	-	
<b>Project Management (10 percent of Planning, Fieldwork, and Reporting Activities)</b>			\$	-	
<b>Contingency of 5 percent (on Planning, Fieldwork, and Reporting Activities)</b>			\$	-	
<b>Total</b>			\$	11,384,874	Costs are based on Navy "Normalization of Data" Database (NORM) projections Fiscal Year 2018 and beyond; does not include Fiscal Year 2017 costs or awards. As provided to CH2M in email dated September 28, 2017.

Other Notes:

- A Class IV Cost Estimate was not developed for this COA per NAVFAC Washington request. The Cost Estimate presented herein is based on Navy "Normalization of Data" Database (NORM) projections as requested by NAVFAC Washington.

# Attachment 5

**Attachment 5-1**  
**Course of Action 2 - Lunga Recreation Area Reopened at UXO 034 (No Camping and No Access to Reservoir Available)**  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCRBQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessor-%	Complete
1	<b>Lunga Recreation Area Reopening Course of Action (COA)</b> <b>1: Lunga Recreation Area Reopened at UXO 034 (No Camping and No Access to Reservoir available)</b>	<b>423 days</b>	<b>Mon 5/15/17</b>	<b>Wed 7/11/18</b>		<b>43%</b>
2	<b>Contract Awards</b>	<b>120 days</b>	<b>Fri 12/8/17</b>	<b>Fri 4/6/18</b>		<b>0%</b>
3	Contract for LUCs Installation at UXO 034	120 days	Fri 12/8/17	Fri 4/6/18	11	0%
4	<b>COA Memo and COA Selection</b>	<b>198 days</b>	<b>Wed 5/24/17</b>	<b>Thu 12/7/17</b>		<b>69%</b>
5	Develop Pre-Draft COA Memo	38 days	Wed 5/24/17	Fri 6/30/17		100%
6	Document Review: NFW NTR and MCRBQ NREA	104 days	Sat 7/1/17	Thu 10/12/17	5	100%
7	IPR Meeting #1 (Selection of COA 4 or 5 as likely COA)	0 days	Thu 7/13/17	Thu 7/13/17		100%
8	Address Comments/Develop Draft COA Memo	18 days	Fri 10/13/17	Mon 10/30/17	6	75%
9	Document Review: NFW Senior Management	21 days	Tue 10/31/17	Mon 11/20/17	8	0%
10	IPR Meeting #2	1 day	Tue 11/7/17	Tue 11/7/17		0%
11	<u>Decision Document: Final Endorsement, Selection, and Documentation of COA by MCRBQ Base Commander</u>	30 days	Wed 11/8/17	Thu 12/7/17	10	0%
12	Address Comments/Develop Final COA Memo (for NFW Documentation)	14 days	Tue 11/21/17	Mon 12/4/17	9	0%
13	Briefing on selected COA provided to QPMT	0 days	Wed 12/6/17	Wed 12/6/17	12FS+1 day	0%

Project: ATT\_5-1\_COA2\_V3  
 Date: Mon 10/30/17

Task:  Task  Split  Milestone  Summary

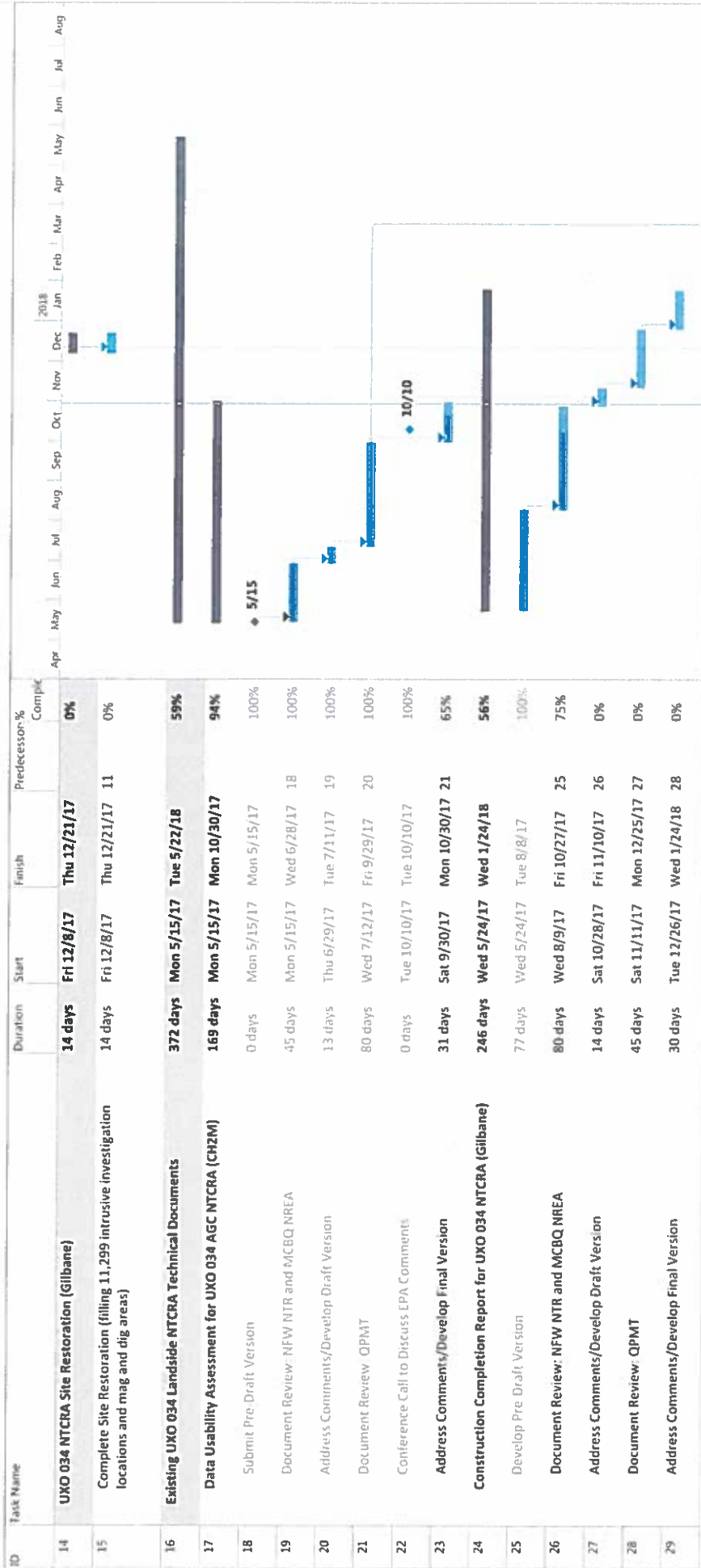
Project Summary:  Project Summary  Inactive Task  Inactive Milestone  Inactive Summary

Manual Task:  Manual Task  Duration-only  Manual Summary Rollup  Manual Summary

Start-only:  Start-only  Finish-only  External Task  External Milestone

Deadline:  Deadline  Progress  Manual Progress

**Attachment 5-1**  
**Course of Action 2 - Lunga Recreation Area Reopened at UXO 034 (No Camping and No Access to Reservoir Available)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**  
**Marine Corps Base Quantico (MCBQ), Quantico, Virginia**



Project: ATT\_5-1\_COA2\_V3  
 Date: Mon 10/30/17

Task:  Task  Split  Milestone  Summary

Project Summary:  Project Summary  Inactive Task  Inactive Milestone  Inactive Summary

Manual Task:  Manual Task  Duration-only  Manual Summary Backup  Manual Summary

Start-only:  Start-only  Finish-only  External Tasks  External Milestone

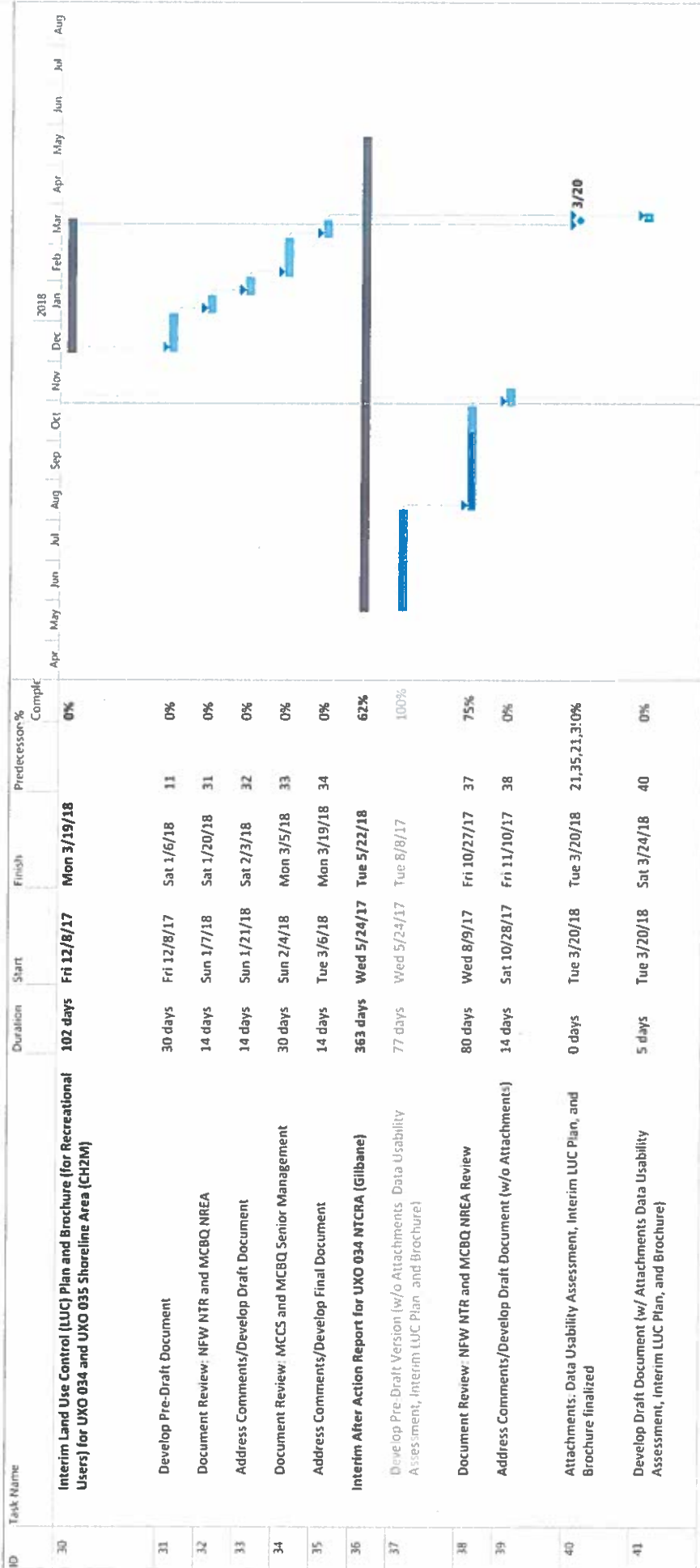
Deadline:  Deadline  Progress  Manual Progress

**ENCLOSURE**



Attachment 5-1

Course of Action 2 - Lunga Recreation Area Reopened at UXD 034 (No Camping and No Access to Reservoir Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia



Project: ATT\_5-1\_COA2\_V3  
 Date: Mon 10/30/17

Task Split Milestone Summary

Manual Task, Duration-only, Manual Summary Rollup, Manual Milestone

Start-only, Finish-only, External Tasks, External Milestone

Deadline, Progress, Manual Progress

Attachment 5-1  
 Course of Action 2 - Lunga Recreation Area Reopened at UXO 034 (No Camping and No Access to Reservoir Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessor %	Compl
42	Document Review: MARCORSSYSCOM	30 days	Wed 5/24/17	Thu 6/22/17		0%
43	Address Comments/Develop Final Document	14 days	Wed 5/24/17	Tue 6/6/17		0%
44	MARCORSSYSCOM Endorsement on Final Version Provided	0 days	Tue 5/22/18	Tue 5/22/18	43FS+14 d	0%
45	Field Elements	210 days	Tue 11/14/17	Mon 6/11/18		0%
46	UXO 034 LUCs (APTIM)	42 days	Sat 4/7/18	Fri 5/18/18		0%
47	UXO 034 LUCs	42 days	Sat 4/7/18	Fri 5/18/18	2	0%
48	MCCS Infrastructure Repair of UXO 034	210 days	Tue 11/14/17	Mon 6/11/18		0%
49	Contracting, Subcontracting, Permitting, and Work Planning	120 days	Tue 11/14/17	Tue 3/13/18	11	0%
50	Perform Infrastructure Repairs	90 days	Wed 3/14/18	Mon 6/11/18	49	0%
51	Land Use Controls Administrative Implementation	30 days	Tue 6/12/18	Wed 7/11/18		0%
52	Document LUCs Installation. Update MCBQ Web Site, NIRIS LUC Tracker, and Implement Brochure	30 days	Tue 6/12/18	Wed 7/11/18	47,50	0%
53	Lunga Recreation Area Reopening (UXO 034 Surface Use Only with Reservoir Access)	0 days	Wed 7/11/18	Wed 7/11/18	52	0%



Project: ATT\_5-1\_COA2\_V3  
 Date: Mon 10/30/17

Task: [Task] [Split] [Milestone] [Summary]

Project Summary: [Project Summary] [Inactive Task] [Inactive Milestone] [Inactive Summary]

Manual Task: [Manual Task] [Duration-only] [Manual Summary Rollup] [Manual Summary]

Start-only: [Start-only] [Finish-only] [External Tasks] [External Milestone]

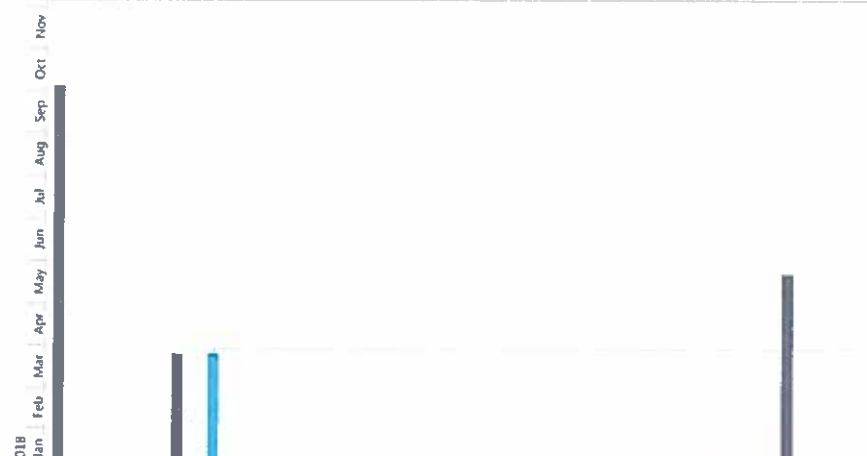
Deadline: [Deadline] [Progress] [Manual Progress]

ENCLOSURE ( )

Attachment 5-2

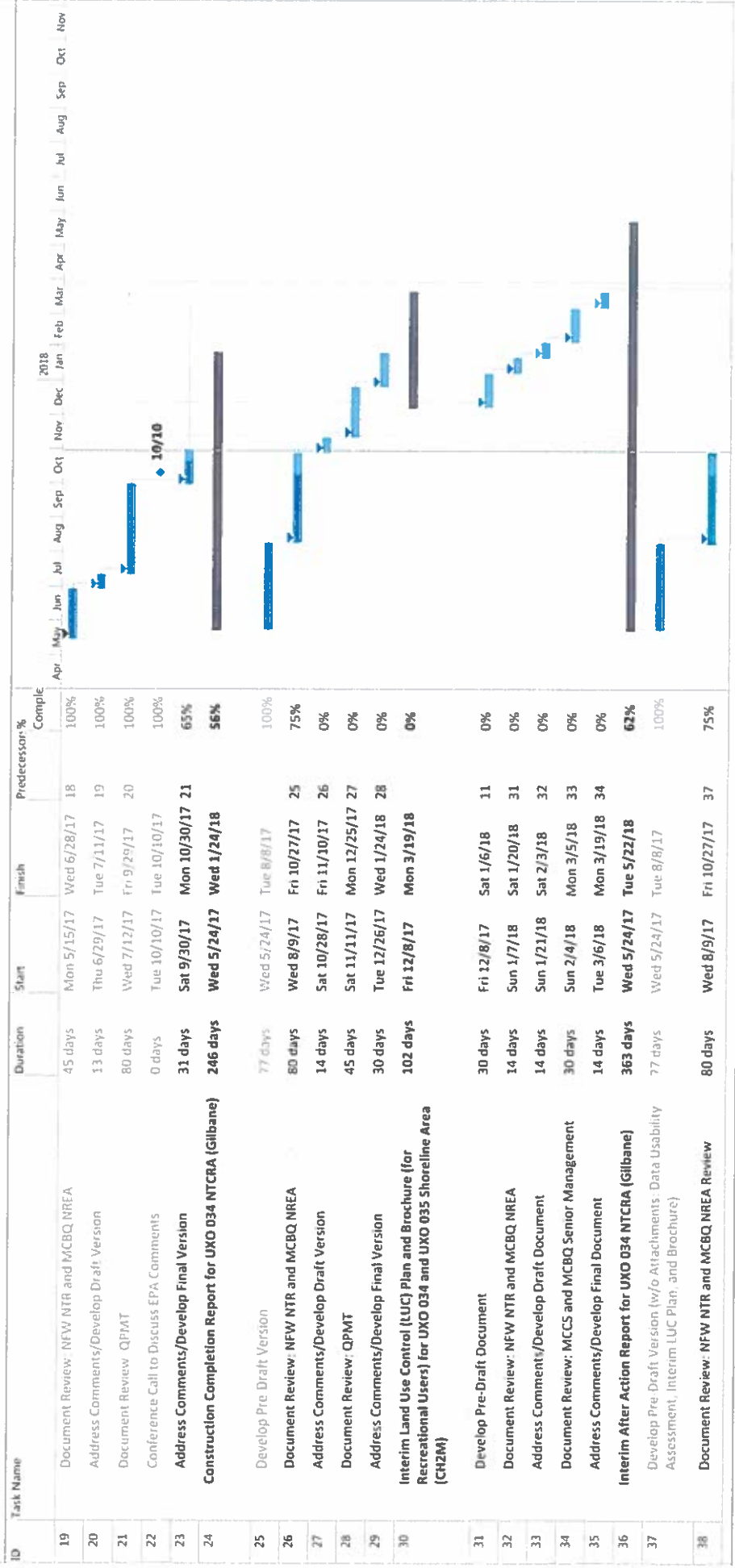
Course of Action 3 - Lunga Recreation Area Reopened at UXO 034 (Camping Available; No Access to Reservoir)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessor*	Complete
1	<b>Lunga Recreation Area Reopening Course of Action (COA) 3: Lunga Recreation Area Reopened at UXO 034 (Camping Available; No Access to Reservoir)</b>	<b>507 days</b>	<b>Mon 5/15/17</b>	<b>Wed 10/3/18</b>		<b>34%</b>
2	<b>Contract Awards</b>	<b>107 days</b>	<b>Fri 12/8/17</b>	<b>Sat 3/24/18</b>		<b>0%</b>
3	UXO 034 Remaining Targets and Additional LUCS	107 days	Fri 12/8/17	Sat 3/24/18	11	0%
4	<b>COA Memo and COA Selection</b>	<b>198 days</b>	<b>Wed 5/24/17</b>	<b>Thu 12/7/17</b>		<b>67%</b>
5	Develop Pre Draft COA Memo	38 days	Wed 5/24/17	Fri 6/30/17		100%
6	Document Review NFW NTR and MCBQ NREA	104 days	Sat 7/1/17	Thu 10/12/17	5	100%
7	IPR Meeting #1 (Selection of COA 4 or 5 as likely COA selection)	0 days	Thu 7/13/17	Thu 7/13/17		100%
8	Address Comments/Develop Draft COA Memo	18 days	Fri 10/13/17	Mon 10/30/17	6	58%
9	Document Review: NFW Senior Management	21 days	Tue 10/31/17	Mon 11/20/17	8	0%
10	IPR Meeting #2	1 day	Tue 11/7/17	Tue 11/7/17		0%
11	<u>Decision Document: Final Endorsement, Selection, and Documentation of COA by MCBQ Base Commander</u>	30 days	Wed 11/8/17	Thu 12/7/17	10	0%
12	Address Comments/Develop Final COA Memo (for NFW Documentation)	14 days	Tue 11/21/17	Mon 12/4/17	9	0%
13	Briefing on selected COA provided to QPMT	0 days	Wed 12/6/17	Wed 12/6/17	12FS+1 day	0%
14	<b>UXO 034 NTCRA Site Restoration (Gilbane)</b>	<b>14 days</b>	<b>Fri 12/8/17</b>	<b>Thu 12/21/17</b>		<b>0%</b>
15	Complete Site Restoration (filling 11,299 intrusive investigation locations and mag and dig areas)	14 days	Fri 12/8/17	Thu 12/21/17	11	0%
16	<b>Existing UXO 034 Landslide NTCRA Technical Documents</b>	<b>372 days</b>	<b>Mon 5/15/17</b>	<b>Tue 5/22/18</b>		<b>59%</b>
17	<b>Data Usability Assessment for UXO 034 AGC NTCRA (CH2M)</b>	<b>169 days</b>	<b>Mon 5/15/17</b>	<b>Mon 10/30/17</b>		<b>94%</b>
18	Submit Pre Draft Version	0 days	Mon 5/15/17	Mon 5/15/17		100%



ENCLOSURE (1)

**Attachment 5-2**  
**Course of Action 3 - Lunga Recreation Area Reopened at UXO 034 (Camping Available; No Access to Reservoir)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**  
**Marine Corps Base Quantico (MCBQ), Quantico, Virginia**



Project: ATT\_5-2\_COA3\_V5  
 Date: Mon 10/30/17

Task Legend:  
 Task: [Blue Bar]  
 Split: [Blue Bar with Diamond]  
 Milestone: [Black Diamond]  
 Summary: [Black Bar]

Task Status Legend:  
 Project Summary: [Blue Bar]  
 Inactive Task: [Grey Bar]  
 Inactive Milestone: [Grey Diamond]  
 Inactive Summary: [Grey Bar]

Task Type Legend:  
 Manual Task: [Blue Bar]  
 Duration-only: [Blue Bar with Diamond]  
 Manual Summary Rollup: [Blue Bar with Diamond]  
 Manual Summary: [Blue Bar]

Task Category Legend:  
 Start-only: [Blue Bar]  
 Finish-only: [Blue Bar with Diamond]  
 External Task: [Blue Bar]  
 External Milestone: [Blue Diamond]

Task Color Legend:  
 Deadline: [Black Bar]  
 Progress: [Blue Bar]  
 Manual Progress: [Blue Bar]

**ENCLOSURE (1)**



**Attachment 5-2**  
**Course of Action 3 - Lunga Recreation Area Reopened at UXO 034 (Camping Available; No Access to Reservoir)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**  
**Marine Corps Base Quantico (MCBQ), Quantico, Virginia**

ID	Task Name	Duration	Start	Finish	Predecessor-%	Complete
39	Address Comments/Develop Draft Document (w/o Attachments)	14 days	Sat 10/28/17	Fri 11/10/17	38	0%
40	Attachments: Data Usability Assessment, Interim LUC Plan, and Brochure finalized	0 days	Tue 3/20/18	Tue 3/20/18	23,35	0%
41	Develop Draft Document (w/ Attachments Data Usability Assessment, Interim LUC Plan, and Brochure)	5 days	Tue 3/20/18	Sat 3/24/18	40	0%
42	Document Review - MARCORSSYSCOM	30 days	Sun 3/25/18	Mon 4/23/18	41	0%
43	Address Comments/Develop Final Document	14 days	Tue 4/24/18	Mon 5/7/18	42	0%
44	<u>MARCORSYSCOM Endorsement on Final Version Provided</u>	0 days	Tue 5/22/18	Tue 5/22/18	43FS+14 ds	0%
45	<b>UXO 034 Remaining Targets TCRA Preparation Documents</b>	<b>58 days</b>	<b>Wed 11/8/17</b>	<b>Thu 1/4/18</b>		<b>0%</b>
46	<b>TCRA QAPP (UXO 034 Remaining Targets): Assumed done under existing APTIM contract</b>	<b>58 days</b>	<b>Wed 11/8/17</b>	<b>Thu 1/4/18</b>		<b>0%</b>
47	Develop Pre-Draft Version	14 days	Wed 11/8/17	Tue 11/21/17	10	0%
48	Document Review: NFW NTR and MCBQ NREA	30 days	Wed 11/22/17	Thu 12/21/17	47	0%
49	Address Comments/Develop Final Version	14 days	Fri 12/22/17	Thu 1/4/18	48	0%
50	<b>Field Elements</b>	<b>272 days</b>	<b>Wed 11/8/17</b>	<b>Mon 8/6/18</b>		<b>0%</b>
51	<b>TCRA</b>	<b>45 days</b>	<b>Sun 3/25/18</b>	<b>Tue 5/8/18</b>		<b>0%</b>
52	TCRA Fieldwork	45 days	Sun 3/25/18	Tue 5/8/18	49,3	0%
53	<b>UXO 034 and Other Landside LUCs (APTIM)</b>	<b>42 days</b>	<b>Sun 3/25/18</b>	<b>Sat 5/5/18</b>		<b>0%</b>
54	UXO 034 LUCs	42 days	Sun 3/25/18	Sat 5/5/18	3,49	0%
55	<b>MCCS Infrastructure Repair of UXO 034</b>	<b>272 days</b>	<b>Wed 11/8/17</b>	<b>Mon 8/6/18</b>		<b>0%</b>
56	Contracting, Subcontracting, Permitting, and Work Planning	120 days	Wed 11/8/17	Wed 3/7/18	10	0%
57	Perform Infrastructure Repairs	90 days	Wed 5/9/18	Mon 8/6/18	52,56	0%
58	<b>TCRA Completion Documents</b>	<b>151 days</b>	<b>Sun 5/6/18</b>	<b>Wed 10/3/18</b>		<b>0%</b>

Project: ATT 5-2 COA3\_V5  
 Date: Mon 10/30/17

Task: Split, Milestone, Summary

Project Summary: Inactive Task, Inactive Milestone, Inactive Summary

Manual Task, Duration-only, Manual Summary Rollup, Manual Summary

Start only, Finish only, External Tasks, External Milestone

Deadline, Progress, Manual Progress



Attachment 5-2  
 Course of Action 3 - Lunga Recreation Area Reopened at UXO 034 (Camping Available; No Access to Reservoir)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia

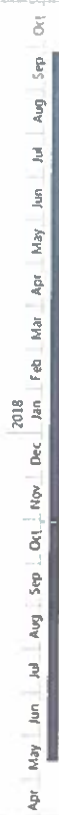
ID	Task Name	Duration	Start	Finish	Predecessor %	Complete
59	<b>Construction Completion Report for TCRA</b>	<b>148 days</b>	<b>Wed 5/9/18</b>	<b>Wed 10/3/18</b>		0%
60	Develop Pre-Draft Version	45 days	Wed 5/9/18	Fri 6/22/18	52	0%
61	Document Review: NFW NTR and MCBQ NREA	14 days	Sat 6/23/18	Fri 7/6/18	60	0%
62	Address Comments/Develop Draft Version	14 days	Sat 7/7/18	Fri 7/20/18	61	0%
63	Document Review: OPMT	45 days	Sat 7/21/18	Mon 9/3/18	62	0%
64	Address Comments/Develop Final Version	30 days	Tue 9/4/18	Wed 10/3/18	63	0%
65	<b>After Action Report for TCRA</b>	<b>131 days</b>	<b>Wed 5/9/18</b>	<b>Sun 9/16/18</b>		0%
66	Develop Pre-Draft Version	45 days	Wed 5/9/18	Fri 6/22/18	52	0%
67	Document Review: NFW NTR and MCBQ NREA	14 days	Sat 6/23/18	Fri 7/6/18	66	0%
68	Address Comments/Develop Draft Final Document	14 days	Sat 7/7/18	Fri 7/20/18	67	0%
69	Document Review: MARCORSSCOM	30 days	Sat 7/21/18	Sun 8/19/18	68	0%
70	Address Comments/Develop Final Document	14 days	Mon 8/20/18	Sun 9/2/18	69	0%
71	<u>MARCORSSCOM Endorsement on Final Version Provided</u>	0 days	Sun 9/16/18	Sun 9/16/18	70FS+14 d	0%
72	<b>Land Use Controls Administrative Implementation</b>	<b>30 days</b>	<b>Sun 5/6/18</b>	<b>Mon 6/4/18</b>		0%
73	Document LUCs Installation: Update MCBQ Web Site, NIRIS LUC Tracker, and Implement Brochure	30 days	Sun 5/6/18	Mon 6/4/18	54	0%
74	<b>Lunga Recreation Area Reopening (UXO 034 Surface Use and Limited Subsurface Use with Reservoir Access)</b>	<b>0 days</b>	<b>Wed 10/3/18</b>	<b>Wed 10/3/18</b>	<b>71,64,73,5</b>	<b>0%</b>



Attachment 5-3

Course of Action 4 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; No Camping)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessor-%	Complete
1	<b>Lunga Recreation Area Reopening Course of Action (COA) 4: Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir available; No Camping)</b>	<b>500 days</b>	<b>Mon 5/15/17</b>	<b>Wed 9/26/18</b>		<b>37%</b>
2	<b>Contract Awards</b>	<b>79 days</b>	<b>Thu 9/28/17</b>	<b>Fri 12/15/17</b>		<b>50%</b>
3	UXO 035 Shoreline TCRA	0 days	Thu 9/28/17	Thu 9/28/17		100%
4	EODTECHDIV QA Support	54 days	Mon 10/23/17	Fri 12/15/17		50%
5	<b>COA Memo and COA Selection</b>	<b>198 days</b>	<b>Wed 5/24/17</b>	<b>Thu 12/7/17</b>		<b>69%</b>
6	Develop Pre Draft COA Memo	38 days	Wed 5/24/17	Fri 6/30/17		100%
7	Document Review: NFW NTR and MCBQ NREA	104 days	Sat 7/1/17	Thu 10/12/17	6	100%
8	IPR Meeting #1 (Selection of COA 4 or 5 as likely COA)	0 days	Thu 7/13/17	Thu 7/13/17		100%
9	Address Comments/Develop Draft COA Memo	18 days	Fri 10/13/17	Mon 10/30/17	7	75%
10	Document Review: NFW Senior Management	21 days	Tue 10/31/17	Mon 11/20/17	9	0%
11	IPR Meeting #2	1 day	Tue 11/7/17	Tue 11/7/17		0%
12	<i>Decision Document: Final Endorsement, Selection, and Documentation of COA by MCBQ Base Commander</i>	30 days	Wed 11/8/17	Thu 12/7/17	11	0%
13	Address Comments/Develop Final COA Memo (for NFW Documentation)	14 days	Tue 11/21/17	Mon 12/4/17	10	0%
14	Briefing on selected COA provided to QPMT	0 days	Wed 12/6/17	Wed 12/6/17	13FS+1 day	0%
15	<b>UXO 034 NTCRA Site Restoration (Gilbane)</b>	<b>14 days</b>	<b>Fri 12/8/17</b>	<b>Thu 12/21/17</b>		<b>0%</b>
16	Complete Site Restoration (filling 11,299 intrusive investigation locations and mag and dig areas)	14 days	Fri 12/8/17	Thu 12/21/17	12,12	0%
17	<b>Existing UXO 034 Landside NTCRA Technical Documents</b>	<b>372 days</b>	<b>Mon 5/15/17</b>	<b>Tue 5/22/18</b>		<b>59%</b>
18	<b>Data Usability Assessment for UXO 034 AGC NTCRA (CH2M)</b>	<b>169 days</b>	<b>Mon 5/15/17</b>	<b>Mon 10/30/17</b>		<b>94%</b>
19	Submit Pre Draft Version	0 days	Mon 5/15/17	Mon 5/15/17		100%
20	Document Review: NFW NTR and MCBQ NREA	45 days	Mon 5/15/17	Wed 6/28/17	19	100%
21	Address Comments/Develop Draft Version	13 days	Thu 6/29/17	Tue 7/11/17	20	100%
22	Document Review QPMT	80 days	Wed 7/12/17	Fri 9/29/17	21	100%



Project: ATT\_5-3\_COA4\_V4  
 Date: Mon 10/30/17

Task Summary: Inactive Task, Inactive Milestone, Inactive Summary

Manual Task Summary: Manual Task, Duration only, Manual Summary Rollup, Manual Summary

Start only, Finish only, External Tasks, External Milestone

Deadline, Progress, Manual Progress

ENCLOSURE (1)

**Attachment 5-3**  
**Course of Action 4 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; No Camping)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**  
**Marine Corps Base Quantico (MCBQ), Quantico, Virginia**

ID	Task Name	Duration	Start	Finish	Predecessor % Complete	2018
23	Conference Call to Discuss EPA Comments	0 days	Tue 10/10/17	Tue 10/10/17	100%	Oct 10/10
24	Address Comments/Develop Final Version	31 days	Sat 9/30/17	Mon 10/30/17	65%	
25	<b>Construction Completion Report for UXO 034 NTCRA (Gilbane)</b>	246 days	Wed 5/24/17	Wed 1/24/18	56%	
26	Develop Pre-Draft Version	77 days	Wed 5/24/17	Tue 8/8/17	100%	
27	Document Review: NFW NTR and MCBQ NREA	80 days	Wed 8/9/17	Fri 10/27/17	75%	
28	Address Comments/Develop Draft Version	14 days	Sat 10/28/17	Fri 11/10/17	0%	
29	Document Review: QPMT	45 days	Sat 11/11/17	Mon 12/25/17	0%	
30	Address Comments/Develop Final Version	30 days	Tue 12/26/17	Wed 1/24/18	0%	
31	<b>Interim Land Use Control (LUC) Plan and Brochure (for Recreational Users) for UXO 034 and UXO 035 Shoreline Area (CH2M)</b>	102 days	Fri 12/8/17	Mon 3/19/18	0%	
32	Develop Pre-Draft Document	30 days	Fri 12/8/17	Sat 1/6/18	0%	
33	Document Review: NFW NTR and MCBQ NREA	14 days	Sun 1/7/18	Sat 1/20/18	0%	
34	Address Comments/Develop Draft Document	14 days	Sun 1/21/18	Sat 2/3/18	0%	
35	Document Review: MCCS and MCBQ Senior Management	30 days	Sun 2/4/18	Mon 3/5/18	0%	
36	Address Comments/Develop Final Document	14 days	Tue 3/6/18	Mon 3/19/18	0%	
37	<b>Interim After Action Report for UXO 034 NTCRA (Gilbane)</b>	363 days	Wed 5/24/17	Tue 5/22/18	62%	
38	Develop Pre-Draft Version (w/o Attachments: Data Usability Assessment, Interim LUC Plan, and Brochure)	77 days	Wed 5/24/17	Tue 8/8/17	100%	
39	Document Review: NFW NTR and MCBQ NREA Review	80 days	Wed 8/9/17	Fri 10/27/17	75%	
40	Address Comments/Develop Draft Document (w/o Attachments)	14 days	Sat 10/28/17	Fri 11/10/17	0%	
41	Attachments: Data Usability Assessment, Interim LUC Plan, and Brochure finalized	0 days	Tue 3/20/18	Tue 3/20/18	22,36,22,310%	3/20
42	Develop Draft Document (w/ Attachments Data Usability Assessment, Interim LUC Plan, and Brochure)	5 days	Tue 3/20/18	Sat 3/24/18	41	
43	Document Review: MARCORNSYSCOM	30 days	Wed 5/24/17	Thu 6/22/17	0%	
44	Address Comments/Develop Final Document	14 days	Wed 5/24/17	Tue 6/6/17	0%	

Project: ATI\_5-3\_COA4\_V4  
 Date: Mon 10/30/17

Legend:

- Task
- Split
- Milestone
- Summary
- Project Summary
- Inactive Task
- Inactive Milestone
- Inactive Summary
- Manual Task
- Duration only
- Manual Summary Rollup
- Manual Summary
- Start only
- Finish only
- External Tasks
- External Milestone
- Deadline
- Progress
- Manual Progress

ENCLOSURE (1)

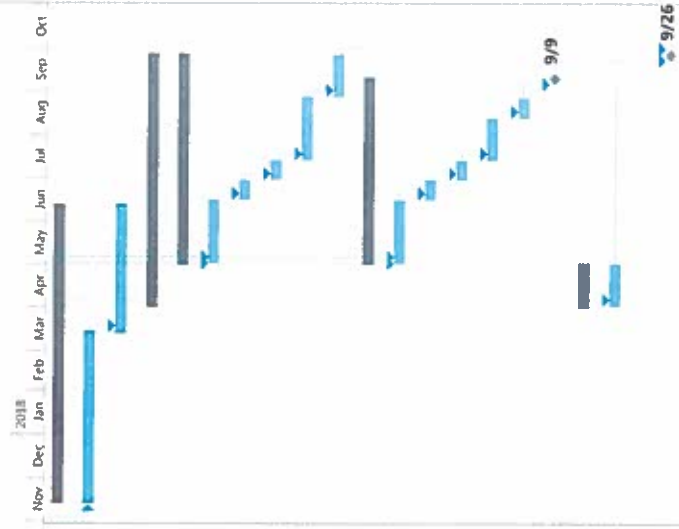


**Attachment 5-3**  
**Course of Action 4 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; No Camping)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**  
**Marine Corps Base Quantico (MCBC), Quantico, Virginia**

ID	Task Name	Duration	Start	Finish	Predessor-% Complete
45	MARCORSYSCOM Endorsement on Final Version Provided	0 days	Tue 5/22/18	Tue 5/22/18	44FS+14 dt:0%
46	UXO 035 Shoreline TCRA Preparation Documents	179 days	Thu 6/15/17	Sun 12/10/17	36%
47	UXO 035 Shoreline TCRA Action Memorandum	34 days	Thu 6/15/17	Wed 7/19/17	100%
48	UXO 035 Shoreline TCRA Action Memorandum Signed	0 days	Thu 6/15/17	Thu 6/15/17	100%
49	EPA Concurrence Letter on UXO 035 Shoreline TCRA Action Memorandum	0 days	Wed 7/19/17	Wed 7/19/17	100%
50	Agreement for Base Water Level for TCRA	0 days	Wed 6/21/17	Wed 6/21/17	100%
51	Agreement to Lower Water Level to 279 ftmsk for UXO 035 TCRA	0 days	Wed 6/21/17	Wed 6/21/17	100%
52	UXO 035 TCRA QAPP	74 days	Thu 9/28/17	Sun 12/10/17	30%
53	APTIM Kickoff Meeting	0 days	Thu 10/12/17	Thu 10/12/17	100%
54	Develop Pre-Draft Version	30 days	Thu 9/28/17	Fri 10/27/17	75%
55	Document Review- NFW NTR and MCBO NREA	30 days	Sat 10/28/17	Sun 11/26/17	54
56	Address Comments/Develop Final Version	14 days	Mon 11/27/17	Sun 12/10/17	55
57	UXO 035 TCRA ESS (Administrative Approval of Boundary Extensions for Existing ESSs for UXO 034, 038, and 039)	30 days	Wed 10/11/17	Thu 11/9/17	50%
58	Submittal to MARCORSSCOM	0 days	Wed 10/11/17	Wed 10/11/17	100%
59	MARCORSYSCOM Review and Endorsement	30 days	Wed 10/11/17	Thu 11/9/17	50%
60	Lunga Recreation Area Coordination Meeting	0 days	Mon 10/23/17	Mon 10/23/17	100%
61	Range Control Coordination Meeting	0 days	Mon 10/23/17	Mon 10/23/17	100%
62	Field Elements	210 days	Tue 11/14/17	Mon 6/11/18	0%
63	UXO 034 and Other Landside LUCs (APTIM)	32 days	Tue 3/6/18	Fri 4/6/18	0%
64	UXO 039 LUCs	7 days	Tue 3/6/18	Mon 3/12/18	56FS+85 dt:0%
65	UXO 034 LUCs (includes signage on Training Area Shoreline)	19 days	Mon 3/19/18	Fri 4/6/18	0%
66	UXO 038 LUCs	5 days	Wed 3/28/18	Sun 4/1/18	56FS+107 c:0%
67	UXO 035 Shoreline Area TCRA (includes UXO 034, UXO 038, and UXO 039 Shoreline Areas) (APTIM)	114 days	Mon 1/8/18	Tue 5/1/18	0%
68	Shoreline Area TCRA	114 days	Mon 1/8/18	Tue 5/1/18	56FS+28 dt:0%

Attachment 5-3  
 Course of Action 4 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available, No Camping)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessor % Complete
69	<b>MCCS Infrastructure Repair of UXO 034</b>	210 days	Tue 11/14/17	Mon 6/11/18	0%
70	Contracting, Subcontracting, Permitting, and Work Planning	120 days	Tue 11/14/17	Tue 3/13/18	12
71	Perform Infrastructure Repairs	90 days	Wed 3/14/18	Mon 6/11/18	70
72	<b>UXO 035 Shoreline TCRA Completion Documents</b>	178 days	Mon 4/2/18	Wed 9/26/18	0%
73	Construction Completion Report for UXO 035 TCRA	148 days	Wed 5/2/18	Wed 9/26/18	0%
74	Develop Pre-Draft Version	45 days	Wed 5/2/18	Fri 6/15/18	66.68
75	Document Review: NFW NTR and MCBQ NREA	14 days	Sat 6/16/18	Fri 6/29/18	74
76	Address Comments/Develop Draft Version	14 days	Sat 6/30/18	Fri 7/13/18	75
77	Document Review: QPMT	45 days	Sat 7/14/18	Mon 8/27/18	76
78	Address Comments/Develop Final Version	30 days	Tue 8/28/18	Wed 9/26/18	77
79	<b>After Action Report for UXO 035 TCRA</b>	131 days	Wed 5/2/18	Sun 9/9/18	0%
80	Develop Pre-Draft Version	45 days	Wed 5/2/18	Fri 6/15/18	66.68
81	Document Review: NFW NTR and MCBQ NREA	14 days	Sat 6/16/18	Fri 6/29/18	80
82	Address Comments/Develop Draft Document	14 days	Sat 6/30/18	Fri 7/13/18	81
83	Document Review: MARCORSYSCOM	30 days	Sat 7/14/18	Sun 8/12/18	82
84	Address Comments/Develop Final Document	14 days	Mon 8/13/18	Sun 8/26/18	83
85	<b>MARCORSYSCOM Endorsement on Final Version Provided</b>	0 days	Sun 9/9/18	Sun 9/9/18	84FS+14 d: 0%
86	<b>Land Use Controls Administrative Implementation</b>	30 days	Mon 4/2/18	Tue 5/1/18	0%
87	Document LUCs Installation: Update MCBQ Web Site, NIRIS LUC Tracker, and Implement Brochure	30 days	Mon 4/2/18	Tue 5/1/18	66
88	<b>Lunga Recreation Area Reopening (UXO 034 Surface Use Only with Reservoir Access)</b>	0 days	Wed 9/26/18	Wed 9/26/18	85, 78, 87 0%



Project: ATT\_5-3\_COA4\_V4  
 Date: Mon 10/30/17

Task Split Milestone Summary

Project Summary Inactive Task Inactive Milestone Inactive Summary

Manual Task Duration-only Manual Summary Rollup Manual Summary

Start-only Finish-only External Tasks External Milestone

Deadline Progress Manual Progress

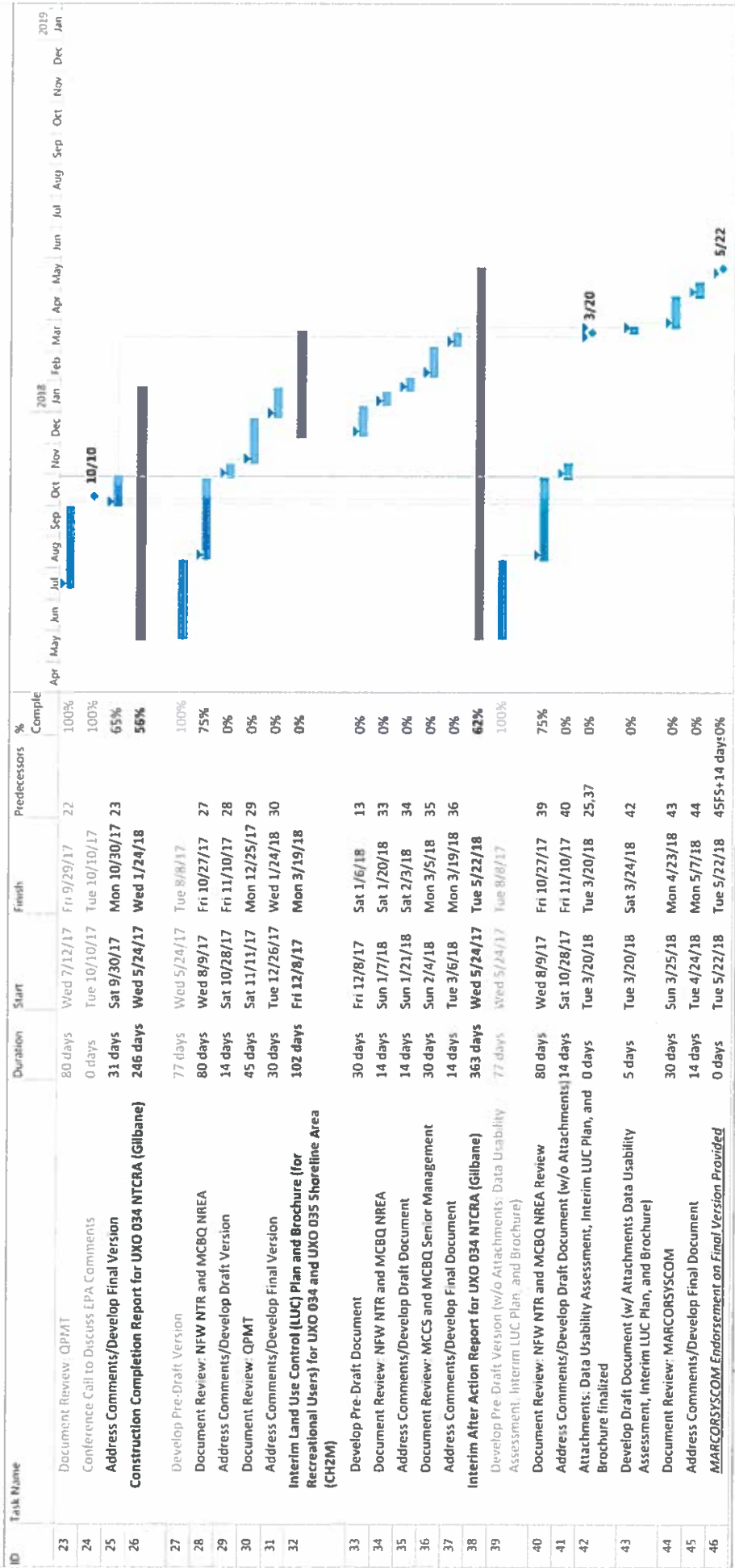
**ENCLOSURE (1)**

Attachment 5-4

Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia



**Attachment 5-4**  
**Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**  
**Marine Corps Base Quantico (MCBQ), Quantico, Virginia**



Project: ATT 5-4\_COA5\_V5  
 Date: Mon 10/30/17

Legend:

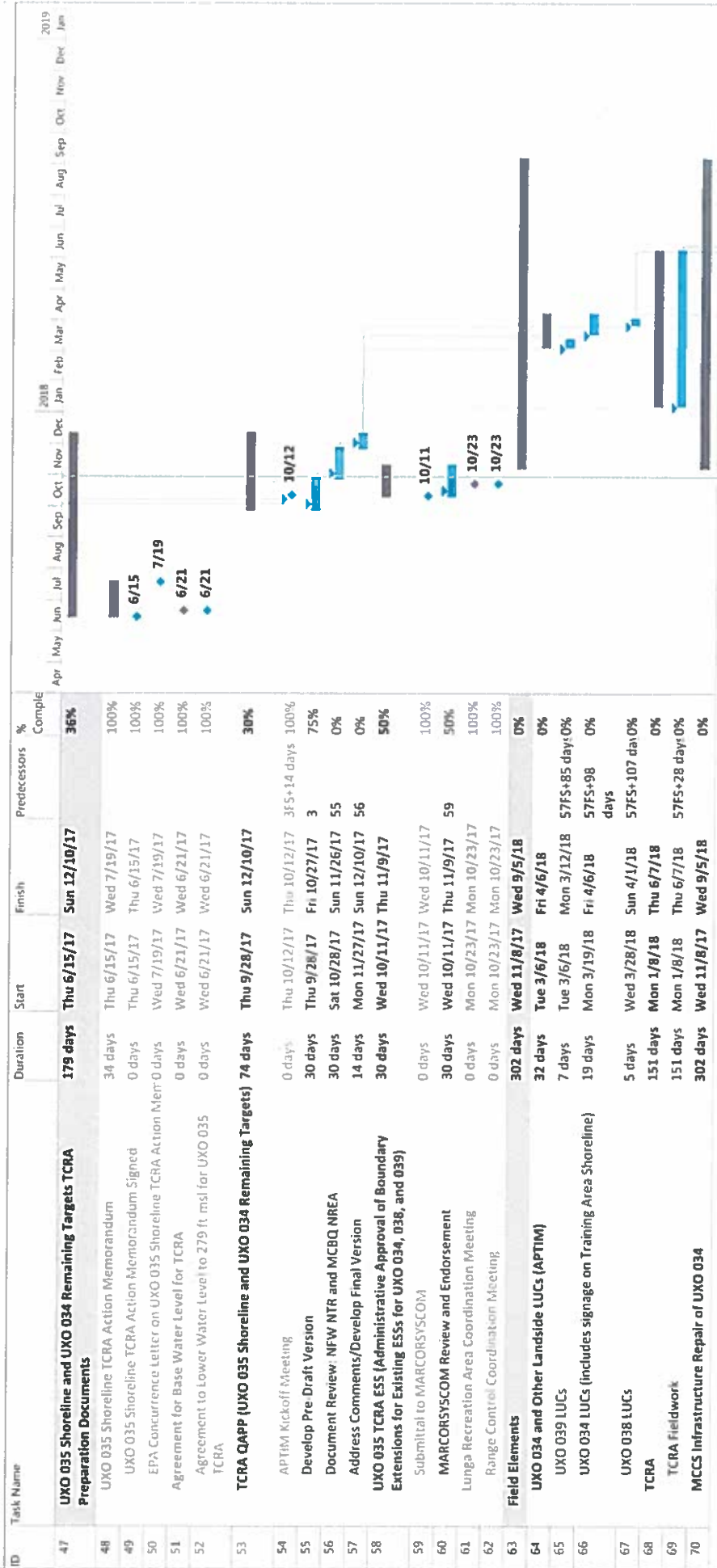
- Task
- Split
- Milestone
- Summary
- Project Summary
- Inactive Task
- Inactive Milestone
- Inactive Summary
- Manual Task
- Duration-only
- Manual Summary Rollup
- Manual Summary
- Start-only
- Finish-only
- External Tasks
- External Milestone
- Deadline
- Progress
- Manual Progress

Page 2

ENCLOSURE (1)



Attachment 5-4  
 Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCRBQ), Quantico, Virginia



Project: ATT 5-4 COA5\_V5  
 Date: Mon 10/30/17

Task:  Task  Split  Milestone  Summary

Project Summary:  Project Summary  Inactive Task  Inactive Milestone  Inactive Summary

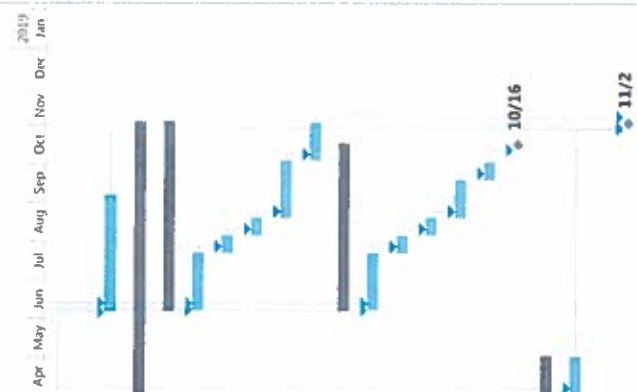
Manual Task:  Manual Task  Duration only  Manual Summary Rollup  Manual Summary

Start only:  Start only  Finish only  External Tasks  External Milestone

Deadline:  Deadline  Progress  Manual Progress

Attachment 5-4  
 Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessors	% Complete
71	Contracting, Subcontracting, Permitting, and Work Planning	120 days	Wed 11/18/17	Wed 3/7/18	12	0%
72	Perform Infrastructure Repairs	90 days	Fri 6/8/18	Wed 9/5/18	69,71	0%
73	<b>TCRA Completion Documents</b>	<b>215 days</b>	<b>Mon 4/2/18</b>	<b>Fri 11/2/18</b>		<b>0%</b>
74	<b>Construction Completion Report for TCRA</b>	<b>148 days</b>	<b>Fri 6/8/18</b>	<b>Fri 11/2/18</b>		<b>0%</b>
75	Develop Pre-Draft Version	45 days	Fri 6/8/18	Sun 7/22/18	67,69	0%
76	Document Review: NFW NTR and MCBQ NREA	14 days	Mon 7/23/18	Sun 8/5/18	75	0%
77	Address Comments/Develop Draft Version	14 days	Mon 8/6/18	Sun 8/19/18	76	0%
78	Document Review: QPMT	45 days	Mon 8/20/18	Wed 10/3/18	77	0%
79	Address Comments/Develop Final Version	30 days	Thu 10/4/18	Fri 11/2/18	78	0%
80	<b>After Action Report for TCRA</b>	<b>131 days</b>	<b>Fri 6/8/18</b>	<b>Tue 10/16/18</b>		<b>0%</b>
81	Develop Pre-Draft Version	45 days	Fri 6/8/18	Sun 7/22/18	67,69	0%
82	Document Review: NFW NTR and MCBQ NREA	14 days	Mon 7/23/18	Sun 8/5/18	81	0%
83	Address Comments/Develop Draft Final Document	14 days	Mon 8/6/18	Sun 8/19/18	82	0%
84	Document Review: MARCORSYSCOM	30 days	Mon 8/20/18	Tue 9/18/18	83	0%
85	Address Comments/Develop Final Document	14 days	Wed 9/19/18	Tue 10/2/18	84	0%
86	<b>MARCORSYSCOM Endorsement on Final Version Provided</b>	<b>0 days</b>	<b>Tue 10/16/18</b>	<b>Tue 10/16/18</b>	<b>85FS+14 days</b>	<b>0%</b>
87	Land Use Controls Administrative Implementation	30 days	Mon 4/2/18	Tue 5/1/18		0%
88	Document LUCs Installation: Update MCBQ Web Site, NIRIS LUC Tracker, and Implement Brochure	30 days	Mon 4/2/18	Tue 5/1/18	67	0%
89	<b>Lunga Recreation Area Reopening (UXO 034 Surface Use and Limited Subsurface Use with Reservoir Access)</b>	<b>0 days</b>	<b>Fri 11/2/18</b>	<b>Fri 11/2/18</b>	<b>86,79,88,72</b>	<b>0%</b>



Project: ATT\_5-4\_COA5\_V5  
 Date: Mon 10/30/17

Task:  Task  Split  Milestone  Summary

Project Summary:  Project Summary  Inactive Task  Inactive Milestone  Inactive Summary

Manual Task:  Manual Task  Duration only  Manual Summary Rollup  Manual Summary

Start only:  Start only  Finish only  External Tasks  External Milestone

Deadline:  Deadline  Progress  Manual Progress

ENCLOSURE (1)

Attachment 5-4  
 Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBCQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessors	% Complete
1	Lunga Recreation Area Reopening Course of Action (COA) 5: Lunga Recreation Area Reopened at UXO 034, UXO 038, and UXO 039 (Access to Reservoir available; Camping available)	996 days	Mon 5/15/17	Tue 2/4/20		25%
2	Contract Awards	178 days	Thu 9/28/17	Sat 3/24/18		17%
3	UXO 035 Shoreline TCRA	0 days	Thu 9/28/17	Thu 9/28/17		100%
4	UXO 034 Remaining Targets, UXO 038 and UXO 039 TCRA	107 days	Fri 12/8/17	Sat 3/24/18	13	0%
5	EODTECHDIV QA Support	54 days	Mon 10/23/17	Fri 12/15/17		50%
6	COA Memo and COA Selection	198 days	Wed 5/24/17	Thu 12/7/17		67%
7	Develop Pre-Draft COA Memo	38 days	Wed 5/24/17	Fri 6/30/17		100%
8	Document Review: NFW NTR and IACBQ NREA	104 days	Sat 7/1/17	Thu 10/12/17	7	100%
9	IPR Meeting #1 (Selection of COA 4 or 5 as likely COA selection)	0 days	Thu 7/13/17	Thu 7/13/17		100%
10	Address Comments/Develop Draft COA Memo	18 days	Fri 10/13/17	Mon 10/30/17	8	58%
11	Document Review: NFW Senior Management	21 days	Tue 10/31/17	Mon 11/20/17	10	0%
12	IPR Meeting #2	1 day	Tue 11/7/17	Tue 11/7/17		0%
13	Decision Document: Final Endorsement, Selection, and Documentation of COA by MCBCQ Base Commander	30 days	Wed 11/8/17	Thu 12/7/17	12	0%
14	Address Comments/Develop Final COA Memo (for NFW Documentation)	14 days	Tue 11/21/17	Mon 12/4/17	11	0%
15	Briefing on selected COA provided to OPMT	0 days	Wed 12/6/17	Wed 12/6/17	14FS+1 day	0%
16	UXO 034 NTCRA Site Restoration (Gilbane)	14 days	Fri 12/8/17	Thu 12/21/17		0%
17	Complete Site Restoration (filling 11,299 intrusive investigation locations and mag and dig areas)	14 days	Fri 12/8/17	Thu 12/21/17	13	0%
18	Existing UXO 034 Landside NTCRA Technical Documents	372 days	Mon 5/15/17	Tue 5/22/18		59%
19	Data Usability Assessment for UXO 034 AGC NTCRA (CH2M)	165 days	Mon 5/15/17	Mon 10/30/17		94%
20	Submit Pre-Draft Version	0 days	Mon 5/15/17	Mon 5/15/17		100%
21	Document Review: NFW NTR and IACBQ NREA	45 days	Mon 5/15/17	Wed 6/28/17	20	100%
22	Address Comments/Develop Draft Version	13 days	Thu 6/29/17	Tue 7/11/17	21	100%
23	Document Review: OPMT	80 days	Wed 7/12/17	Fri 9/29/17	22	100%

Project: ATT\_5-5\_COA6\_V2  
 Date: Mon 10/30/17

Task Split Milestone Summary

Project Summary Inactive Task Inactive Milestone Inactive Summary

Manual Task Duration only Manual Summary Rollup Manual Summary External Milestone

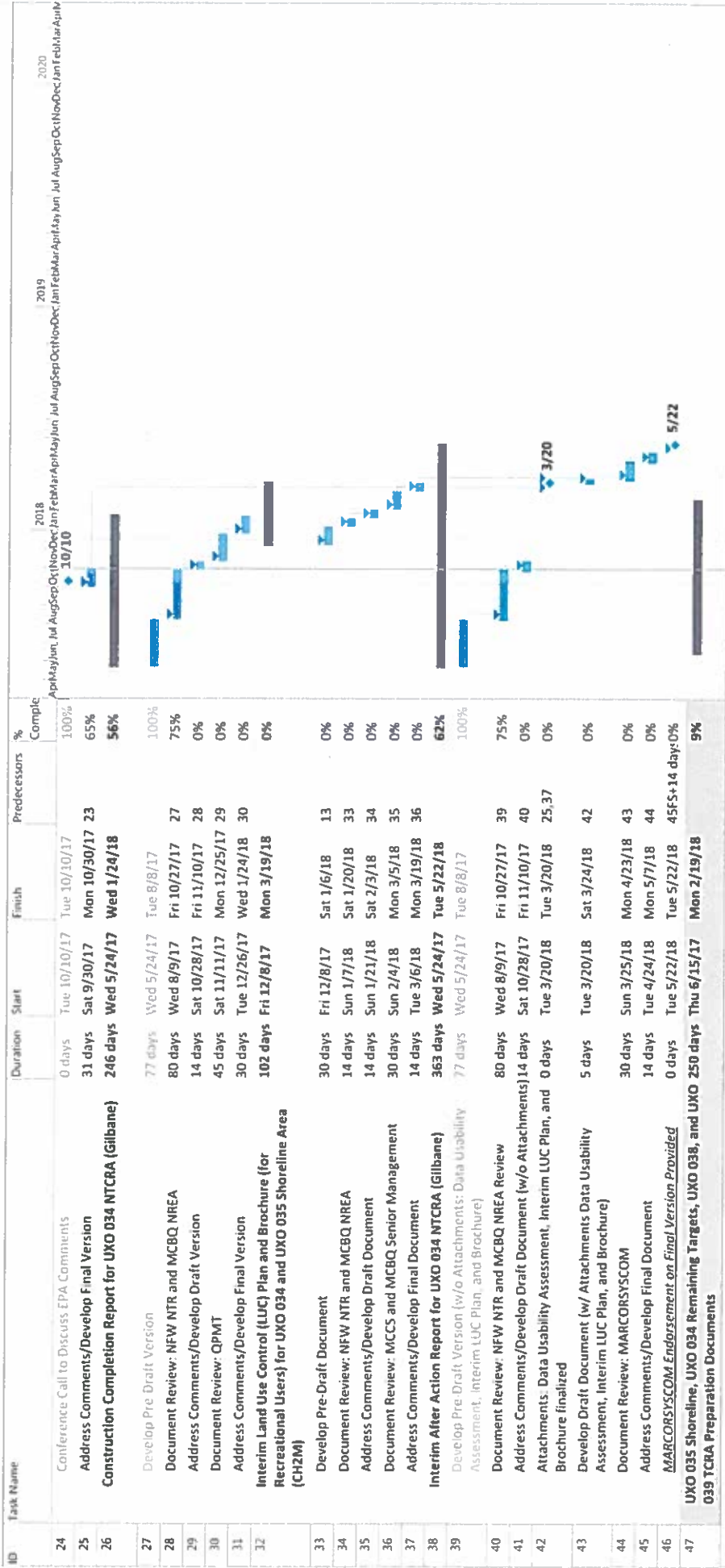
Start-only Finish-only External Tasks External Milestone

Deadline Progress Manual Progress

ENCLOSURE (1)

Attachment 5-4

Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia



Project: ATT 5-5\_COA6\_V2  
 Date: Mon 10/30/17

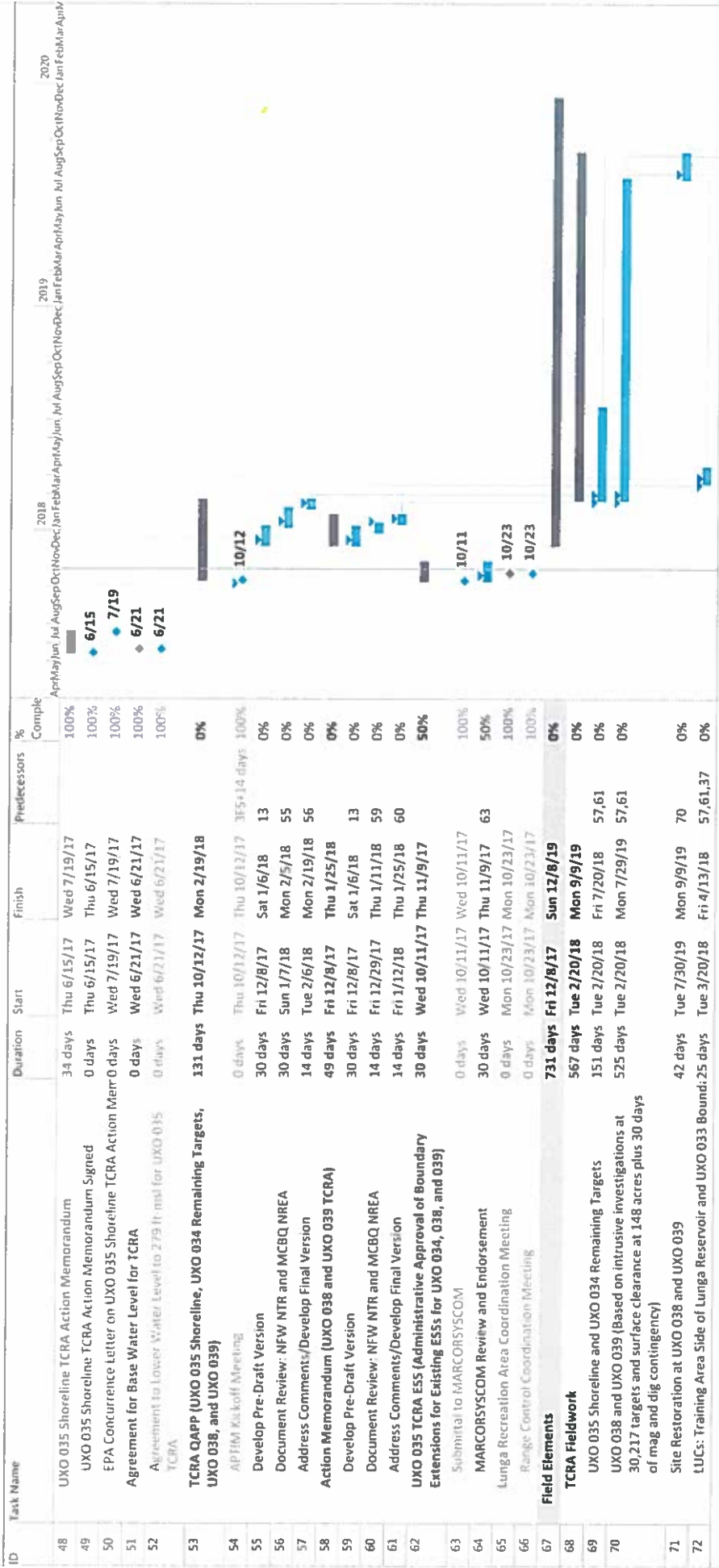
Legend:  
 Task: [Blue bar]  
 Split: [Blue bar with vertical line]  
 Milestone: [Blue diamond]  
 Summary: [Blue bar with vertical line]  
 Project Summary: [Blue bar]  
 Inactive Task: [Grey bar]  
 Inactive Milestone: [Grey diamond]  
 Inactive Summary: [Grey bar with vertical line]  
 Manual Task: [Blue bar]  
 Duration-only: [Blue bar]  
 Manual Summary/Rollup: [Blue bar]  
 Manual Milestone: [Blue diamond]  
 Start only: [Blue bar]  
 Finish only: [Blue bar]  
 External Tasks: [Blue bar]  
 External Milestone: [Blue diamond]

Timeline: 2018, 2019, 2020  
 Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec

ENCLOSURE (1)



**Attachment 5-4**  
**Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)**  
**Lunga Recreation Area Reopening Courses of Action Technical Memorandum**  
**Marine Corps Base Quantico (MCBC), Quantico, Virginia**



Project: ATT\_5-5\_COA6\_V2  
 Date: Mon 10/30/17

Task: Split, Milestone, Summary

Project Summary: Manual Task, Duration only, Manual Summary, Rollup, Manual Summary

Inactive Task: Inactive Milestone, Inactive Summary

Start only, Finish only, External Tasks, External Milestone

Deadline, Progress, Manual Progress

Attachment 5-4  
 Course of Action 5 - Lunga Recreation Area Reopened at UXO 034 (Access to Reservoir Available; Camping Available)  
 Lunga Recreation Area Reopening Courses of Action Technical Memorandum  
 Marine Corps Base Quantico (MCBQ), Quantico, Virginia

ID	Task Name	Duration	Start	Finish	Predecessors	% Complete
73	<b>MCCS Infrastructure Repair of UXO 034</b>	731 days	Fri 12/8/17	Sun 12/8/19		0%
74	Contracting, Subcontracting, Permitting, and Work Planning	120 days	Fri 12/8/17	Fri 4/6/18	13	0%
75	Perform Infrastructure Repairs	90 days	Tue 9/10/19	Sun 12/8/19	69,70	0%
76	<b>TCRA Completion Documents</b>	<b>190 days</b>	<b>Tue 7/30/19</b>	<b>Tue 2/4/20</b>		<b>0%</b>
77	Construction Completion Report for TCRA	148 days	Tue 9/10/19	Tue 2/4/20		0%
78	Develop Pre-Draft Version	45 days	Tue 9/10/19	Thu 10/24/19	71	0%
79	Document Review: NFW NTR and MCBQ NREA	14 days	Fri 10/25/19	Thu 11/7/19	78	0%
80	Address Comments/Develop Draft Version	14 days	Fri 11/8/19	Thu 11/21/19	79	0%
81	Document Review: QPMT	45 days	Fri 11/22/19	Sun 1/5/20	80	0%
82	Address Comments/Develop Final Version	30 days	Mon 1/6/20	Tue 2/4/20	81	0%
83	<b>After Action Report for TCRA</b>	<b>131 days</b>	<b>Tue 9/10/19</b>	<b>Sat 1/18/20</b>		<b>0%</b>
84	Develop Pre-Draft Version	45 days	Tue 9/10/19	Thu 10/24/19	71	0%
85	Document Review: NFW NTR and MCBQ NREA	14 days	Fri 10/25/19	Thu 11/7/19	84	0%
86	Address Comments/Develop Draft Final Document	14 days	Fri 11/8/19	Thu 11/21/19	85	0%
87	Document Review: MARCORSSCOM	30 days	Fri 11/22/19	Sat 12/21/19	86	0%
88	Address Comments/Develop Final Document	14 days	Sun 12/22/19	Sat 1/4/20	87	0%
89	<u>MARCORSYSCOM Endorsement on Final Version Provided</u>	0 days	Sat 1/18/20	Sat 1/18/20	88FS+14 days: 0%	0%
90	<b>Land Use Controls Administrative Implementation</b>	<b>30 days</b>	<b>Tue 7/30/19</b>	<b>Wed 8/28/19</b>		<b>0%</b>
91	Document LUCs Installation: Update MCBQ Web Site, NIRIS LUC Tracker, and Implement Brochure	30 days	Tue 7/30/19	Wed 8/28/19	70,72	0%
92	<b>Lunga Recreation Area Reopening (UXO 034 Surface Use and Limited Subsurface Use with Reservoir Access)</b>	0 days	Tue 2/4/20	Tue 2/4/20	89,82,91,75	0%



Project: ATT 5-5, COA6\_V2  
 Date: Mon 10/30/17

Task Split Milestone Summary

Project Summary Inactive Task Inactive Milestone Inactive Summary

Manual Task Duration only Manual Summary/Rollup Manual Milestone

Start-only Finish-only External Tasks External Milestone

Deadline Progress Manual Progress

Appendix B  
Suggested Language for Safety Brochure

***Munitions at Lunga Recreation Area:***

*Lunga Recreation Area is part of Marine Corps Base Quantico and was utilized as a military training area over 50 years ago before becoming a recreational area. Although extensive cleanup actions for munitions have been performed at Lunga Recreation Area and across Marine Corps Base Quantico, it is possible that munitions presenting an explosive hazard may be encountered at Lunga Recreation Area and other portions of Marine Corps Base Quantico. Munitions are projectiles, bombs, hand grenades, and other types of items that the military use in training and combat. A common term used for munitions that have not detonated is unexploded ordnance (UXO).*

*Munitions are designed to be dangerous and can explode if approached, touched, moved, or disturbed. Recreation area visitors should follow the 3Rs of explosives safety when visiting Lunga Recreation Area:*

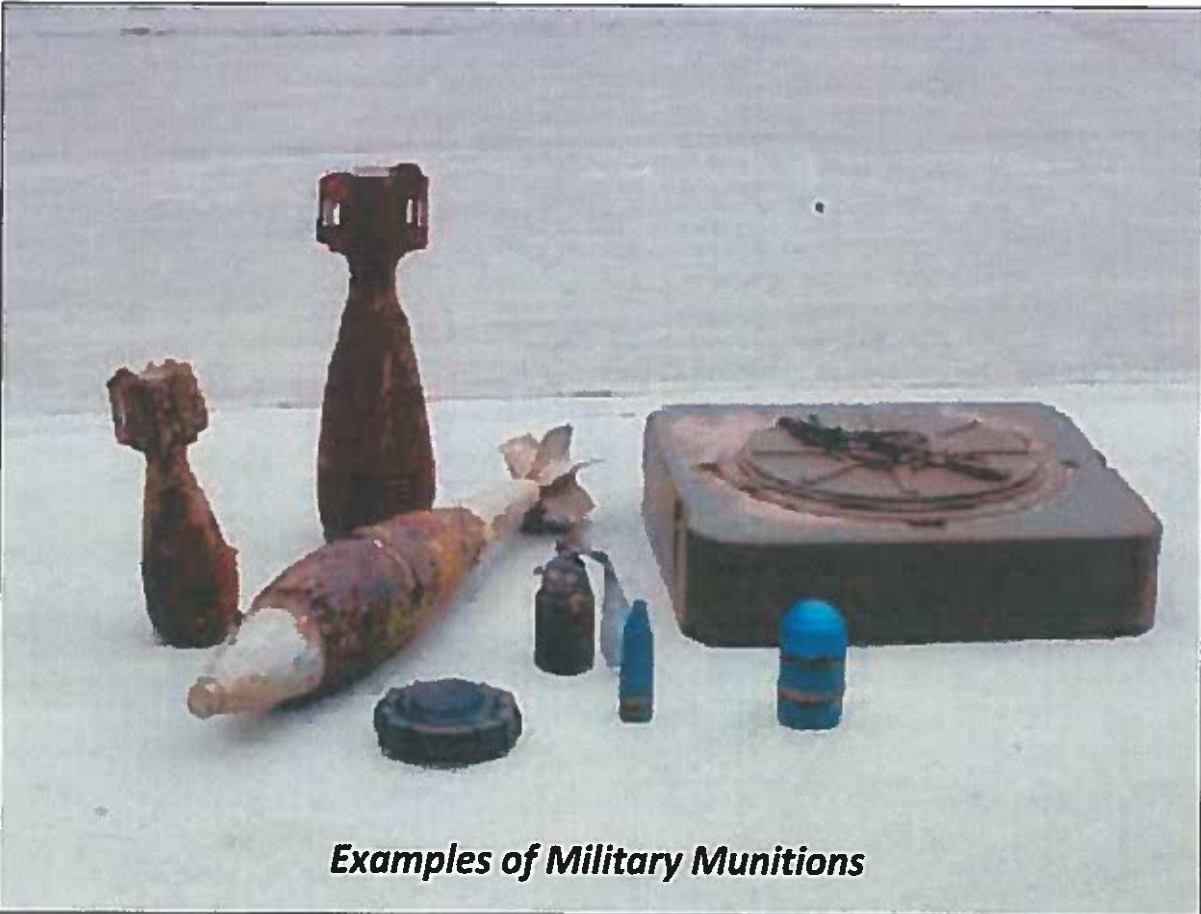
*Recognize – When you may have encountered a munition and that munitions are dangerous.*

*Retreat – Do NOT approach, touch, move, or disturb the item; carefully leave the area.*

*Report – Report the item and location to recreation area staff or military police.*

*Camping at the recreation area should only be performed at designated campsites. No digging for fire pits or other holes at the recreation area are allowed. Campfires and cooking fires are restricted to designated fire rings and above ground grill locations. Park users should avoid areas with downed trees, especially where root balls are exposed at the ground surface.*

*Boating and fishing are allowed in Lunga Reservoir; however, anchoring at the bottom of the reservoir will not be allowed. Patrons should avoid any disturbance of the sediments at the bottom of the reservoir during boating and fishing activities.*



***Examples of Military Munitions***



Appendix C  
Munitions Safety Awareness Training for  
Lunga Recreation Area Staff

Staff working at Lunga Recreation Area should be aware that they are working in, and adjacent to, areas that may have munitions from the previous use of the recreation area for military training over 50 years ago. For any staff working on Lunga Recreation Area, a simplified munitions safety awareness training will be completed as part of new staff onboarding and with a refresher training provided on an annual basis to understand the potential explosive hazard posed, and the potential need to identify and avoid munitions in the recreation area. The following items will be completed as part of this training:

1. Review of Safety Brochure for Lunga Recreation Area: Staff will review the updated Safety Brochure (specifically the Munitions Safety Awareness portion) developed for Lunga Recreation Area upon reopening.
2. Department of Defense Environment, Safety, and Occupational Health Network and Information Exchange 3Rs (Recognize, Retreat, Report) Explosives Safety Education Program: Each staff member will complete a web-based review of the munitions and explosives safety education program at <https://www.denix.osd.mil/uxo/>. The review will consist of the main page of the website and the 3Rs Guide – Outdoor Recreation (small) available in Adobe®.pdf format at <https://www.denix.osd.mil/uxo/educational-resources/safety-guides/>. Additional 3R and explosive safety information on the website may be reviewed at the staff's discretion. The review is assumed to take less than 15 minutes of staff time.

If a potential munition is identified by or reported to Lunga Recreation Area staff, notification will be made to the Marine Corps Base Quantico Explosives Safety Officer who will determine if engagement of the Marine Corps Base Quantico Explosive Ordnance Disposal unit is required.

The review of the above items will be considered completion of the munitions safety awareness training for Lunga Recreation Area staff. A signature page will be maintained by Marine Corps Community Services to indicate who has completed this training and when the training was completed.



Appendix D  
Annual Inspection Checklist



**Annual Inspection Checklist for Land Use Controls**  
**Lunga Recreation Area**  
**Naval Facilities Engineering Command Washington**

This checklist presents the results of an Annual Inspection of Land Use Controls (LUCs) conducted by Naval Facilities Engineering Command Washington in accordance with the *Interim Land Use Control Plan, Lunga Recreation Area, Marine Corps Base Quantico, Virginia*. The objectives of the LUCs at Lunga Recreation Area are as follows:

- Restrict activities within areas possibly containing munitions and explosives of concern (MEC) to prevent exposure that could result in an explosion, causing injury or death.
- Provide a long-term maintenance and inspection program to ensure the integrity of the LUCs in maintained and documented.

Inspection Items					
Inspection Item Number	Inspection Item	Inspection Completed (Y/N/NA)?	Summary of Inspection Performed	Corrective Actions Identified? (Y/N/NA)	Description of Corrective Action
1	Inspection of the fencing and signage to determine if LUCs are in operation and if any repairs or modifications are needed.				
2	Inspection of 6 inches of backfill thickness placed at designated campsites within the Oak Camping Area for any substantial erosion or loss of the 6 inches of backfill thickness (for example, a hole dug within and through the backfill layer).				
3	Check that the Safety Brochure is being provided to Lunga Recreation Area Visitors: To ensure that the brochure is available (at the Camp Store and Office; and kiosk within the Oak Camping Area), that the content communicates potential munitions hazards, and is provided to all Lunga Recreation Area visitors as part of check-in and recreation area entry. To ensure that the MCCS Lunga Park website ( <a href="https://www.quantico.usmc-mccs.org/recreation/">https://www.quantico.usmc-mccs.org/recreation/</a> ) and the MCBQ iSportsman website ( <a href="https://quantico.isportsman.net/">https://quantico.isportsman.net/</a> ) contains the brochure available for viewing and download.				
4	Check that the Lunga Park Information, Fees, and Charges Brochure is being provided to Lunga Recreation Area Visitors: To ensure that the brochure is available (at the Camp Store and Office) and that the restrictions regarding camping, boating, fishing, swimming, and wading are identified to camp patrons and visitors as part of check-in, registration, and recreation area entry. To ensure that the MCCS Lunga Park website contains the brochure available for viewing and download. To ensure that the safe boater test (when using motorboats) communicates the no anchoring at the bottom of the reservoir requirement. To ensure that the boat motors over 10 horsepower will be operated at idle speed only on the reservoir.				

Inspection Items					
Inspection Item Number	Inspection Item	Inspection Completed (Y/N/NA)?	Summary of Inspection Performed	Corrective Actions Identified? (Y/N/NA)	Description of Corrective Action
5	Document that Munitions Safety Awareness Training for Lunga Recreation Area Staff is being completed: To document that the safety awareness training is available and being provided to MCCS and other MCBQ staff working at Lunga Recreation Area.				
6	Check that LUCs are identified within the NIRIS LUC Tracker: To confirm that the LUCs identified herein have been memorialized within the NIRIS LUC Tracker web-based management tool.				
7	Review Excavation Permit Request Forms to determine that notice of potential munitions items was identified: To confirm if any excavation permit request forms were submitted for Lunga Recreation Area and, if so, that the notice of the potential munitions items, associated land use restrictions, and the need for on-site UXO construction support has been identified through the MCBQ NREA Branch approval of the form.				
8	Review MCBQ Installation Master Plan: to ensure that LUCs have been documented: To confirm if the Master Plan has been updated for MCBQ and, if so, have the appropriate land use restrictions been identified.				
9	Confirm Marine Corps Base Order in-place: To confirm that a Marine Corps Base (MCINCR-MCBQ) Order has been issued and distributed by the MCBQ Base Commander with the land use restrictions and Interim LUC Plan.				
10	Review Emergency MCBQ EOD Support Requests: To identify if MCBQ EOD support was required at Lunga Recreation Area with any investigation/removal of potential MEC items.				
11	Review Actual Camping Use: To ensure that camping is only being performed in designated areas (Oak Camping Area within UXO 034).				
12	Reservoir Water Level and Drought Monitoring: To ensure the following reservoir water level data is being recorded on a weekly basis: (A) Reservoir water level elevation data in ft-msl; and (B) edge of water in reservoir above or below the two Buffer Points marked on the boat dock. The two Buffer Point markings will also be inspected to ensure the markings are visible.				
13	Safety Danger Zone Buoys and Flags: To ensure Range Management buoys, flags, and associated access control marker system within the reservoir is present and working.				

Inspection Items					
Inspection Item Number	Inspection Item	Inspection Completed (Y/N/NA)?	Summary of Inspection Performed	Corrective Actions Identified? (Y/N/NA)	Description of Corrective Action
14	Document Tree and Exposed Root Ball Survey and Investigation Results: To document the completion of the tree and exposed root ball survey and results of the metallic anomaly investigation by the UXO team.		Refer to Tree and Exposed Root Ball Survey Form (Form D-1) below for additional details and results		

**Notes:**

Y – Yes

N – No

NA – Not applicable

**Inspection Certification:**

Inspected by: \_\_\_\_\_

Company/Organization: \_\_\_\_\_

Date of Inspection: \_\_\_\_\_

Date of Last Inspection: \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

