



DEPARTMENT OF THE ARMY  
LONGHORN ARMY AMMUNITION PLANT  
POST OFFICE BOX 220  
RATCLIFF, AR 72951

May 9, 2018

DAIM-ODB-LO

Mr. Rich Mayer  
US Environmental Protection Agency  
Federal Facilities Section R6  
1445 Ross Avenue  
Dallas, TX 75202-2733

Re: Final Land Use Control Remedial Design/Remedial Action Construction Report  
LHAAP-001-R-01 and LHAAP-003-R-01, Longhorn Army Ammunition Plant, May  
2018

Dear Mr. Mayer,

The above-reference document is being transmitted to you for your records. This document replaces the Draft Final issued on February 1, 2018, which was considered final after 30 days without regulatory comment. This Final document includes the recordation completed on April 19, 2018 and corrections to the List of Attachments and Attachments 3 and 4, as well as corrections and updates to Sections 3.1 and 3.3.2. Response to comments on the Draft version of the document are included within this Final Version.

The document was prepared by Bhate Environmental Associates, Inc., (Bhate) on behalf of the Army as part of Bhate's Performance Based Remediation contract for the facility. I ask that Kim Nemmers, Bhate's Project Manager, be copied on any communications related to the project.

The point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil).

Sincerely,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is positioned above the printed name.

Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Copies furnished:  
A. Palmie, TCEQ, Austin, TX  
P. Bruckwicki, Caddo Lake NWR, TX  
R. Smith, USACE, Tulsa District, OK  
A. Williams, USACE, Tulsa District, OK  
N. Smith, USAEC, San Antonio, TX  
K. Nemmers, Bhate, Lakewood, CO (for project files)



DEPARTMENT OF THE ARMY  
LONGHORN ARMY AMMUNITION PLANT  
POST OFFICE BOX 220  
RATCLIFF, AR 72951

May 9, 2018

DAIM-ODB-LO

Ms. April Palmie  
Texas Commission on Environmental Quality Superfund Section, MC-136  
12100 Park 35 Circle, Bldg D  
Austin, TX 78753

Re: Final Land Use Control Remedial Design/Remedial Action Construction Report  
LHAAP-001-R-01 and LHAAP-003-R-01, Longhorn Army Ammunition Plant, May  
2018

Dear Ms. Palmie,

The above-reference document is being transmitted to you for your records. This document replaces the Draft Final issued on February 1, 2018, which was considered final after 30 days without regulatory comment. This Final document includes the recordation completed on April 19, 2018 and corrections to the List of Attachments and Attachments 3 and 4, as well as corrections and updates to Sections 3.1 and 3.3.2. Response to comments on the Draft version of the document are included within this Final Version.

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Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Copies furnished:  
R. Mayer, USEPA Region 6, Dallas, TX  
P. Bruckwicki, Caddo Lake NWR, TX  
R. Smith, USACE, Tulsa District, OK  
A. Williams, USACE, Tulsa District, OK  
N. Smith, USAEC, San Antonio, TX  
K. Nemmers, Bhate, Lakewood, CO (for project files)

**TCEQ and USEPA Review Comments**  
**DRAFT Land Use Control Remedial Design/Remedial Action Construction Report**  
**LHAAP-001-R-01 and LHAAP-003-R-01, Longhorn Army Ammunition Plant December 2017**  
**Review Date: 26 January 2018**

**SPECIFIC COMMENTS**

The following table provides specific comments and identifies the location within the document where each comment applies.

<b>Comment No.</b>	<b>Location in Document</b>	<b>Regulator Comments</b>	<b>Respondent (Bhate)<sup>1</sup></b>	<b>Response to Comment (Contractor)</b>
<b>TCEQ Comments</b>				
1.	Section 3.2.2, Page 3-3	Page 3-3, last bullet should end with 2018 (not 2019).	C	Concur. Sentence will be revised to state: <i>This update to the Comprehensive LUC Management Plan will be completed during the next annual update which will be in the fourth quarter 2018.</i>
2.	Section 3.3.4, Page 3-5	Page 3-5, Section 3.3.4, Remove redundant sentence "These actions are taken to reestablish its protectiveness." This is stated in preceding sentence.	X	Concur. The second sentence in this paragraph and presented in the Regulator comment will be removed.
3.	Figure 1-2	Figure 1-1, Remove "and Monitoring Locations" from the title. In the legend, add "(LUC Boundary)" after the existing text for the red line.	C	Concur. Regulator Comment appears to apply to Figure 1-2, which will be revised to state: <i>LHAAP-001-R and LHAAP-003-R Site Location Map with LUC Boundaries.</i> The text "(LUC Boundary)" will be added after the existing text for the line that is red.
4.	Appendix C	Appendix C, Exhibits A and B are not legible. All details, including the meets and bounds notes, need to be legible for the record.	C	Concur. Bhate will revise the PDF with copies that are legible.
<b>USEPA Comments</b>				
5.	Appendix C-Page 2	Second Page of Appendix C, second paragraph, the phone number for the Marshall Library is not in service when you dial the number. Is the number transposed?	C	Concur. The area code presented for Marshall Library was typed into the document incorrectly. The area code will be changed to 903.
6.	Section 1.6.2.2	On the Initial Notice of Land Use Controls page (Attachment 1), in the last paragraph, the word Administrative is misspelled.	C	Concur. The term "Administrative Record" will be revised to <i>Administrative Record</i> in the final sentence within the Initial Notice of Land Use Controls.

**Notes:**

- 1) Respondent Concur (C), Does not concur (D), Takes Exception (E) or Delete (X).
- 2) Commenter Agrees (A) with response or Does Not Agree (D) with response.

**FINAL**  
**LAND USE CONTROL REMEDIAL DESIGN/  
REMEDIAL ACTION CONSTRUCTION REPORT**  
**LHAAP-001-R-01 AND LHAAP-003-R-01**  
**LONGHORN ARMY AMMUNITION PLANT**

**May 2018**

**Contract Number: W9128F-13-D-0012**

**Task Order Number: W912BV17F0150**

**Performance Based Remediation (PBR)**

**Longhorn Army Ammunition Plant**

**Karnack, Texas**

*Prepared For:*



**Longhorn Army Ammunition Plant**  
**Karnack, Texas**

*Under Contract To:*



**U.S. Army Corps of Engineers**  
**Tulsa District**  
**Tulsa, Oklahoma**

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### **Attachment**

Attachment 1 - Initial Notice of Land Use Controls Including 2008 LUC Boundary Maps for LHAAP-001-R and LHAAP-003-R

Attachment 2 - Initial Notice of Land Use Controls for Four Environmental Sites at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas Transmittal Letters

## RD LHAAP-001-R-01 AND LHAAP-003-R-01

### LONGHORN ARMY AMMUNITION PLANT

Attachment 3 - Notice of Land Use Controls Including Final LUC Boundary Maps for LHAAP-001-R and LHAAP-003-R

Attachment 4 - Notice of Land Use Controls for Two Environmental Sites at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas Transmittal Letters

### **Appendices**

Appendix A LTM Inspection and Maintenance Checklist

Appendix B LUC Compliance Certification Form

Appendix C Recordation of Land Use Controls for LHAAP-001-R and LHAAP-003-R

## ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
bgs	below ground surface
BIP	Blow-in-place
CD	Cultural debris
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CTT	Closed, Transferring, and Transferred
DNT	Dinitrotoluene
DoD	Department of Defense
ECP	Environmental Condition of Property
EE/CA	Engineering Evaluation/Cost Analysis
e2M	Engineering-Environmental Management
FFA	Federal Facility Agreement
GW-Ind	Groundwater-Industrial
HMX	1,3,5,7-Tetranitro-1,3,5,7-tetrazocane
IRP	Installation Restoration Program
LHAAP	Longhorn Army Ammunition Plant
LUC	Land use control
µg/kg	Micrograms per kilogram
µg/L	Micrograms per liter
MC	Munitions constituent
MCL	Maximum Contaminant Level
MD	Munitions debris
MEC	Munitions and Explosives of Concern
mm	Millimeter
MMRP	Military Munitions Response Program
MOA	Memorandum of Agreement
MPPEH	Material potentially presenting explosive hazard
MRS	Munitions response site
MSC	Medium Specific Concentration
NCP	National Contingency Plan
NFA	No Further Action
NPL	National Priorities List
OB/OD	Open burn/open detonation
O&M	Operation and maintenance
PCL	Protective Concentration Level
RACR	Remedial Action Completion Report
RAO	Remedial action objective
RD	Remedial design
RDX	1,3,5-Trinitro-1,3,5-triazinane
ROD	Record of Decision



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SARA	Superfund Amendments and Reauthorization Act
§	Section
SI	Site Inspection
STEP	Solutions to Environmental Problems
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
TNT	Trinitrotoluene
TRRP	Texas Risk Reduction Program
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UU/UE	Unlimited Use/Unlimited Exposure
UXO	Unexploded Ordnance
WP	White phosphorus

## 1 INTRODUCTION

This document presents the land use controls (LUCs) remedial design (RD)/Remedial Action Construction Report (RACR) for the implementation of LUCs associated with the remedy set forth in the Final Longhorn Army Ammunition Plant (LHAAP) Record of Decision (ROD) (United States [U.S.] Army, August 2016) for Military Munitions Response Program (MMRP) sites LHAAP-001-R01 (South Test Area/Bomb Test Area) and LHAAP-003-R01 (Ground Signal Test Area). The ROD and this LUC RD/RACR was prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986. The ROD includes a remedial action for limited groundwater monitoring for perchlorate to confirm levels in groundwater are below the Texas Risk Reduction Program (TRRP) Tier 1 Groundwater Residential Protective Concentration Level (PCL). The limited groundwater monitoring is not associated with the LUCs for the sites and thus is not discussed further in this document.

This LUC RD/RACR document was prepared for the U.S. Army under the Worldwide Environmental Remediation Services Contract No. W9128F-13-D-0012 managed by the U.S. Army Corps of Engineers (USACE), Tulsa District.

### 1.1 Facility Background

The LHAAP is an inactive, government-owned, formerly contractor-operated and maintained industrial facility located in central-east Texas, in the northeastern corner of Harrison County. The facility occupies approximately 1,200 of its former 8,416 acres located between State Highway 43 in Karnack, Texas, and the southwestern shore of Caddo Lake, as shown on **Figure 1-1**. The LHAAP was listed as a National Priorities List (NPL) site on August 9, 1990, due to threatened releases of hazardous substances, pollutants, or contaminants. The U.S. Environmental Protection Agency (USEPA), the Texas Water Commission (now the Texas Commission on Environmental Quality [TCEQ]), and the U.S. Army signed a Federal Facility Agreement (FFA) on December 30, 1991, to address the contamination at LHAAP.

### 1.2 Munitions Response Sites LHAAP-001-R and LHAAP-003-R Site Descriptions

Munitions response sites (MRSs) LHAAP-001-R (South Test Area/Bomb Test Area), is co-located with Installation Restoration Program (IRP) site LHAAP-27 and is situated in the southern portion of LHAAP and covers an area of approximately 79 acres (**Figure 1-2**). Site LHAAP-001-R was constructed in 1954 and used for testing photoflash bombs produced at the facility until approximately 1956. During the late 1950s, illuminating signal devices were also demilitarized within pits excavated in the vicinity of the test pad. During the 1960s, leaking production items may have been demilitarized by detonation. Leaking white phosphorus (WP) munitions were supposedly disposed of, although no primary source documentation concerning this effort has been located. A 1984 LHAAP Contamination Survey indicated that the area had been relatively

## RD LHAAP-001-R-01 AND LHAAP-003-R-01

### LONGHORN ARMY AMMUNITION PLANT

inactive since the early 1960s and no disposal or testing activities have been carried out in this area since this time. LHAAP-001-R was identified as a munitions and explosives of concern (MEC) area based on the visual confirmation of MEC.

Site LHAAP-003-R (Ground Signal Test Area), is co-located with IRP site LHAAP-54 and is situated in the southeastern portion of LHAAP and covers an area of approximately 80 acres (**Figure 1-2**). Site LHAAP-003-R was used intermittently in April 1963 for aerial and on-ground testing and destruction of a variety of devices, including pyrotechnic signal devices, red phosphorus smoke wedges, infrared flares, illuminating mortar shells and cartridges, button bombs, and various types of explosive simulators. The site was also used intermittently over a 20-year period for testing and burn-out of rocket motors. From late 1988 through 1991, the site was also used for the burn-out of Pershing missile rocket motors. Occasionally, leaking WP munitions were burned at the site as a demilitarization activity. LHAAP-003-R was identified as a MEC area based on the reported presence of MEC.

Previous investigations, including an August 2007 Engineering Evaluation/Cost Analysis (EE/CA), prepared by CAPE, verified the presence of MEC at LHAAP-001-R and LHAAP-003-R, and recommended the removal of MEC, along with the implementation of LUCs to reduce the risk within the sites. Soil samples collected from both sites indicated that no WP was identified at detectable concentrations and no munitions constituents (MC) were present in any pre- or post-detonation soil samples collected.

Between August and November 2008, a non-time critical MEC removal action was conducted at both sites and surface clearances were performed. At LHAAP-001-R, a surface clearance of approximately 65 acres and subsurface clearance to the depth of detection in a 14-acre open burn/open detonation (OB/OD) area were performed. A total of 384 MEC/material potentially presenting explosive hazard (MPPEH) items and 14 inert items were located and destroyed and a total of 22,139 pounds of munitions debris and 1,876 pounds of cultural debris (CD) were removed during the course of surface and subsurface clearance. At LHAAP-003-R, a total of 12 MEC/MPPEH items and one inert item were located and destroyed and 6,880 pounds of munitions debris and 5,981 pounds of CD were removed during the course of the surface clearance.

Following the 2008 non-time critical removal action surface clearance activities, LUCs were prepared and constructed for both sites. LUCs were designed and constructed to promote ongoing protection of human safety against potential explosive hazards that may remain at the MMRP sites. The LUCs' performance objectives are to prohibit the development and use of the property for residential housing, elementary and secondary schools, and child care facilities and playgrounds, and to prohibit intrusive activities such as digging or any other activity which could result in explosive safety risks. The recordation notification for the sites, which was filed with Harrison County, include a description of the LUCs (**Appendix C**). The boundary of the LUCs encloses the site boundaries shown on **Figures 2-7 and 2-8**. The locations of the signs are also shown of **Figures 2-7 and 2-8**. The LUC to prohibit residential land use will remain in place until

it is demonstrated that the MEC no longer presents a threat to public/human safety. The LUC restricting land use to nonresidential will remain in place until it is demonstrated that the MEC no longer presents a threat to public/ human safety. A LUC to prohibit intrusive subsurface activities, including digging, will remain in place until it is demonstrated that the MEC no longer present an explosive hazard. However, intrusive subsurface activities may occur provided that the Army and the EPA approve such intrusive subsurface activities before they are commenced and provided that they are undertaken by qualified personnel who are trained in explosives safety measures.

LUC boundary maps for LHAAP-001-R and LHAAP-003-R, generated as part of the 2008 LUC implementation, are presented as **Attachments 1 and 3** to this LUC RD/RACR document. The 2008 LUCs included:

- Restriction against intrusive activities, including digging. A legal description survey and plat of the LUC boundaries and locations of MEC warning signs prepared in accordance with 30 Texas Administrative Code (TAC) Section (§) 335.569, Appendix III, for recordation in the Harrison County Clerk's Office.
- Placement of MEC warning signage along the perimeter of LHAAP-001-R and LHAAP-003-R to serve as the physical demarcation of the controlled areas. The signs have visibility from one sign to the next, with a maximum spacing of 100 feet. The signs include warning of the potential presence of MEC, state the restriction against intrusive activities, and provide a contact number. The locations of the signs are shown in **Attachment 1 and 2** as **Figures 2-7 and 2-8**.
- Education program for future refuge visitors, staff, and volunteers. The program includes informational pamphlets and a safety video warning of the potential presence of MEC and presenting examples of MEC that were or may be found at the sites.

The Final ROD for LHAAP-001-R and LHAAP-003-R was issued in August 2016 and documents the final selected remedy for the sites (U.S. Army, August 2016). The ROD found that although the removal actions provided an effective solution for reducing risk of exposure by reducing the potential for any direct contact with MEC or material potentially presenting explosive hazard (MPPEH), there is the potential that some MEC remains. A summary of the LUC remedial action objective (RAO) and the selected remedy for LHAAP-001-R and LHAAP-003-R, identified in the Final ROD, is presented in the following sections.

### **1.3 Land Use Control Remedial Action Objective**

The LUC RAO developed for LHAAP-001-R and LHAAP-003-R, as outlined in the LHAAP-001-R and LHAAP-003-R ROD (U.S. Army, August 2016) is:

- Protection of human health and safety from explosive hazards that may have remained at the sites after the MEC removal action.

## **1.4 Land Use Control Remedial Action**

The LUC remedial action for MEC at LHAAP-001-R and LHAAP-003-R is comprised of the following elements:

- LUC to prohibit residential use.
- LUC to restrict land use to non-residential.
- LUC to restrict intrusive activities (e.g., digging).
- Signage to convey MEC warning.
- Education Program.

The Educational Program materials, including pamphlets and video, were delivered to the U. S. Fish and Wildlife Service (USFWS) in hard copy and electronic form as part of the Site Specific Final Report for the MEC Removal Action report (EODT, 2009). There is no recurring requirement associated with this LUC and it will not be addressed further in this document.

## 2 SITE CHARACTERISTICS

This section presents a summary of site characteristics for LHAAP-001-R and LHAAP-003-R, which are primarily based on the following historical documents: (1) *Final ROD* (U.S. Army, August 2016), (2) *Engineering Evaluation/Cost Analysis Action Memorandum for Three Munitions Response Sites-South test Area/Bomb Test Area, Static Test Area, and Ground Signal Test Area* (CAPE Environmental, August 2007), and (3) *Draft-Final Remedial Design-LHAAP-16* (AECOM, January 2017).

Site LHAAP-001-R encompasses an area of approximately 79 acres. Site topography slopes gently to the east and surface water runoff generally flows to the southeast toward Harrison Bayou. Groundwater at the site is encountered between 7 feet and 9 feet below ground surface (bgs), and is topographically controlled with a general flow direction to the north.

LHAAP-003-R encompasses an area of approximately 80 acres, located in the watersheds of Saunders Branch and Harrison Bayou. Both Saunders Branch and Harrison Bayou flow into Caddo Lake. Surface water from the site flows toward drainage ditches located alongside a circular dirt road forming on the outer margin of the site. The ditches converge to the northeast and southwest directing surface water to Saunders Branch and Harrison Bayou, respectively. Depth to groundwater at the site averages around 15 feet bgs with seasonal fluctuations.

Neither LHAAP-001-R nor LHAAP-003-R include areas of archeological or historical importance.

### 2.1 Geology and Hydrogeology

The hydrogeologic environment consists of an alluvial depositional environment with multiple permeable layers consisting primarily of silty and/or clayey sands separated by silty clay and clay layers of widely variable thickness that act as aquitards or leaky aquitards. The permeable zones are separated into shallow, intermediate, and deep zones at each site (sometimes split into “upper and lower” when needed), but the alluvial nature of the environment means that groundwater zones are laterally discontinuous at times and may vary in thickness and permeability laterally and vertically.

Surface water runoff at LHAAP-001-R generally flows to the southeast toward Harrison Bayou. Depth to groundwater ranges between 7 feet and 9 feet bgs and flows in a northerly direction.

Based on previous hydrogeological assessments, the groundwater and surface flow direction at LHAAP-003-R are to the northwest and parallel Saunders Branch and Harrison Bayou. Depth to groundwater averages 15 feet bgs.

## **2.2 Current and Future Land Use**

LHAAP has been an industrial facility since 1942. Production activities and associated waste management activities continued until the facility was determined to be in excess of the U.S. Army's needs in 1997. The plant area has been relatively dormant since that time. LHAAP is surrounded by a fence (except on the border with Caddo Lake), and current access measures at the LHAAP preclude unlimited public access to areas within the fence. The fence now represents the National Wildlife Refuge boundary, which surrounds both MRSs LHAAP-001-R and LHAAP-003-R. Approved access for hunters is limited.

The reasonably anticipated future use of LHAAP-001-R and LHAAP-003-R is as part of a national wildlife refuge. This anticipated future use is based on a Memorandum of Agreement (MOA) (U.S. Army, April 2004) between the USFWS and the U.S. Army. That MOA documents the transfer process of the LHAAP acreage to USFWS to become the Caddo Lake National Wildlife Refuge and will be used to facilitate a future transfer of LHAAP-001-R and LHAAP-003-R. Presently the Caddo Lake National Wildlife Refuge occupies approximately 7,000 acres of the 8,416-acre former installation. In accordance with the National Wildlife Refuge System Administration Act of 1966 and its amendments (16 United States Code [U.S.C.] 668dd), the land will remain as a national wildlife refuge unless there is a change brought about by an act of Congress, or the land is part of an exchange authorized by the Secretary of the Interior.

## **2.3 Nature and Extent of MEC**

MMRP sites LHAAP-001-R and LHAAP-003-R are co-located with Installation Restoration Program (IRP) sites LHAAP-27 and LHAAP-54, respectively.

From 2002 to 2007, investigations related to the MMRP were conducted at LHAAP. As a result of the records review for the U.S. Army Closed, Transferring, and Transferred (CTT) Range/Site Inventory in 2002, the South Test Area/Bomb Test Area and Ground Signal Area were designated as LHAAP-001-R and LHAAP-003-R, respectively (Engineering-Environmental Management [e2M], 2002). For these two MRSs, investigations were conducted to determine the presence or absence of MEC. Details regarding investigations at each site are presented below.

### **2.3.1 LHAAP-001-R**

Between 2002 and 2004, a MMRP Site Inspection (SI) was conducted for LHAAP-001-R to determine the presence or absence of MEC at the site, which may have remained from activities conducted by the Department of Defense (DoD) during operation of the MRS, and may pose a threat to human health and/or the environment (e2M, June 2005).

Results of the historical records review and a visual SI verified MEC presence at the site. Possible source areas for MEC identified during the SI included the following:

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- Testing areas associated with the various suspected ordnance types.
- A Demolition Area located within the footprint of LHAAP-001-R. This area was reportedly designed for detonation of dangerous/unserviceable ammunition.
- Spent flares, a 155 millimeter (mm) WP projectile, shrapnel from photoflash bombs, and ordnance related scrap found on the site.

In 2007, an EE/CA was conducted to facilitate a non-time-critical removal action of MEC at the site (CAPE Environmental, August 2007). During this effort, twenty-one MEC and MPPEH items along with 700 pounds of munitions debris (MD) were recovered at the surface or within the top 6 inches of the soil. The items were clustered within an area suspected as being used for OB/OD activities, although the area was never permitted as an OB/OD unit. The suspected OB/OD area is approximately 14 acres in size.

Between August and November 2008, a MEC non-time-critical removal action was conducted and LUCs were developed for the site (EODT, September 2009). Surface clearance of the entire 79 acre site and subsurface clearance to the depth of detection, within a 14-acre area of the site, was performed at LHAAP-001-R. Magnetometer-assisted surface clearance was performed for the entire site, which required site preparations including brush removal. The clearance team worked in grids and established 5-foot sweep lanes within each grid, removing and disposing of all surface MEC and MPPEH, MD, CD, and range-related debris. A total of 90 MEC/MPPEH items were located and destroyed, and a total of 6,742 pounds of MD and 154 pounds of CD were removed during the course of surface clearance. Subsurface MEC removal was conducted for the suspected OB/OD area of approximately 14 acres within LHAAP-001-R. Magnetometers were utilized to detect surface and subsurface anomalies. Each detected anomaly was excavated until the item was located, identified, and a magnetic signature was no longer detected at the location. All MEC/MPPEH encountered were explosively destroyed to verify that no residual explosive hazard existed. A total of 294 MEC/MPPEH items and 14 inert items were located, excavated, and removed and a total of 15,397 pounds of MD and 1,722 pounds of CD were removed during the course of subsurface clearance. MEC items were destroyed using the “blow-in-place” (BIP) method following approved demolition procedures. Debris was consolidated and relocated to the site lay down area. The debris was stored in approved containers, inspected, verified, and certified as free of explosives, and shipped off site for final disposition.

LUCs were designed and constructed for LHAAP-001-R, consistent with recommendations of the EE/CA, which included:

- Restriction against intrusive activities. Title 30 TAC § 335.569, Appendix III requires that the restriction be recorded in the Harrison County Clerk’s Office, with the survey, map, and LUC language.
- Signage at the perimeter of LHAAP-001-R. Signs were installed at the perimeter of the site, serving as the physical demarcation of the controlled areas. The signs have visibility from one



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sign to the next with a maximum spacing of 100 feet. The signs include warning of the potential presence of MEC and state the restriction against intrusive activities.

- Education program for future refuge visitors, staff, and volunteers. The program includes informational pamphlets and safety video warning of the potential presence of MEC and presenting examples of MEC that were or may be found at the site.

#### **2.3.2 LHAAP-003-R**

Between 2002 and 2004, a MMRP SI was conducted for LHAAP-003-R to determine the presence or absence of MEC at the site, which may have remained from activities conducted by the DoD during operations of the MRS. The SI verified MEC presence at the site (e2M, June 2005). Possible source areas for MEC identified during the SI included: testing areas associated with the various suspected ordnance types; a confirmed mortar impact area on site with numerous unidentified ordnance item shapes on the surface and outside the mortar berm; a site reportedly used for the testing and burnout of Pershing and Sergeant rocket motors; and areas associated with past demilitarization activities. In addition, a Sergeant rocket motor reportedly exploded at the site around 1970 and debris was reportedly placed in the resulting crater and backfilled. It was also reported that occasionally WP munitions were burned at the site. It appears that most of the items tested at this location were statically fired and observed for adequate illumination and burn time and not launched by a weapons system.

In 2007, an EE/CA was conducted to facilitate a non-time-critical removal action of MEC at the site (CAPE Environmental, August 2007). During this effort, fourteen MEC and MPPEH items along with 513 pounds of MD were recovered at the surface or within the top 6 inches of the soil. The items were clustered within the former Mortar Test Area.

Between August and November 2008, a MEC removal action was conducted and LUCs were developed for the site. Magnetometer-assisted surface clearance was performed at LHAAP-003-R for the entire site of approximately 80 acres, and site preparations included brush removal. The clearance team worked in grids and established 5-foot sweep lanes within each grid, removing and disposing of all surface MEC and MPPEH, MD, CD, and range related debris. Twelve MEC/MPPEH items and one inert item were located and destroyed and 6,880 pounds of MD and 5,981 pounds of CD were removed during the course of surface clearance. All MEC items were destroyed using the BIP method following approved demolition procedures. All debris was consolidated and relocated to the site lay down area. The debris was stored in approved containers, inspected, verified and certified as free of explosives, and shipped off site for final disposition.

LUCs were designed and constructed for LHAAP-003-R consistent with the recommendations of the EE/CA, which included:

LUC RD/RACR LHAAP-001-R-01 AND LHAAP-003-R-01  
LONGHORN ARMY AMMUNITION PLANT

- Restriction against intrusive activities. Title 30 TAC § 335.569, Appendix III requires that the restriction be recorded in the Harrison County Clerk's Office, with the survey, map, and LUC language.
- Signage at the perimeter of LHAAP-003-R. Signs were installed at the perimeter of the site, serving as the physical demarcation of the controlled areas. The signs have visibility from one sign to the next with a maximum spacing of 100 feet. The signs include warning of the potential presence of MEC and state the restriction against intrusive activities.
- Education program for future refuge visitors, staff, and volunteers. The program includes informational pamphlets and safety video warning of the potential presence of MEC and presenting examples of MEC that were or may be found at the site.

RD LHAAP-001-R-01 AND LHAAP-003-R-01  
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### 3 LAND USE CONTROL REMEDIAL DESIGN/REMEDIAL ACTION CONSTRUCTION

The remedial action objective for LHAAP-001-R and LHAAP-003-R is protection of human health and safety from explosive hazards that may have remained at the sites after the MEC removal action. The duration for the LUCs specified in the MEC ROD for this purpose must remain in place until it is demonstrated that the MEC no longer presents a threat to public/human safety.

This section describes the LUC RD/RAC for LHAAP-001-R and LHAAP-003-R. Per the Final ROD, the LUCs' performance objectives are to:

- Prohibit the development and use of the property for residential housing, elementary and secondary schools, child care facilities, and playgrounds.
- Restrict land use to nonresidential
- Prohibit intrusive activities such as digging or any other activity which could result in explosive safety risk.
- Maintain existing MEC warning signs at the perimeter of each site to physically demarcate controlled areas.

The implementation, maintenance, and inspection requirements associated with each of the performance objectives that comprise this LUC RD/RAC are described below. The actions taken to implement the LUC objectives during the remedial action phase, as well as ongoing maintenance, monitoring, and reporting requirements are presented in Section 3.1 below. Upon regulatory review and concurrence with the final LUC RD/RACR, it will be distributed as part of the Comprehensive LUC Management Plan.

For portions of LHAAP-001-R and LHAAP-003-R subject to LUCs that are not owned by the Army, the Army will monitor and report on the implementation, maintenance, and enforcement of LUCs, and coordinate with federal, state, and local governments and owners and occupants of properties subject to LUCs. The Army remains responsible for ensuring that the remedy remains protective of human health and safety.

#### 3.1 LUC Implementation (Completed)

The actions required to implement the LUCs for LHAAP-001-R and LHAAP-003-R are described below. An initial notice of LUCs, was completed on December 8, 2016 (**Attachments 1 and 2**), within 90 days of ROD signature as required. The notice of LUCs including the final LUC boundary maps and description of the LUCs were completed on May 9, 2018 (**Attachments 3 and 4**). The preliminary LUC boundaries presented in the initial notice are considered the final LUC boundaries presented in the notice of final LUCs and are presented on **Figure 1-2**. The following actions were undertaken to implement LUCs for LHAAP-001-R and LHAAP-003-R:

## RD LHAAP-001-R-01 AND LHAAP-003-R-01

### LONGHORN ARMY AMMUNITION PLANT

- Finalize the boundaries of the LUCs as part of the remedial action (completed). The preliminary LUC boundaries are considered the final LUC boundaries, as referenced on **Figure 1-2**.
- Survey the LUC boundaries (completed). The boundaries were finalized based on USEPA and TCEQ concurrence, and the LUC boundaries were surveyed by a State of Texas licensed surveyor. A legal description of the surveyed area accompanies the survey plat.
- Record the LUCs in Harrison County. The LUC plats and legal descriptions and LUC restriction language was recorded in the Harrison County Courthouse in accordance with Title 30 TAC §335.566 on April 19, 2018 (**Appendix C**).
- Provide notice of LUCs with finalization of the RD/RACR (completed).
  - Prepare the notice of land use restrictions including prohibiting development/use for residential housing, elementary and secondary schools, child care facilities and play grounds; prohibit intrusive activities, and maintenance of existing MEC warning signs along the perimeter of each site to physically demarcate controlled areas. The notice consists of a brief description of the LUCs and a figure depicting the LUC boundaries.
  - Transmit the notice to federal, state, and local governments involved at LHAAP-001-R and LHAAP-003-R and owners and occupants of the property subject to restrictions and LUCs. The notices have been sent to federal, state, and local officials including: State Representatives, the Harrison County Judge, Harrison County Historical Courthouse, the City of Uncertain Mayor, and Caddo Lake and Leigh Water Supply Corporations' Presidents. Notice has also been sent to the Caddo Lake National Wildlife Refuge Manager, as a representative of the USFWS, the future transferee of the property.

## 3.2 Maintenance and Monitoring

Components of the final remedy at LHAAP-001-R and LHAAP-003-R require repair and maintenance and those activities are described in this section, along with other routine maintenance activities. The following subsections present the maintenance and monitoring requirements of the final remedy.

### 3.2.1 Maintenance of Existing MEC Warning Signs

MEC warning signs have been installed at the perimeter of LHAAP-001-R and LHAAP-003-R (64 signs at each site), that serve as a physical demarcation of the controlled areas. The signs have visibility from one sign to the next with a maximum spacing of 100 feet. The signs include warning of potential presence of MEC and state the restriction against intrusive activities.

These signs will be visually inspected annually, or as needed, to ensure they remain intact, undamaged, and visible from one sign to the next. Maintenance will be conducted, as needed, and may include the following activities:

- Mowing and brush clearing around MEC warning signs to ensure that they are visible from one sign location to the next sign location.
- Rehanging/affixing MEC warning signs or replacing MEC warning sign(s), if they become damaged or illegible. Figure 3-1 presents an example of the Unexploded Ordnance (UXO) Danger signs that are required. The specifications for sign replacement are found in Appendix N of the MEC Removal Action report (EODT, 2009).
- Repairing existing MEC warning sign posts, which may require the reestablishment of the concrete base or post replacement.

The Inspection and Maintenance Checklist is provided in **Appendix A**. Repairs will also be documented via photographs and field notes.

### **3.2.2 Administrative Maintenance**

Administrative maintenance required to ensure LUCs remain in place and effective include:

- Annual field inspections of LHAAP-001-R and LHAAP-003-R to confirm that no violations of the LUCs have occurred. Documentation of the inspection will be included on the Inspection and Maintenance Checklist (see **Appendix A**).
- Annual certifications that no LUC-restricted activities have been authorized and that LHAAP-001-R and LHAAP-003-R conditions and use are consistent with the LUCs. The Annual LUC Compliance Certification Form is presented in **Appendix B**.
- Periodic transmittal of a LUC Notice to federal, State, and local authorities and to owners and occupants of LHAAP-001-R and LHAAP-003-R. The notice will include the land use restrictions referenced in the ROD, a written description of the LUCs, and a figure depicting the LUC boundaries. The transmittal will coincide with each Five Year Review and will be documented in the report.
- The final LUC RD/RACR will be added to the Comprehensive LUC Management Plan and the plan will be provided to the owner or occupant of LHAAP-001-R and LHAAP-003-R. This update to the Comprehensive LUC Management Plan will be completed during the next annual update, which will be in the fourth quarter of 2018.

The U.S. Army will address LUC problems within its control that are likely to impact remedy integrity and shall address problems as soon as practicable.

### **3.3 Reporting of LUC Inspection and Monitoring**

Beginning with finalization of this RD/RACR and approval of the Inspection and Maintenance forms and the Annual Certification Form, the U.S. Army will undertake inspections and certify continued compliance with the LUC objectives. The U.S. Army, or the transferee after transfer, will retain the LUC Inspection and Certification documents in the project files for incorporation into the Five Year Review reports, and these documents will be made available to USEPA and TCEQ upon request. In addition, should any violations be found during the certification, the U.S. Army will provide to USEPA and TCEQ, along with the document, a separate written explanation indicating the specific violations found and what efforts or measures have or will be taken to correct those violations. The need to continue inspections and certifications will be revisited during each Five Year Review.

#### **3.3.1 Notice of Planned Property Conveyances**

Upon transfer of Army-owned property, the Army will provide written notice of the LUCs to the transferee of the potential presence of MEC and any land use restrictions referenced in the ROD. Within 15 days of transfer, the U.S. Army will provide written notice to USEPA and TCEQ of the division of implementation, maintenance, and enforcement responsibilities unless such information has already been provided in the LUC RD/RACR. The notice will describe the mechanism by which the LUC will continue to be implemented, maintained, inspected, reported, and enforced. Upon transfer, such responsibilities may shift to the transferee via appropriate provisions placed in the Environmental Condition of Property (ECP) or other environmental document for transfer. Although the U.S. Army may transfer responsibility for various implementation actions, the U.S. Army will also retain ultimate responsibility for the remedy integrity. This means that the U.S. Army is responsible for addressing substantive violations of the LUC performance objectives that would undermine the U.S. Army's CERCLA remedy. The U.S. Army also will be responsible for incorporating RD information and outlining the transferee's LUC obligations into property transfer documentation. In the event property is transferred out of Federal control, the LUCs relating to property restrictions shall be recorded in the deed and shall be enforceable by the U.S. and the state of Texas.

#### **3.3.2 Opportunity to Review Text of Intended LUCs**

The U.S. Army provided a copy of the land use restriction notification to TCEQ for review and approval prior to its recordation in Harrison County. The USEPA also received a copy for review. The U.S. Army will produce an ECP or other environmental document for transfer of LHAAP-001-R and LHAAP-003-R, but before executing transfer, the U.S. Army will provide the USEPA and TCEQ with a copy of the ECP or other environmental document for transfer so that they may have reasonable opportunity, before transfer, to review all LUC-related provisions.

### **3.3.3 Notification Should Action(s) which Interfere with LUC Effectiveness be Discovered Subsequent to Conveyance**

Should the U.S. Army discover, after conveyance of the site, any activity on the property inconsistent with the LUC performance objectives, the U.S. Army shall notify the USEPA and TCEQ within 72 hours of such discovery. Consistent with Section 4.3.4 below, the U.S. Army will then work with the USEPA, TCEQ, and the transferee to correct the problem(s) discovered. This reporting requirement does not preclude the U.S. Army from taking immediate action pursuant to its CERCLA authorities to prevent any perceived risk(s) to human health and safety.

### **3.3.4 LUC Enforcement**

Should the LUC remedy reflected in this LUC RD/RACR fail, the U.S. Army will coordinate with the USEPA and TCEQ to ensure that appropriate actions are taken to reestablish its protectiveness. These actions may range from informal resolutions with the USFWS or its lessee, to the institution of judicial action against non-federal third parties. Alternatively, should the circumstances warrant such, the U.S. Army could choose to exercise its response authorities under CERCLA. Should the U.S. Army become aware that any future owner or user of the property has violated any LUC requirement over which a local agency may have independent jurisdiction, the U.S. Army may notify those agencies of such violation(s) and work cooperatively with them to re-achieve owner/user compliance with the LUC.

### **3.3.5 Modification or Termination of LUCs**

The LUCs shall remain in effect until such time as the U.S. Army and USEPA agree that it has been demonstrated that MEC no longer presents a threat to public/human safety, allowing unrestricted property use. When this occurs, the LUCs will be terminated, as needed. The decision to terminate the LUC will be documented consistent with the National Contingency Plan (NCP) process for post-ROD changes, potentially including an explanation of significant differences or a RACR. If the property has been transferred and a determination by the U.S. Army and USEPA has been made to terminate the LUC, the U.S. Army shall provide to the owner of the property an appropriate release for recordation pertaining to the site and will also timely advise other local stakeholders of the action.



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LONGHORN ARMY AMMUNITION PLANT

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EODT. July 2008. *Final Work Plan for MEC Removal Action at the Former LHAAP LHAAP-001-R (Site 27) and LHAAP-003-R (Site 54) Karnack, Texas*

EODT. September 2009. *Final Site Specific Report for the MEC Removal Action at the Former Longhorn Army Ammunition Plant, LHAAP-001-R (Site 27) and LHAAP-003-R (Site 54), Karnack, Texas.*

National Wildlife Refuge System Administration Act of 1966, Section 668dd.

STEP. April 2005. *Plant-wide Perchlorate Investigation, Longhorn Army Ammunition Plant, Karnack, Texas.*

TCEQ. March 2017. *Texas Risk Reduction Tier 1 Protective Concentration Levels.*

USACE Tulsa District. January 1998. *Record of Decision at Group 1 Sites (Sites 11, 1, XX, 27), Longhorn Ammunition Plant, Karnack, Texas.*

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U.S. Army. April 2004. *Memorandum of Agreement Between the Department of the Army and the Department of the Interior for the Interagency Transfer of Lands at the Longhorn Army Ammunition Plant for the Caddo Lake National Wildlife Refuge, Harrison County, Texas.* Signed by the Department of the Interior on April 27, 2004, and the Army on April 29, 2004.

USEPA. June 11, 2010. *Munitions Constituents Data Summary Report, Longhorn Army Ammunition Plant, Karnack, Texas.* Letter from Stephen Tzhone, Remedial Project Manager of USEPA Region 6 Superfund Division to Rose M. Zeiler, Longhorn Army Ammunition Plant Site Manager.

## RD LHAAP-001-R-01 AND LHAAP-003-R-01

### LONGHORN ARMY AMMUNITION PLANT

U.S. Fish and Wildlife Service (USFWS). November 2003. *Contaminant Investigation of Northern, Central, and Eastern Portions of Caddo Lake National Wildlife Refuge, Texas.*

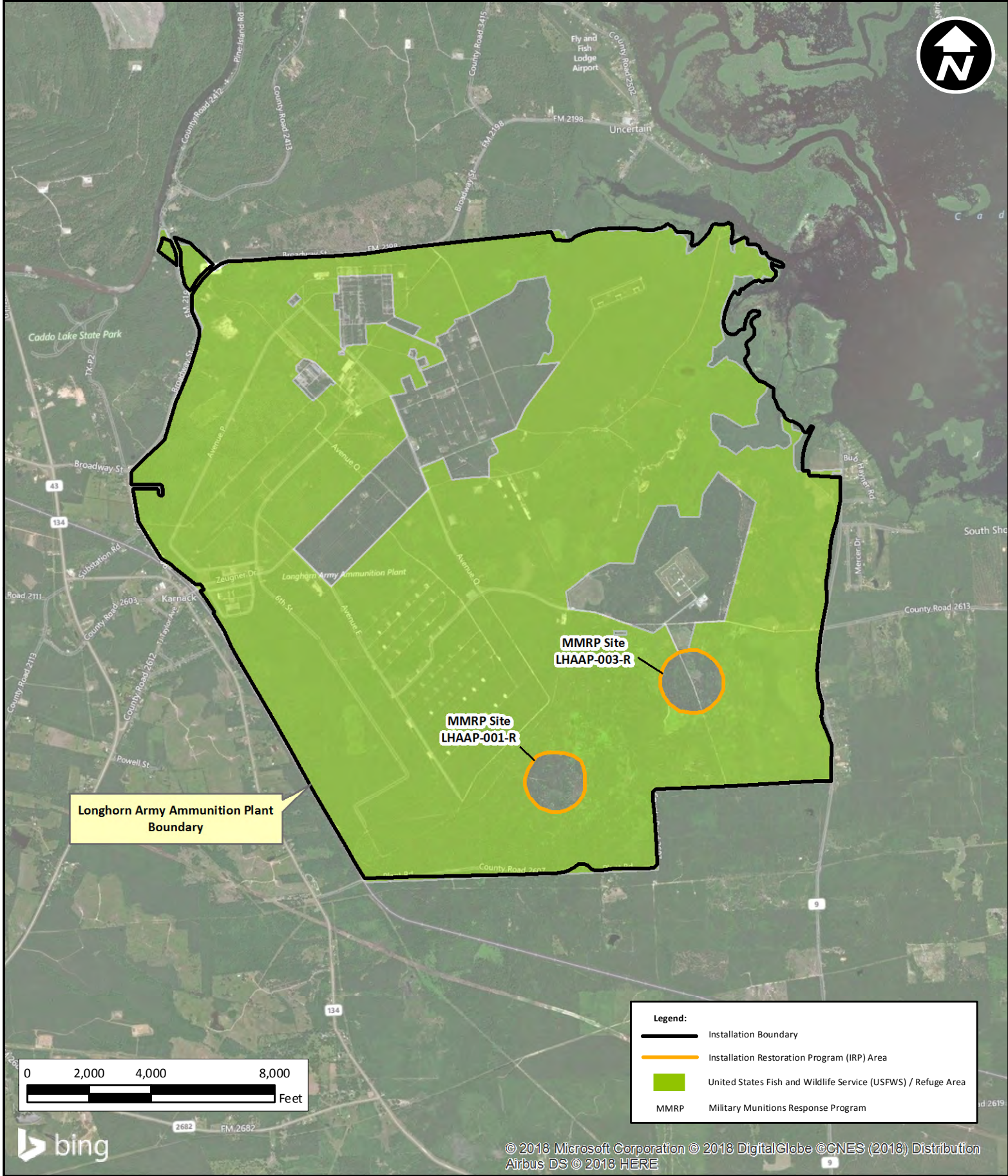
## FIGURES

RD LHAAP-001-R-01 AND LHAAP-003-R-01

LONGHORN ARMY AMMUNITION PLANT

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LHAAP Site Map

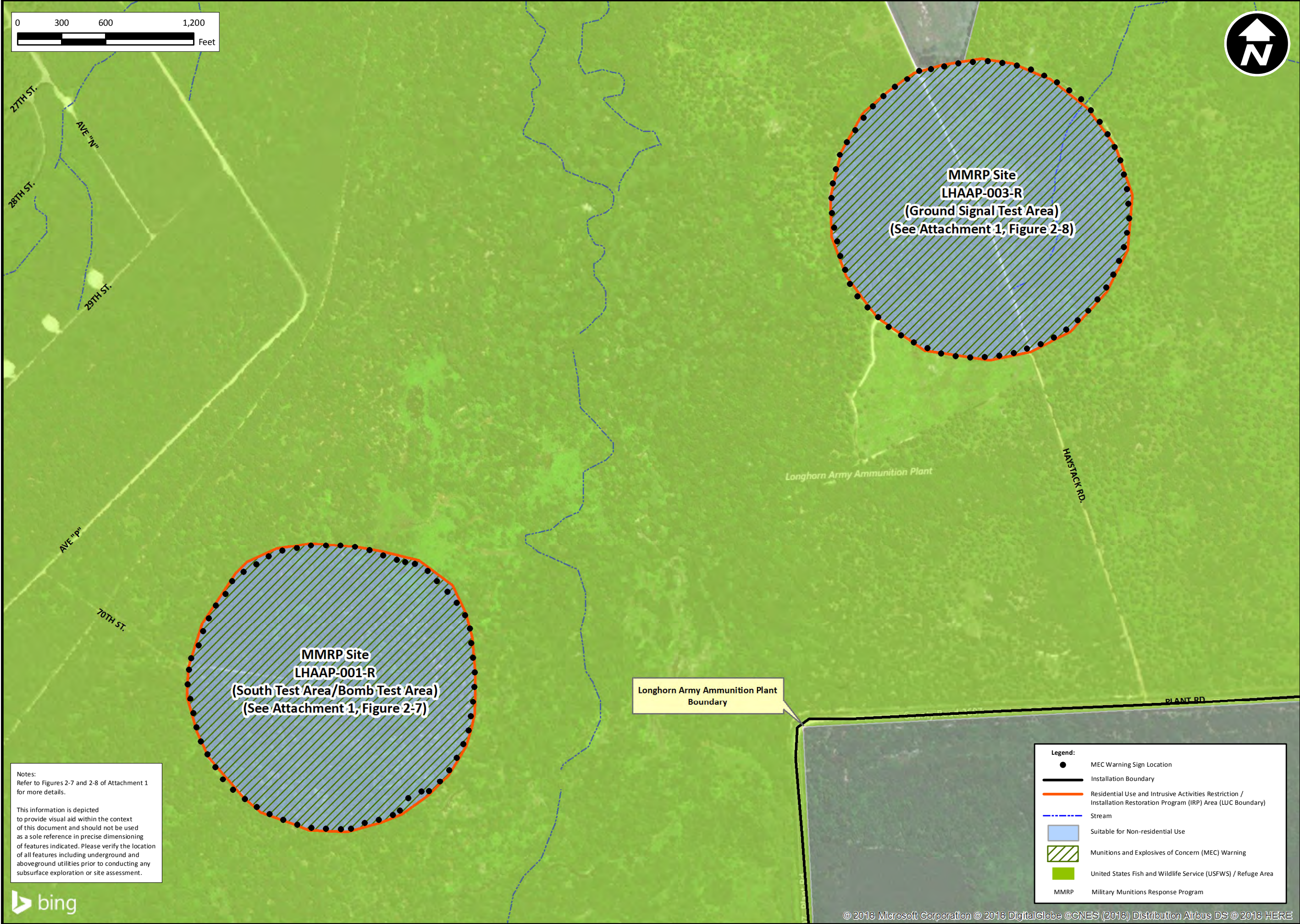
Remedial Design LHAAP-001-R and LHAAP-003-R Group 4  
Longhorn Army Ammunition Plant  
Karnack, Texas



Figure 1-1

PROJECT NO:	SCALE:	DATE:	DRAWN BY:
NW01312.0150	As Shown	1/30/2018	MRM





LHAAP-001-R and LHAAP-003-R  
Site Location Map with LUC Boundaries

Remedial Design LHAAP-001-R and LHAAP-003-R Group 4  
Longhorn Army Ammunition Plant  
Karnack, Texas

PROJECT NO:  
NWO1312.0150

SCALE:  
As Shown

DATE:  
1/31/2018

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bhate  
ENVIRONMENT &  
INFRASTRUCTURE

Figure 1-2

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## **ATTACHMENTS**



**ATTACHMENT 1**

**INITIAL NOTICE OF LAND USE CONTROLS INCLUDING 2008 LUC  
BOUNDARY MAPS FOR LHAAP-001-R AND LHAAP-003-R**



## **Initial Notice of Land Use Controls**

### **LHAAP-001-R, South Test Area/South Bomb Area and LHAAP-003-R, Ground Signal Test Area Longhorn Army Ammunition Plant, Karnack Texas**

The former Longhorn Army Ammunition Plant (LHAAP) is an inactive government-owned, formerly contractor-operated and maintained Department of Defense facility located in central east Texas in the northeast corner of Harrison County. LHAAP is approximately 14 miles northeast of Marshall, Texas. The facility is approximately 40 miles west of Shreveport, Louisiana. The former U.S. Army installation occupied nearly 8,416 acres between State Highway 43 at Karnack, Texas, and the southwestern shore of Caddo Lake and is accessed by State Highways 43 and 134.

LHAAP was placed on the National Priorities List (NPL) on August 9, 1990. Activities to remediate contamination began in 1990. After its listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission (currently known as the TCEQ) entered into a CERCLA Section 120 Federal Facilities Agreement (FFA) for remedial activities at LHAAP. The FFA became effective December 30, 1991. LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army Armament, Munitions, and Chemical Command as excess property.

The sites addressed in this Initial Notice of Land Use Controls are LHAAP-001-R and LHAAP-003-R, which are shown on the attached Figures and discussed below.

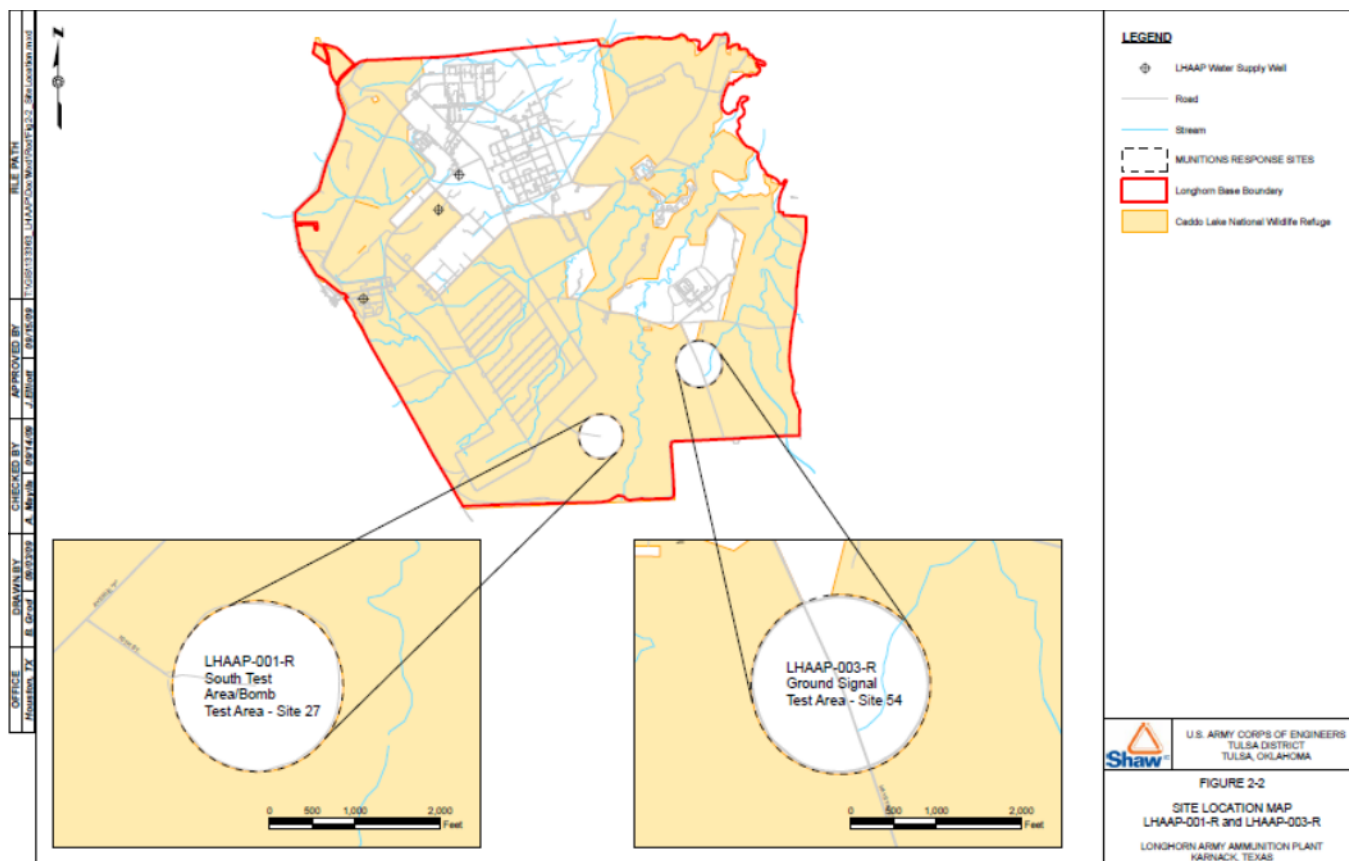
Land Use Controls (LUCs) are applied at LHAAP-001-R and LHAAP-003-R as part of the final remedy in accordance with the Record of Decision signed September 13, 2016. LUCs are necessary to promote ongoing protection of human safety against potential explosive hazards that may remain at the MMRP sites. The performance objectives are to prohibit the development and use of the property for residential housing, elementary and secondary schools, and child care facilities and playgrounds, and to prohibit intrusive activities such as digging or any other activity which could result in explosive safety risks.

#### **Land Use Controls**

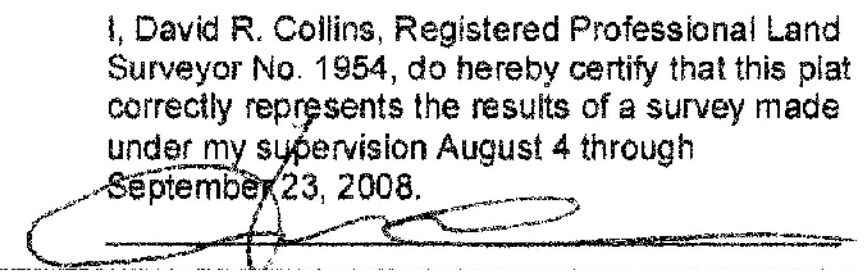
- The LUC to prohibit residential land use will remain in place until it is demonstrated that the MEC no longer presents a threat to public/human safety.
- The LUC restricting land use to nonresidential will remain in place until it is demonstrated that the MEC no longer presents a threat to public/human safety.
- A LUC to prohibit intrusive subsurface activities, including digging, will remain in place until it is demonstrated that the MEC no longer present an explosive hazard. However, intrusive subsurface activities may occur provided that the Army and the EPA approve such intrusive subsurface activities before they are commenced and provided that they are undertaken by qualified personnel who are trained in explosives safety measures.

Further information may be found in the Administrative Record at the Marshall Public Library, at website [www.longhornaap.com](http://www.longhornaap.com) or by contacting Rose M. Zeiler (479-635-0110 or [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil)).

LHAAP-001-R, South Test Area/South Bomb Area and  
LHAAP-003-R, Ground Signal Test Area  
Longhorn Army Ammunition Plant, Karnack Texas



**LHAAP-001-R, South Test Area/South Bomb Area  
Longhorn Army Ammunition Plant, Karnack, Texas**



Principal of the firm: \_\_\_\_\_

SUXOS: \_\_\_\_\_

Initial Notice of Land Use Controls  
LHAAP-003-R, Ground Signal Test Area  
Longhorn Army Ammunition Plant, Karnack, Texas

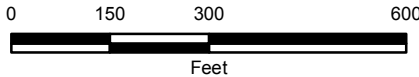
Boundary of nonresidential use  
restriction and restriction against  
intrusive activities



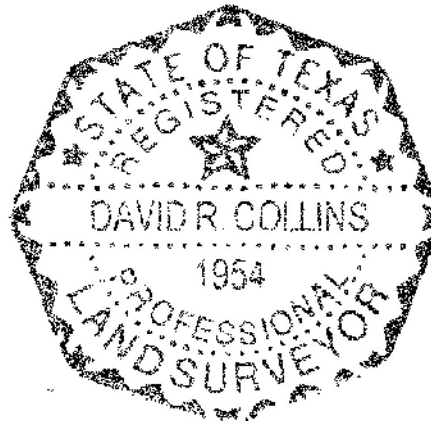
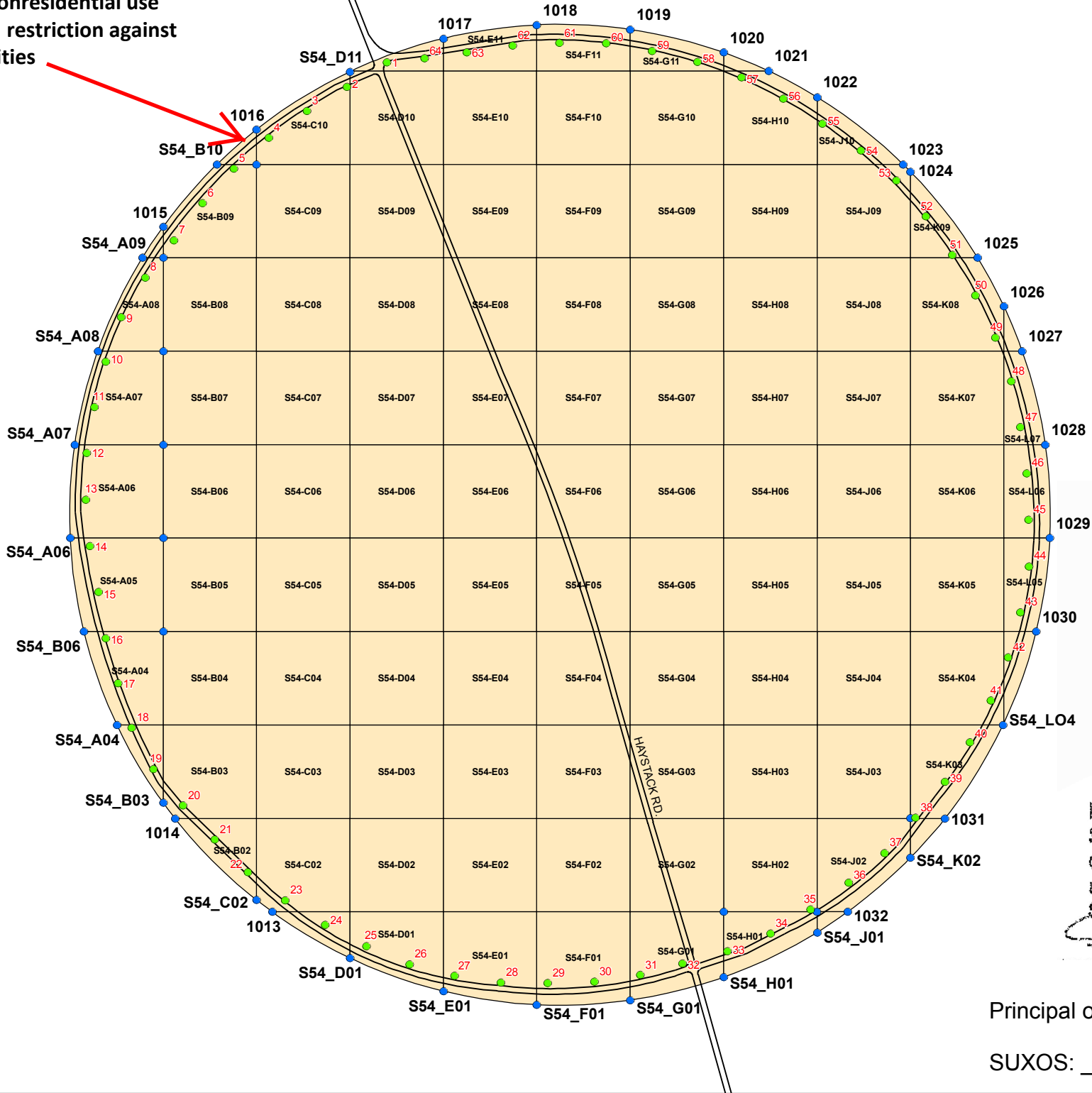
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SIGN 13	3613894.1	394947	1017	395180.3	3614195.0
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SIGN 19	3613718.3	394991.2	1023	395480.2	3614112.9
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SIGN 21	3613672.4	395031.1	1026	395546.1	3614020.2
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SIGN 26	3613591	395158.1	1031	395507.7	3613686.2
SIGN 27	3613583.5	395187.6	1032	395444.2	3613625.2
SIGN 28	3613579.1	395217.8	S54_A04	394967.3	3613747.1
SIGN 29	3613578.7	395248.2	S54_A06	394936.8	3613869.1
SIGN 3	3614147.8	395091.2	S54_A07	394939.8	3613930.0
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SIGN 6	3614087.5	395022.9			
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SIGN 8	3614039.1	394985.8			
SIGN 9	3614013.1	394969.9			

Legend

- UXO Signs
- Boundary Stakes
- Roads
- Investigated Grids



Datum: NAD83 UTM  
Monument: Longhorn Army Ammunition Plant  
Monument BG-1 with coordinates  
NORTHING-3614801.46,  
EASTING-395385.09



I, David R. Collins, Registered Professional Land  
Surveyor No. 1954, do hereby certify that this plat  
correctly represents the results of a survey made  
under my supervision August 4 through  
September 28, 2008.

Principal of the firm: \_\_\_\_\_

SUXOS: \_\_\_\_\_



## **ATTACHMENT 2**

### **INITIAL NOTICE OF LAND USE CONTROLS FOR FOUR ENVIRONMENTAL SITES AT LONGHORN ARMY AMMUNITION PLANT (LHAAP), KARNACK, TEXAS TRANSMITTAL LETTERS**





December 8, 2016

DAIM-ODB-LO

Senator Ted Cruz  
305 S. Broadway, Suite 501  
Tyler, TX 75702

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

The final Records of Decision (RODs) for four sites at LHAAP were signed on September 13, 2016. The four sites are: LHAAP-16 Landfill; LHAAP-17 Burning Ground No. 2/Flashing Area Group 2; LHAAP-001-R South Test Area/South Bomb Area; and, LHAAP-003-R Ground Signal Test Area.

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The point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil).

Sincerely,

A handwritten signature in black ink, reading "Rose M. Zeiler", is positioned below the "Sincerely," text.

Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Three Enclosures  
Copies furnished:  
R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Senator John Cornyn  
517 Hart Senate Office Bldg.  
Washington, DC 20510

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Congressman Louie Gohmert  
Congressional District 1  
1121 ESE Loop 323, Ste 206  
Tyler, TX 75701

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Senator Kevin Eltife  
P.O. Box 12068  
Capitol Station  
Austin, Texas 78711

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Representative Chris Paddie  
Room E2.412  
P.O. Box 2910  
Austin, TX 78768

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Hugh Taylor - Harrison County Judge  
Harrison County Historical Courthouse  
#1 Peter Whetstone Square, Room 314  
Marshall, TX 75670

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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D. Richmann (Administrative Record)





December 8, 2016

DAIM-ODB-LO

William Hatfield  
Harrison County Historical Courthouse  
#1 Peter Whetstone Square, Room 307  
Marshall, TX 75670

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Sam Canup  
P.O Box 277  
Uncertain, TX 75661

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Erik Duerkop  
USFWS - Caddo Lake NWR  
15600 State Hwy 134  
National Wildlife Refuge  
Karnack, Texas 75661

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Carl Shelton – President  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Paul Fortune – Vice President  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Jim McCutchens – Secretary/Treasurer  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Chris Miller  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Joe Stephens  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)





December 8, 2016

DAIM-ODB-LO

Octavia Polk  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Rick Sims  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Brenda Walker  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Terry Britt – President  
Caddo Lake Water Supply Corporation Board of Directors  
159 Easy St.  
Karnack, TX 75661

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Robert Wall – Vice-President  
Caddo Lake Water Supply Corporation Board of Directors  
2153 Dorrough Rd.  
Karnack, TX 75661

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Longhorn AAP Site Manager

Three Enclosures  
Copies furnished:  
R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
D. Richmann (Administrative Record)



December 8, 2016

DAIM-ODB-LO

Joe Oliphant – Secretary Treasurer  
Caddo Lake Water Supply Corporation Board of Directors  
2451 Blairs Landing Rd.  
Karnack, TX 75661

Re: Initial Notice of Land Use Controls for four environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

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December 8, 2016

DAIM-ODB-LO

Billy Wall  
Caddo Lake Water Supply Corporation Board of Directors  
2149 Dorrough Rd.  
Karnack, TX 75661

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December 8, 2016

DAIM-ODB-LO

David Smith  
Caddo Lake Water Supply Corporation Board of Directors  
449 Cypress Drive  
Uncertain, TX 75661

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December 8, 2016

DAIM-ODB-LO

Jay Webb  
Caddo Lake Water Supply Corporation Board of Directors  
1027 Cypress Dr.  
Uncertain, TX 75661

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December 8, 2016

DAIM-ODB-LO

Ernest Knott  
Caddo Lake Water Supply Corporation Board of Directors  
195 Mossy Brake Rd.  
Uncertain, TX 75661

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December 8, 2016

DAIM-ODB-LO

Gary Kempf  
Caddo Lake Water Supply Corporation Board of Directors  
2249 Blairs Landing Rd.  
Karnack, TX 75661

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December 8, 2016

DAIM-ODB-LO

Russell Wright  
Caddo Lake Water Supply Corporation Board of Directors  
3057 Dorrough Rd.  
Karnack, TX 75661

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**ATTACHMENT 3**

**NOTICE OF LAND USE CONTROLS INCLUDING FINAL LUC BOUNDARY MAPS  
FOR LHAAP-001-R AND LHAAP-003-R**



## **Notice of Land Use Controls**

### **LHAAP-001-R, South Test Area/South Bomb Area and LHAAP-003-R, Ground Signal Test Area Longhorn Army Ammunition Plant, Karnack Texas**

The former Longhorn Army Ammunition Plant (LHAAP) is an inactive government-owned, formerly contractor-operated and maintained Department of Defense facility located in central east Texas in the northeast corner of Harrison County. LHAAP is approximately 14 miles northeast of Marshall, Texas. The facility is approximately 40 miles west of Shreveport, Louisiana. The former U.S. Army installation occupied nearly 8,416 acres between State Highway 43 at Karnack, Texas, and the southwestern shore of Caddo Lake and is accessed by State Highways 43 and 134.

LHAAP was placed on the National Priorities List (NPL) on August 9, 1990. Activities to remediate contamination began in 1990. After its listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission (currently known as the TCEQ) entered into a CERCLA Section 120 Federal Facilities Agreement (FFA) for remedial activities at LHAAP. The FFA became effective December 30, 1991. LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army Armament, Munitions, and Chemical Command as excess property.

The sites addressed in this Notice of Land Use Controls are LHAAP-001-R and LHAAP-003-R, which are shown on the attached Figures and discussed below.

Land Use Controls (LUCs) are applied at LHAAP-001-R and LHAAP-003-R as part of the final remedy in accordance with the Record of Decision signed September 13, 2016. LUCs are necessary to promote ongoing protection of human safety against potential explosive hazards that may remain at the MMRP sites. The performance objectives are to prohibit the development and use of the property for residential housing, elementary and secondary schools, and child care facilities and playgrounds, and to prohibit intrusive activities such as digging or any other activity which could result in explosive safety risks.

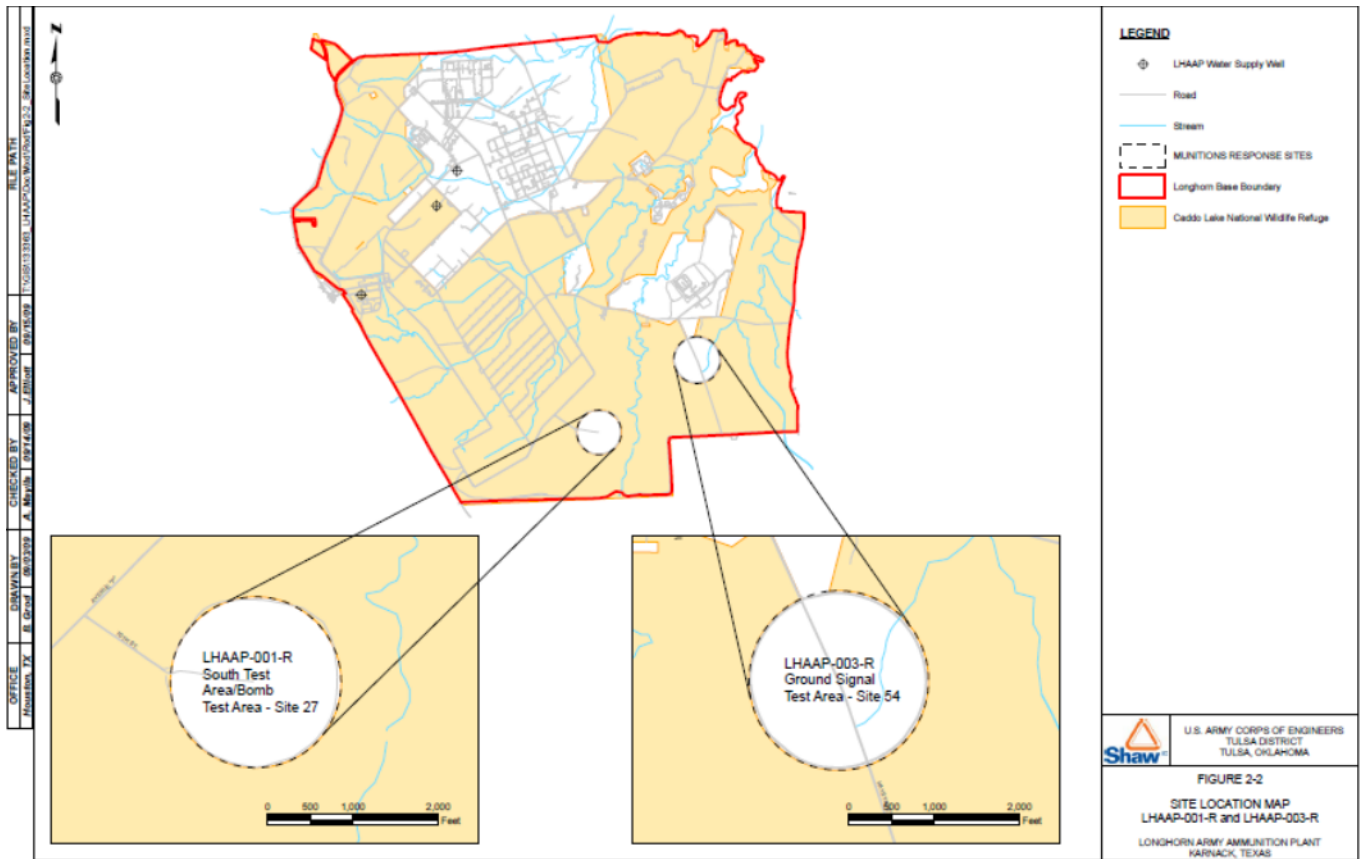
#### **Land Use Controls**

- The LUC to prohibit residential land use will remain in place until it is demonstrated that the MEC no longer presents a threat to public/human safety.
- The LUC restricting land use to nonresidential will remain in place until it is demonstrated that the MEC no longer presents a threat to public/human safety.
- A LUC to prohibit intrusive subsurface activities, including digging, will remain in place until it is demonstrated that the MEC no longer present an explosive hazard. However, intrusive subsurface activities may occur provided that the Army and the EPA approve such intrusive subsurface activities before they are commenced and provided that they are undertaken by qualified personnel who are trained in explosives safety measures.

Further information may be found in the Administrative Record at the Marshall Public Library, at website [www.longhornaap.com](http://www.longhornaap.com) or by contacting Rose M. Zeiler (479-635-0110 or [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil)).

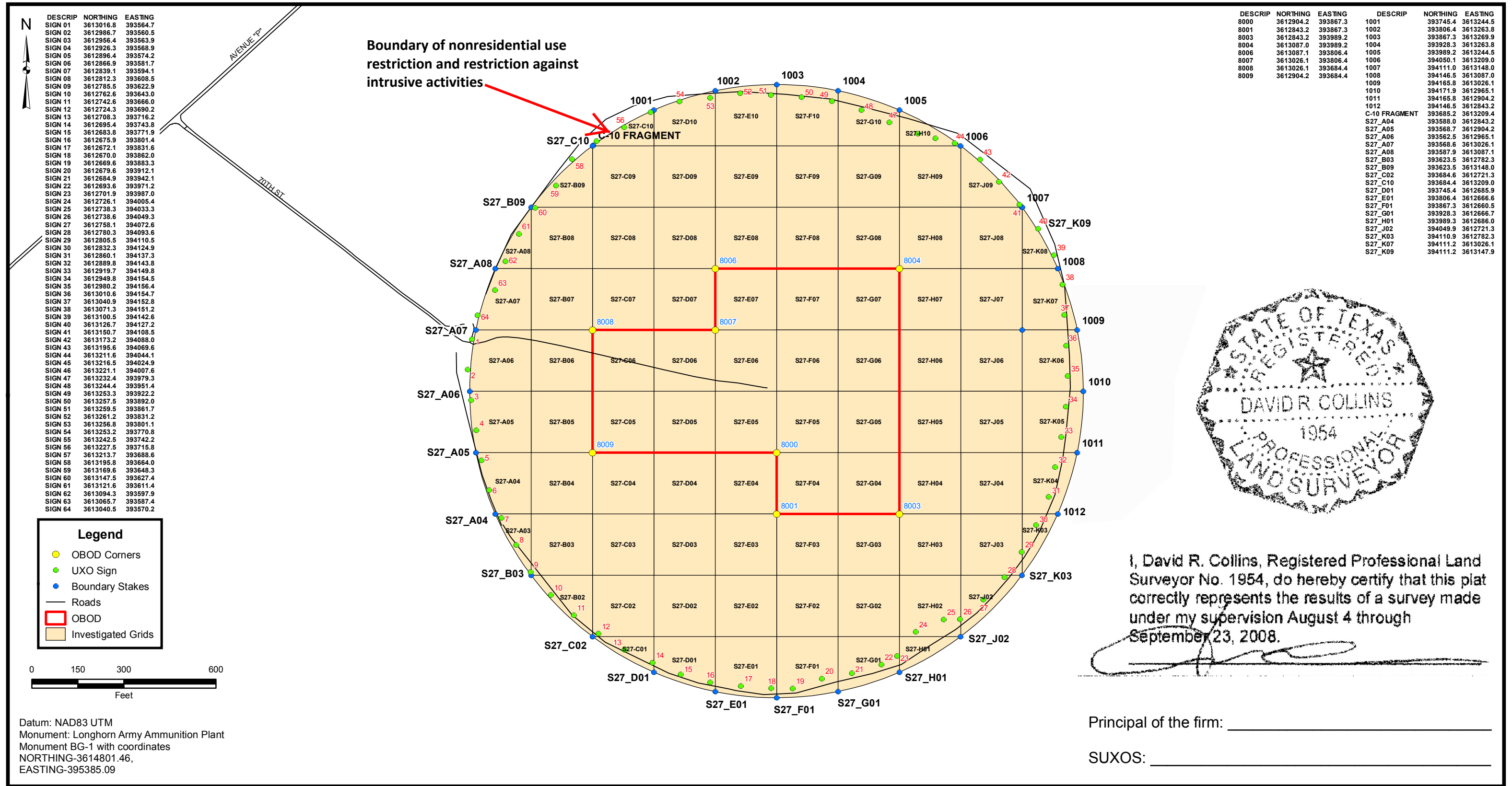
## Notice of Land Use Controls

LHAAP-001-R, South Test Area/South Bomb Area and  
LHAAP-003-R, Ground Signal Test Area  
Longhorn Army Ammunition Plant, Karnack Texas

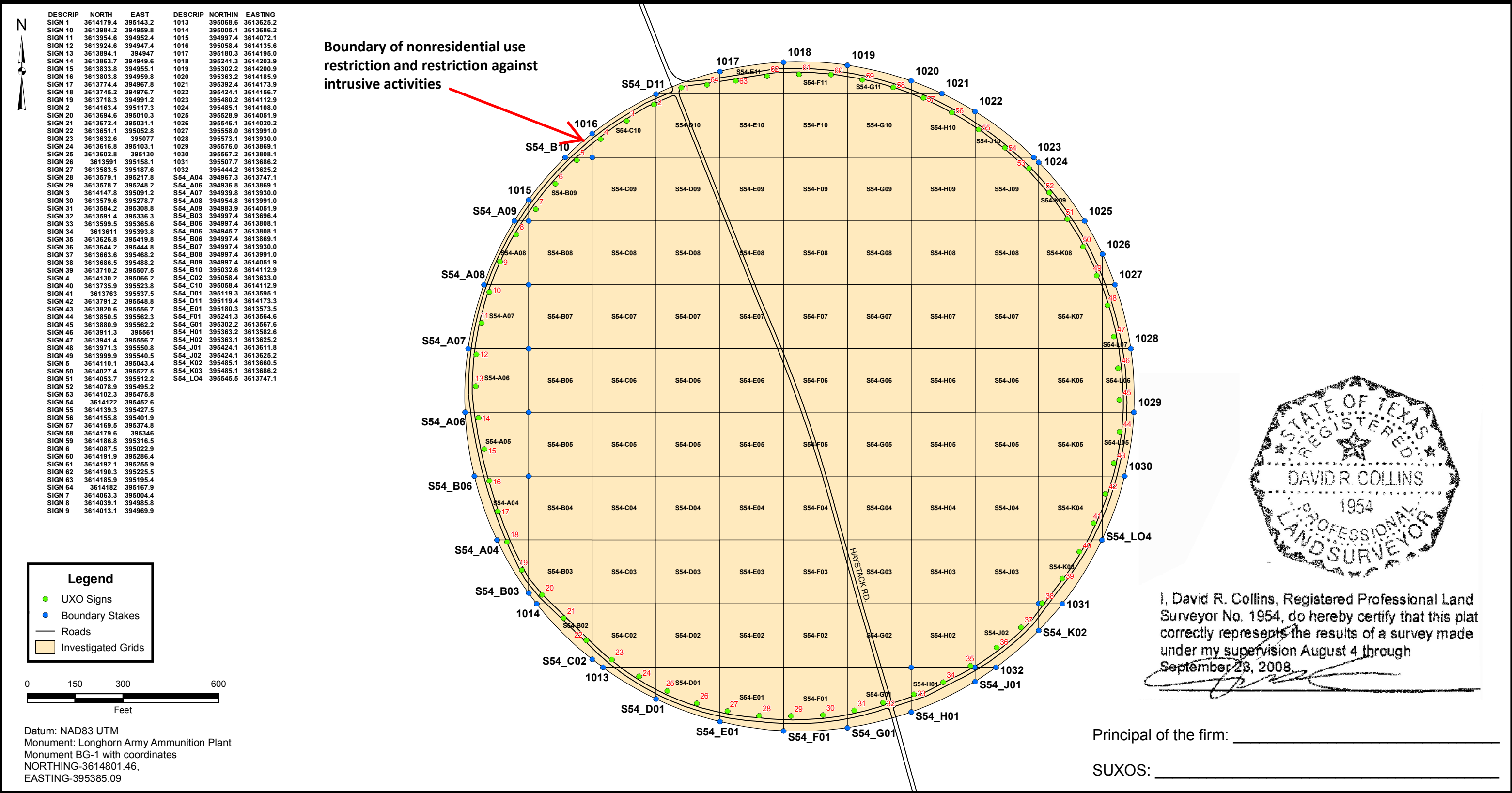




**Notice of Land Use Controls**  
**LHAAP-001-R, South Test Area/South Bomb Area**  
**Longhorn Army Ammunition Plant, Karnack, Texas**



Notice of Land Use Controls  
LHAAP-003-R, Ground Signal Test Area  
Longhorn Army Ammunition Plant, Karnack, Texas



**ATTACHMENT 4**

**NOTICE OF LAND USE CONTROLS FOR TWO ENVIRONMENTAL SITES AT  
LONGHORN ARMY AMMUNITION PLANT (LHAAP), KARNACK, TEXAS  
TRANSMITTAL LETTERS**

FINAL RD LHAAP-001-R-01 AND LHAAP-003-R-01  
LONGHORN ARMY AMMUNITION PLANT

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May 9, 2018

DAIM-ODB-LO

Senator Ted Cruz  
305 S. Broadway, Suite 501  
Tyler, TX 75702

Re: Notice of Land Use Controls for two environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

The final Land Use Control (LUC) Remedial Design (RD)/Remedial Action Construction Report (RACR) for two sites at LHAAP was completed in 2018. The two sites are: LHAAP-001-R South Test Area/South Bomb Area and LHAAP-003-R Ground Signal Test Area.

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Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Three Enclosures  
Copies furnished:  
R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
Administrative Record



May 9, 2018

DAIM-ODB-LO

Senator John Cornyn  
517 Hart Senate Office Bldg.  
Washington, DC 20510

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Ammunition Plant (LHAAP), Karnack, Texas

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May 9, 2018

DAIM-ODB-LO

Congressman Louie Gohmert  
Congressional District 1  
1121 ESE Loop 323, Ste 206  
Tyler, TX 75701

Re: Notice of Land Use Controls for two environmental sites at Longhorn Army  
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May 9, 2018

DAIM-ODB-LO

Senator Kevin Eltife  
P.O. Box 12068  
Capitol Station  
Austin, Texas 78711

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May 9, 2018

DAIM-ODB-LO

Representative Chris Paddie  
Room E2.412  
P.O. Box 2910  
Austin, TX 78768

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May 9, 2018

DAIM-ODB-LO

Hugh Taylor - Harrison County Judge  
Harrison County Historical Courthouse  
#1 Peter Whetstone Square, Room 314  
Marshall, TX 75670

Re: Notice of Land Use Controls for two environmental sites at Longhorn Army  
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May 9, 2018

DAIM-ODB-LO

William Hatfield  
Harrison County Historical Courthouse  
#1 Peter Whetstone Square, Room 307  
Marshall, TX 75670

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May 9, 2018

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Sam Canup  
P.O Box 277  
Uncertain, TX 75661

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May 9, 2018

DAIM-ODB-LO

Erik Duerkop  
USFWS - Caddo Lake NWR  
15600 State Hwy 134  
National Wildlife Refuge  
Karnack, Texas 75661

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May 9, 2018

DAIM-ODB-LO

Carl Shelton – President  
Liegh Water Supply Corporation Board of Directors  
P.O. Box 1408  
Marshall, TX 75671

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Ammunition Plant (LHAAP), Karnack, Texas

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The attached information is provided to fulfill a requirement of the LUC RD/RACR to give notice of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. The selected remedy of land use controls has been implemented at both sites. The notices are being sent to federal, state and local governments involved at these sites and the owners and occupants of the properties subject to the use restrictions and land use controls.

The point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil).

Sincerely,

A handwritten signature in cursive script, reading "Rose M. Zeiler", is positioned above the typed name.

Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Three Enclosures  
Copies furnished:  
R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
Administrative Record



May 9, 2018

DAIM-ODB-LO

Terry Britt – President  
Caddo Lake Water Supply Corporation Board of Directors  
159 Easy St.  
Karnack, TX 75661

Re: Notice of Land Use Controls for two environmental sites at Longhorn Army  
Ammunition Plant (LHAAP), Karnack, Texas

The final Land Use Control (LUC) Remedial Design (RD)/Remedial Action Construction Report (RACR) for two sites at LHAAP was completed in 2018. The two sites are: LHAAP-001-R South Test Area/South Bomb Area and LHAAP-003-R Ground Signal Test Area.

The attached information is provided to fulfill a requirement of the LUC RD/RACR to give notice of the groundwater and soil (surface and subsurface) contamination and any land use restrictions referenced in the ROD. The selected remedy of land use controls has been implemented at both sites. The notices are being sent to federal, state and local governments involved at these sites and the owners and occupants of the properties subject to the use restrictions and land use controls.

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Sincerely,

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Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Three Enclosures  
Copies furnished:  
R. Mayer, USEPA Region 6, Dallas, TX  
A. Palmie, TCEQ, Austin, TX  
Administrative Record

## **APPENDIX A**

### **LTM INSPECTION AND MAINTENANCE CHECKLIST**



RD LHAAP-001-R-01 AND LHAAP-003-R-01

LONGHORN ARMY AMMUNITION PLANT

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## LTM Inspection and Maintenance Checklist

General Information	
Project Name	LTM Inspection and Maintenance, LHAAP-001-R and LHAAP-003-R MMRP, Longhorn Army Ammunition Plant, Karnack, TX
Contractor	
Inspector's Name	
Inspector's Title	
Inspector's Signature	
Inspector's Contact Number	
Inspection Date	
Type of Inspection	<input type="checkbox"/> Quarterly <input type="checkbox"/> Semiannual <input type="checkbox"/> Annual <input type="checkbox"/> Prior to forecast rain <input type="checkbox"/> After rain event <input type="checkbox"/> Other _____

Description		Yes	No	N/A	Comments (Attach photos/location sketches)	Corrective Action (Attach photos)
<b>A. Perimeter Signage</b>						
A.1	Are there any damaged signs?					
A.2	Are there any missing signs?					
A.3	Are all signs legible?					
A.4	Is perimeter boundary mowed?					

A.5	Are signs visible from one sign to the next sign?					
<b>B. LUC Boundary</b>						
B.1	Is the LUC Boundary identifiable?					
<b>C. Dig and Intrusive Activities restriction</b>						
C.1	Any observed digging activities or similar intrusive activities within the site boundaries?					

Note: Annual compliance inspections shall be conducted no later than March 1 of each year for the previous calendar year and filed onsite.

## **APPENDIX B**

### **LAND USE CONTROL COMPLIANCE CERTIFICATION FORM**

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## LAND USE CONTROL COMPLIANCE CERTIFICATION FORM

In accordance with the LUC Plan dated \_\_\_\_\_ for LHAAP-001-R and LHAAP-003-R, an inspection of the sites was conducted by \_\_\_\_\_ on \_\_\_\_\_.

A summary of land use control mechanisms is as follows:

- Land use restrictions - restrict land use to non-residential.
- Integrity of LUC signage by ensuring signs are present, legible and have visibility from one sign to the next.

A summary of compliance with land use and restriction covenants is as follows:

- The posted signs are properly maintained at LHAAP-001-R and LHAAP-003-R.
- No digging or intrusive activities have taken place within the boundaries identified for LHAAP-001-R and LHAAP-003-R.
- No land use other than non-residential.
- Pamphlets and safety awareness video are being used to educate visitors.

I, the undersigned, do document that the inspections were performed as indicated above, and that the above information is true and correct to the best of my knowledge, information, and belief.

Date: \_\_\_\_\_

Name: \_\_\_\_\_

Signature: \_\_\_\_\_

Completed annual compliance inspections shall be conducted no later than March 1 of each year for the previous calendar year and filed on site.

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## **APPENDIX C**

### **RECORDATION OF LAND USE CONTROLS FOR LHAAP-001-R AND LHAAP-003-R**

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2018-000004040

\*\*\*DO NOT REMOVE THIS PAGE – IT IS A PART OF THIS INSTRUMENT\*\*\*

NOTICE

6 Pages

FILED AND RECORDED – OPR	CLERKS NOTES
<b>On:</b> <u>04/19/2018 02:27 PM</u>	
<b>Document Number:</b> <u>2018-000004040</u>	
<b>Receipt No:</b> <u>1804258</u>	
<b>Amount:</b> \$ <u>42.00</u>	
<b>By:</b> <u>Ann Turner</u> , Deputy	
<b>Patsy Cox, County Clerk Harrison County, Texas</b>	



STATE OF TEXAS  
COUNTY OF HARRISON

I hereby certify that this instrument was filed on the date and time stamped hereon by me  
and was duly recorded in the Official Public Records of Harrison County, Texas.

Patsy Cox, Harrison County Clerk

---

Record and Return To:



KIM NEMMERS  
4085 ASPEN LANE

EVERGREEN, CO 80439

**STATE OF TEXAS**

**HARRISON COUNTY**

**INDUSTRIAL SOLID WASTE  
NOTICE OF LAND USE CONTROLS**

**KNOW ALL MEN BY THESE PRESENTS THAT:**

Pursuant to the Rules of the Texas Commission on Environmental Quality (TCEQ) pertaining to Industrial Solid Waste Management, this document is hereby filed in the Public Records of Harrison County, Texas in compliance with the recordation requirements of said rules:

**I**

The U.S. Army, Department of Defense, has performed a removal of munitions and explosives of concern on the land described herein. Longhorn Army Ammunition Plant (LHAAP) Munition Response Sites (MRSs) LHAAP-001-R (South Test Area/Bomb Test Area) and LHAAP-003-R (Ground Signal Test Area) are former military test areas located in the southern and southeastern portions of LHAAP, respectively. LHAAP was placed on the National Priorities List (NPL) in August 1990. After its listing on the NPL, the U.S. Army, United States Environmental Protection Agency (USEPA) and the TCEQ entered into an agreement under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 for remedial activities. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991. MRSs LHAAP-001-R and LHAAP-003-R are co-located with NPL sites LHAAP-27 and LHAAP-54, respectively and are also considered NPL sites. Remedial activities at these sites were performed in accordance with the FFA requirements.

MRS LHAAP-01-R was constructed in 1954 and was used for testing photoflash bombs produced at the facility until approximately 1956. During the late 1950s, illuminating signal devices were also demilitarized within pits excavated in the vicinity of the test pad. During the 1960s, leaking production items may have been demilitarized by detonation. LHAAP-001-R was identified as an MRS based on the visual confirmation of MEC.

MRS LHAAP-003-R was used intermittently in April 1963 for aerial and on-ground testing and destruction of a variety of devices, including pyrotechnic signal devices, red phosphorus smoke wedges, infrared flares, illuminating mortar shells and cartridges, button bombs and various types of explosive simulators. The site was used intermittently over a 20-year period for testing and burn-out of rocket motors. From late 1988 through 1991, the site was used for the burn-out of Pershing missile rocket motors and, occasionally, leaking white phosphorus munitions were burned at the site as a demilitarization activity. LHAAP-003-R was identified as an MRS based on the reported presence of MEC.

Non-time critical removal actions (NTRAs) for MEC removal were conducted at both sites in 2008. A Final Record of Decision (ROD) for LHAAP-001-R and LHAAP-003-R was issued in August 2016, which documents the final selected remedy for the sites, including the implementation of Land Use Controls (LUCs) designed to promote ongoing protection of human safety against potential explosive hazards that may have remained at the sites following the MEC removal actions. The LUCs' performance objectives are to prohibit residential use, to restrict land use to non-residential, and to prohibit intrusive activities such as digging or any other activity which could result in explosive safety risks.

Further information may be found by examination of the Notice of Registration No. 30990 files, which are available for inspection upon request at TCEQ, Central File Room Customer Service Center, Building E (Room 103, first floor) 12100 Park 35 Circle, Austin, Texas 78753, (512) 239-2900, Monday through Friday 8:00 am to 5:00 pm, or the Administrative Record available at the Marshall Public Library, 300 South Alamo Boulevard, Marshall, Texas 75670, (903) 935-4465, Monday, Tuesday and Thursday 9:30AM – 7:30PM, Wednesday and Friday 9:30AM – 5:30PM, and Saturday 9:30AM – 3:30PM.

The TCEQ requires certain persons to provide recordation in the real property records to notify the public on the conditions of the land and/or the occurrence of remediation. This notification is not a representation or warranty by the TCEQ of the suitability of this land for any purpose.

## II

MRS LHAAP-001-R covers an area of approximately 72.14 acre-tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in **Exhibit A**. The entire LHAAP-001-R parcel is within a LUC boundary which is described in **Exhibit A**.

MRS LHAAP-003-R covers an area of approximately 79.53 acre-tract, more or less, located in Harrison County, Texas, near the town of Karnack, being more particularly described with survey plat and metes and bounds established in **Exhibit B**. The entire LHAAP-003-R parcel is within a LUC boundary which is described in **Exhibit B**.

The United States Department of the Army has undertaken careful environmental study of MRSs LHAAP-001-R and LHAAP-003-R and the USEPA and TCEQ concluded that LUCs should remain in place until it is demonstrated that MEC no longer presents an explosive hazard.

Future use of these sites is intended as a national wildlife refuge consistent with industrial or recreational activities and not for residential purposes. The LUCs placed on the property to ensure appropriate future use include:

(1) Use must remain non-residential as described above. For purposes of this certification, residential use includes, but is not limited to, single family or multi-family residences, child care facilities, nursing home or assisted living facilities, and any type of educational purpose for children/young adults in grades kindergarten through 12. This LUC will remain in place until it is demonstrated that the MEC no longer present a threat to human safety/health.

(2) No intrusive activity shall be permitted, which includes digging or any other activity which could result in explosive safety risks, without prior consent. This LUC will remain in place until it is demonstrated that the MEC no longer present an explosive hazard. Intrusive subsurface activities may occur provided that the Army and the EPA approve such intrusive subsurface activities before they are commenced and provided that they are undertaken by qualified personnel who are trained in explosives safety measures.

### III

The owner of these sites is the Department of the Army, and its address where more specific information may be obtained is as follows:

ATTN: DAIM-ODB-LO (R. Zeiler)  
Post office Box 220  
Ratcliff, AR 72951

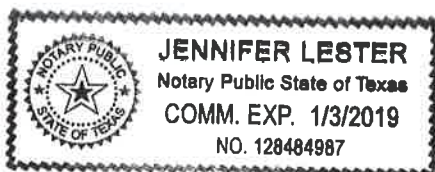
Or  
Assistant Chief of Staff for Installation Management  
ATTN: DAIM-ODB (T. Lederle)  
600 Army Pentagon  
Washington, D.C. 20310-0600

Rose M. Zeiler  
Longhorn AP Site Manager

EXECUTED this the 19<sup>th</sup> day of April, 2018.

BEFORE ME, on this 19<sup>th</sup> day of April, personally appeared Rose M. Zeiler, of the United States Army, United States Department of Defense, known to me to be the person and agent of said agency whose name is subscribed to the foregoing instrument, and she acknowledged to me that she executed the same for the purposes and in the capacity therein expressed.

GIVEN UNDER MY HAND AND SEAL OF OFFICE, this the 19<sup>th</sup> day of April, 2018.



Notary Public in and for the State of Texas,  
County of Harrison

Exhibit A  
LHAAP-001-R, South Test Area/South Bomb Area  
Longhorn Army Ammunition Plant, Karnack, Texas

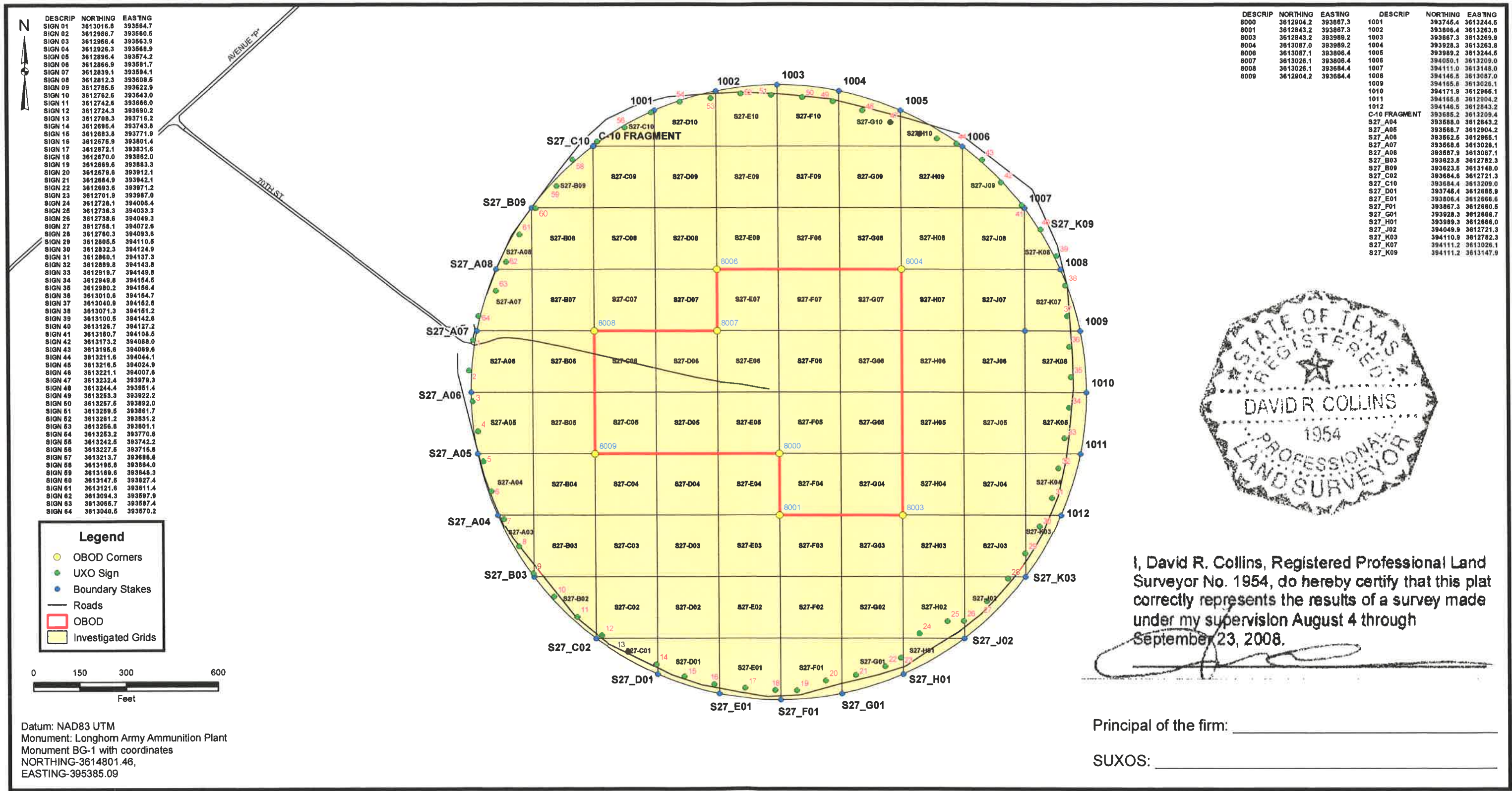




Exhibit B  
LHAAP-003-R, Ground Signal Test Area  
Longhorn Army Ammunition Plant, Karnack, Texas

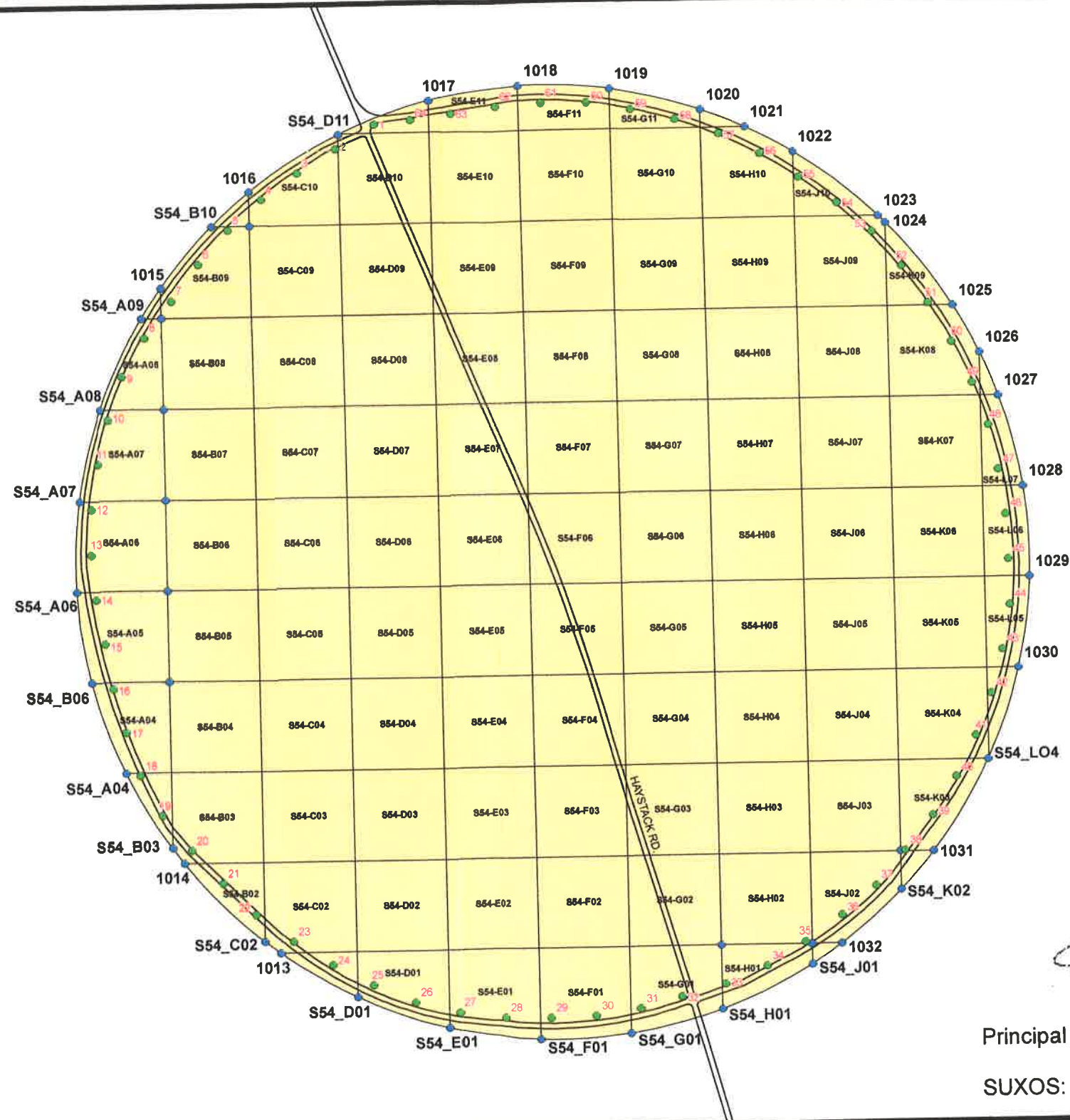
DESCRIP	NORTH	EAST	DESCRIP	NORTH	EASTING
SIGN 1	3614178.4	395143.2	1013	395068.8	3613626.2
SIGN 10	3613984.2	394959.8	1014	395005.1	3613686.2
SIGN 11	3613954.6	394952.4	1016	394997.4	3614072.1
SIGN 12	3613924.6	394947.4	1018	395058.4	3614135.6
SIGN 13	3613894.1	394947	1017	395180.3	3614195.0
SIGN 14	3613863.7	394949.6	1016	395241.3	3614203.9
SIGN 15	3613833.8	394956.1	1019	395302.2	3614200.9
SIGN 16	3613803.8	394959.8	1020	395363.2	3614195.9
SIGN 17	3613774.4	394967.8	1021	395392.4	3614173.9
SIGN 18	3613745.2	394976.7	1022	395424.1	3614156.7
SIGN 19	3613718.3	394991.2	1023	395480.2	3614112.9
SIGN 2	3614163.4	395117.3	1024	395485.1	3614108.0
SIGN 20	3613694.6	395010.3	1025	395525.9	3614051.9
SIGN 21	3613672.4	395031.1	1026	395546.1	3614020.2
SIGN 22	3613651.1	395052.8	1027	395558.0	3613991.0
SIGN 23	3613632.6	395077	1028	395573.1	3613930.0
SIGN 24	3613616.8	395103.1	1029	395579.0	3613869.1
SIGN 25	3613602.8	395130	1030	395567.2	3613808.1
SIGN 26	3613581	395158.1	1031	395507.7	3613866.2
SIGN 27	3613558.6	395187.6	1032	395444.2	3613825.2
SIGN 28	3613579.1	395217.8	S54_A04	394967.3	3613747.1
SIGN 29	3613578.7	395248.2	S54_A06	394936.8	3613889.1
SIGN 3	3614147.8	395091.2	S54_A07	394939.8	3613930.0
SIGN 30	3613679.8	395276.7	S54_A08	394954.8	3613991.0
SIGN 31	3613684.2	395308.8	S54_A09	394983.9	3614051.9
SIGN 32	3613591.4	395336.3	S54_B03	394997.4	3613998.4
SIGN 33	3613599.6	395365.6	S54_B06	394997.4	3613888.1
SIGN 34	3613611	395393.8	S54_B06	394948.7	3613805.1
SIGN 35	3613628.8	395419.8	S54_B06	394997.4	3613889.1
SIGN 36	3613644.2	395444.8	S54_B07	394997.4	3613930.0
SIGN 37	3613683.6	395488.2	S54_B08	394997.4	3613991.0
SIGN 38	3613688.6	395488.2	S54_B09	394997.4	3614081.9
SIGN 39	3613710.2	395507.8	S54_B10	395032.8	3614112.9
SIGN 4	3614130.2	395096.2	S54_C02	395088.4	3613633.0
SIGN 40	3613735.9	395023.8	S54_C10	395058.4	3614112.9
SIGN 41	3613769	395537.5	S54_D01	395119.3	3613888.1
SIGN 42	3613791.2	395648.8	S54_D11	395119.4	3614173.3
SIGN 43	3613820.6	395656.7	S54_E01	395180.3	3613673.6
SIGN 44	3613850.6	395682.3	S54_F01	395241.3	3613664.4
SIGN 45	3613880.9	395692.2	S54_G01	395302.2	3613667.8
SIGN 46	3613911.3	395691	S54_H01	395363.2	3613682.6
SIGN 47	3613941.4	395656.7	S54_H02	395363.1	3613626.2
SIGN 48	3613971.3	395580.8	S54_J01	395424.1	3613611.8
SIGN 49	3613989.9	395540.6	S54_J02	395424.1	3613626.2
SIGN 5	3614110.1	395043.4	S54_K02	395486.1	3613660.6
SIGN 50	3614027.4	395527.8	S54_K03	395485.1	3613686.2
SIGN 51	3614053.7	395512.2	S54_LO4	395485.9	3613747.1
SIGN 52	3614078.9	395495.2			
SIGN 53	3614102.5	395478.8			
SIGN 54	3614122	395482.4			
SIGN 55	3614139.3	395427.5			
SIGN 56	3614155.8	395401.9			
SIGN 57	3614169.6	395374.8			
SIGN 58	3614179.6	395346			
SIGN 59	3614186.8	395310.5			
SIGN 6	3614087.5	395022.9			
SIGN 60	3614191.9	395286.4			
SIGN 61	3614192.1	395286.9			
SIGN 62	3614190.3	395285.9			
SIGN 63	3614185.9	395195.4			
SIGN 64	3614182	395197.9			
SIGN 7	3614053.3	395004.4			
SIGN 8	3614038.1	394988.8			
SIGN 9	3614013.1	394959.9			

Legend

- UXO Signs
- Boundary Stakes
- Roads
- Investigated Grids



Datum: NAD83 UTM  
Monument: Longhorn Army Ammunition Plant  
Monument BG-1 with coordinates  
NORTHING-3614801.46,  
EASTING-395385.09



I, David R. Collins, Registered Professional Land Surveyor No. 1954, do hereby certify that this plat correctly represents the results of a survey made under my supervision August 4 through September 23, 2008.

Principal of the firm: \_\_\_\_\_  
SUXOS: \_\_\_\_\_