

**Final  
Site-Specific Field Sampling Plan,  
Site-Specific Safety and Health Plan, and Site-Specific  
Unexploded Ordnance Safety Plan Attachments,  
Former Mortar Firing Point, Parcel 105Q-X and  
Former Defendamm Range (Eastern), Parcel 225Q**

**Fort McClellan  
Calhoun County, Alabama**

**Task Order CK10  
Contract No. DACA21-96-D-0018  
IT Project No. 796887**

**April 2002**

**Final  
Site-Specific Field Sampling Plan Attachment  
Former Mortar Firing Point, Parcel 105Q-X and  
Former Defendamm Range (Eastern), Parcel 225Q**

**Fort McClellan  
Calhoun County, Alabama**

**Prepared for:**

**U.S. Army Corps of Engineers, Mobile District  
109 St. Joseph Street  
Mobile, Alabama 36602**

**Prepared by:**

**IT Corporation  
312 Directors Drive  
Knoxville, Tennessee 37923**

**Task Order CK10  
Contract No. DACA21-96-D-0018  
IT Project No. 796887**

**April 2002**

**Revision 0**

# Table of Contents

---

	<b>Page</b>
List of Tables .....	iii
List of Figures .....	iii
List of Acronyms .....	iv
Executive Summary .....	ES-1
1.0 Project Description.....	1-1
1.1 Introduction .....	1-1
1.2 Site Description .....	1-1
1.3 Scope of Work .....	1-4
2.0 Summary of Existing Environmental Studies .....	2-1
3.0 Site-Specific Data Quality Objectives .....	3-1
3.1 Overview .....	3-1
3.2 Data Users and Available Data.....	3-1
3.3 Conceptual Site Exposure Model .....	3-2
3.4 Decision-Making Process, Data Uses, and Needs .....	3-3
3.4.1 Risk Evaluation .....	3-3
3.4.2 Data Types and Quality .....	3-4
3.4.3 Precision, Accuracy, and Completeness.....	3-4
4.0 Field Activities .....	4-1
4.1 UXO Survey Requirements and Utility Clearances .....	4-1
4.1.1 Surface UXO Survey .....	4-1
4.1.2 Downhole UXO Survey .....	4-1
4.1.3 Utility Clearances.....	4-1
4.2 Environmental Sampling .....	4-2
4.2.1 Surface Soil Sampling.....	4-2
4.2.1.1 Sample Locations and Rationale .....	4-2
4.2.1.2 Sample Collection .....	4-2
4.2.2 Subsurface Soil Sampling .....	4-3
4.2.2.1 Sample Locations and Rationale .....	4-3
4.2.2.2 Sample Collection .....	4-3
4.2.3 Depositional Sampling .....	4-4
4.2.3.1 Sample Locations and Rationale .....	4-4

## **Table of Contents** (Continued)

---

	<b>Page</b>
4.2.3.2 Sample Collection .....	4-4
4.3 Decontamination Requirements .....	4-4
4.4 Surveying of Sample Locations.....	4-4
4.5 Analytical Program.....	4-5
4.6 Sample Preservation, Packaging, and Shipping .....	4-6
4.7 Investigation-Derived Waste Management .....	4-6
4.8 Site-Specific Safety and Health.....	4-6
5.0 Project Schedule.....	5-1
6.0 References .....	6-1

Attachment 1 – List of Abbreviations and Acronyms

## List of Tables

---

<b>Number</b>	<b>Title</b>	<b>Follows Page</b>
3-1	Summary of Data Quality Objectives	3-1
4-1	Sample Locations and Rationale	4-2
4-2	Surface and Subsurface Soil Sample Designations and QA/QC Sample Quantities	4-2
4-3	Depositional Soil Sample Designations and QA/QC Sample Quantities	4-4
4-4	Analytical Samples	4-5

## List of Figures

---

<b>Number</b>	<b>Title</b>	<b>Follows Page</b>
1-1	Site Location Map, Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q	1-1
1-2	Site Map, Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q	1-1
1-3	ASR Plate 5 (World War II to 1950) Range Location Map	1-2
1-4	ASR Plate 6 (1950 to 1973) Range Location Map	1-2
1-5	1940 Aerial Photograph, Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q	1-3
1-6	1949 Aerial Photograph, Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q	1-3
1-7	1961 Aerial Photograph, Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q	1-4
1-8	1976 Aerial Photograph, Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q	1-4
3-1	Human Health Conceptual Site Exposure Model	3-3
4-1	Proposed Sample Location Map, Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q	4-2

## ***List of Acronyms***

---

See Attachment 1, List of Abbreviations and Acronyms

## ***Executive Summary***

---

In accordance with Contract Number DACA21-96-D-0018, Task Order CK10, IT Corporation (IT) will conduct site investigation activities at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, at Fort McClellan (FTMC), Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at this site. The purpose of this site-specific field sampling plan is to provide technical guidance for sampling activities at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q.

Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, are located in the northeastern portion of the Main Post of FTMC. Former Defendam Range (Eastern), Parcel 225Q, occupies 2,533 acres. Former Mortar Firing Point, Parcel 105Q-X, is located just north of the firing line for Former Defendam Range (Eastern), Parcel 225Q. The area of investigation will be limited to Parcel 105Q-X and the firing line and possible impact area of Parcel 225Q (approximately 41 acres).

Parcel 105Q-X is reported by long-time FTMC personnel to be a Former Mortar Firing Point. Although Parcel 105Q-X is reported to be a mortar firing point, mortars were not observed by IT during site walks. Two weapons suspected to be 40-mm or 57-mm guns were observed just north of Parcel 105Q-X during site walks conducted by IT in January 2002. Two trenches and a berm with dug out cells were observed. Rifle blanks (suspected M-16) were noted on the floors of the cells dug into the berm.

Parcel 225Q is identified as a Former Defendam Range on the 1946 Reservation Map. The U.S. Army Corps of Engineers Archives Search Report states that the range was abandoned by 1958. According to the Environmental Baseline Survey, the dimensions of the firing line and safety fan suggest that this was a machine gun field fire range. There is no other information available regarding the exact dates of use or ordnance fired at this range.

During site walks conducted by IT in January 2002, numerous vehicle-body parts with holes and 12 items reported to be 81-mm mortars were seen in Parcel 225Q. The mortars are suspected to be practice mortars. Also observed in Parcel 225Q were a few mounds, pits, and pieces of concrete near the former firing line.

IT will collect 20 surface soil samples, 20 subsurface soil samples, and 6 depositional soil samples at this site. Potential contaminant sources at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, are primarily metals and explosives. Chemical analyses of the samples collected during the field program will include nitroaromatic/nitramine explosives and metals. In addition, 10 percent of the samples will be analyzed for volatile organic compounds, semivolatile organic compounds, chlorinated and organophosphorous pesticides, and chlorinated herbicides. Results from these analyses will be compared with site-specific screening levels, ecological screening values, and background values to determine if potential site-specific chemicals are present at the site at concentrations that pose an unacceptable risk to human health or the environment.

The potential exists for the presence of unexploded ordnance (UXO) at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, due to the presence of surrounding parcels with histories as impact areas. Therefore, prior to initiating field activities at Parcels 105Q-X and 225Q, IT will conduct UXO avoidance activities as outlined in Appendix E of the installation-wide sampling and analysis plan (SAP) and the attached site-specific UXO safety plan. Surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

This site-specific field sampling plan attachment to the SAP for Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, will be used in conjunction with the site-specific safety and health plan, the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan, monitoring well installation and maintenance plan, waste management plan, ordnance and explosives management plan, and quality assurance plan. Site-specific hazard analyses are included in the site-specific safety and health plan.

# **1.0 Project Description**

---

## **1.1 Introduction**

The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q, under Task Order CK10, Contract Number DACA21-96-D-0018.

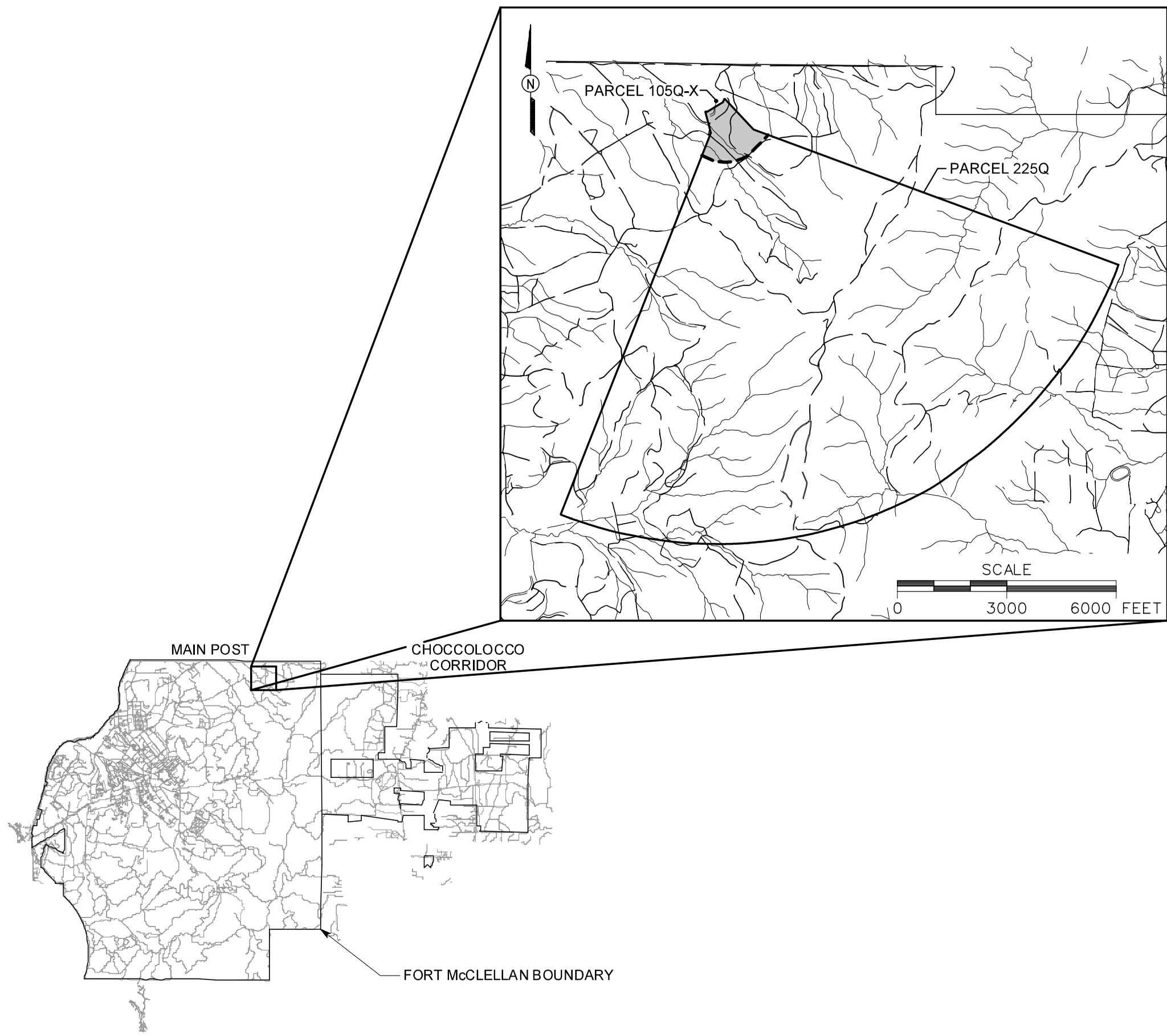
This site-specific field sampling plan (SFSP) is an attachment to the installation-wide sampling and analysis plan (SAP) for FTMC (IT, 2002a) and has been prepared to provide technical guidance for sample collection and analysis at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP), the site-specific unexploded ordnance (UXO) safety plan, the installation-wide work plan (WP) (IT, 2002b), and the SAP. The SAP includes the installation-wide safety and health plan, monitoring well installation and maintenance plan, waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP.

## **1.2 Site Description**

Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q, are located in the northeastern portion of the Main Post of FTMC (Figure 1-1). Former Defendamm Range (Eastern), Parcel 225Q, occupies 2,533 acres; however, the area of investigation will be limited to the firing line and the possible impact area (approximately 41 acres). Former Mortar Firing Point, Parcel 105Q-X, is located just north of the firing line for the Former Defendamm Range (Eastern), Parcel 225Q.

According to the Environmental Baseline Survey (EBS), Former Mortar Firing Point, Parcel 105Q-X, is located at French Hill Quarry on the Main Post (Environmental Science and Engineering [ESE], 1998). This mortar firing point was reported by long-time FTMC personnel (ESE, 1998). Although Parcel 105Q-X is reported to be a mortar firing point, mortars were not observed on site. Two weapons suspected to be 40-mm or 57-mm guns were observed just north of the parcel during site walks conducted by IT in January 2002 (Figure 1-2). Two trenches,

DWG. NO.: ... \796887es.316  
 PROJ. NO.: 796887  
 INITIATOR: N. BADON  
 PROJ. MGR.: J. YACOUB  
 DRAFT. CHCK. BY:  
 ENGR. CHCK. BY: S. MORAN  
 DATE LAST REV.:  
 DRAWN BY:  
 STARTING DATE: 02/05/02  
 DRAWN BY: D. BOMAR  
 04/03/02  
 10:45:43  
 by anderg  
 c:\cadd\design\796887es.316

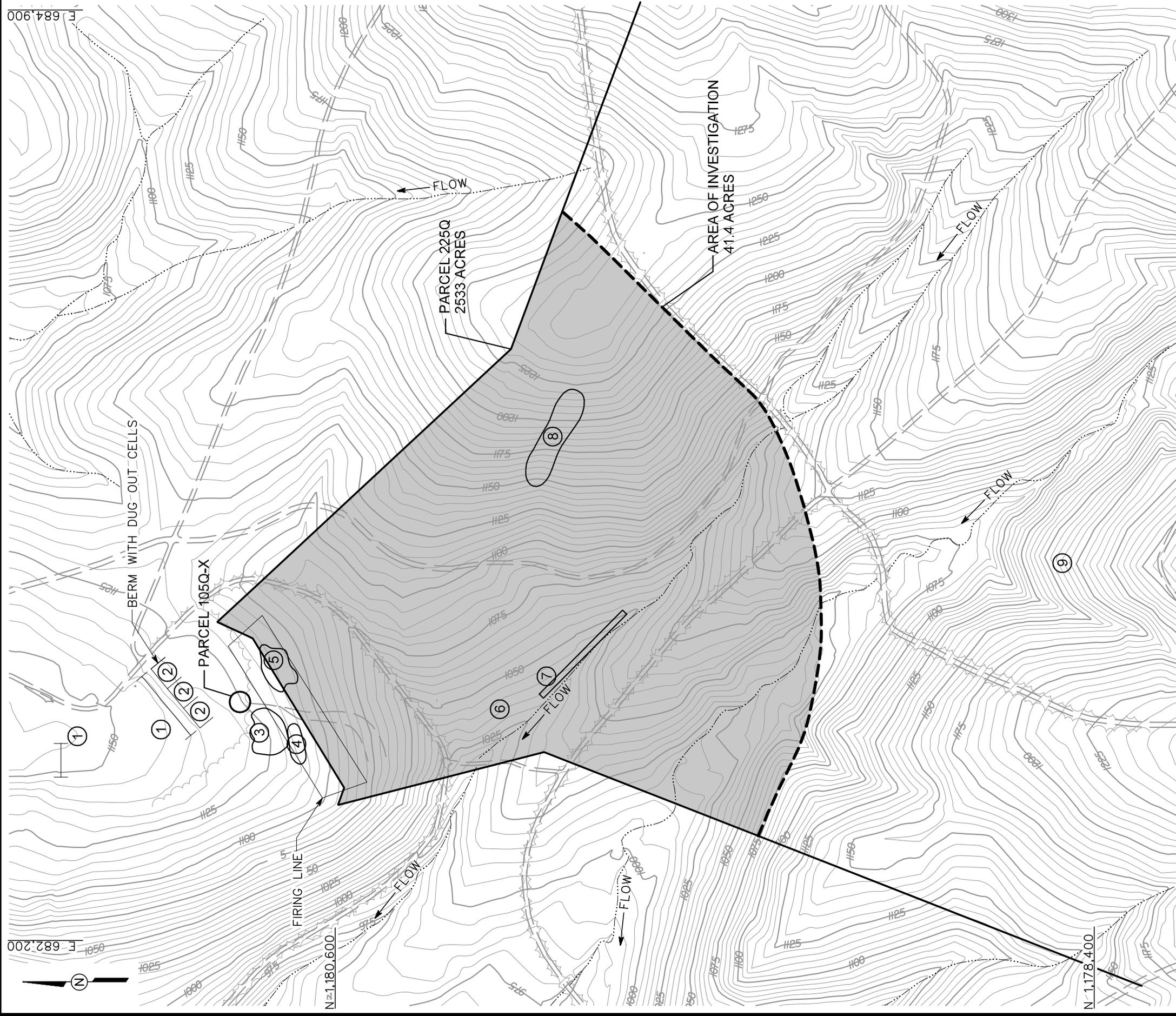


**LEGEND**

- — UNIMPROVED ROADS AND PARKING
- — PAVED ROADS AND PARKING
- ▭ PARCEL BOUNDARY
- - - AREA OF INVESTIGATION
- — SURFACE DRAINAGE / CREEK

**FIGURE 1-1**  
**SITE LOCATION MAP**  
**FORMER MORTAR FIRING POINT**  
**PARCEL 105Q-X**  
**FORMER DEFENDAM RANGE**  
**(EASTERN), PARCEL 225Q**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT McCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018

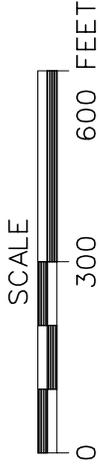


**LEGEND:**

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- AREA OF INVESTIGATION
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- TRENCH

**TRAINING AIDS/PHYSICAL FEATURES OBSERVED**

- ① 40mm/57mm GUN
- ② SUSPECTED M16 BLANKS
- ③ 5 MOUNDS 3-5' HIGH, CONCRETE SLAB PIECES
- ④ 5 PITS, 2 SURROUNDED BY ROCKS
- ⑤ SOIL DISTURBANCE, CRESCENT SHAPED MOUND, CABLE EMBEDDED IN GROUND
- ⑥ SURFACE DEPRESSION/IMPACT CRATER
- ⑦ NUMEROUS VEHICLE BODY PARTS WITH HOLES
- ⑧ 81mm MORTARS
- ⑨ ROCK-FILLED DRUMS WITH HOLES



**FIGURE 1-2**  
**SITE MAP**  
**FORMER MORTAR FIRING POINT**  
**PARCEL 105Q-X**  
**FORMER DEFENDAM RANGE**  
**(EASTERN), PARCEL 225Q**

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT MCCLLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



**IT CORPORATION**  
 A Member of The IT Group

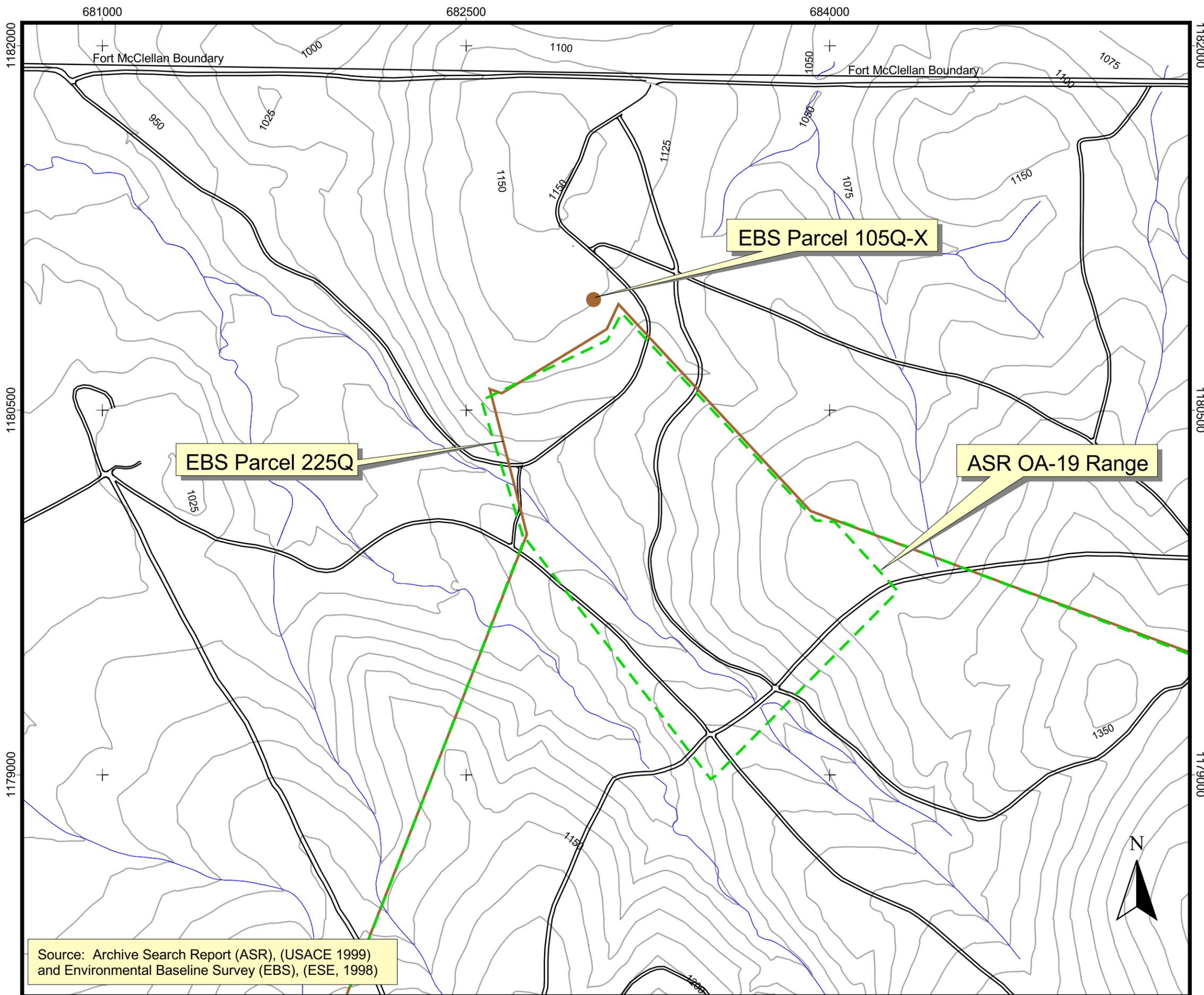
approximately 3 to 5 feet deep. A berm was located along the southeastern side of the southern trench, north of Parcel 105Q-X. Cells were dug out of the berm along the southeastern slope of the berm. Rifle blanks (suspected M-16) were observed on the cell floors.

Former Defendamm Range (Eastern), Parcel 225Q, and its surface danger zone, or safety fan, appear on the 1946 Reservation Map near the northern post boundary and the western slope of the Choccolocco Mountains (ESE, 1998). The orientation of the range suggests that the direction of fire was to the south-southeast (Figure 1-2). According to the EBS, the manner in which the firing line is depicted and the wide field of fire suggest that this was a machine gun field fire range (ESE, 1998). With the exception of the 1946 Reservation Map, there is not any other information available regarding this range, dates of use, or operation (ESE, 1998).

Former Defendamm Range (Eastern), Parcel 225Q, is shown on Plates 5 (World War II to 1950 Range Use) and 10 (Cumulative Map of All Ranges) of the USACE *Archive Search Report, Maps, Fort McClellan, Anniston, Alabama* (ASR) (USACE, 1999a). It is identified as “Range” (OA-19) in the ASR. The range fan in the ASR Plate 5 appears to approximately match the EBS Parcel 225Q range fan (Figure 1-3). The ASR states that the range was abandoned by 1958 and that the types of explosives used on this range are unknown (USACE, 1999a).

The ASR Plate 6 shows a range outline to the north of Parcel 225Q and Parcel 105Q-X and is named as “Mock Fire Base” (Figure 1-4). According to the ASR, the Mock Fire Base (OA-17) appears to have been built during the Vietnam War. Training debris found during a site visit by the ASR team included expended rifle blanks and pyrotechnic devices, such as smoke grenades (USACE, 1999a).

During site walks conducted by IT in January 2002, numerous physical features and training aids were observed at Former Defendamm Range (Eastern), Parcel 225Q (Figure 1-2). Along the former firing line, a total of six mounds and five pits were observed. An area of soil disturbance containing a crescent-shaped mound and a cable embedded in the ground was seen near the northeastern end of the former firing line. Near the center of the former firing line, an area of five mounds, approximately 3 to 5 feet high, and concrete slab pieces were observed. Five pits were observed just south of the five mounds.



Source: Archive Search Report (ASR), (USACE 1999) and Environmental Baseline Survey (EBS), (ESE, 1998)

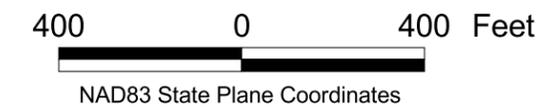
# Figure 1-3

## ASR Plate 5 (World War II to 1950) Range Location Map

Former Mortar Firing Point,  
Parcel 105Q-X and  
Former Defendam Range  
(Eastern), Parcel 225Q  
Fort McClellan, Alabama

**Legend**

-  EBS Parcel
-  ASR OA-19 Range
-  Roads
-  Streams
-  Topographic Contours  
25-foot Interval

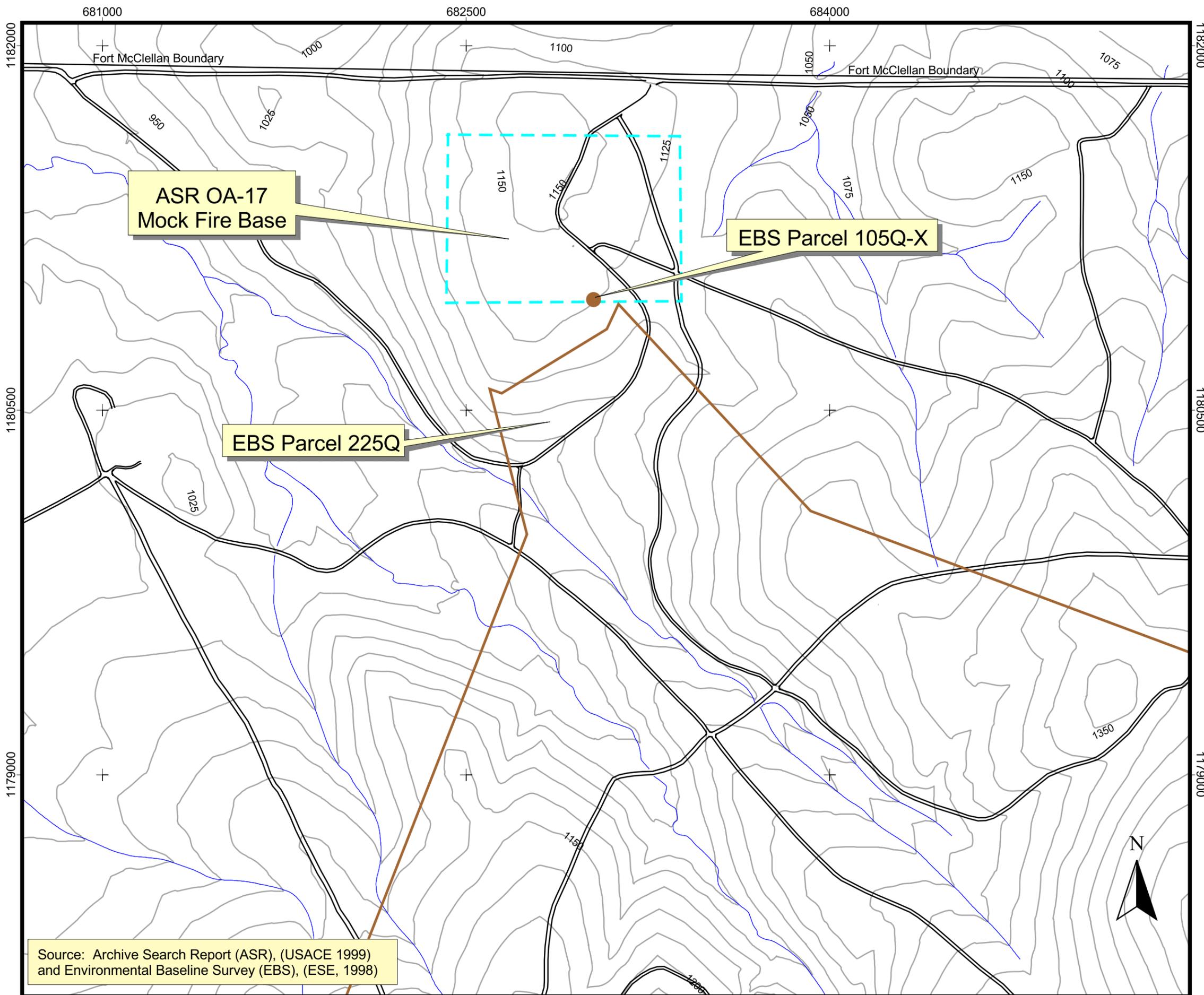


U.S. Army Corps  
of Engineers  
Mobile District



**IT CORPORATION**  
*A Member of The IT Group*

Contract No. DACA21-96-D-0018



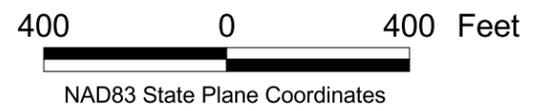
Source: Archive Search Report (ASR), (USACE 1999) and Environmental Baseline Survey (EBS), (ESE, 1998)

# Figure 1-4

**ASR Plate 6  
(1950 to 1973)  
Range Location Map**  
Former Mortar Firing Point,  
Parcel 105Q-X and  
Former Defendam Range  
(Eastern), Parcel 225Q  
Fort McClellan, Alabama

**Legend**

-  EBS Parcel
-  ASR OA-17 Mock Fire Base
-  Roads
-  Streams
-  Topographic Contours  
25-foot Interval



U.S. Army Corps  
of Engineers  
Mobile District



**IT CORPORATION**  
*A Member of The IT Group*

Contract No. DACA21-96-D-0018

In the central portion of the area of investigation (in Parcel 225Q), 12 items reported to be 81-mm mortars were found (Figure 1-2). The mortars appear to be unfuzed and are suspected to be practice mortars. Numerous vehicle-body parts were observed west of the mortars along a creek that runs northwest through the Former Defend Range (Eastern), Parcel 225Q. The vehicle parts cover an approximately 300-foot long area along the creek and contain some bullet or possibly mortar fragment holes. An area with six rock-filled, 55-gallon drums was seen south of the area of investigation. The drums contain some bullet or possibly mortar fragment holes.

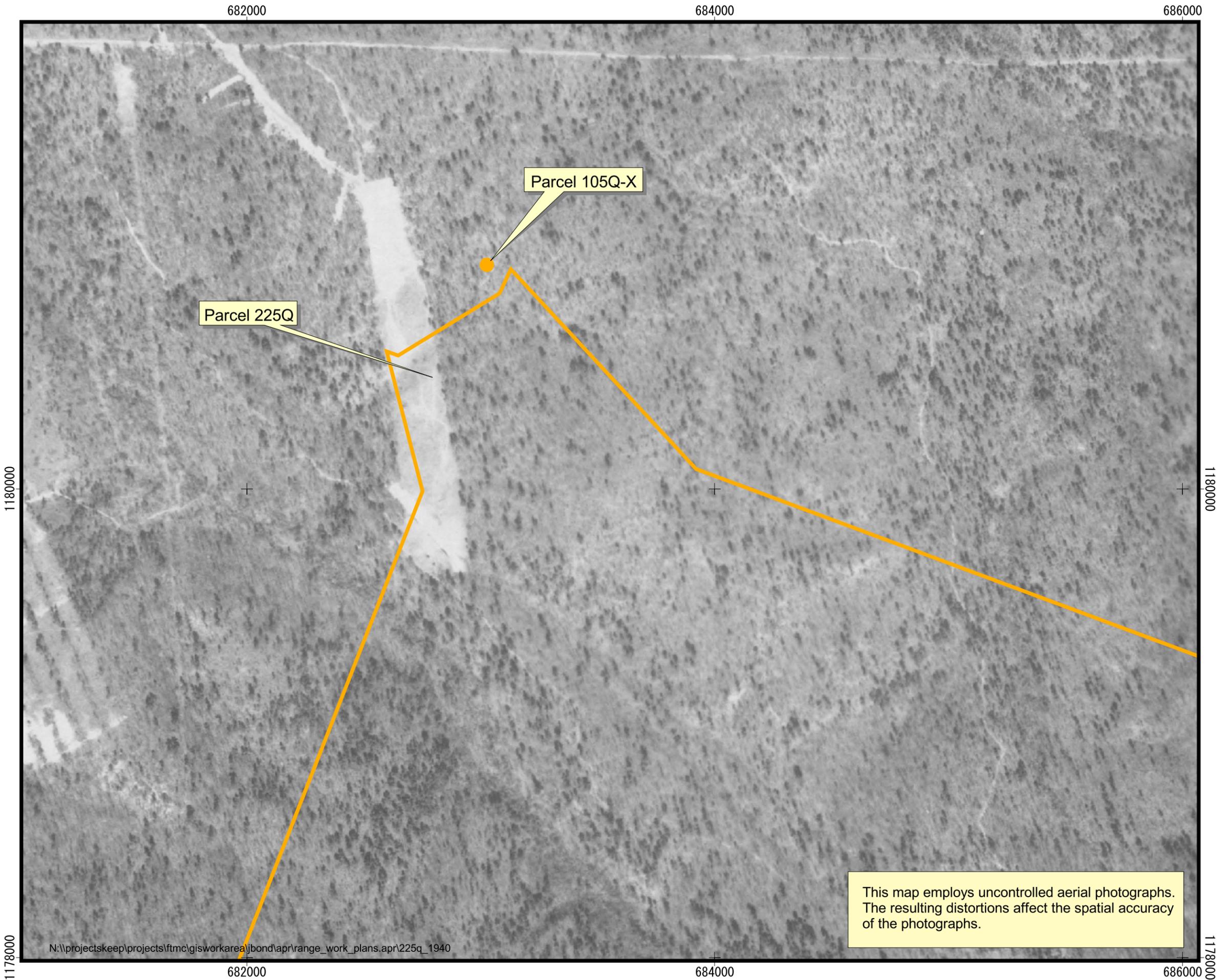
***Aerial Photographs.*** Available aerial photographs were reviewed to reveal any land-use activity in the study area. The following is a review of the available aerial photographs for this study area and only includes figures for the 1940, 1949, 1961, and 1976 aerial photographs:

**1937.** This aerial photograph shows the area of investigation as an unaltered, heavily wooded area.

**1940.** This aerial photograph shows most of the area of investigation to be fully wooded, with the exception of a long, bare strip of land running north-northwest to south-southeast along the western boundary of Parcel 225Q (Figure 1-5). It is unknown what the area was used for at this time.

**1949.** This aerial photograph shows the area west of Parcel 105Q-X and part of the northern area of Parcel 225Q to be sparsely vegetated, indicating possible heavy use activity (Figure 1-6). Three bare circular areas are visible near the southern portion of the study area. The long, bare strip of land seen in the 1940 photograph has become almost fully reclaimed by vegetation. Two separate portions of the bare strip remain, one near the location of the Former Mortar Firing Point, Parcel 105Q-X, and the second (running northwest to southeast) near the western border of Parcel 225Q.

**1954.** Activity in this aerial photograph appears similar to the 1949 photograph. Due to the lack of clarity of this photograph, it is difficult to determine if land use activity in the study area has changed.



# Figure 1-5

**1940 Aerial Photograph**  
 Former Mortar Firing Point,  
 Parcel 105Q-X and  
 Former Defendam Range  
 (Eastern), Parcel 225Q  
 Fort McClellan, AL

Legend

 Parcel Boundary/  
Range Safety Fan

0 400 Feet



NAD83 State Plane Coordinates



U.S. Army Corps  
 of Engineers  
 Mobile District



**IT CORPORATION**  
*A Member of The IT Group*

This map employs uncontrolled aerial photographs.  
 The resulting distortions affect the spatial accuracy  
 of the photographs.

682000

684000

686000

Source of photograph: U.S. Environmental Protection Agency, 1990, Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama (TS-PIC-89334), Environmental Photographic Interpretation Center (EPIC), Environmental Monitoring Systems Laboratory

1180000

1180000

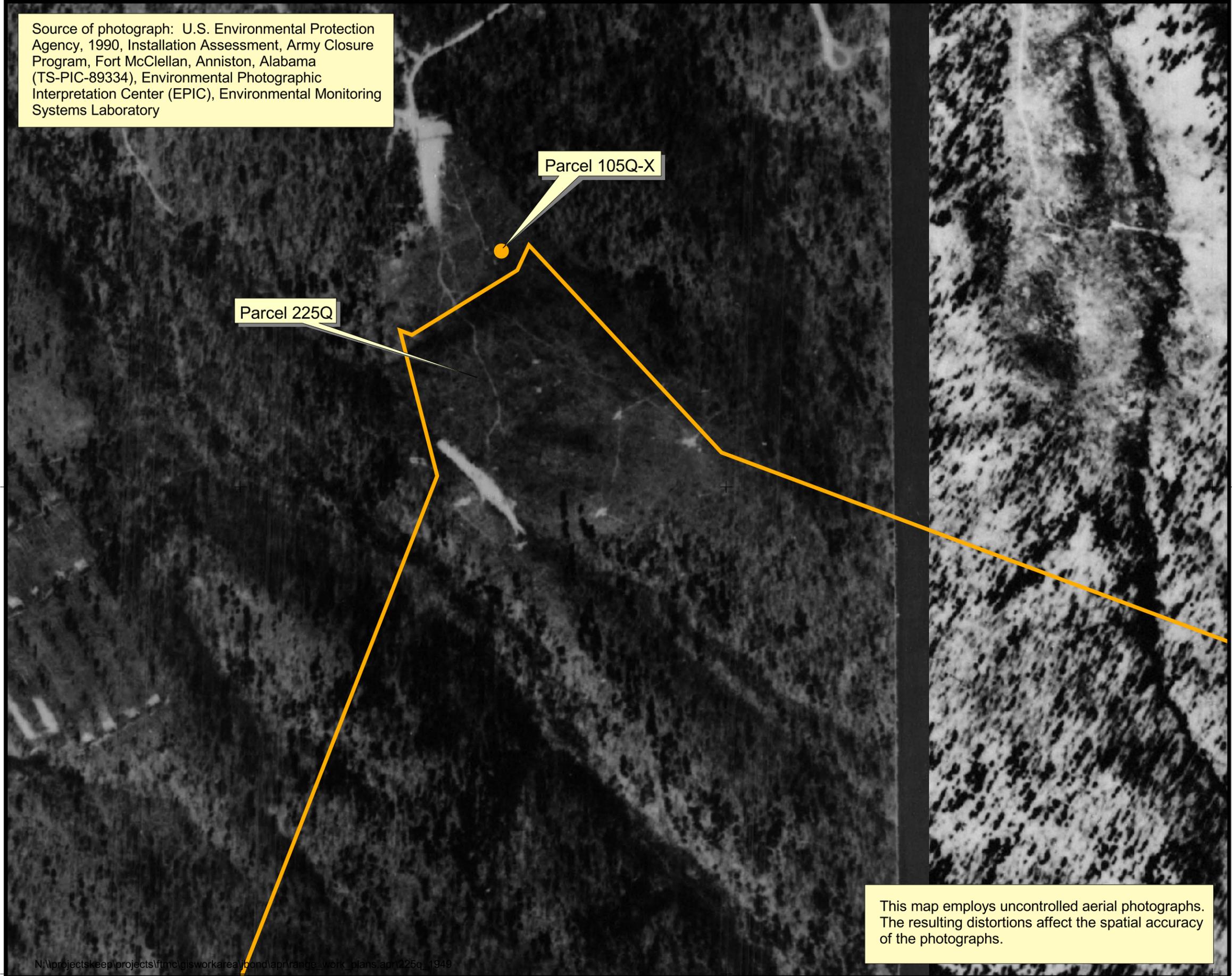
1178000

1178000

682000

684000

686000



# Figure 1-6

## 1949 Aerial Photograph

Former Mortar Firing Point, Parcel 105Q-X and Former Defendam Range (Eastern), Parcel 225Q Fort McClellan, AL

Legend

 Parcel Boundary/  
Range Safety Fan

0 400 Feet



NAD83 State Plane Coordinates



U.S. Army Corps of Engineers  
Mobile District



**IT CORPORATION**  
*A Member of The IT Group*

This map employs uncontrolled aerial photographs. The resulting distortions affect the spatial accuracy of the photographs.

Contract No. DACA21-96-D-0018

**1961.** The 1961 aerial photograph appears to show considerable more activity in the area north of Parcel 105Q-X. Two parallel surface features, running northeast to southwest, appear just north of Parcel 105Q-X (Figure 1-7).

**1969.** This photograph appears similar to the 1961 aerial photograph. The two northeast-southwest surface features remain visible; however, with the exception of a few roads that transect the parcel. Most of Parcel 225Q appears to have been completely reclaimed by vegetation.

**1976.** This aerial photograph shows the area northwest of Parcel 105Q-X to be almost void of vegetation from land use (Figure 1-8).

**1982, 1994, and 1998.** This group of aerial photographs shows little activity in the area of investigation. Most of the study area appears to have been completely reclaimed by vegetation. The bare area observed in the 1976 aerial photograph is visible on all three aerial photographs.

Soils at the Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, are characterized as Stony Rough Land sandstone (Ss) (U.S. Department of Agriculture [USDA], 1961). This miscellaneous soil type consists of rough, mountainous areas with outcrops of sandstone and quartzite bedrock, loose rock fragments, and scattered patches of sandy soil material. It also includes rock escarpments on higher parts of the Choccolocco and Coldwater Mountains, where quartzite of the Weisner Formation is common (USDA, 1961).

Stony Rough Land sandstone consists of well-drained, shallow or stony, friable, medium to strongly acidic soils. Slopes generally are more than 25 percent. Erosion has been slight to severe, and some of the slopes have lost all of their original surface soil. The soil material is generally shallow over bedrock. Runoff is high, permeability is moderate to rapid, infiltration is slow, and the capacity for available moisture is low. The depth to bedrock is typically less than 2.5 feet, with depth to water exceeding 20 feet below ground surface (bgs) (USDA, 1961).

### **1.3 Scope of Work**

The scope of work for activities associated with the SI at the Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, as specified by the statement of work (USACE, 1999b), includes the following tasks:

682000

684000

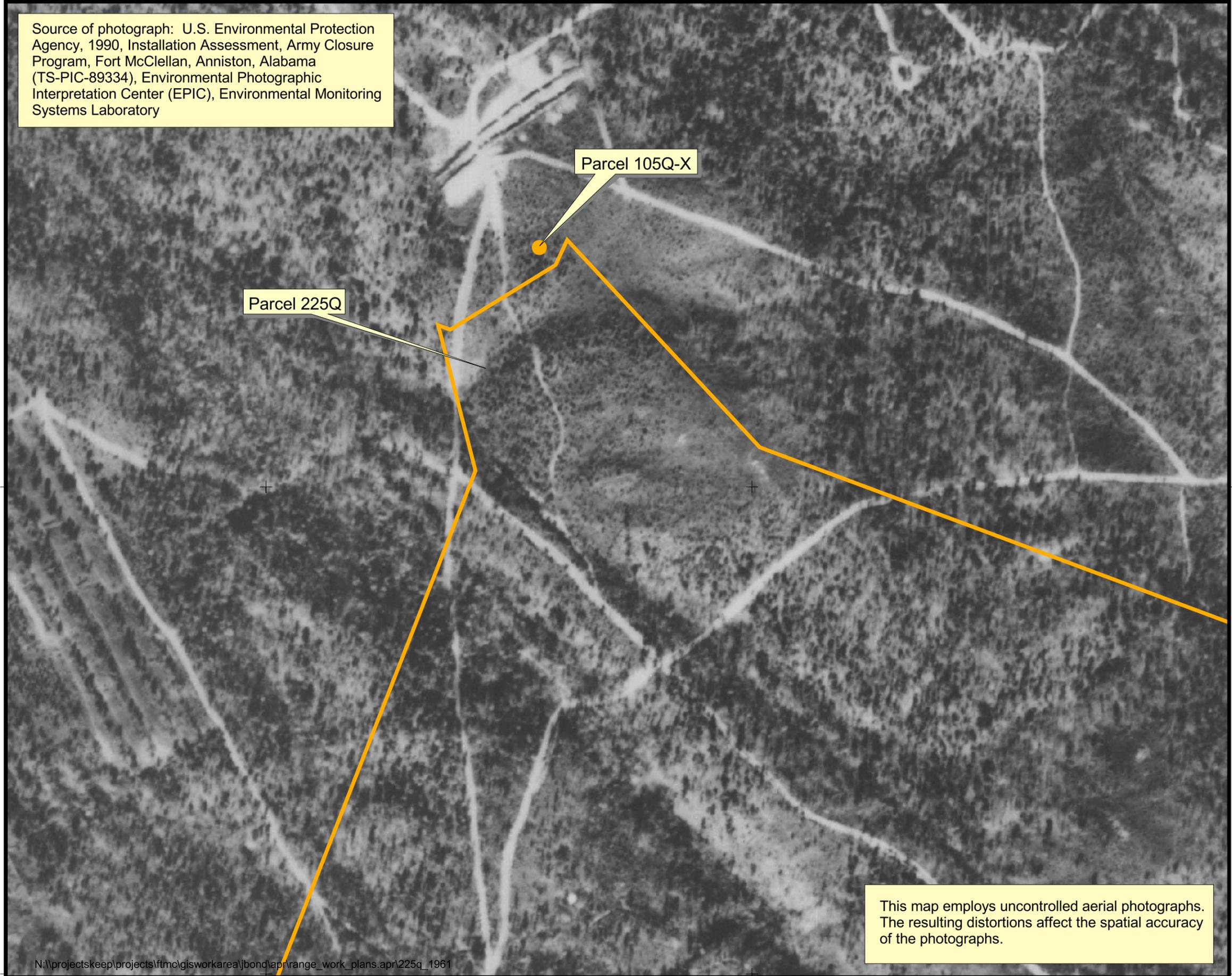
Source of photograph: U.S. Environmental Protection Agency, 1990, Installation Assessment, Army Closure Program, Fort McClellan, Anniston, Alabama (TS-PIC-89334), Environmental Photographic Interpretation Center (EPIC), Environmental Monitoring Systems Laboratory

1180000

1180000

1178000

1178000



Parcel 105Q-X

Parcel 225Q

# Figure 1-7

## 1961 Aerial Photograph

Former Mortar Firing Point,  
Parcel 105Q-X and  
Former Defendam Range  
(Eastern), Parcel 225Q  
Fort McClellan, AL

Legend

 Parcel Boundary/  
Range Safety Fan

0 400 Feet



NAD83 State Plane Coordinates



U.S. Army Corps  
of Engineers  
Mobile District



**IT CORPORATION**  
*A Member of The IT Group*

This map employs uncontrolled aerial photographs.  
The resulting distortions affect the spatial accuracy  
of the photographs.

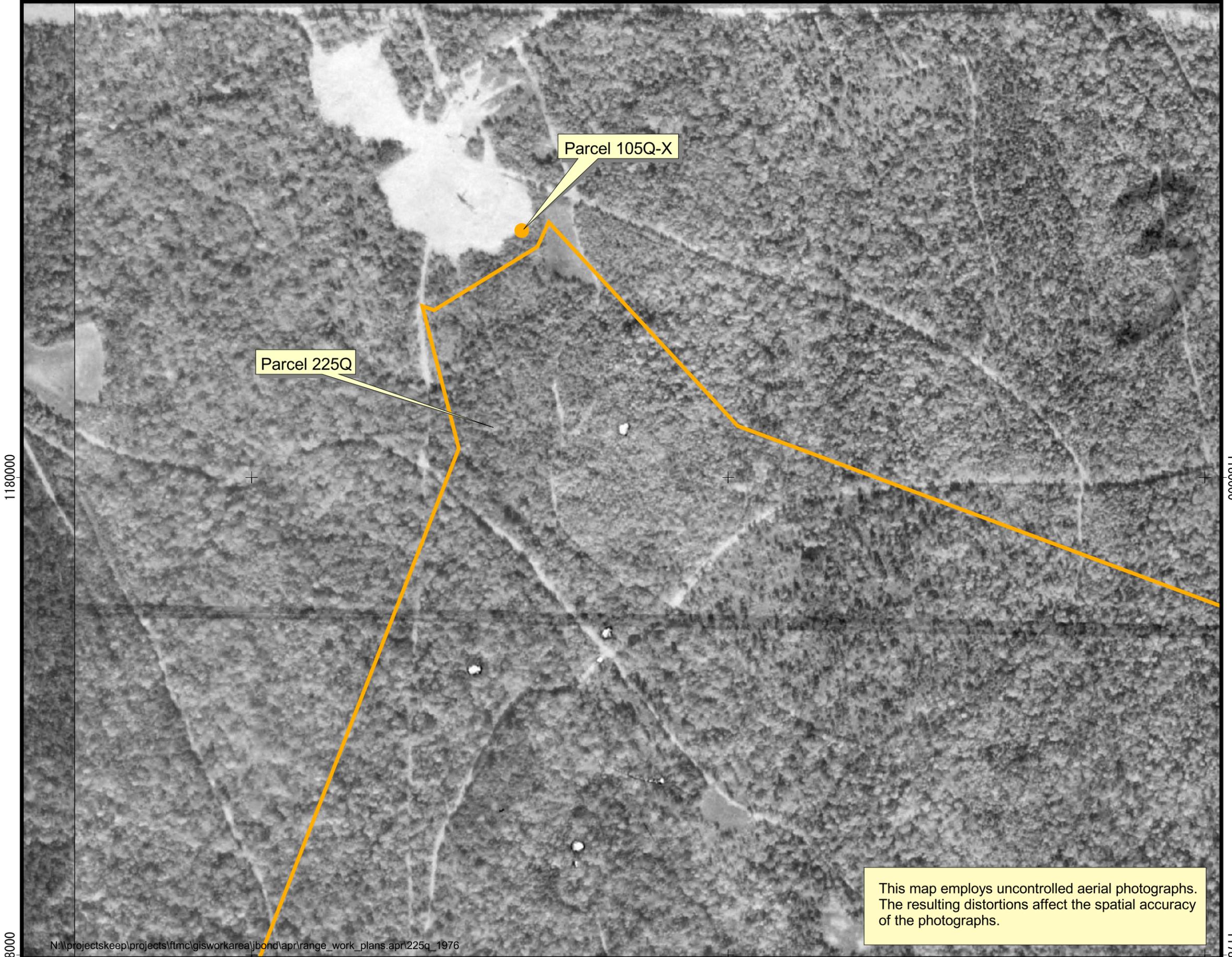
682000

684000

682000

684000

686000



# Figure 1-8

**1976 Aerial Photograph**  
 Former Mortar Firing Point,  
 Parcel 105Q-X and  
 Former Defendam Range  
 (Eastern), Parcel 225Q  
 Fort McClellan, AL

### Legend

 Parcel Boundary/  
Range Safety Fan

0 400 Feet

NAD83 State Plane Coordinates



U.S. Army Corps  
of Engineers  
Mobile District



**IT CORPORATION**  
A Member of The IT Group

This map employs uncontrolled aerial photographs.  
The resulting distortions affect the spatial accuracy  
of the photographs.

1178000

682000

684000

686000

1178000

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Develop the UXO safety plan attachment.
- Conduct a surface and near-surface UXO survey over all areas to be included in the sampling effort.
- Provide downhole UXO support for all intrusive drilling to determine buried downhole hazards.
- Collect 20 surface soil samples, 20 subsurface soil samples, and 6 depositional soil samples to determine whether potential site-specific chemicals (PSSC) are present and to provide data useful for supporting any future planned corrective measures and closure activities.
- Analyze samples for the parameters listed in Section 4.5.

UXO surface sweeps and downhole surveys of soil borings will be required to support field activities at this site. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance. The site-specific UXO safety plan attachment addresses the manner in which the avoidance will be conducted.

At completion of the field activities and sample analyses, an SI summary report will be prepared to summarize the results of the activities, to evaluate the absence or presence of PSSCs at this site and to recommend further actions, if appropriate. The SI summary report will be prepared in accordance with current guidelines of the U.S. Environmental Protection Agency (EPA), Region IV, and the Alabama Department of Environmental Management (ADEM).

## ***2.0 Summary of Existing Environmental Studies***

---

The EBS was conducted by ESE to document current environmental conditions of all FTMC property (ESE, 1998). The study was to identify sites that, based on available information, have no history of contamination and comply with U.S. Department of Defense guidance for fast-track cleanup at closing installations. The EBS also provides a baseline picture of FTMC properties by identifying and categorizing the properties by the following seven criteria:

1. Areas where no storage, release, or disposal of hazardous substance or petroleum products has occurred (including no migration of these substances from adjacent areas)
2. Areas where only release or disposal of petroleum products has occurred
3. Areas where release, disposal, and/or migration of hazardous substance has occurred, but at concentrations that do not require a removal or remedial response
4. Areas where release, disposal, and/or migration of hazardous substance has occurred, and all removal or remedial actions to protect human health and the environment have been taken
5. Areas where release, disposal, and/or migration of hazardous substance has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken
6. Areas where release, disposal, and/or migration of hazardous substance has occurred, but required actions have not yet been implemented
7. Areas that are not evaluated or require further evaluation.

For non-Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) environmental or safety issues, the parcel label includes the following components: a unique non-CERCLA issue number, the letter "Q" designating the parcel as a Community Environmental Response Facilitation Act (CERFA) Category 1 Qualified Parcel, and the code for the specific non-CERCLA issue(s) present (ESE, 1998). The non-CERCLA issue codes used are:

- A = Asbestos (in buildings)
- L = Lead-based paint (in buildings)
- P = Polychlorinated biphenyls

- R = Radon (in buildings)
- RD = Radionuclides/radiological issues
- X = UXO
- CWM = Chemical warfare material.

The EBS was conducted in accordance with the CERFA protocols (CERFA-Public Law 102-426) and U.S. Department of Defense policy regarding contamination assessment. Record searches and reviews were performed on all reasonably available documents from FTMC, ADEM, EPA Region IV, and Calhoun County, as well as a database search of CERCLA-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historical maps and aerial photographs were reviewed to document historical land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted. In addition, visual site inspections were conducted to verify conditions of specific property parcels.

Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q, are identified as Category 1 CERFA sites, with Parcel 105Q-X additionally qualified "X" for UXO. These CERFA sites are parcels where no known or recorded storage, release, or disposal (including migration) has occurred on site property; however, because these sites were former ranges, additional evaluation is required to determine the environmental condition of both parcels.

## **3.0 Site-Specific Data Quality Objectives**

---

### **3.1 Overview**

The data quality objective (DQO) process is followed to establish data requirements. This process ensures that the proper quantity and quality of data are generated to support the decision-making process associated with the action selection for Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q. This section incorporates the components of the DQO process described in the EPA publication 600/R-96/005, *Guidance for the Data Quality Objectives Process* (EPA, 2000). The DQO process as applied to Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, is described in more detail in Section 3.4 of this SFSP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples and the procedures necessary to meet the objectives of the SI and establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Chapter 5.0 in the QAP (IT, 2002a). Data will be reported in accordance with the definitive data requirements of Chapter 2 of the USACE Engineer Manual 200-1-6, *Chemical Quality Assurance For Hazardous, Toxic and Radioactive Waste (HTRW) Projects* (USACE, 1997) and evaluated by the stipulated requirements for the generation of definitive data (Section 7.2.2 of the QAP). Chemical data will be reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms, along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

### **3.2 Data Users and Available Data**

The available data related to the SI at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q, presented in Table 3-1, have been used to formulate a site-specific conceptual model. This conceptual model was developed to support the development of this SFSP, which is necessary to meet the objectives of these activities and to establish a basis for future action at the site. The data users for the data and information generated during field activities are primarily EPA, USACE, ADEM, FTMC, and other USACE supporting contractors. This SFSP, along with the necessary companion documents, has been designed to provide the regulatory agencies with sufficient detail to reach a determination as to the adequacy of the scope of work. The program has also been designed to provide the level of

Table 3-1

**Summary of Data Quality Objectives  
Site Investigation  
Parcels 105Q-X and 225Q  
Fort McClellan, Calhoun County, Alabama**

Users	Available Data	Conceptual Site Model	Media of Concern	Data Uses and Objectives	Data Types	Analytical Level	Data Quantity
EPA, ADEM USACE, DOD FTMC, IT Corporation  Other contractors, and possible future land users	None	<u>Contaminant Source</u> Former Mortar Firing Point, Parcel 105Q-X and Former Defendang Range (Eastern), Parcel 225Q (explosives and metals)	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals, Nitroaromatic/Nitramine Explosives, plus 10 percent of sample types for TCL VOCs, TCL SVOCs, CI Pesticides, OP Pesticides, and CI Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	20 surface soil samples + QC
		<u>Subsurface soil</u>	<u>Subsurface Soil</u> TAL Metals, Nitroaromatic/Nitramine Explosives, plus 10 percent of sample types for TCL VOCs, TCL SVOCs, CI Pesticides, OP Pesticides, and CI Herbicides				
		<u>Migration Pathways</u> Infiltration to subsurface soil, biotransfer to venison, dust emissions and volatilization to ambient air, and runoff to depositional soil	<u>Depositional soil</u>	Definitive quality data for future decision-making	<u>Depositional soil</u> TAL Metals, Nitroaromatic/Nitramine Explosives, Plus 10 percent of sample types for TCL VOCs, TCL SVOCs, CI Pesticides, OP Pesticides, and CI Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	20 subsurface soil samples + QC
		<u>Potential Receptors</u> Recreational site user (current and future) Resident (future)				Definitive data in data packages (as defined in USACE EM200-1-6)	6 depositional soil samples + QC
		<u>PSSC</u> metals, nitroaromatic/nitramine explosives, SVOCs, VOCs, CI Pesticides, OP Pesticides, and CI Herbicides					

ADEM - Alabama Department of Environmental Management.

CI - Chlorinated

DOD - U.S. Department of Defense.

EM200-1-6 - USACE Engineering Manual, *Chemical Quality Assurance for HTRW Projects*, October 10, 1997.

EPA - U.S. Environmental Protection Agency.

FTMC - Fort McClellan.

OP - Organophosphorus.

PSSC - Potential site-specific chemical.

QC - Quality control.

SI - Site investigation.

SVOCs - semivolatile organic compounds.

TAL - Target analyte list.

TCL - Target compound list.

TOC - Total organic carbon.

USACE - U.S. Army Corps of Engineers.

VOCs - volatile organic compounds.

defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

### **3.3 Conceptual Site Exposure Model**

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks and hazards to human health in the risk assessment. The CSEM includes receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates a consistent and comprehensive evaluation of human health through graphically presenting all possible exposure pathways, including sources, release and transport pathways, and exposure routes. In addition, the CSEM helps to ensure that potential pathways are not overlooked. The elements of a complete exposure pathway and CSEM are:

- Source (i.e., contaminated environmental) media
- Contaminant release mechanisms
- Contaminant transport pathways
- Receptors
- Exposure pathways.

Contaminant release mechanisms and transport pathways are not relevant for direct receptor contact with a contaminated source medium.

Primary contaminant releases were probably limited to training activities, more precisely, pieces of ammunition deposited on or within surface and subsurface soil and their subsequent breakdown. Potential contaminant transport pathways include infiltration and leaching to subsurface soil, dust emissions and volatilization to ambient air, runoff to depositional soil, and biotransfer to deer through browsing.

Current conditions at the site and anticipated future land use dictate the selection of receptor scenarios used to estimate current and future risks and hazards to human health. Currently, the site is not utilized and is not maintained. Trees cover most of the study area. Although access to Fort McClellan is limited, it is possible that an individual could circumvent the perimeter fence on the base and trespass into the area to hunt. Two drainage creeks are located in the southwestern portion of the area of investigation, but there is not sufficient surface water to support fish habitat for fish consumption. Due to steep terrain at the site, groundwater will not be collected. The only plausible receptor under the current land-use scenario is a recreational site

user who may hunt. The following potential receptors were considered, but not included under the current land-use scenario:

- **Groundskeeper.** The site is not currently maintained by a groundskeeper.
- **Construction Worker.** No development or construction is occurring at the site.
- **Resident.** The site is not currently used for residential purposes.

Future land use for Parcels 105Q-X and 225Q is shown as part of the remediation reserve to be used for passive recreation (FTMC, 1997). The sites may not be deemed safe for public access until remediation has been completed because of the potential for UXO (FTMC, 1997). Potential receptor scenarios evaluated for the future include the following:

- **Resident.** Although the site is not expected to be used for residential purposes, the resident is considered in order to provide information for the project manager and regulators.
- **Recreational Site User.** Because the future site is planned for passive recreational use, and hunting is a viable option, the recreational site user is included. Fish ingestion will not be evaluated because the streams are too small to support fish for consumption.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptor scenarios and exposure pathways for this site is provided in Table 3-1 and Figure 3-1.

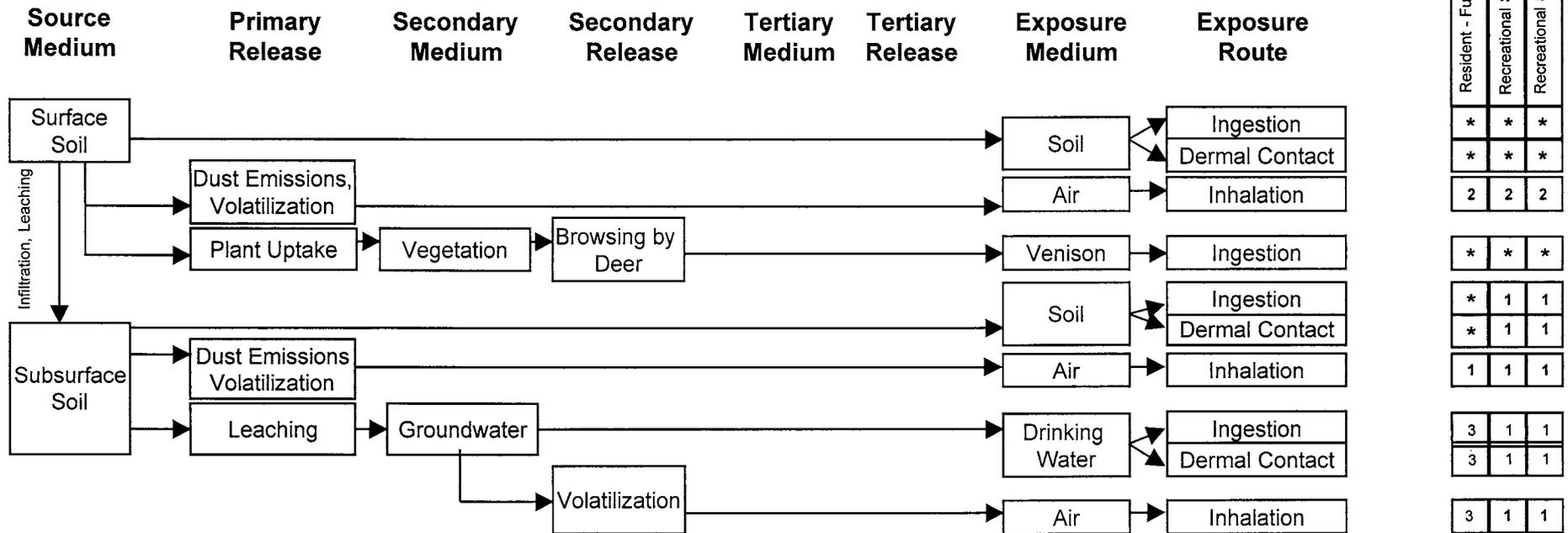
### **3.4 Decision-Making Process, Data Uses, and Needs**

The seven-stage data quality decision-making process presented in detail in Chapter 3.0 of the QAP will be followed during the SI at Former Mortar Firing Point, Parcel 105Q-X, and Former Defend Range (Eastern), Parcel 225Q. Data uses and needs are summarized in Table 3-1.

#### **3.4.1 Risk Evaluation**

Confirmation of contamination at Former Mortar Firing Point, Parcel 105Q-X, and Former Defend Range (Eastern), Parcel 225Q, will be based on using EPA definitive data to determine whether or not PSSCs are detected in site media. Detected site chemical concentrations will be compared to site-specific screening levels, ecological screening values,

**Figure 3-1**  
**Human Health Conceptual Site Exposure Model**  
**Former Mortar Firing Point, Parcel 105Q-X and**  
**Former Defend Range (Eastern), Parcel 225Q**  
**Fort McClellan, Alabama**



\* = Complete exposure pathway evaluated in the streamlined risk assessment.  
 1 = Incomplete exposure pathway.  
 2 = Although theoretically complete, this pathway is judged to be insignificant and is not evaluated in the streamlined risk assessment.  
 3 = Groundwater is too difficult to collect due to terrain and thus is unlikely to be developed at the site as a source of drinking water.

and background values to determine if PSSCs are present at the site at concentrations that pose an unacceptable risk to human health or the environment. Definitive data will be adequate for confirming the presence of site contamination and for supporting a feasibility study and risk assessment.

Assessment of potential ecological risk associated with sites or parcels (e.g. specific ecological assessment methods, etc.) will be addressed in accordance with procedures in Section 5.3 of the WP (IT, 2002b).

### ***3.4.2 Data Types and Quality***

Surface soil, subsurface soil, and depositional soil will be sampled and analyzed to meet the objectives of the SI at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q. Quality assurance/quality control (QA/QC) samples will be collected for all sample types, as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 methods, including Update III methods where applicable; comply with EPA definitive data requirements; and be reported using hard-copy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

### ***3.4.3 Precision, Accuracy, and Completeness***

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP (IT, 2002a).

## **4.0 Field Activities**

---

### **4.1 UXO Survey Requirements and Utility Clearances**

Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q, are within the “Possible Explosive Ordnance Impact Areas” shown on Plate 10 of the *Archives Search Report, Maps, Fort McClellan, Anniston, Alabama* (USACE, 1999a).

Therefore, IT will conduct UXO avoidance activities, including surface sweeps and downhole surveys of soil borings. The site-specific UXO safety plan provides technical guidance for ordnance and explosives avoidance for sample collection activities at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2000a).

#### **4.1.1 Surface UXO Survey**

A UXO sweep will be conducted over areas that will be included in the sampling and surveying activities to identify UXO on or near the surface that may present a hazard to on-site workers during field activities. Low-sensitivity magnetometers will be used to locate surface and shallow-buried metal objects. UXO located on the surface will be identified and conspicuously marked for easy avoidance. Subsurface metallic anomalies will not be disturbed, but will also be marked for easy avoidance. UXO personnel requirements, procedures, and detailed descriptions of the geophysical equipment to be used are provided in Appendix E of the SAP (IT, 2002a).

#### **4.1.2 Downhole UXO Survey**

During soil boring and downhole sampling activities, downhole UXO surveys will be performed to determine if buried metallic objects are present. UXO monitoring, as described in Appendix E of the SAP (IT, 2002a), will continue until undisturbed soil is encountered or the borehole has been advanced to 12 feet bgs, whichever is reached first.

#### **4.1.3 Utility Clearances**

After the UXO surface survey has cleared the area to be sampled and prior to performing any intrusive sampling, a utility clearance will be performed at locations where soil samples will be collected, using the procedure outlined in Section 4.2 of the SAP (IT, 2002a). The site manager will mark the proposed locations with stakes, coordinate with the local utility companies to clear

the proposed locations for utilities, and obtain digging permits. Once the locations are approved (for both UXO and utility avoidance) for intrusive sampling, the stakes will be labeled as cleared.

## **4.2 Environmental Sampling**

The environmental sampling program at the Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q, includes the collection of surface, subsurface, and depositional soil samples for chemical analysis. These samples will be collected and analyzed to provide data for characterizing the site to determine the environmental condition of the site and any further action to be conducted. Additionally, samples will be collected from environmental media in locations that will assist in the assessment of potential ecological impacts resulting from activities at the site.

### **4.2.1 Surface Soil Sampling**

Surface soil samples will be collected from 20 locations at the Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q.

#### **4.2.1.1 Sample Locations and Rationales**

The sampling rationale for each surface soil sample location is listed in Table 4-1. Proposed sampling locations are shown on Figure 4-1. Surface soil sample designations and QA/QC sample requirements are summarized in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions.

#### **4.2.1.2 Sample Collection**

Surface soil samples will be collected from the upper 1 foot of soil by direct-push methodology using the methods specified in Section 5.1.1.1 and Section 6.1.1.1 of the SAP (IT, 2000a). In areas where site access does not permit the use of a direct-push rig, the samples will be collected using a stainless steel hand auger as specified in Section 5.1.1.2 and Section 6.1.1.1 of the SAP (IT, 2002a). Collected soil samples will be screened using a photoionization detector (PID) in accordance with Section 6.8.3 of the SAP. Surface soil samples will be screened for information purposes only, and not to select samples for analysis. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Chapter 4.0 and listed in Table 4-1 of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Chapter 6.0 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

Table 4-1

**Sample Locations and Rationale  
Site Investigation,  
Former Mortar Firing Point, Parcel 105Q-X and Former Defendamm Range (Eastern), Parcel 225Q  
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
105Q-X	HR-105Q-GP01	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in the northernmost trench in the cleared area north of Parcel 105Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-105Q-GP02	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located at the northernmost gun in the cleared area north of Parcel 105Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-105Q-GP03	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located at the southernmost gun in the cleared area north of Parcel 105Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-105Q-GP04	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in the center of the southernmost trench, in the cleared area north of Parcel 105Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-105Q-GP05	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located at the center of the Former Mortar Firing Point, Parcel 105Q-X. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-105Q-GP06	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in the floor of the center dug out cell along the berm at the southeast side of the trench. This location is at the northern gun location, north of Parcel 105Q-X. Soil sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
225Q	HR-225Q-GP01	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located on one of the five mounds north of the former firing line for Parcel 225Q. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP02	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, on the crescent shaped mound along the former firing line. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP03	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, approximately 200 feet south of the center of the former firing line, in an area of heavy use observed on early aerial photographs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP04	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, approximately 450 feet south-southeast and downslope of the center of the former firing line, in an area of heavy use observed on early aerial photographs. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP05	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, approximately 450 feet east-southeast of the center of the former firing line. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP06	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, approximately 600 feet south of the center of the former firing line, in an area of heavy use observed on early aerial photographs, downslope of a surface depression/impact crater seen during site walks. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.

Table 4-1

**Sample Locations and Rationale  
Site Investigation,  
Former Mortar Firing Point, Parcel 105Q-X and Former Defendamm Range (Eastern), Parcel 225Q  
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

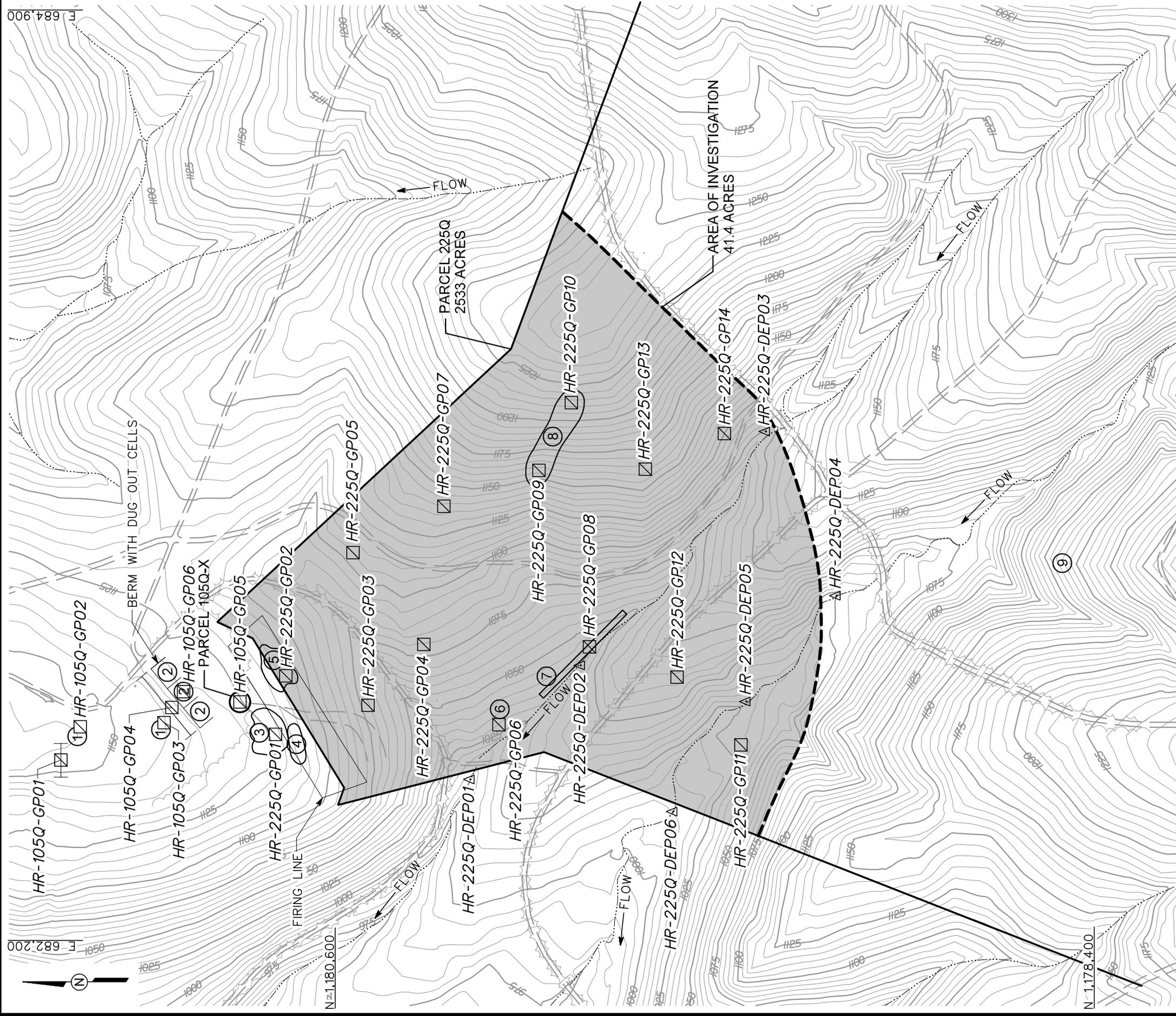
Parcel Number	Sample Location	Sample Media	Sample Location Rationale
225Q	HR-225Q-GP07	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, approximately 675 feet southeast of the center of the former firing line. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP08	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, in the central portion of the area of investigation, and at the center of an area of numerous vehicle body parts with holes. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP09	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, in the central portion of the area of investigation, downslope of 12 items reported to be 81mm mortars. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP10	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, in the central portion of the area of investigation, upslope of 12 items reported to be 81mm mortars. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP11	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, in the southwestern corner of the area of investigation, approximately 1275 feet south-southwest of the center of the former firing line. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP12	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, in the southwestern portion of the area of investigation, approximately 1050 feet south-southeast of the center of the former firing line. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP13	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, approximately 1200 feet southeast of the center of the former firing line. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-GP14	Surface soil Subsurface soil	Soil boring for surface and subsurface soil samples to be located in Parcel 225Q, approximately 1500 feet southeast of the center of the former firing line, near the southern boundary of the area of investigation. Sample data will indicate if contaminant releases into the environment have occurred from the use of this area and if contaminated media exist at this site. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the site for food and/or habitat purposes.
	HR-225Q-DEP01	Depositional soil	The sample will be placed in the easternmost intermittent streambed that runs northwest through Parcel 225Q. The sample will be collected from the intermittent streambed outside the western boundary of Parcel 225Q. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exist at this site. Sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes.
	HR-225Q-DEP02	Depositional soil	The sample will be placed in the easternmost intermittent streambed that runs northwest through Parcel 225Q. The sample will be collected from the intermittent streambed in Parcel 225Q, in the vicinity of numerous vehicle parts with holes. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exist at this site. Sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes.
	HR-225Q-DEP03	Depositional soil	The sample will be placed in the easternmost intermittent streambed that runs northwest through Parcel 225Q. The sample will be collected from the intermittent streambed at the southern boundary of the area of investigation. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exist at this site. Sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes.
	HR-225Q-DEP04	Depositional soil	The sample will be placed in the westernmost intermittent streambed that runs northwest through Parcel 225Q. The sample will be collected from the intermittent streambed outside the southern boundary of the area of investigation. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exist at this site. Sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes.

**Table 4-1**

**Sample Locations and Rationale  
Site Investigation,  
Former Mortar Firing Point, Parcel 105Q-X and Former Defendamm Range (Eastern), Parcel 225Q  
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
225Q	HR-225Q-DEP05	Depositional soil	The sample will be placed in the westernmost intermittent streambed that runs northwest through Parcel 225Q. The sample will be collected from the intermittent streambed in Parcel 225Q, approximately 375 feet northwest of HR-225Q-DEP04 . Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exist at this site. Sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes.
	HR-225Q-DEP06	Depositional soil	The sample will be placed in the westernmost intermittent streambed that runs northwest through Parcel 225Q. The sample will be collected from the intermittent streambed outside the western boundary of Parcel 225Q. Sample data will indicate if contaminant releases into the environment have occurred from use of this area and if contaminated media exist at this site. Sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes.



**LEGEND:**

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- AREA OF INVESTIGATION
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- TRENCH
- PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED DEPOSITIONAL SOIL SAMPLE LOCATION

**TRAINING AIDS/PHYSICAL FEATURES OBSERVED**

- ① 40mm/57mm GUN
- ② SUSPECTED M16 BLANKS
- ③ 5 MOUNDS 3-5' HIGH, CONCRETE SLAB PIECES
- ④ 5 PITS, 2 SURROUNDED BY ROCKS
- ⑤ SOIL DISTURBANCE, CRESCENT SHAPED MOUND, CABLE EMBEDDED IN GROUND
- ⑥ SURFACE DEPRESSION/IMPACT CRATER
- ⑦ NUMEROUS VEHICLE BODY PARTS WITH HOLES
- ⑧ 81mm MORTARS
- ⑨ ROCK-FILLED DRUMS WITH HOLES

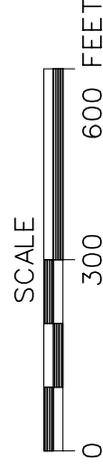


FIGURE 4-1

PROPOSED SAMPLE LOCATION MAP  
 FORMER MORTAR FIRING POINT  
 PARCEL 105Q-X  
 FORMER DEFENDAM RANGE  
 (EASTERN), PARCEL 225Q

U. S. ARMY CORPS OF ENGINEERS  
 MOBILE DISTRICT  
 FORT MCLELLAN  
 CALHOUN COUNTY, ALABAMA  
 Contract No. DACA21-96-D-0018



**IT CORPORATION**  
 A Member of The IT Group

Table 4-2

Surface and Subsurface Soil Sample Designations and QA/QC Sample Quantities  
 Site Investigation,  
 Parcels 105Q-X and 225Q  
 Fort McClellan, Calhoun County, Alabama

(Page 1 of 2)

Parcel Number	Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
				Field Duplicates	MS/MSD	
105Q-X	HR-105Q-GP01	HR-105Q-GP01-SS-RR0001-REG	0-1		HR-105Q-GP01-SS-RR0001-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
		HR-105Q-GP01-DS-RR0002-REG	2-4			
	HR-105Q-GP02	HR-105Q-GP02-SS-RR0003-REG	0-1			TAL Metals and Explosives
		HR-105Q-GP02-DS-RR0004-REG	2-4			
	HR-105Q-GP03	HR-105Q-GP03-SS-RR0005-REG	0-1			TAL Metals and Explosives
		HR-105Q-GP03-DS-RR0006-REG	2-4			
HR-105Q-GP04	HR-105Q-GP04-SS-RR0007-REG	0-1			TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides	
	HR-105Q-GP04-DS-RR0008-REG	2-4	HR-105Q-GP04-DS-RR0009-FD			
HR-105Q-GP05	HR-105Q-GP05-SS-RR0010-REG	0-1			TAL Metals and Explosives	
	HR-105Q-GP05-DS-RR0011-REG	2-4				
HR-105Q-GP06	HR-105Q-GP06-SS-RR0012-REG	0-1			TAL Metals and Explosives	
	HR-105Q-GP06-DS-RR0013-REG	2-4				
225Q	HR-225Q-GP01	HR-225Q-GP01-SS-RM0001-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP01-DS-RM0002-REG	2-4			
	HR-225Q-GP02	HR-225Q-GP02-SS-RM0003-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP02-DS-RM0004-REG	2-4			
	HR-225Q-GP03	HR-225Q-GP03-SS-RM0005-REG	0-1			TAL Metals and Explosives
HR-225Q-GP03-DS-RM0006-REG		2-4				
HR-225Q-GP04	HR-225Q-GP04-SS-RM0007-REG	0-1			TAL Metals and Explosives	
	HR-225Q-GP04-DS-RM0008-REG	2-4				
HR-225Q-GP05	HR-225Q-GP05-SS-RM0009-REG	0-1			TAL Metals and Explosives	
	HR-225Q-GP05-DS-RM0010-REG	2-4				

Table 4-2

**Surface and Subsurface Soil Sample Designations and QA/QC Sample Quantities**  
**Site Investigation,**  
**Parcels 105Q-X and 225Q**  
**Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

Parcel Number	Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
				Field Duplicates	MS/MSD	
	HR-225Q-GP06	HR-225Q-GP06-SS-RM0011-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP06-DS-RM0012-REG	2-4			
	HR-225Q-GP07	HR-225Q-GP07-SS-RM0013-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP07-DS-RM0014-REG	2-4			
	HR-225Q-GP08	HR-225Q-GP08-SS-RM0015-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP08-DS-RM0016-REG	2-4			
	HR-225Q-GP09	HR-225Q-GP09-SS-RM0017-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP09-DS-RM0018-REG	2-4			
	HR-225Q-GP10	HR-225Q-GP10-SS-RM0019-REG	0-1	HR-225Q-GP10-SS-RM0020-FD		TAL Metals and Explosives
		HR-225Q-GP10-DS-RM0021-REG	2-4			
	HR-225Q-GP11	HR-225Q-GP11-SS-RM0022-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP11-DS-RM0023-REG	2-4			
	HR-225Q-GP12	HR-225Q-GP12-SS-RM0024-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP12-DS-RM0025-REG	2-4			
	HR-225Q-GP13	HR-225Q-GP13-SS-RM0026-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP13-DS-RM0027-REG	2-4			
	HR-225Q-GP14	HR-225Q-GP14-SS-RM0028-REG	0-1			TAL Metals and Explosives
		HR-225Q-GP14-DS-RM0029-REG	2-4	HR-225Q-GP14-DS-RM0030-FD		

Cl and OP - Chlorinated and Organophosphorous  
Explosives - Nitroaromatic and Nitramine.  
FD - Field duplicate.  
MS/MSD - Matrix spike/matrix spike duplicate.  
QA/QC - Quality assurance/quality control.

REG - Field sample.  
SVOCs - Semivolatile organic compounds.  
TAL - Target analyte list.  
TCL - Target compound list.  
VOCs - Volatile organic compounds.

## **4.2.2 Subsurface Soil Sampling**

Subsurface soil samples will be collected from 20 soil boring locations at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q.

### **4.2.2.1 Sample Locations and Rationales**

Subsurface soil samples will be collected from the soil borings proposed on Figure 4-1. The sampling rationale for each subsurface soil sample location is listed in Table 4-1. Subsurface soil sample designations and QA/QC sample requirements are listed in Table 4-2. The final soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field observations and utility and UXO clearance results.

### **4.2.2.2 Sample Collection**

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot bgs in the unsaturated zone. The soil borings will be advanced and soil samples collected using the direct-push sampling procedures specified in Section 5.1.1.1 and Section 6.1.1.1 of the SAP (IT, 2000a). In areas where site access does not permit the use of a direct-push rig, the samples will be collected using a hand auger as specified in Section 5.1.1.2 and Section 6.1.1.1 of the SAP.

Soil samples will be collected continuously for the first 4 feet. A detailed lithological log will be recorded by the on-site geologist for each borehole. At least one subsurface sample from each borehole will be selected for analysis. The collected subsurface soil samples will be field-screened using a PID in accordance with Section 6.8.3 of the SAP to measure samples exhibiting elevated readings exceeding background (readings in ambient air). Typically, the subsurface soil sample showing the highest reading (above background) will be selected and sent to the laboratory for analysis. If none of the samples indicate a reading exceeding background using the PID, the deepest interval from the soil boring will be sampled and submitted to the laboratory for analysis. Subsurface soil samples may be selected for analysis from any depth interval if the on-site geologist suspects PSSCs at the interval. Site conditions such as lithology may also determine the actual sample depth interval submitted for analysis. The depth of the boring may be extended beyond 4 feet bgs, and more than one subsurface soil sample may be collected if field measurements and observations indicate a possible layer of PSSCs, and/or additional sample data would provide insight to the existence of any PSSCs.

Sample documentation and COC will be recorded as specified in Chapter 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Chapter 4.0 and listed in Table 4-1 of the QAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

### **4.2.3 Depositional Sampling**

Six depositional soil samples will be collected from the area of investigation at Former Mortar Firing Point, Parcel 105Q-X, and Former Defendam Range (Eastern), Parcel 225Q.

#### **4.2.3.1 Sample Locations and Rationales**

The proposed locations for the depositional soil samples are shown on Figure 4-1. Depositional sampling rationales are presented in Table 4-1. The depositional sample designations and QA/QC sample requirements are listed in Table 4-3. The actual depositional sample points will be at the discretion of the ecological sampler, based on drainage pathways and actual field observations.

#### **4.2.3.2 Sample Collection**

The depositional samples will be collected in accordance with the procedures for surface soil sampling as specified in Section 6.1.1.1 of the SAP. Sample documentation and COC will be recorded as specified in Chapter 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analysis required in this SFSP are discussed in Chapter 4.0 and listed in Table 4-1 of the SAP. The depositional samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

### **4.3 Decontamination Requirements**

Decontamination will be performed on sampling and non-sampling equipment to prevent cross-contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 6.5.1.1 of the SAP (IT, 2002a). Decontamination of non-sampling equipment will be performed in accordance with the requirements presented in Section 6.5.1.2 of the SAP.

### **4.4 Surveying of Sample Locations**

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using a global positioning system (GPS) to provide accuracy within 1 meter. Horizontal

Table 4-3

**Depositional Soil Sample Designations and QA/QC Sample Quantities  
Site Investigation,  
Parcels 105Q-X and 225Q  
Fort McClellan, Calhoun County, Alabama**

Parcel Number	Sample Location	Sample Designation	Sample Matrix	Sample Depth	QA/QC Samples		Analytical Suite
					Field Duplicates	MS/MSD	
225Q	HR-225Q-DEP01	HR-225Q-DEP01-DEP-RM0031-REG	Depositional Soil	0-1			TAL Metals and Explosives
	HR-225Q-DEP02	HR-225Q-DEP02-DEP-RM0032-REG	Depositional Soil	0-1		HR-225Q-DEP02-DEP-RM0032-MS/MSD	TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-225Q-DEP03	HR-225Q-DEP03-DEP-RM0033-REG	Depositional Soil	0-1			TAL Metals and Explosives
	HR-225Q-DEP04	HR-225Q-DEP04-DEP-RM0034-REG	Depositional Soil	0-1	HR-225Q-DEP04-DEP-RM0035-FD		TAL Metals and Explosives
	HR-225Q-DEP05	HR-225Q-DEP05-DEP-RM0036-REG	Depositional Soil	0-1			TAL Metals and Explosives
	HR-225Q-DEP06	HR-225Q-DEP06-DEP-RM0037-REG	Depositional Soil	0-1	HR-225Q-DEP06-DEP-RM0038-FD		TAL Metals and Explosives

CI and OP - Chlorinated and Organophosphorous.  
Explosives - Nitroaromatic and Nitramine.  
FD - Field duplicate.  
MS/MSD - Matrix spike/matrix spike duplicate.  
QA/QC - Quality assurance/quality control.  
REG - Field sample.

SVOCs - Semivolatile organic compounds.  
TAL - Target analyte list.  
TCL - Target compound list.  
TOC - Total organic carbon  
VOCs - Volatile organic compounds.

coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Procedures to be used for GPS surveying are described in Section 4.4.1.1 of the SAP.

#### **4.5 Analytical Program**

Samples collected at locations specified in this SFSP will be analyzed for a specific suite of chemicals and elements based on the history of site usage, as well as EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from Former Mortar Firing Point, Parcel 105Q-X, and Former Defendamm Range (Eastern), Parcel 225Q, consist of the following list of analytical suites:

- Target analyte metals - Method 6010B/7000
- Nitroaromatic/nitramine explosives – Method 8330.

Approximately ten percent of the sample types will be analyzed for an extended suite of parameters which includes:

- Target compound list volatile organic compounds - Method 5035/8260B
- Target compound list semivolatile organic compounds - Method 8270C
- Chlorinated herbicides - Method 8151A
- Chlorinated pesticides - Method 8081A
- Organophosphorus pesticides - Method 8141A.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-4 in this SFSP and Chapter 5.0 of the QAP. Data will be reported in accordance with definitive data requirements of Chapter 2 of the USACE Engineering Manual 200-1-6, *Chemical Quality Assurance For Hazardous, Toxic and Radioactive Waste (HTRW) Projects* (USACE, 1997), and evaluated by the stipulated requirements for the generation of definitive data (Section 7.2.2 of the QAP). Chemical data will be reported by the laboratory via hard-copy data packages using Contract Laboratory Program-like forms, along with electronic copies. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

Table 4-4

**Analytical Samples  
Site Investigation,  
Parcels 105Q-X and 225Q  
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples <sup>a</sup>				EMAX
				No. of Sample Points	No. of Events	No. of Field Samples	Field Dups (10%)	MS/MSD (5%)	Trip Blank (1/ship)	Eq. Rinse (1/wk/matrix)	Total No. Analysis

**Parcels 105Q-X and 225Q: 46 soil matrix samples (20 surface soil, 20 subsurface soil, and 6 depositional soil samples)**

**All samples will be analyzed for the following parameters:**

Explosives	8330	soil	normal	46	1	46	5	2	0	3	58
TAL Metals	6010B/7000	soil	normal	46	1	46	5	2	0	3	58

**Approximately 10% of the sample types will be analyzed for the following parameters:**

Nitroaromatic/Nitromine	8260B	soil	normal	5	1	5	1	1	1	1	10
TCL VOCs	8270C	soil	normal	5	1	5	1	1	0	1	9
Chlorinated Pesticides	8081A	soil	normal	5	1	5	1	1	0	1	9
Organophosphorus Pesticides	8141A	soil	normal	5	1	5	1	1	0	1	9
Chlorinated Herbicides	8151A	soil	normal	5	1	5	1	1	0	1	9

**Parcels 105Q-X and 225Q Subtotal:**

117	15	9	1	11	162
-----	----	---	---	----	-----

<sup>a</sup>Field duplicate, QA split, and MS/MSD samples were calculated as a percentage of the field samples collected per site and were rounded to the nearest whole number.

Trip blank samples will be collected with water matrix samples for VOC analysis only. Assumed four field samples per day to estimate trip blanks. Equipment blanks will be collected once per event whenever sampling equipment is field decontaminated and re-used. They will be repeated weekly for sampling events that last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

MS/MSD - Matrix spike/matrix spike duplicate.  
QA/QC - Quality assurance/quality control.  
SVOCs - Semivolatile organic compounds.

TAL - Target analyte list.  
TAT - Turn-around time  
TCL - Target compound list.  
VOCs - Volatile organic compounds.

Ship samples to: EMAX Laboratories, Inc.  
1835 205th Street  
Torrance, CA 90501  
Attn: Elizabeth McIntyre  
Tel: 310-618-8889  
Fax: 310-618-0818

#### **4.6 Sample Preservation, Packaging, and Shipping**

Sample preservation, packaging, and shipping will follow the procedures specified in Sections 6.1.3 through 6.1.7 of the SAP (IT, 2002a). Completed analysis request/COC records will be secured and included with each shipment of coolers to:

Attn: Sample Receiving/Elizabeth McIntyre  
EMAX Laboratories, Inc.  
1835 205th Street  
Torrance, California 90501  
Telephone: (310) 618-8889.

#### **4.7 Investigation-Derived Waste Management**

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements described in Appendix D of the SAP (IT, 2002a). The IDW expected to be generated at Former Mortar Firing Point, Parcel 105Q-X, and Former Defend Range (Eastern), Parcel 225Q, will include decontamination fluids, soil cuttings, and disposable personal protective equipment. Sampling of IDW to obtain analytical results for characterizing the waste for disposal will follow the procedures specified in Section 6.1.1.8 of the SAP.

#### **4.8 Site-Specific Safety and Health**

Safety and health requirements for this SI are provided in the SSHP attachment for Former Mortar Firing Point, Parcel 105Q-X, and Former Defend Range, Parcel 225Q. The SSHP attachment will be used in conjunction with the installation-wide safety and health plan, Attachment A of the SAP (IT, 2002a).

## **5.0 Project Schedule**

---

The project schedule for the SI activities will be provided by the IT project manager to the Base Realignment and Closure Cleanup Team.

## 6.0 References

---

Environmental Science and Engineering, Inc. (ESE), 1998, *Final Environmental Baseline Survey, Fort McClellan, Alabama*, prepared for U.S. Army Environmental Center, Aberdeen Proving Ground, Maryland, January.

Fort McClellan (FTMC), 1997, *Fort McClellan Comprehensive Reuse Plan, Fort McClellan Reuse and Redevelopment Authority of Alabama*, prepared under contract to the Calhoun County Commission, November.

IT Corporation (IT), 2002a, *Draft Revision 3, Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*, February.

IT Corporation (IT), 2002b, *Draft Revision 2, Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, February.

U.S. Army Corps of Engineers (USACE), 1999a, *Archive Search Report, Maps, Fort McClellan, Anniston, Alabama*, July.

U.S. Army Corps of Engineers (USACE), 1999b, *Statement of Work for Task Order CK10, Remedial Investigations (RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama*, June.

U.S. Army Corps of Engineers (USACE), 1997, *Chemical Quality Assurance For Hazardous, Toxic and Radioactive Waste (HTRW) Projects*, EM200-1-6, October.

U.S. Department of Agriculture (USDA), 1961, *Soil Survey, Calhoun County, Alabama*, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Environmental Protection Agency (EPA), 2000, *Guidance for the Data Quality Objectives Process*, EPA 600/R-96/005, August.

U. S. Environmental Protection Agency (EPA), 1999, *Statement of Work for Task Order CK10, Remedial Investigations (RIs) at the Chemical Warfare Material Sites, RIs at the Fuel/Training Areas, RIs at the Print Plants/Motor Pools, RIs at the Ground Scars/Boiler Plants, RI at Range 24A, Site Investigations (SIs) at the Historic Ranges, and a Groundwater Investigation at Rideout Field at Fort McClellan, Alabama*, June.

**ATTACHMENT 1**

**LIST OF ABBREVIATIONS AND ACRONYMS**

## List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid	BCT	BRAC Cleanup Team	Cl.	chlorinated
2,4,5-T	2,4,5-trichlorophenoxyacetic acid	BERA	baseline ecological risk assessment	CLP	Contract Laboratory Program
2,4,5-TP	silvex	BEHP	bis(2-ethylhexyl)phthalate	cm	centimeter
3D	3D International Environmental Group	BFB	bromofluorobenzene	CN	chloroacetophenone
AB	ambient blank	BFE	base flood elevation	CNB	chloroacetophenone, benzene, and carbon tetrachloride
AbB3	Anniston gravelly clay loam, 2 to 6 percent slopes, severely eroded	BG	Bacillus globigii	CNS	chloroacetophenone, chloropicrin, and chloroform
AbC3	Anniston gravelly clay loam, 6 to 10 percent slopes, severely eroded	bgs	below ground surface	CO	carbon monoxide
AbD3	Anniston and Allen gravelly clay loams, 10 to 15 percent slopes, eroded	BHC	betahexachlorocyclohexane	Co-60	cobalt-60
Abs	skin absorption	BHHRA	baseline human health risk assessment	CoA	Code of Alabama
ABS	dermal absorption factor	BIRTC	Branch Immaterial Replacement Training Center	COC	chain of custody; contaminant of concern
AC	hydrogen cyanide	bkg	background	COE	Corps of Engineers
ACAD	AutoCadd	bls	below land surface	Con	skin or eye contact
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded	BOD	biological oxygen demand	COPC	chemical(s) of potential concern
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded	Bp	soil-to-plant biotransfer factors	COPEC	chemical(s) of potential ecological concern
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded	BRAC	Base Realignment and Closure	CPSS	chemicals present in site samples
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded	Braun	Braun Intertec Corporation	CQCSM	Contract Quality Control System Manager
ACGIH	American Conference of Governmental Industrial Hygienists	BSAF	biota-to-sediment accumulation factors	CRDL	contract-required detection limit
AdE	Anniston and Allen stony loam, 10 to 25 percent slope	BSC	background screening criterion	CRL	certified reporting limit
ADEM	Alabama Department of Environmental Management	BTAG	Biological Technical Assistance Group	CRQL	contract-required quantitation limit
ADPH	Alabama Department of Public Health	BTEX	benzene, toluene, ethyl benzene, and xylenes	CRZ	contamination reduction zone
AEC	U.S. Army Environmental Center	BTOC	below top of casing	Cs-137	cesium-137
AEL	airborne exposure limit	BTV	background threshold value	CS	ortho-chlorobenzylidene-malononitrile
AET	adverse effect threshold	BW	biological warfare; body weight	CSEM	conceptual site exposure model
AF	soil-to-skin adherence factor	BZ	breathing zone; 3-quinuclidinyl benzilate	CSM	conceptual site model
AHA	ammunition holding area	C	ceiling limit value	CT	central tendency
AL	Alabama	Ca	carcinogen	ctr.	container
ALAD	-aminolevulinic acid dehydratase	CAB	chemical warfare agent breakdown products	CWA	chemical warfare agent
amb.	Amber	CAMU	corrective action management unit	CWM	chemical warfare material; clear, wide mouth
amsl	above mean sea level	CBR	chemical, biological and radiological	CX	dichloroformoxime
ANAD	Anniston Army Depot	CCAL	continuing calibration	'D'	duplicate; dilution
AOC	area of concern	CCB	continuing calibration blank	D&I	detection and identification
APEC	areas of potential ecological concern	CCV	continuing calibration verification	DAF	dilution-attenuation factor
APT	armor-piercing tracer	CD	compact disc	DANC	decontamination agent, non-corrosive
AR	analysis request	CDTF	Chemical Defense Training Facility	°C	degrees Celsius
ARAR	applicable or relevant and appropriate requirement	CEHNC	U.S. Army Engineering and Support Center, Huntsville	°F	degrees Fahrenheit
AREE	area requiring environmental evaluation	CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act	DCE	dichloroethene
ASP	Ammunition Supply Point	CERFA	Community Environmental Response Facilitation Act	DDD	dichlorodiphenyldichloroethane
ASR	Archives Search Report	CESAS	Corps of Engineers South Atlantic Savannah	DDE	dichlorodiphenyldichloroethane
AST	aboveground storage tank	CF	conversion factor	DDT	dichlorodiphenyltrichloroethane
ASTM	American Society for Testing and Materials	CFC	chlorofluorocarbon	DEH	Directorate of Engineering and Housing
AT	averaging time	CFDP	Center for Domestic Preparedness	DEP	depositional soil
ATSDR	Agency for Toxic Substances and Disease Registry	CFR	Code of Federal Regulations	DFTPP	decafluorotriphenylphosphine
ATV	all-terrain vehicle	CG	carbonyl chloride (phosgene)	DI	deionized
AWARE	Associated Water and Air Resources Engineers, Inc.	CGI	combustible gas indicator	DID	data item description
AWWSB	Anniston Water Works and Sewer Board	ch	inorganic clays of high plasticity	DIMP	di-isopropylmethylphosphonate
'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)	CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine	DM	dry matter
BCF	blank correction factor; bioconcentration factor	CK	cyanogen chloride	DMBA	dimethylbenz(a)anthracene
		cl	inorganic clays of low to medium plasticity	DMMP	dimethylmethylphosphonate

## List of Abbreviations and Acronyms (Continued)

DOD	U.S. Department of Defense	FD	field duplicate	GW	groundwater
DOJ	U.S. Department of Justice	FDA	U.S. Food and Drug Administration	gw	well-graded gravels; gravel-sand mixtures
DOT	U.S. Department of Transportation	FedEx	Federal Express, Inc.	HA	hand auger
DP	direct-push	FEMA	Federal Emergency Management Agency	HCl	hydrochloric acid
DPDO	Defense Property Disposal Office	FFCA	Federal Facilities Compliance Act	HD	distilled mustard
DPT	direct-push technology	FFE	field flame expedient	HDPE	high-density polyethylene
DQO	data quality objective	FFS	focused feasibility study	HEAST	Health Effects Assessment Summary Tables
DRMO	Defense Reutilization and Marketing Office	FI	fraction of exposure	Herb.	herbicides
DRO	diesel range organics	Fil	filtered	HHRA	human health risk assessment
DS	deep (subsurface) soil	Flt	filtered	HI	hazard index
DS2	Decontamination Solution Number 2	FMDC	Fort McClellan Development Commission	HPLC	high performance liquid chromatography
DWEL	drinking water equivalent level	FML	flexible membrane liner	HNO <sub>3</sub>	nitric acid
E&E	Ecology and Environment, Inc.	FMP 1300	Former Motor Pool 1300	HQ	hazard quotient
EB	equipment blank	FOMRA	Former Ordnance Motor Repair Area	HQ <sub>screen</sub>	screening-level hazard quotient
EBS	environmental baseline survey	Foster Wheeler	Foster Wheeler Environmental Corporation	hr	hour
EC <sub>50</sub>	effects concentration for 50 percent of a population	Frtn	fraction	H&S	health and safety
ECBC	Edgewood Chemical/Biological Command	FS	field split; feasibility study	HSA	hollow-stem auger
ED	exposure duration	FSP	field sampling plan	HTRW	hazardous, toxic, and radioactive waste
EDD	electronic data deliverable	ft	feet	'I'	out of control, data rejected due to low recovery
EF	exposure frequency	ft/ft	feet per foot	IATA	International Air Transport Authority
EDQL	ecological data quality level	FTA	Fire Training Area	ICAL	initial calibration
EE/CA	engineering evaluation and cost analysis	FTMC	Fort McClellan	ICB	initial calibration blank
Elev.	elevation	FTRRA	FTMC Reuse & Redevelopment Authority	ICP	inductively-coupled plasma
EM	electromagnetic	g	gram	ICRP	International Commission on Radiological Protection
EMI	Environmental Management Inc.	g/m <sup>3</sup>	gram per cubic meter	ICS	interference check sample
EM31	Geonics Limited EM31 Terrain Conductivity Meter	G-856	Geometrics, Inc. G-856 magnetometer	ID	inside diameter
EM61	Geonics Limited EM61 High-Resolution Metal Detector	G-858G	Geometrics, Inc. G-858G magnetic gradiometer	IDL	instrument detection limit
EOD	explosive ordnance disposal	GAF	gastrointestinal absorption factor	IDLH	immediately dangerous to life or health
EODT	explosive ordnance disposal team	gal	gallon	IDM	investigative-derived media
EPA	U.S. Environmental Protection Agency	gal/min	gallons per minute	IDW	investigation-derived waste
EPC	exposure point concentration	GB	sarin	IEUBK	Integrated Exposure Uptake Biokinetic
EPIC	Environmental Photographic Interpretation Center	gc	clay gravels; gravel-sand-clay mixtures	IF	ingestion factor; inhalation factor
EPRI	Electrical Power Research Institute	GC	gas chromatograph	ILCR	incremental lifetime cancer risk
ER	equipment rinsate	GCL	geosynthetic clay liner	IMPA	isopropylmethyl phosphonic acid
ERA	ecological risk assessment	GC/MS	gas chromatograph/mass spectrometer	IMR	Iron Mountain Road
ER-L	effects range-low	GCR	geosynthetic clay liner	in.	inch
ER-M	effects range-medium	GFAA	graphite furnace atomic absorption	Ing	ingestion
ESE	Environmental Science and Engineering, Inc.	GIS	Geographic Information System	Inh	inhalation
ESMP	Endangered Species Management Plan	gm	silty gravels; gravel-sand-silt mixtures	IP	ionization potential
ESN	Environmental Services Network, Inc.	gp	poorly graded gravels; gravel-sand mixtures	IPS	International Pipe Standard
ESV	ecological screening value	gpm	gallons per minute	IR	ingestion rate
ET	exposure time	GPR	ground-penetrating radar	IRDMIS	Installation Restoration Data Management Information System
EU	exposure unit	GPS	global positioning system	IRIS	Integrated Risk Information Service
Exp.	explosives	GS	ground scar	IRP	Installation Restoration Program
E-W	east to west	GSA	General Services Administration; Geologic Survey of Alabama	IS	internal standard
EZ	exclusion zone	GSBP	Ground Scar Boiler Plant	ISCP	Installation Spill Contingency Plan
FAR	Federal Acquisition Regulations	GSSI	Geophysical Survey Systems, Inc.	IT	IT Corporation
FB	field blank	GST	ground stain	ITEMS	IT Environmental Management System™

## List of Abbreviations and Acronyms (Continued)

'J'	estimated concentration	MMBtu/hr	million Btu per hour	NRCC	National Research Council of Canada
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded	MOGAS	motor vehicle gasoline	NRHP	National Register of Historic Places
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded	MP	Military Police	ns	nanosecond
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes	MPA	methyl phosphonic acid	N-S	north to south
JPA	Joint Powers Authority	MPM	most probable munition	NS	not surveyed
K	conductivity	MQL	method quantitation limit	NSA	New South Associates, Inc.
K <sub>ow</sub>	octonal-water partition coefficient	MR	molasses residue	nT	nanotesla
L	lewisite; liter	MRL	method reporting limit	nT/m	nanoteslas per meter
l	liter	MS	matrix spike	NTU	nephelometric turbidity unit
LBP	lead-based paint	mS/cm	millisiemens per centimeter	nv	not validated
LC	liquid chromatography	mS/m	millisiemens per meter	O <sub>2</sub>	oxygen
LCS	laboratory control sample	MSD	matrix spike duplicate	O&G	oil and grease
LC <sub>50</sub>	lethal concentration for 50 percent population tested	MTBE	methyl tertiary butyl ether	O&M	operation and maintenance
LD <sub>50</sub>	lethal dose for 50 percent population tested	msl	mean sea level	OB/OD	open burning/open detonation
LEL	lower explosive limit	MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded	OD	outside diameter
LOAEL	lowest-observed-advserse-effects-level	mV	millivolts	OE	ordnance and explosives
LT	less than the certified reporting limit	MW	monitoring well	oh	organic clays of medium to high plasticity
LUC	land-use control	MWI&P	Monitoring Well Installation and Management Plan	ol	organic silts and organic silty clays of low plasticity
LUCAP	land-use control assurance plan	Na	sodium	OP	organophosphorus
LUCIP	land-use control implementation plan	NA	not applicable; not available	ORP	oxidation-reduction potential
max	maximum	NAD	North American Datum	OSHA	Occupational Safety and Health Administration
MB	method blank	NAD83	North American Datum of 1983	OSWER	Office of Solid Waste and Emergency Response
MCL	maximum contaminant level	NAVD88	North American Vertical Datum of 1988	OVM-PID/FID	organic vapor meter-photoionization detector/flame ionization detector
MCLG	maximum contaminant level goal	NAS	National Academy of Sciences	OVS	oil/water separator
MCPA	4-chloro-2-methylphenoxyacetic acid	NCEA	National Center for Environmental Assessment	oz	ounce
MCS	media cleanup standard	NCP	National Contingency Plan	PA	preliminary assessment
MD	matrix duplicate	NCRP	National Council on Radiation Protection and Measurements	PAH	polynuclear aromatic hydrocarbon
MDC	maximum detected concentration	ND	not detected	PARCCS	precision, accuracy, representativeness, comparability, completeness, and sensitivity
MDCC	maximum detected constituent concentration	NE	no evidence; northeast	Parsons	Parsons Engineering Science, Inc.
MDL	method detection limit	ne	not evaluated	Pb	lead
mg	milligrams	NEW	net explosive weight	PBMS	performance-based measurement system
mg/kg	milligrams per kilogram	NFA	No Further Action	PC	permeability coefficient
mg/kg/day	milligram per kilogram per day	NG	National Guard	PCB	polychlorinated biphenyl
mg/kgbw/day	milligrams per kilogram of body weight per day	NGP	National Guardsperson	PCDD	polychlorinated dibenzo-p-dioxins
mg/L	milligrams per liter	ng/L	nanograms per liter	PCDF	polychlorinated dibenzofurans
mg/m <sup>3</sup>	milligrams per cubic meter	NGVD	National Geodetic Vertical Datum	PCE	perchloroethene
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils	Ni	nickel	PCP	pentachlorophenol
MHz	megahertz	NIC	notice of intended change	PDS	Personnel Decontamination Station
µg/g	micrograms per gram	NIOSH	National Institute for Occupational Safety and Health	PEF	particulate emission factor
µg/kg	micrograms per kilogram	NIST	National Institute of Standards and Technology	PEL	permissible exposure limit
µg/L	micrograms per liter	NLM	National Library of Medicine	PES	potential explosive site
µmhos/cm	micromhos per centimeter	NPDES	National Pollutant Discharge Elimination System	Pest.	pesticides
min	minimum	NPW	net present worth	PETN	pentarey thritol tetranitrate
MINICAMS	miniature continuous air monitoring system	No.	number	PFT	portable flamethrower
ml	inorganic silts and very fine sands	NOAA	National Oceanic and Atmospheric Administration	PG	professional geologist
mL	milliliter	NOAEL	no-observed-adverse-effects-level	PID	photoionization detector
mm	millimeter	NR	not requested; not recorded; no risk	PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
MM	mounded material	NRC	National Research Council		

## List of Abbreviations and Acronyms (Continued)

PM	project manager	RTECS	Registry of Toxic Effects of Chemical Substances	STEL	short-term exposure limit
POC	point of contact	RTK	real-time kinematic	STL	Severn-Trent Laboratories
POL	petroleum, oils, and lubricants	SA	exposed skin surface area	STOLS	Surface Towed Ordnance Locator System®
POW	prisoner of war	SAD	South Atlantic Division	Std. units	standard units
PP	peristaltic pump; Proposed Plan	SAE	Society of Automotive Engineers	SU	standard unit
ppb	parts per billion	SAIC	Science Applications International Corporation	SUXOS	senior UXO supervisor
PPE	personal protective equipment	SAP	installation-wide sampling and analysis plan	SVOC	semivolatile organic compound
ppm	parts per million	sc	clayey sands; sand-clay mixtures	SW	surface water
PPMP	Print Plant Motor Pool	Sch.	Schedule	SW-846	U.S. EPA's <i>Test Methods for Evaluating Solid Waste: Physical/Chemical Methods</i>
ppt	parts per thousand	SCM	site conceptual model	SWMU	solid waste management unit
PR	potential risk	SD	sediment	SWPP	storm water pollution prevention plan
PRA	preliminary risk assessment	SDG	sample delivery group	SZ	support zone
PRG	preliminary remediation goal	SDZ	safe distance zone; surface danger zone	TAL	target analyte list
PSSC	potential site-specific chemical	SEMS	Southern Environmental Management & Specialties, Inc.	TAT	turn around time
pt	peat or other highly organic silts	SF	cancer slope factor	TB	trip blank
PVC	polyvinyl chloride	SFSP	site-specific field sampling plan	TBC	to be considered
QA	quality assurance	SGF	standard grade fuels	TCA	trichloroethane
QA/QC	quality assurance/quality control	SHP	installation-wide safety and health plan	TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
QAM	quality assurance manual	SI	site investigation	TCDF	tetrachlorodibenzofurans
QAO	quality assurance officer	SINA	Special Interest Natural Area	TCE	trichloroethene
QAP	installation-wide quality assurance plan	SL	standing liquid	TCL	target compound list
QC	quality control	SLERA	screening-level ecological risk assessment	TCLP	toxicity characteristic leaching procedure
QST	QST Environmental, Inc.	sm	silty sands; sand-silt mixtures	TDEC	Tennessee Department of Environment and Conservation
qty	quantity	SM	Serratia marcescens	TDGCL	thiodiglycol
Qual	qualifier	SMDP	Scientific Management Decision Point	TDGCLA	thiodiglycol chloroacetic acid
'R'	rejected data; resample	s/n	signal-to-noise ratio	TERC	Total Environmental Restoration Contract
R&A	relevant and appropriate	SOP	standard operating procedure	THI	target hazard index
RA	remedial action	SOPQAM	U.S. EPA's <i>Standard Operating Procedure/Quality Assurance Manual</i>	TIC	tentatively identified compound
RAO	removal action objective	sp	poorly graded sands; gravelly sands	TLV	threshold limit value
RBC	risk-based concentration	SP	submersible pump	TN	Tennessee
RCRA	Resource Conservation and Recovery Act	SPCC	system performance calibration compound	TNT	trinitrotoluene
RD	remedial design	SPCS	State Plane Coordinate System	TOC	top of casing; total organic carbon
RDX	cyclonite	SPM	sample planning module	TPH	total petroleum hydrocarbons
ReB3	Rarden silty clay loams	SQRT	screening quick reference tables	TR	target cancer risk
REG	regular field sample	Sr-90	strontium-90	TRADOC	U.S. Army Training and Doctrine Command
REL	recommended exposure limit	SRA	streamlined human health risk assessment	TRPH	total recoverable petroleum hydrocarbons
RFA	request for analysis	SRM	standard reference material	TSCA	Toxic Substances Control Act
RfC	reference concentration	Ss	stony rough land, sandstone series	TSDF	treatment, storage, and disposal facility
RfD	reference dose	SS	surface soil	TWA	time-weighted average
RGO	remedial goal option	SSC	site-specific chemical	UCL	upper confidence limit
RI	remedial investigation	SSHO	site safety and health officer	UCR	upper certified range
RL	reporting limit	SSHP	site-specific safety and health plan	'U'	not detected above reporting limit
RME	reasonable maximum exposure	SSL	soil screening level	UF	uncertainty factor
ROD	Record of Decision	SSSL	site-specific screening level	USACE	U.S. Army Corps of Engineers
RPD	relative percent difference	SSSSL	site-specific soil screening level	USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
RRF	relative response factor	STB	supertropical bleach	USAEC	U.S. Army Environmental Center
RSD	relative standard deviation	STC	source-term concentration	USAEHA	U.S. Army Environmental Hygiene Agency
RTC	Recruiting Training Center	STD	standard deviation	USACMLS	U.S. Army Chemical School

## List of Abbreviations and Acronyms (Continued)

---

USAMPS	U.S. Army Military Police School
USATCES	U.S. Army Technical Center for Explosive Safety
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USC	United States Code
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UST	underground storage tank
UTL	upper tolerance level; upper tolerance limit
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Supervisor
UXOSO	UXO safety officer
V	vanadium
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
WAC	Women's Army Corps
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WRS	Wilcoxon rank sum
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd <sup>3</sup>	cubic yards

S – Non-target compound analyzed for and detected (GC/MS methods)  
T – Non-target compound analyzed for but not detected (non GC/MS methods)  
U – Analysis in unconfirmed  
Z – Non-target compound analyzed for and detected (non-GC/MS methods)

### Qualifiers

J – The low-spike recovery is low  
N – The high-spike recovery is low  
R – Data is rejected

### SAIC – Data Qualifiers, Codes and Footnotes, 1995 Remedial Investigation

N/A – Not analyzed

ND – Not detected

#### Boolean Codes

LT – Less than the certified reporting limit

#### Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

I – Interfaces in sample make quantitation and/or identification to be suspicious

J – Value is estimated

K – Reported results are affected by interfaces or high background

N – Tentatively identified compound (match greater than 70%)

Q – Sample interference obscured peak of interest

R – Non-target compound analyzed for but not detected (GC/MS methods)