

**Final
Site-Specific Field Sampling Plan,
Site-Specific Safety and Health Plan, and Site-Specific
Unexploded Ordnance Safety Plan Attachments,
Former Range 43, Parcel 97Q, Range, Choccolocco Corridor,
Parcel 144Q-X, and Impact Area, Choccolocco Corridor,
Parcel 147Q-X**

**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 Range 43, Parcel 97Q,
Range, Choccolocco Corridor, Parcel 144Q-X,
Impact Area, Choccolocco Corridor, Parcel 147Q-X**

**Fort McClellan
Calhoun County, Alabama**

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**Task Order CK10
Contract No. DACA21-96-D-0018
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April 2002

Revision 0

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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 Range 43, Parcel 97Q; Range, Choccolocco Corridor, Parcel 144Q-X; and Impact Area, Choccolocco Corridor, Parcel 147Q-X, at Fort McClellan (FTMC), Calhoun County, Alabama, to determine the presence or absence of potential site-specific chemicals at these sites. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at Parcels 97Q, 144Q-X, and 147Q-X.

Parcels 97Q, 144Q-X, and 147Q-X are located west of the Choccolocco Mountains near the eastern boundary of FTMC. These parcels are located in the northwestern area of the Choccolocco Corridor.

Former Range 43, Parcel 97Q, is identified as a former small arms range located in Choccolocco Corridor. Range 43, Parcel 97Q, is described in the *Final Environmental Baseline Survey, Fort McClellan, Alabama*, (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998) as approximately 4 acres in size; however, the *Archives Search Report, Fort McClellan, Anniston, Alabama* (ASR) (USACE, 1999a and b) describes Range 43 as approximately 7 acres in size. The area of investigation for Parcel 97Q will be expanded beyond the parcel boundaries identified in the EBS, based upon the results of the site walk and review of aerial photographs. The total area of investigation for Parcel 97Q consists of approximately 8 acres.

Interviews with long time FTMC personnel indicated that the Parcel 97Q range was used for small arms training during World War II (WWII), the Korean War, and the Vietnam War. The direction of fire was reported to be to the west; however, the firing line identified by the EBS for this range suggests a southwestern fire direction. Smoke training has also been observed in the vicinity of this former range.

Site walks conducted by IT personnel in December 2001 and January 2002 revealed several features that appear to be related to range-training activities. These features included the following:

- A line of firing positions or target pits, spaced at approximately 20-foot intervals, were observed slightly to the east of Parcel 97Q. The approximate dimensions

were 2 feet by 3 feet wide and 6 feet deep. The walls were supported by wooden framework. These features are presumed to have been used as firing positions or target pits. The location of these features appears to be to the east of the firing line identified in the EBS for Parcel 97Q.

- Numerous 5.56-mm blanks were observed by an overgrown road within the western area of Parcel 97Q.
- Numerous wood-framed target boxes were observed in the hillside southwest of the Parcel 97Q boundary identified in the EBS. The target boxes appear to be linearly oriented in several NW/SE trending lines.
- An end of range sign (black and white diagonal) located approximately 550 feet southwest of the western boundary of Parcel 97Q identified in the EBS.

Parcel 144Q-X, approximately 19 acres in size, is identified as a former range. The footprint of Parcel 144Q-X encompasses about two thirds of Parcel 97Q, and most of Parcel 147Q-X. According to the EBS, the presence of cratered areas within the parcel boundaries suggests that large caliber weapons were fired.

The Parcel 144Q-X site walk conducted by IT personnel in December 2001 revealed four features, one of which is located within the boundaries of Parcel 147Q-X. The observed features are:

- An observation tower located in the east central portion of the parcel
- An airframe mock-up
- A series of firing positions or target pits
- Area of depressions approximately 3 to 6 feet wide by 2 feet deep (located within Parcel 147Q-X).

Parcel 147Q-X, approximately 3 acres in size, was identified as a former impact area. It is not known which range is associated with this impact area. This parcel is located within the footprint of Parcel 144Q-X.

The Parcel 147Q-X site walk revealed the presence of an area of depressions, approximately 3 to 6 feet wide and 2 feet deep in the northeastern area of Parcel 147Q-X. An ammunition box was present in the bottom of one depression. An expended 40-mm flare and an expended pop flare

were present near the depressions. It is speculated that these depressions were used as firing points.

IT will collect 18 surface soil samples, 18 subsurface soil samples, 4 groundwater samples, and 7 depositional soil samples at these parcels. Potential contaminants at Parcels 97Q, 144Q-X, and 147Q-X are primarily metals and explosives. Chemical analyses for the samples collected during the field program will include nitroaromatic/nitroamine explosives and metals. In addition, 10 percent of the samples will be analyzed for volatile organic compounds, semivolatile organic compounds, chlorinated and organophosphorus 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 (PSSC) are present at the parcels at concentrations that pose an unacceptable risk to human health or the environment.

The potential exists for the presence of unexploded ordnance (UXO) at Parcels 97Q, 144Q-X, and 147Q-X due to past site activities. Therefore, prior to initiating field activities at any of these parcels, 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. The surface sweeps and downhole surveys will be conducted to identify anomalies for the purpose of UXO avoidance.

This SFSP attachment for the SAP for Parcels 97Q, 144Q-X, and 147Q-X will be used in conjunction with the site-specific safety and health plan (SSHP), the site-specific UXO safety plan, the installation-wide work plan, and the SAP. The SAP includes the installation-wide safety and health plan (SHP), monitoring well installation and maintenance plan, investigation-derived waste management plan, ordnance and explosives management plan and quality assurance plan. Site-specific hazard analyses are included in the SSHP.

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 site investigations (SI) at Former Range 43, Parcel 97Q, Range, Choccolocco Corridor, Parcel 144Q-X, and Impact Area, Choccolocco Corridor, Parcel 147Q-X, under Task Order CK10, Contract Number DACA21-96-D-0018. Former Range 43, Parcel 97Q, and Range, Choccolocco Corridor, Parcel 144Q-X, are former ranges, and Impact Area, Choccolocco Corridor, Parcel 147Q-X, is a former impact area.

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 Parcels 97Q, 144Q-X, and 147Q-X. This SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) and site-specific unexploded ordnance (UXO) safety plan developed for Parcels 97Q, 144Q-X, and 147Q-X, and the *Installation-Wide Work Plan* (WP) (IT, 2002b) and SAP. The SAP includes the installation-wide safety and health plan (SHP), well installation and maintenance plan, investigation-derived waste management plan, ordnance and explosives management plan, and quality assurance plan (QAP). Site-specific hazard analyses are included in the SSHP.

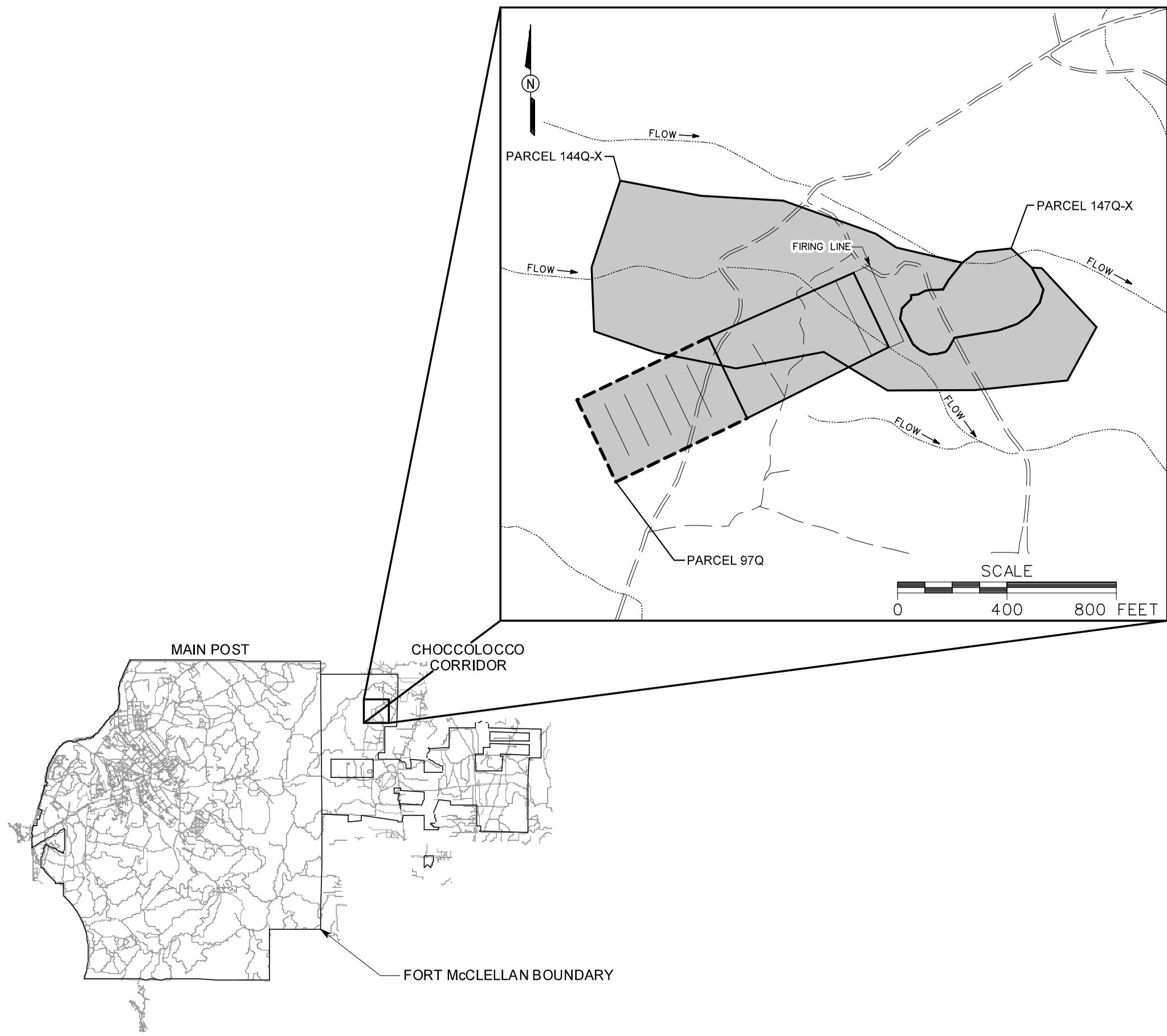
1.2 Site Descriptions

Parcels 97Q, 144Q-X, and 147Q-X are located west of the Choccolocco Mountains near the eastern boundary of the FTMC Main Post. These parcels are located in the northwestern area of the Choccolocco Corridor (Figure 1-1).

In 1941, the Alabama legislature leased approximately 4,488 acres to the U.S. government to provide an access corridor from the Main Post to Talledega National Forest. The lease for Choccolocco Corridor was terminated in May 1998 and the land is now managed by the Alabama Forestry Commission.

The information presented for each of the subject parcels was compiled from the *Final Environmental Baseline Survey, Fort McClellan, Alabama*, (EBS) (Environmental Science and Engineering, Inc.[ESE], 1998), the *Archives Search Report, Fort McClellan, Anniston, Alabama*

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 PROJ. NO.: 796887
 INITIATOR: M. MALONEY
 PROJ. MGR.: J. YACOUB
 DRAFT. CHCK. BY:
 ENGR. CHCK. BY: S. MORAN
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 STARTING DATE: 02/28/02
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LEGEND

-  UNIMPROVED ROADS AND PARKING
-  PAVED ROADS AND PARKING
-  PARCEL BOUNDARY
-  AREA OF ADDITIONAL INVESTIGATION
-  SURFACE DRAINAGE / CREEK
-  WOOD FRAMED TARGET BOXES ON HILLSIDE

FIGURE 1-1
SITE LOCATION MAP
 FORMER RANGE 43
 PARCEL 97Q
 RANGE, CHOCCOLOCCO CORRIDOR
 PARCEL 144Q-X
 IMPACT AREA, CHOCCOLOCCO
 CORRIDOR, PARCEL 147Q-X

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(ASR) (USACE, 1999a and b) and site walks conducted by IT personnel in December 2001 and January 2002.

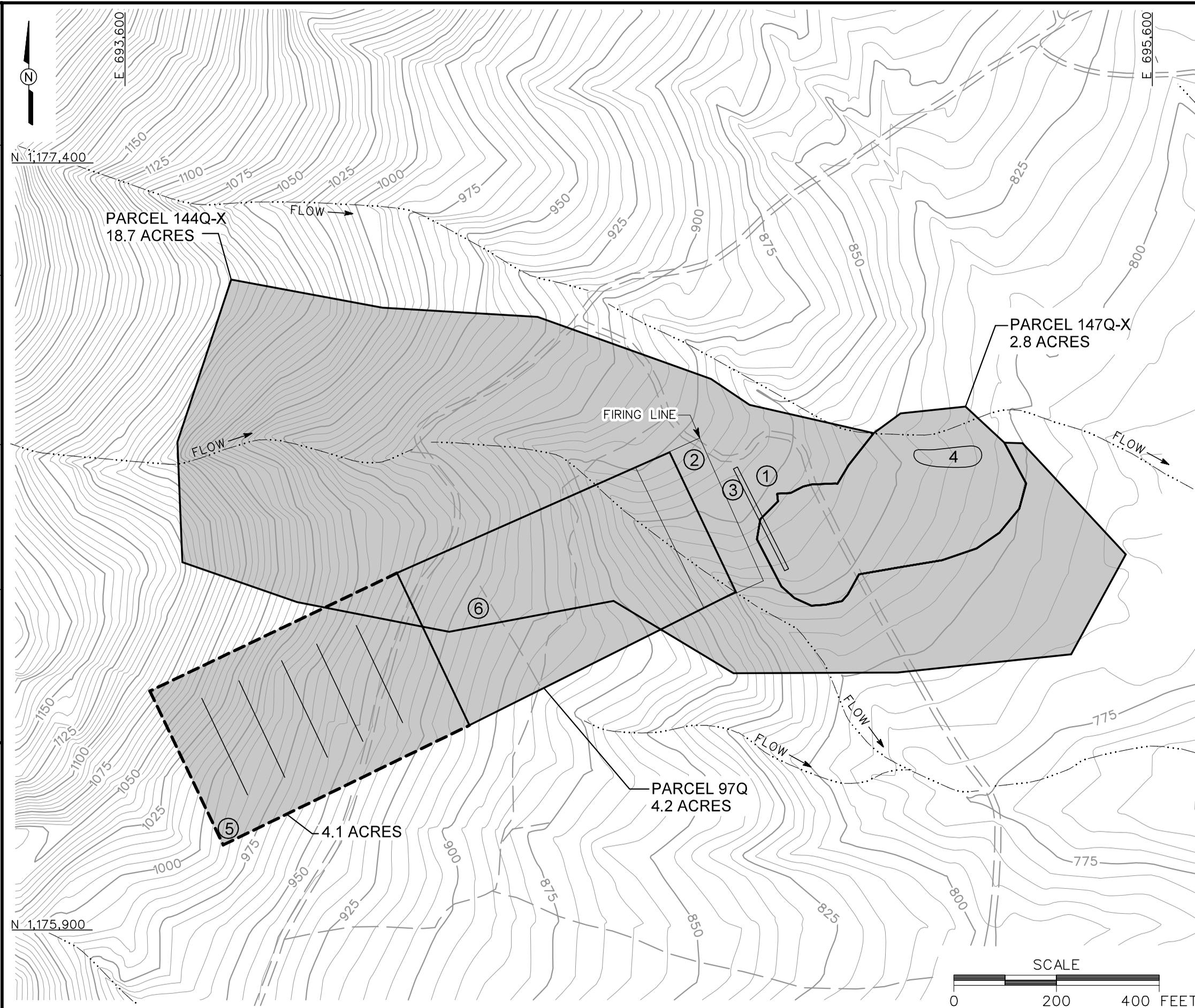
Parcel 97Q. Former Range 43, Parcel 97Q, is identified as a former small arms range located in Choccolocco Corridor. The EBS identifies Range 43, Parcel 97Q, as approximately 4 acres in size; however, in the ASR, Range 43 is reported as approximately 7 acres in size. The area of investigation for Parcel 97Q will be expanded beyond the parcel boundaries identified in the EBS, based upon the results of the site walk and review of aerial photographs. The total area of investigation for Parcel 97Q consists of approximately 8 acres.

Approximately two-thirds of Parcel 97Q is located within the boundaries of Parcel 144Q-X. The Parcel 97Q range was previously designated as Range 43 and Range 3 but the dimensions of these previous ranges are not documented in the EBS. Interviews with long time FTMC personnel indicated that the Parcel 97Q range was used for small arms training during World War II (WWII), the Korean War, and the Vietnam War. The direction of fire was reported to be to the west, however the firing line identified by the EBS for this range suggests a southwestern fire direction. Smoke training has also been observed in the vicinity of this former range (ESE, 1998).

The Parcel 97Q site walks conducted by IT personnel in December 2001 and January 2002 revealed several features that appear to be related to range-training activities (Figure 1-2). These features included the following:

- A line of firing positions or target pits spaced at approximately 20-foot intervals, were observed slightly to the east of Parcel 97Q. The approximate dimensions were 2 feet by 3 feet wide and 6 feet deep. The walls were supported by wooden framework. These features are presumed to have been used as firing positions or target pits. The location of these features appears to be to the east of the firing line identified in the EBS for Parcel 97Q.
- Numerous 5.56-mm blanks were observed by an overgrown road within the western area of Parcel 97Q.
- Numerous wood-framed target boxes were observed in the hillside southwest of the Parcel 97Q boundary identified in the EBS. The target boxes appear to be linearly oriented in several northwest/southeast trending lines.
- An end of range sign (black and white diagonal) located approximately 550 feet southwest of the western boundary of Parcel 97Q identified in the EBS.

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 PROJ. MGR.: J. YACOUB
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LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- PARCEL BOUNDARY
- AREA OF ADDITIONAL INVESTIGATION
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- WOOD FRAMED TARGET BOXES ON HILLSIDE

TRAINING AIDS/PHYSICAL FEATURES OBSERVED

- ① OBSERVATION TOWER
- ② AIR FRAME MOCKUP
- ③ RECTANGULAR DUG-OUT FIRING/TARGET POSITIONS, WALLS SUPPORTED BY WOODEN FRAMEWORK, SPACED ~20' ALONG FIRING LINE
- ④ DEPRESSIONS, AMMUNITION BOXES IN BOTTOM OF DEPRESSION. 40mm FLARE AND POP FLARE (BOTH EXPENDED) FOUND IN AREA
- ⑤ BLACK AND WHITE DIAGONAL END OF RANGE SIGN
- ⑥ OVERGROWN ROAD NUMEROUS 5.56 BLANKS POSSIBLE FIRING POSITION

FIGURE 1-2
SITE MAP
 FORMER RANGE 43
 PARCEL 97Q
 RANGE, CHOCCOLOCCO CORRIDOR
 PARCEL 144Q-X
 IMPACT AREA, CHOCCOLOCCO
 CORRIDOR, PARCEL 147Q-X

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 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



Parcel 144Q-X. Range, Choccolocco Corridor, Parcel 144Q-X, approximately 19 acres in size, is identified as a former range located in the northwestern section of the Choccolocco Corridor. Parcel 144Q-X encompasses about two thirds of Parcel 97Q and most of Parcel 147Q-X. The presence of cratered impact areas within the range area suggests that large caliber weapons may have been fired toward Parcel 144Q-X (ESE, 1998). Fused ordnance may be present at this site. This range appears to be active in Environmental Photographic Interpretation Center aerial photographs dated 1949, 1954, and 1972 (ESE, 1998).

The Parcel 144Q-X site walks, conducted by IT personnel in December 2001 and January 2002, revealed the presence of several possible range-related features within the boundary of Parcel 144Q-X. One of these features is located within the boundaries of Parcel 147Q-X. Most of Parcel 147Q-X is located within the boundaries of Parcel 144Q-X. The locations of these features are illustrated on Figure 1-2. The observed features are:

- An observation tower located in the east central portion of the parcel, near the northwestern edge of Parcel 147Q-X.
- An airframe mock-up is located in the north central portion of Parcel 144Q-X on the path of horse trail. The horse trail goes through the airframe. There are not any bullet holes observed in the airframe, suggesting that it has not been used as a target for range training.
- A series of firing positions or target pits located to the east of Parcel 97Q (described above in the Parcel 97Q description).
- An area of depressions located in the northeastern area of Parcel 147Q-X. The depressions were approximately 3 to 6 feet wide by 2 feet deep. An ammunition box was present in the bottom of one depression. An expended 40-mm flare and an expended pop flare were present near the depressions. It is speculated that these depressions were used as foxholes for firing positions.

Parcel 147Q-X Description. Impact Area, Choccolocco Corridor, Parcel 147Q-X, approximately 3 acres in size, identified as a former impact area, is located in the northwestern section of the Choccolocco Corridor. It is not known which range is associated with this impact area. This parcel is located within the boundaries of Parcel 144Q-X. Fused ordnance may be present at this site (ESE, 1998).

The Parcel 147Q-X site walk, conducted in December 2001, revealed an area of depressions, approximately 3 to 6 feet wide and 2 feet deep in the northeastern area of Parcel 147Q-X. An ammunition box was present in the bottom of one depression. An expended 40-mm flare and an expended pop flare were present near the depressions. It is speculated that these depressions were used as firing points. The locations of these depressions are illustrated in Figure 1-2.

1.2.1 Archive Search Report Ranges

The ASR maps (USACE, 1999a), were examined to determine whether there were documented ranges present within the boundaries of Parcels 97Q, 144Q-X, and 147Q-X. The only range activity documented on the ASR maps was on Plate 6. Parcel 97Q is identified on Plate 6 as Range 43.

Plate 6 of the ASR. Plate 6 of the ASR, which covers the time frame from 1950 until 1973, depicts a small arms (rifle and pistol) range in the same location and similar dimensions as Parcel 97Q. The ASR lists this range as Range 43, Technique of Fire Range. Range 43, approximately 7 acres in size, was built during the Vietnam War and was abandoned by 1974. (In the EBS, Parcel 97Q is estimated as 4 acres in size).

1.2.2 Aerial Photographs

Available FTMC aerial photographs were reviewed to reveal any land-use activity at Parcels 97Q, 144Q-X, and 147Q-X. Only the aerial photographs that showed distinct surface activity changes (years 1954 and 1969) are presented in this SFSP. The following paragraphs summarize the review of aerial photographs for the years 1937, 1940, 1954, 1969, 1976, 1982, 1994, and 1998.

1937. There is not any evidence of activity visible at any of the parcels in this photograph. The parcels and the surrounding areas are wooded. A road or trail is visible on the southwestern perimeter of Parcel 144Q-X.

1940. There is not any evidence of activity visible at any of the parcels in this. The road or trail seen in the 1937 photograph is no longer visible.

1954. Signs of activity are visible in this aerial photograph (Figure 1-3). The northern portion of Parcel 97Q appears to have been cleared of vegetation. Dirt roads or trails are visible in the north-central area of Parcel 144Q-X. These roads appear to connect to a northeast/southwest

693900

694800

695700

1177200

1177200

1176300

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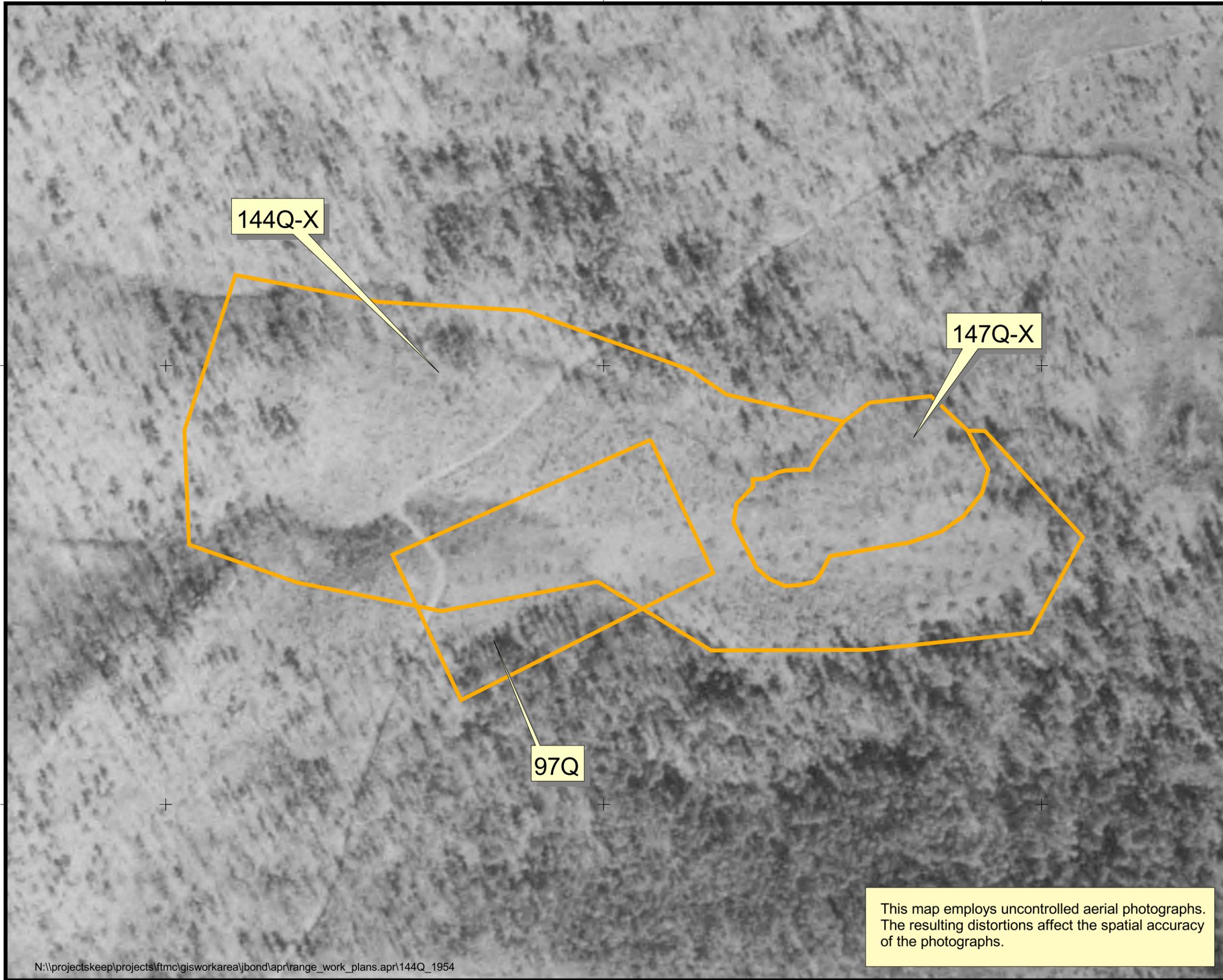


Figure 1-3

1954 Aerial Photograph
 Parcels 97Q, 144Q-X,
 and 147Q-X
 Fort McClellan, AL

Legend

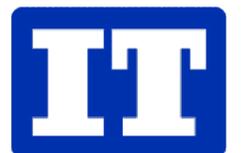
 Parcel Boundary

0  200 Feet

NAD83 State Plane Coordinates



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 Mobile District



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trending road that runs throughout the region beyond these parcels. Within Parcel 147Q-X, the northwestern two-thirds appears to be free of vegetation. Regularly spaced round features, possibly craters or tree stumps, are visible in this devegetated section of Parcel 147Q-X.

1969. Significant clearing is evident within Parcel 97Q in this photograph (Figure 1-4). The cleared area extends beyond the parcel boundary. A road has been constructed leading to the eastern edge of Parcel 97Q. Parcels 144Q-X and 147Q-X appear to be revegetated and signs of activity are not visible in either of these parcels. Only traces of the dirt road or trail present in the 1954 photograph are visible in the 1969 photograph.

1976. This photograph is similar to the 1969 photograph. The area occupied by Parcel 97Q appears to be cleared. Parcels 144Q-X and 147Q-X appear to be vegetated and inactive.

1982. The 1982 photograph shows significant vegetation regrowth within Parcel 97Q since 1976. Signs of site activities are not apparent in any of the three subject parcels.

1994. This aerial photograph, the only color photograph in the series, shows considerable vegetation and no signs of any site activities in any of the subject parcels.

1998. The 1998 photograph is similar to the 1994 photograph with vegetative cover present throughout the subject parcels. There is no visible evidence of any site activities in this photograph.

Land elevation ranges from approximately 1,075 feet above mean sea level (amsl) near the western boundary of Parcel 144Q-X to approximately 800 feet amsl near the eastern boundary of Parcel 144Q-X. The direction of surface water flow is typically controlled by topography; therefore, surface water is expected to drain to the east. Local shallow groundwater flow direction at the subject parcels is most likely controlled by topography; therefore, groundwater flow in the residuum is likely to the east.

1.2.3 Soil Descriptions

The soils within Parcel 97Q, 144Q-X, and 147Q-X primarily consist of the following soil series. These are as follows:

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694800

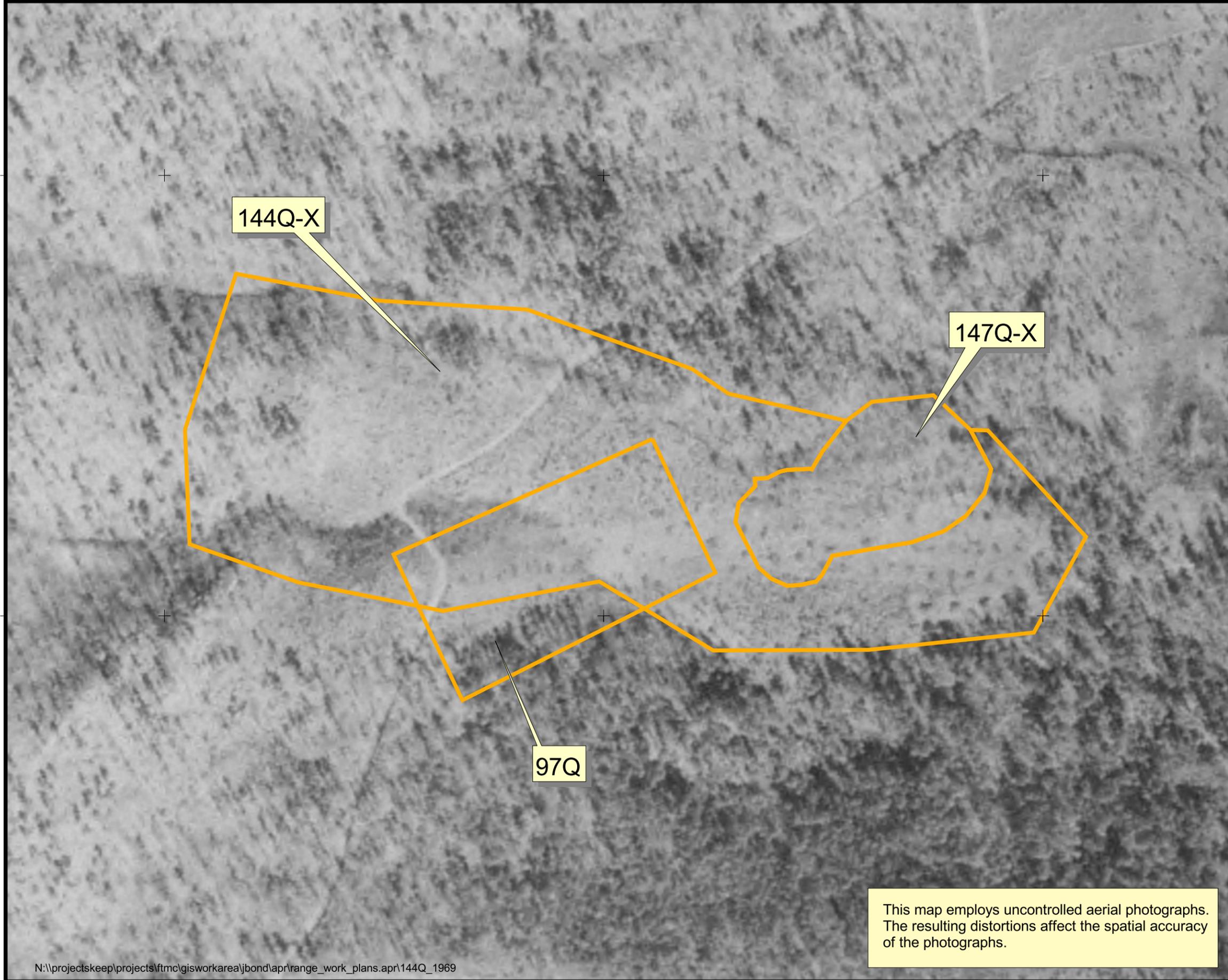
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1177200

1177200

1176300

1176300



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693900

694800

695700

Figure 1-4

1969 Aerial Photograph Parcels 97Q, 144Q-X, and 147Q-X Fort McClellan, AL

Legend

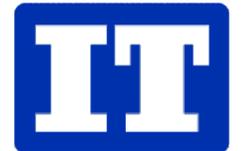
 Parcel Boundary

0  200 Feet

NAD83 State Plane Coordinates



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- The stony rough land series of soils
- The Anniston and Allen Series of soils
- The Philo and Stendal Series of soils.

The soils in the higher western elevations of Parcel 144Q-X, located on the eastern foothills of the Choccolocco Mountains, consist of the stony rough land, sandstone series (Ss). This miscellaneous land type consists of a rough mountainous area with many outcrops of sandstone and quartzite bedrock, loose rock fragments, and scattered patches of sandy soil material. Slopes are generally more than 25 percent. The soil material is generally present as a thin layer over bedrock. Depth to bedrock is typically less than 3 feet. Depth to groundwater is usually more than 20 feet (U.S. Department of Agriculture [USDA], 1961).

The Anniston and Allen Series of soils consists of strongly acidic, deep, well-drained soils that have developed in old local alluvium. The parent material washed from the adjacent higher-lying Linker, Muskingum, Enders, and Montevallo soils, which developed from weathered sandstone, shale, and quartzite. The Anniston and Allen soils are on foot slopes and colluvial fans at the bases of the Choccolocco, Coldwater, and Colvin Mountains. The surface horizon of the Allen soils is chiefly dark grayish-brown fine sandy loam or loam. The subsoil is dark red fine sandy clay loam. Fragments of sandstone and quartzite, as much as 8 inches in diameter, are on the surface and throughout the soil. The Allen soils are associated with the Anniston, Cane, Jefferson, and Locust soils. They differ from the Anniston only in having a lighter colored surface horizon. For the Anniston and Allen soil series, the depth to bedrock typically ranges from 2 feet to greater than 10 feet and depth to water is typically greater than 20 feet (USDA, 1961). Series members, or mapping units, of the Anniston and Allen soil series that are present within Parcels 97Q, 144Q-X, and 147Q-X include the following:

- Anniston soil series member AbC3, gravelly clay loam, 6 to 10 percent slopes, severely eroded. This soil mapping unit is present in the north central area of Parcel 144Q-X and the northern portion of Parcel 147Q-X. This soil consists of areas that were formerly Anniston gravelly loam or Allen gravelly loam that have lost nearly all of their original surface soil through erosion. Many small shallow gullies and a few deep gullies are present within this mapping unit. Infiltration is moderately slow and the capacity to hold moisture is low (USDA, 1961).
- Anniston and Allen soil series member AcE2, gravelly loam, 15 to 25 percent slopes, eroded. AcE2 is present within the northeastern portions of Parcels 144Q-X and 147Q-X. These soils have stronger slopes, thinner solum, and more rapid runoff as compared to other Anniston and Allen gravelly soil series with lesser

slope. Severely eroded patches and shallow gullies are common. Infiltration is low and capacity to hold moisture is low (USDA, 1961).

- The Anniston and Allen series member AdE, stony loam, 10 to 25 percent slope, is present within the western portions of Parcel 97Q and 144Q-X. Characteristics that distinguish this series member from the Anniston and Allen gravelly loams, 2 to 6 percent slope, are stronger slopes, less erosion, and numerous stones. These soils are poorly suited to cultivation (USDA, 1961).

The third series of soils present within the subject parcels is the Philo and Stendal Series of soils. The Philo Series consists of strongly acid, moderately well-drained soils that are developing in local and general alluvium. The parent material washed mainly from sandstone and shale, but some of it originated from limestone. Philo soils occur on first bottoms along most streams in the northern part of Calhoun County. The surface soil is very dark grayish-brown to dark-brown fine sandy loam, and the subsoil is dark-brown, slightly mottled fine sandy loam (USDA, 1961).

The Stendal Series consists of strongly acid, somewhat poorly drained soils that are developing in general alluvium that washed chiefly from sandstone and shale. Some of the material originated from limestone. These soils occur on first bottoms along most streams in the northern part of Calhoun County. The surface soil is a dark grayish-brown fine sandy loam and the subsurface soil is a dark-brown, mottled fine sandy loam. Drainage in these soils ranges from somewhat poor to moderately good. For the Philo and Stendal Series, the depth to bedrock is typically greater than 6 feet, with depth to water greater than 1 to 2 feet (USDA, 1961).

Soils that fall into the Philo and Stendal soils local alluvium, 0 to 2 percent slopes (PkA) are found along the southeastern flowing intermittent streams emanating from the Choccolocco Mountains to the west of the subject parcels. One stream flows through the central area of Parcels 97Q and 144Q-X and one stream flows adjacent to the northern border of Parcels 144Q-X and 147Q-X.

1.3 Scope of Work

The scope of work for site investigation (SI) field activities at Parcels 97Q, 144Q-X, and 147Q-X, as specified by the statement of work (USACE, 1999c), includes the following tasks:

- 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 18 surface soil samples, 18 subsurface soil samples, 4 groundwater samples, and 7 depositional soil samples to determine whether potential site-specific chemicals (PSSC) are present at the site and to provide data useful for supporting any future corrective measures and closure activities.
- Analyze samples for the parameters listed in Section 4.5.

The possibility for UXO exists at this site because the parcels are either former active ranges or impact areas; therefore, 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 purposes of UXO avoidance. The site-specific UXO safety plan attachment addresses the manner in which the avoidance will be conducted.

Following the field activities and sample analyses, a SI summary report will be prepared 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 U.S. Environmental Protection Agency (EPA), Region IV, and Alabama Department of Environmental Management (ADEM) guidelines.

2.0 Summary of Existing Environmental Studies

An 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 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.

Parcels 97Q, 144Q-X, and 147Q-X were identified as Category 1 CERFA sites. These CERFA sites are parcels where no known or recorded storage, release, or disposal (including migration) has occurred on site property; however, because Parcels 97Q, 144Q-X, and 147Q-X were formerly active as either a range or as an impact area, additional evaluation to determine the environmental condition of each of these parcels is required.

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 Parcels 97Q, 144Q-X, and 147Q-X. This section incorporates the components of the DQO process described in the publication EPA 600-R-96/005 *Guidance for the Data Quality Objectives Process for Superfund* (EPA, 2000). The DQO process as applied to Parcels 97Q, 144Q-X, and 147Q-X 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 these sites.

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 Section 5.0 in the QAP. Data will be reported in accordance with definitive data requirements of Chapter 2, *Chemistry Data Reporting Requirements and Data Package Deliverables*, 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 Parcels 97Q, 144Q-X, and 147Q-X, 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 defensible data and information required to confirm or rule out the existence of residual chemical contamination in site media.

Table 3-1

**Summary of Data Quality Objectives
Parcel 97Q, 144Q-X, and 147Q-X
Site Investigation
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> Parcels 97Q, 144Q-X, and 147Q-X (explosives and lead) <u>Migration Pathways</u> Rain runoff and erosion to surface soil, infiltration and leaching to subsurface soil and groundwater, biotransfer to venison, dust emissions and volatilization to ambient air, groundwater discharge to surface water, and runoff and erosion to surface water and sediment <u>Potential Receptors</u> Residents (future), Recreational site user (current and future) <u>PSSC</u> metals, nitroexplosives, VOCs, SVOCs, herbicides, and pesticides	<u>Surface soil</u>	SI to confirm the presence or absence of contamination in the site media	<u>Surface soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	18 surface soil samples + QC
			<u>Subsurface Soil</u>				
			<u>Depositional Soil</u>	Definitive quality data for future decision- making	<u>Subsurface Soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	18 subsurface soil samples + QC
			<u>Groundwater</u>				
	<u>Depositional Soil</u> TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides	Definitive data in data packages (as defined in USACE EM200-1-6)	7 depositional soil samples + QC				
	TAL Metals, Nitroaromatic and Nitramine Explosives; Plus 10% of Samples for TCL VOCs TCL SVOCs, CL Pesticides, OP Pesticides, and CL Herbicides			Definitive data in data packages (as defined in USACE EM200-1-6)	4 groundwater samples + QC		

ADEM - Alabama Department of Environmental Management.
 CESAS - Corps of Engineers South Atlantic Savannah.
 DOD - U.S. Department of Defense.
 EPA - U.S. Environmental Protection Agency.
 FTMC - Fort McClellan.
 USACE - U.S. Army Corps of Engineers.

SI - Site investigation.
 QC - Quality control.
 TAL - Target analyte list.
 PSSC - Potential site-specific chemical.
 VOC - Volatile Organic Compounds.
 SVOC - Semi-volatile Organic Compounds.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating potential risks to human health in the risk assessment. The CSEM includes all receptors and potential exposure pathways appropriate to all plausible scenarios. The CSEM facilitates consistent and comprehensive evaluation of risk to human health through graphically presenting all possible exposure pathways, including all 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 scenarios with a contaminated source medium.

Primary contaminant release mechanisms were associated with training exercises (e.g., discharging lead and bullets to the ground), and possibly through leaks and spills. Potential contaminant transport pathways include rain runoff and erosion to surface soil, infiltration and leaching to subsurface soil and groundwater, biotransfer to deer through browsing, and dust emissions and volatilization to ambient air.

Parcels 97Q, 144Q-X, and 147Q-X have been inactive since approximately 1974. Most of the land within the subject parcels is tree covered. Parcels 97Q, 144Q-X, and 147Q-X are located within the Choccolocco Corridor. The land in the Choccolocco Corridor is currently managed by the Alabama Forestry Commission for passive recreation. Recreational activities that may occur include hiking, biking, horseback riding, and hunting. Therefore, the most likely current receptor scenario for these sites is a recreational site user. Intermittent streams are present within and near the subject parcels. Because this site does not have surface water year round, there is not sufficient surface water to contain fish for consumption. Potential receptor scenarios considered, but not included under current land-use scenarios, are as follows:

- **Groundskeeper.** The site is not currently maintained by a groundskeeper.
- **Construction Worker.** The site is unused, and no development or construction is occurring.
- **Resident.** The site is not currently used for residential purposes.

Future land use at Parcels 97Q, 144Q-X, and 147Q-X will be managed by the Alabama Forestry Commission for passive recreation. Activities that may occur include hiking, biking, horseback riding, and hunting. Potential receptor scenarios evaluated for the future include the following:

- **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.
- **Resident.** Although the site is not expected to be utilized for residential purposes, the resident is considered in order to provide information for the project manager and regulators.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors 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

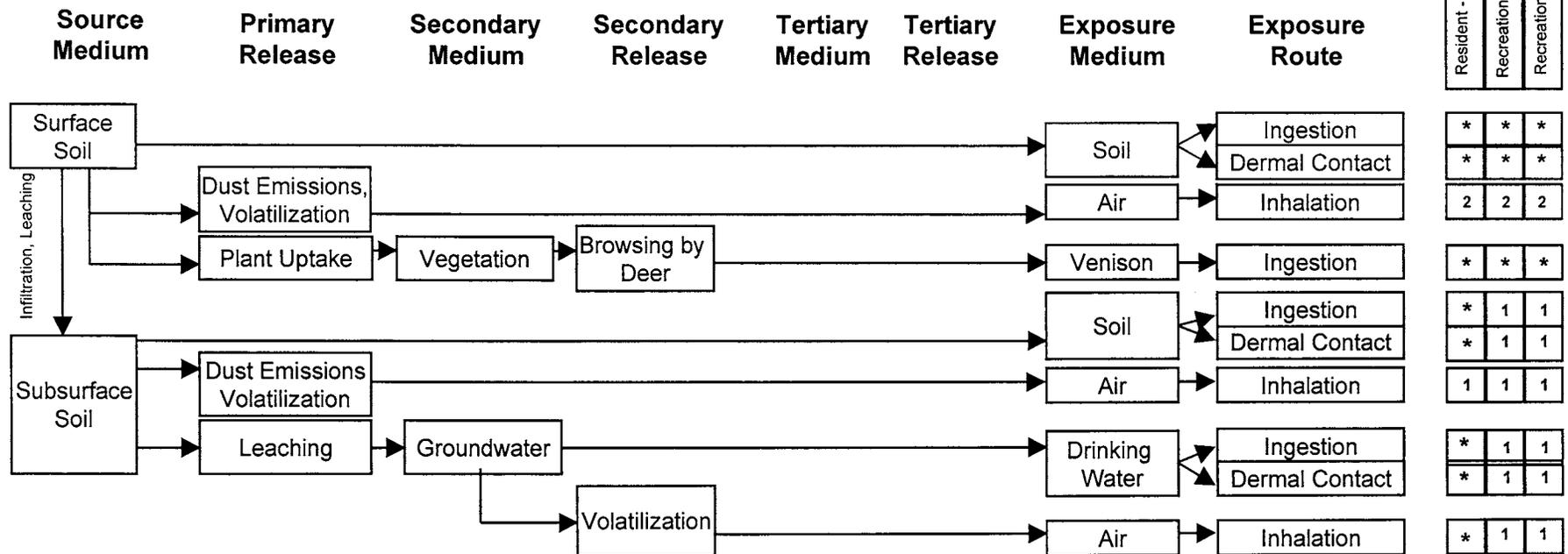
The seven-stage data quality objective decision-making process is presented in detail in Section 3.0 of the QAP and will be followed during the SI at Parcels 97Q, 144Q-X, and 147Q-X. Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at Parcels 97Q, 144Q-X, and 147Q-X 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, 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., surface water and sediment sampling, specific ecological assessment methods, etc.) will be addressed in accordance with the procedures in Section 5.3 of the WP (IT, 2002b).

Figure 3-1
Human Health Conceptual Site Exposure Model
Parcels 97Q, 144Q-X, and 147Q-X
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.

3.4.2 Data Types and Quality

Surface soil, subsurface soil, groundwater, and depositional soil will be sampled and analyzed to meet the objectives of the SI at Parcels 97Q, 144Q-X, and 147Q-X. 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 Update III, where available; 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 defined in Section 3.3 and presented in Section 5.0 of the QAP (IT, 2002a).

4.0 Field Activities

4.1 UXO Survey Requirements and Utility Clearances

Parcels 97Q and 144Q-X are former ranges and Parcel 147Q-X is a former impact area. 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 Parcels 97Q, 144Q-X, and 147Q-X. The site-specific UXO safety plan attachment has been written in conjunction with Appendix E of the SAP (IT, 2002a).

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 and 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 the 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 below ground surface, 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 and groundwater 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 Parcels 97Q, 144Q-X, and 147Q-X includes the collection of surface soil, subsurface soil, groundwater, 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 at the site. 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 a total of 18 soil boring locations as follows:

- Parcel 97Q- surface soil samples will be collected from 10 locations
- Parcel 144Q-X surface soil samples will be collected from 5 locations
- Parcel 147Q-X- surface soil samples will be collected from 3 locations.

4.2.1.1 Sample Locations and Rationale

The sampling rationale for each surface soil sample location is listed in Table 4-1. Proposed sampling locations are shown in Figure 4-1. Surface soil sample designations and required 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 as specified in Section 5.1.1.1 and Section 6.1.1.1 of the SAP (IT, 2002a). 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 Section 4.0 and listed in Table 4-1 of the QAP. Sample documentation and chain-of-custody (COC) will be recorded as specified in Section 6.0 of the SAP. The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

Table 4-1

**Sampling Locations and Rationale
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 5)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
97Q	HR-97Q-GP01	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed at or near one of the wood framed target boxes downrange of the firing line near the southwestern edge of the cleared area visible in the 1969 aerial photograph. The target boxes appear to linearly oriented in several NW/SE trending lines. The cleared area visible in the 1969 photograph extends past the parcel boundary identified in the EBS. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-97Q-GP02	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed at or near one of the wood framed target boxes downrange of the firing line near the southwestern edge of the cleared area visible in the 1969 aerial photograph. The target boxes appear to linearly oriented in several NW/SE trending lines. The cleared area visible in the 1969 photograph extends past the parcel boundary identified in the EBS. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-97Q-GP03	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed at or near one of the wood framed target boxes downrange of the firing line near the southwestern edge of the cleared area visible in the 1969 aerial photograph. The target boxes appear to linearly oriented in several NW/SE trending lines. The cleared area visible in the 1969 photograph extends past the parcel boundary identified in the EBS. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-97Q-GP04	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed at or near one of the wood framed target boxes downrange of the firing line near the southwestern edge of the cleared area visible in the 1969 aerial photograph. The target boxes appear to linearly oriented in several NW/SE trending lines. The cleared area visible in the 1969 photograph extends past the parcel boundary identified in the EBS. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-97Q-GP05	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed at or near one of the wood framed target boxes downrange of the firing line near the southwestern edge of the cleared area visible in the 1969 aerial photograph. The target boxes appear to linearly oriented in several NW/SE trending lines. The cleared area visible in the 1969 photograph extends past the parcel boundary identified in the EBS. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.

Table 4-1

**Sampling Locations and Rationale
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 5)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
97Q (cont.)	HR-97Q-GP06	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the north-central portion of Parcel 97Q at an overgrown road where numerous 5.56 mm rifle blanks were observed during the site walk. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-97Q-GP07	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples to be placed in the south-central portion of Parcel 97Q at an overgrown road where numerous 5.56 mm rifle blanks were observed during the site walk. A surface and subsurface sample will be collected at this location to determine if former site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-97Q-GP08	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples will be located downrange of the firing line for Parcel 97Q that was identified in the EBS. The samples will be collected from this location to determine if previous site activities resulted in soil contamination. Soil 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-97Q-GP09	Surface soil and subsurface soil	Soil boring for surface and subsurface soil samples will be located at the firing line for Parcel 97Q that was identified in the EBS. A surface and subsurface sample will be collected from this location to determine if previous site activities resulted in soil contamination. Soil 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-97Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface and subsurface soil samples will be located in the western central area of the cleared area visible in the 1969 aerial photograph downslope of numerous wooden framed target boxes. This location is outside the parcel boundary identified in the EBS. The soil sample data will be used to determine if previous site activities resulted in soil contamination. Soil sample data will also be used to assess potential impacts to terrestrial biota that may utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.
	HR-97Q-DEP01	Depositional soil	The depositional soil sample location is in the eastern portion of Parcel 97Q in a surface water drainage feature that flows southeast past the firing line. This drainage feature originates in the upper elevations of the Choccolocco Mountains to the west of the parcel and conveys stormwater east-southeast through Parcel 97Q. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for site for food and/or habitat purposes.

Table 4-1

**Sampling Locations and Rationale
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 5)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
144Q-X	HR-144Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the western area of Parcel 144Q -X that appeared to be cleared in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-144Q-GP02	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the western area of Parcel 144Q -X that appeared to be cleared in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-144Q-GP03	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the eastern area of Parcel 144Q-X near a series of rectangular firing positions or target pits. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-144Q-GP04	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in eastern area of Parcel 144Q-X that appeared to be cleared in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.
	HR-144Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface soil and subsurface soil samples to be placed in the north-central portion of Parcel 144Q that appeared to be cleared in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.

Table 4-1

**Sampling Locations and Rationale
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 4 of 5)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
144Q-X (cont.)	HR-144Q-DEP01	Depositional soil	This depositional soil sample location is west of the Parcel 144Q-X boundary in an easterly flowing surface water drainage feature. The drainage feature originates in the Choccolocco Mountains and conveys stormwater to the east/southeast. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for site for food and/or habitat purposes.
	HR-144Q-DEP02	Depositional soil	The depositional soil sample location is in the western area of Parcel 144Q-X in an easterly flowing surface water drainage feature. The drainage feature originates in the Choccolocco Mountains and conveys stormwater to the east/southeast. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for site for food and/or habitat purposes.
	HR-144Q-DEP03	Depositional soil	This depositional soil sample location is in a surface water drainage feature outside the northern boundary of Parcel 144Q-X. This surface water drainage feature originates in the Choccolocco Mountains located to the west of the parcel and conveys stormwater to the east/southeast. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for site for food and/or habitat purposes.
	HR-144Q-DEP04	Depositional soil	This depositional soil sample location is located near the southern boundary of Parcel 144Q-X in a surface water drainage feature. This drainage feature originates to the west in the upper elevations of the Choccolocco Mountains and conveys stormwater east-southeast through Parcel 144Q-X before exiting the site. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for site for food and/or habitat purposes.
147Q-X	HR-147Q-GP01	Surface soil and subsurface soil	Soil boring for surface soil and subsurface soil samples to be placed in the southwestern area of Parcel 147Q-X. Most of this parcel appeared to have been cleared in the 1954 aerial photograph. Sample data will indicate if contaminant releases into the environment have occurred from former activities at this area of the parcel and if contaminated soil exists at this location. Soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes.

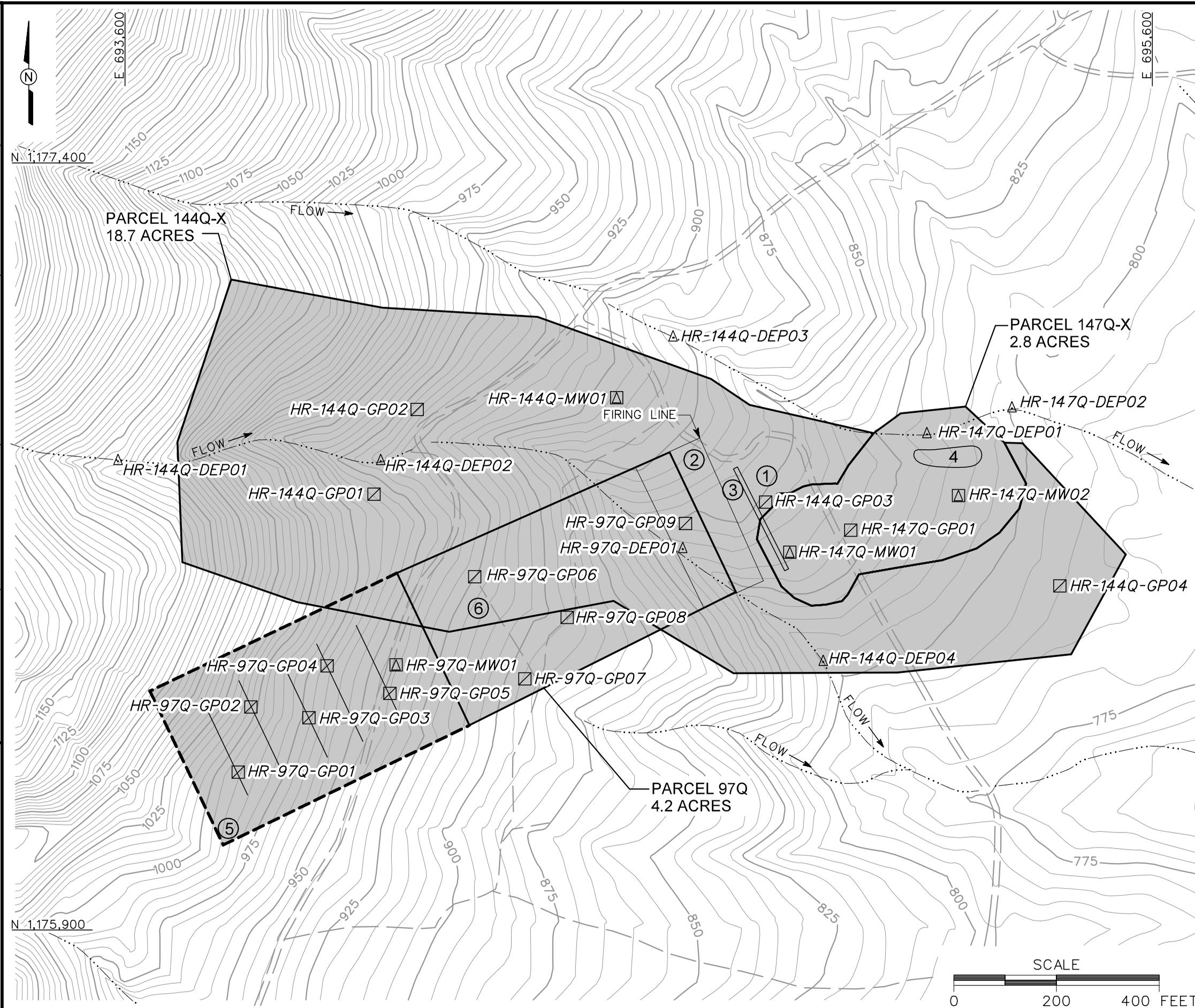
Table 4-1

**Sampling Locations and Rationale
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 5 of 5)

Parcel Number	Sample Location	Sample Media	Sample Location Rationale
147Q-X (cont.)	HR-147Q-MW01	Surface soil, subsurface soil, and groundwater	Soil boring for surface and subsurface soil samples will be placed downslope of a series of rectangular firing positions or target pits observed during the site walk for Parcel 147Q-X. The soil sample data will be used to determine if previous site activities resulted in soil contamination. The soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.
	HR-147Q-MW02	Surface soil, subsurface soil, and groundwater	Soil boring for surface and subsurface soil samples will be placed in the eastern area of Parcel 147Q-X that appeared to be cleared in the 1954 aerial photograph. The soil sample data will be used to determine if previous site activities resulted in soil contamination. The soil sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for food and/or habitat purposes. A residuum monitoring well will be also be installed at this location. The monitoring well will be used to document local groundwater flow direction and location-specific geology and to provide information regarding groundwater quality in the residuum aquifer.
	HR-147Q-DEP01	Depositional soil	The depositional soil sample location is in the northern portion of Parcel 147Q-X in a surface water drainage feature. This surface water drainage feature originates in the higher elevations of the Choccolocco Mountains and conveys stormwater east through the parcel. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for site for food and/or habitat purposes.
	HR-147Q-DEP02	Depositional soil	This offsite depositional soil sample location is located in a surface water drainage feature outside the northeast Parcel 147Q-X boundary. This surface water drainage feature originates west of the parcel and conveys stormwater through the northern area of the parcel before continuing offsite. The sample data will be used to evaluate whether contaminant releases into the environment have occurred and if contaminated media exists at this location. Sample data will also be used to assess potential impacts to terrestrial biota that might utilize the location for site for food and/or habitat purposes.

DWG. NO.: ... 796887es.309
 PROJ. NO.: 796887
 INITIATOR: M. MALONEY
 PROJ. MGR.: J. YACOUB
 DRAFT. CHK. BY:
 ENGR. CHK. BY: S. MORAN
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 01/16/02
 DRAWN BY: D. BOMAR
 04/04/02
 09:31:51
 c:\cadd\design\796887es.309
 by on derg



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- PARCEL BOUNDARY
- AREA OF ADDITIONAL INVESTIGATION
- FIRING LINE
- SURFACE DRAINAGE / CREEK
- WOOD FRAMED TARGET BOXES ON HILLSIDE
- PROPOSED SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE LOCATION
- PROPOSED DEPOSITIONAL SOIL SAMPLE LOCATION

TRAINING AIDS/PHYSICAL FEATURES OBSERVED

- ① OBSERVATION TOWER
- ② AIR FRAME MOCKUP
- ③ RECTANGULAR DUG-OUT FIRING/TARGET POSITIONS, WALLS SUPPORTED BY WOODEN FRAMEWORK, SPACED ~20' ALONG FIRING LINE
- ④ DEPRESSIONS, AMMUNITION BOXES IN BOTTOM OF DEPRESSION. 40mm FLARE AND POP FLARE (BOTH EXPENDED) FOUND IN AREA
- ⑤ BLACK AND WHITE DIAGONAL END OF RANGE SIGN
- ⑥ OVERGROWN ROAD NUMEROUS 5.56 BLANKS POSSIBLE FIRING POSITION

FIGURE 4-1
PROPOSED SAMPLE LOCATION MAP
 FORMER RANGE 43
 PARCEL 97Q
 RANGE, CHOCCOLOCCO CORRIDOR
 PARCEL 144Q-X
 IMPACT AREA, CHOCCOLOCCO
 CORRIDOR, PARCEL 147Q-X

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



Table 4-2

Surface, Subsurface, and Depositional Soil Sample Designations and Analytical Parameters
Site Investigation,
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama

(Page 1 of 3)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-97Q-GP01	HR-97Q-GP01-SS-QL0001-REG	0-1		HR-97Q-GP01-SS-QL0001-MS/MSD	TAL Metals and Explosives
	HR-97Q-GP01-DS-QL0002-REG	2-4			
HR-97Q-GP02	HR-97Q-GP02-SS-QL0003-REG	0-1			TAL Metals and Explosives
	HR-97Q-GP02-DS-QL0004-REG	2-4			
HR-97Q-GP03	HR-97Q-GP03-SS-QL0005-REG	0-1			TAL Metals and Explosives
	HR-97Q-GP03-DS-QL0006-REG	2-4			
HR-97Q-GP04	HR-97Q-GP04-SS-QL0007-REG	0-1			TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-97Q-GP04-DS-QL0008-REG	2-4	HR-97Q-GP04-DS-QL0009-FD		
HR-97Q-GP05	HR-97Q-GP05-SS-QL0010-REG	0-1			TAL Metals and Explosives
	HR-97Q-GP05-DS-QL0011-REG	2-4			
HR-97Q-GP06	HR-97Q-GP06-SS-QL0012-REG	0-1			TAL Metals and Explosives
	HR-97Q-GP06-DS-QL0013-REG	2-4			
HR-97Q-GP07	HR-97Q-GP07-SS-QL0014-REG	0-1			TAL Metals and Explosives
	HR-97Q-GP07-DS-QL0015-REG	2-4			
HR-97Q-GP08	HR-97Q-GP08-SS-QL0016-REG	0-1			TAL Metals and Explosives
	HR-97Q-GP08-DS-QL0017-REG	2-4			
HR-97Q-GP09	HR-97Q-GP09-SS-QL0018-REG	0-1			TAL Metals and Explosives
	HR-97Q-GP09-DS-QL0019-REG	2-4			
HR-97Q-MW01	HR-97Q-MW01-SS-QL0020-REG	0-1	HR-97Q-MW01-SS-QL0021-FD		TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-97Q-MW01-DS-QL0022-REG	2-4			

Table 4-2

**Surface, Subsurface, and Depositional Soil Sample Designations and Analytical Parameters
Site Investigation,
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-97Q-DEP01	HR-97Q-DEP01-DEP-QL0023-REG	0-1			TAL Metals and Explosives
HR-144Q-GP01	HR-144Q-GP01-SS-QM0001-REG	0-1		HR-144Q-GP01-SS-QM0001-MS/MSD	TAL Metals and Explosives
	HR-144Q-GP01-DS-QM0002-REG	2-4			
HR-144Q-GP02	HR-144Q-GP02-SS-QM0003-REG	0-1			TAL Metals and Explosives
	HR-144Q-GP02-DS-QM0004-REG	2-4			
HR-144Q-GP03	HR-144Q-GP03-SS-QM0005-REG	0-1			TAL Metals and Explosives
	HR-144Q-GP03-DS-QM0006-REG	2-4			
HR-144Q-GP04	HR-144Q-GP04-SS-QM0007-REG	0-1			TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
	HR-144Q-GP04-DS-QM0008-REG	2-4	HR-144Q-GP04-DS-QM0009-FD		
HR-144Q-MW01	HR-144Q-MW01-SS-QM0010-REG	0-1			TAL Metals and Explosives
	HR-144Q-MW01-DS-QM0011-REG	2-4			
HR-144Q-DEP01	HR-144Q-DEP01-DEP-QM0012-REG	0-1			TAL Metals and Explosives
HR-144Q-DEP02	HR-144Q-DEP02-DEP-QM0013-REG	0-1	HR-144Q-DEP02-DEP-QM0014-FD		TAL Metals and Explosives
HR-144Q-DEP03	HR-144Q-DEP03-DEP-QM0015-REG	0-1			TAL Metals and Explosives
HR-144Q-DEP04	HR-144Q-DEP04-DEP-QM0016-REG	0-1	HR-144Q-DEP04-DEP-QM0017-FD		TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides

Table 4-2

**Surface, Subsurface, and Depositional Soil Sample Designations and Analytical Parameters
Site Investigation,
Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-147Q-GP01	HR-147Q-GP01-SS-QN0001-REG	0-1		HR-147Q-GP01-SS-QN0001-MS/MSD	TAL Metals and Explosives
	HR-147Q-GP01-DS-QN0002-REG	2-4			
HR-147Q-MW01	HR-147Q-MW01-SS-QN0003-REG	0-1			TAL Metals and Explosives
	HR-147Q-MW01-DS-QN0004-REG	2-4			
HR-147Q-MW02	HR-147Q-MW02-SS-QN0005-REG	0-1			TAL Metals and Explosives
	HR-147Q-MW02-DS-QN0006-REG	2-4			
HR-147Q-DEP01	HR-147Q-DEP01-DEP-QN0007-REG	0-1			TAL Metals and Explosives
HR-147Q-DEP02	HR-147Q-DEP02-DEP-QN0008-REG	0-1	HR-147Q-DEP02-DEP-QN0009-FD		TAL Metals and Explosives

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 a total of 18 soil boring locations as follows:

- Parcel 97Q-subsurface soil samples will be collected from 10 locations
- Parcel 144Q-X subsurface soil samples will be collected from 5 locations
- Parcel 147Q-X- subsurface soil samples will be collected from 3 locations.

4.2.2.1 Sample Locations and Rationale

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 samples to be collected 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 clearance results.

4.2.2.2 Sample Collection

Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot below ground surface 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, 2002a). 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 (IT, 2002a).

Soil samples will be collected continuously for the first 4 feet or until either groundwater or refusal is reached. 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 indicates 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 will 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 below ground surface (bgs) and more than one subsurface soil sample will 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 Section 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Section 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 Permanent Residuum Monitoring Wells

A total of four permanent residuum monitoring wells, consisting of one well each at Parcels 97Q and 144Q-X, and two wells at Parcel 147Q-X, will be installed. The permanent residuum monitoring well locations are shown on Figure 4-1. The rationale for each monitoring well location is presented in Table 4-1. The monitoring well boreholes will be drilled to the top of bedrock, or until adequate groundwater is encountered to install a well with a 10- to 20-foot screen. Monitoring wells will be installed using a truck-mounted hollow-stem auger drill rig. The monitoring well casing will consist of new 2-inch inside-diameter (ID), Schedule 40, threaded, flush-joint polyvinyl chloride (PVC) pipe. Attached to the bottom of the well casing will be a section of new threaded, flush-joint, 0.010-inch continuous wrap PVC well screen, approximately 10 to 20 feet long.

At the discretion of the IT site manager, a sump (composed of new, 2-inch ID, Schedule 40, threaded, flush-joint PVC) may be attached to the bottom of the well screen. After the casing and screen materials are lowered into the boring, a filter pack will be installed around the well screen. In wells installed to depths of 20 feet or less, the filter pack material will be gravity filled. In wells installed to depths greater than 20 feet, the filter pack will be tremied into place. The filter pack will be installed from the bottom of the well to approximately 5 feet above the top of the well screen. The filter pack will consist of 20/40 silica sand. A fine sand (30/70 silica sand), approximately 5 feet thick, may be placed above the filter pack. A bentonite seal, approximately 5 feet thick, will be placed above the filter pack (or fine sand, if used). The remaining annular space will be grouted with a bentonite-cement mixture, using approximately 7 to 8 gallons of water and approximately 5 pounds of bentonite per 94-pound bag of Type I or Type II Portland cement. The grout will be tremied into place from the top of the bentonite seal to ground surface. Monitoring wells will be completed with stick-up or flush mount construction as determined by the site geologist based on site conditions.

Soil samples for lithology will be collected starting at 5 feet bgs and at 5-foot intervals to the total depth of the hole during hollow-stem auger drilling to provide a detailed lithologic log. The samples will be collected for lithology using a 24-inch-long, 2-inch-or-larger-diameter split-spoon sampler. The soil borings will be logged in accordance with American Standard for Testing and Materials Method D 2488 using the Unified Soil Classification System. The soil samples will be screened in the field using a PID for potential volatile organic compounds. The monitoring wells will be drilled, installed, and developed as specified in Section 5.1 and Appendix C of the SAP (IT, 2002a). The exact monitoring well locations will be determined in the field by the on-site geologist, based on actual field conditions.

4.2.4 Groundwater Sampling

Groundwater samples will be collected from the four monitoring wells completed at Parcels 97Q, 144Q-X, and 147Q-X, as presented in Section 4.2.3.

4.2.4.1 Sample Locations and Rationale

Groundwater samples will be collected from the monitoring well locations shown on Figure 4-1. The groundwater sampling rationale is listed in Table 4-1. The groundwater sample designations and required QA/QC sample quantities are listed in Table 4-3.

4.2.4.2 Sample Collection

Prior to sampling monitoring wells, static water levels will be measured from each of the monitoring wells installed at the site to define the groundwater flow in the residuum aquifer. Water level measurements will be performed as outlined in Section 5.5 of the SAP (IT, 2002a). Groundwater samples will be collected in accordance with the procedures outlined in Section 6.1.1.5 and Attachment 5 of the SAP. Low-flow groundwater sampling methodology outlined in Attachment 5, Procedure No. FTMC-GW-001 of the SAP (IT, 2002a) may be used as deemed necessary by the IT site manager.

Sample documentation and COC will be recorded as specified in Section 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are discussed in Section 4.0 and listed in Table 4-1 of the QAP (IT, 2002a). The samples will be analyzed for the parameters listed in Section 4.5 of this SFSP.

Table 4-3

**Groundwater Sample Designation and Analytical Parameters
Site Investigation, Parcels 97Q, 144Q-X and 147Q-X
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Matrix ^a	QA/QC Samples		Analytical Suite
			Field Duplicates	MS/MSD	
HR-97Q-MW01	HR-97Q-MW01-GW-QL3001-REG	Groundwater	HR-97Q-MW01-GW-QL3002-FD		TCL VOCs, TCL SVOCs, TAL Metals, Explosives, CI and OP Pesticides, and CI Herbicides
HR-144Q-MW01	HR-144Q-MW01-GW-QM3001-REG	Groundwater			TAL Metals, Explosives
HR-147Q-MW01	HR-147Q-MW01-GW-QN3001-REG	Groundwater		HR-144Q-MW01-GW-QM3001-MS/MSD	TAL Metals, Explosives
HR-147Q-MW02	HR-147Q-MW02-GW-QN3002-REG	Groundwater			TAL Metals, Explosives

^aGroundwater samples will be collected from the approximate top 5 to 10 feet of the water column per Attachment 5 of the Installation-Wide Sampling and Analysis Plan (IT, 2002a).

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.

4.2.5 Depositional Soil Sampling

Seven depositional soil samples, consisting of one sample from Parcel 97Q, four samples from Parcel 144Q-X, and two samples from Parcel 147Q-X will be collected.

4.2.5.1 Sample Locations and Rationale

The proposed locations for the depositional soil samples are shown in Figure 4-1. Depositional soil sampling rationale is presented in Table 4-1. The depositional soil sample designations and required QA/QC sample requirements are listed in Table 4-2. The actual depositional soil sample points will be at the discretion of the ecological sampler, based upon the surface water drainage pathways and actual field observations.

4.2.5.2 Sample Collection

The depositional soil samples will be collected in accordance with the procedures for surface soil samples as specified in Section 6.1.1.1 of the SAP. Sample documentation and COC will be recorded as specified in Section 6.0 of the SAP. Sample containers, sample volumes, preservatives, and holding times are discussed in Section 4.0 and listed in Table 4-1 of the QAP. 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 either global positioning system (GPS) or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum of 1983. Elevations will be referenced to the North American Vertical Datum of 1988.

Horizontal coordinates for soil sample locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use permanent monitoring wells to determine water levels, a higher level of accuracy is required. Monitoring wells will be surveyed to an

accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Procedures to be used for GPS surveying are described in Section 4.4.1.1 of the SAP. Conventional land survey requirements are presented in Section 4.4.1.2 of the SAP.

4.5 Analytical Program

Samples collected at locations specified in this chapter of this SFSP will be analyzed for specific suites 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 Parcels 97Q, 144Q-X, and 147Q-X, consist of the following list of analytical suites:

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

Approximately 10 percent of the sample types will be analyzed for the following list of analytical suites:

- Target compound list volatile organic compounds – Method 5035/8260B
- Target compound list semivolatile organic compounds – Method 8270C
- Chlorinated pesticides - Method 8081A
- Chlorinated herbicides - Method 8151A
- Organophosphorous 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 Section 5.0 in the QAP. Data will be reported in accordance with 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.

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:

Table 4-4

Analytical Samples
Site Investigation, Parcels 97Q, 144Q-X, and 147Q-X
Fort McClellan, Calhoun County, Alabama

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ^a				EMAX Total No. Analysis
				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)	

Parcels 97Q, 144Q-X and 147Q-X: 4 water matrix samples (4 groundwater samples) and 43 soil matrix samples (18 surface, 18 subsurface, and 7 depositional soil samples)

All samples will be analyzed for the following parameters:

Explosives	8330	water	normal	4	1	4	1	1	0	1	8
TAL Metals	6010B/7000	water	normal	4	1	4	1	1	0	1	8
Explosives	8330	soil	normal	43	1	43	5	3	0	1	55
TAL Metals	6010B/7000	soil	normal	43	1	43	5	3	0	1	55

Approximately 10% of the samples will be analyzed for the following parameters:

TCL VOCs	8260B	water	normal	1	1	1	1	0	2	1	5
TCL SVOCs	8270C	water	normal	1	1	1	1	0	0	1	3
Chlorinated Pesticides	8081A	water	normal	1	1	1	1	0	0	1	3
Organophosphorus Pesticides	8141A	water	normal	1	1	1	1	0	0	1	3
Chlorinated Herbicides	8151A	water	normal	1	1	1	1	0	0	1	3
TCL VOCs	8260B	soil	normal	5	1	5	3	0	0	1	9
TCL SVOCs	8270C	soil	normal	5	1	5	3	0	0	1	9
Chlorinated Pesticides	8081A	soil	normal	5	1	5	3	0	0	1	9
Organophosphorus Pesticides	8141A	soil	normal	5	1	5	3	0	0	1	9
Chlorinated Herbicides	8151A	soil	normal	5	1	5	3	0	0	1	9

Parcel 97Q, 144Q-X and 147Q-X Subtotal:

124	32	8	2	14	188
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^aField 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.

Explosives - Nitroaromatic and Nitramine.

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

- 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 Parcels 97Q, 144Q-X, and 147Q-X will include decontamination fluids, drill cuttings, purge water, 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 (IT, 2002a).

4.8 Site-Specific Safety and Health

Health and safety requirements for this SI are provided in the SSHP attachment for Parcels 97Q, 144Q-X, and 147Q-X. The SSHP attachment will be used in conjunction with the installation-wide safety and health plan, Appendix 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.

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, *Archives Search Report, Conclusions and Recommendations, Fort McClellan, Anniston, Alabama*, July.

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

U.S. Army Corps of Engineers (USACE), 1999c, *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, *USACE Engineer Manual 200-1-6 Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste (HTRW) Projects*.

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 for Superfund*, EPA 600/R-96/005, August.

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 ₃	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 _{screen}	screening-level hazard quotient
EBS	environmental baseline survey	Foster Wheeler	Foster Wheeler Environmental Corporation	hr	hour
EC ₅₀	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 ³	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 _{ow}	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 ₂	oxygen
LCS	laboratory control sample	MSD	matrix spike duplicate	O&G	oil and grease
LC ₅₀	lethal concentration for 50 percent population tested	MTBE	methyl tertiary butyl ether	O&M	operation and maintenance
LD ₅₀	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 ³	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 ³	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)