

Final
Site-Specific Field Sampling Plan and
Site-Specific Safety and Health Plan Attachments
Fill Area East End Reilly Airfield, Parcel 227(7)
Fill Area Northwest of Reilly Airfield, Parcel 229(7)
Drain Field (Building T-459), Parcel 236(Q)
Fill Area at Range 30, Parcel 231(7)

Fort McClellan
Calhoun County, Alabama

Delivery Order CK005
Contract No. DACA21-96-D-0018
IT Project No. 774645

December 1998

Revision 1

Site-Specific Field Sampling Plans

Fill Area East End Reilly Airfield, Parcel 227(7)

Fill Area Northwest of Reilly Airfield, Parcel 229(7)

Drain Field (Building T-459), Parcel 236(Q)

Fill Area at Range 30, Parcel 231(7)

Site Investigation

Final

**Site-Specific Field Sampling Plan Attachment
for the Fill Area East End Reilly Airfield, Parcel 227(7)**

**Fort McClellan
Calhoun County, Alabama**

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**Task Order CK005
Contract No. DACA21-96-D-0018
IT Project No. 774645**

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Revision 1

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List of Acronyms

| | |
|-------|---|
| ADEM | Alabama Department of Environmental Management |
| CERFA | Community Environmental Response Facilitation Act |
| CESAS | Corps of Engineers South Atlantic Savannah |
| CLP | Contract Laboratory Program |
| CSEM | conceptual site exposure model |
| DOE | Directorate of Environment |
| DQO | data quality objective |
| EBS | environmental baseline survey |
| EM | electromagnetic |
| EPA | U.S. Environmental Protection Agency |
| EPIC | Environmental Photographic Interpretation Center |
| ESE | Environmental Science and Engineering, Inc. |
| FTMC | Fort McClellan |
| GPR | ground-penetrating radar |
| GPS | global positioning system |
| IDW | investigation-derived waste |
| IT | IT Corporation |
| PID | photoionization detector |
| PPE | personal protective equipment |
| PSSC | potential site-specific chemical(s) |
| QA/QC | quality assurance/quality control |
| QAP | installation-wide quality assurance plan |
| SAP | sampling and analysis plan |
| SHP | installation-wide safety and health plan |
| SI | site investigation |
| SSHP | site-specific safety and health plan |
| USACE | U.S. Army Corps of Engineers |
| UST | underground storage tank |
| WP | installation-wide work plan |

Executive Summary

In accordance with Contract No. DACA21-96-D-0018, Task Order CK005, IT Corporation (IT) will conduct a site investigation at Fort McClellan, Calhoun County, Alabama at the Fill Area East End Reilly Airfield, Parcel 227(7) to determine the presence or absence of potential site-specific chemicals. This site-specific field sampling plan (SFSP) will provide technical guidance for sampling activities at Fill Area East End Reilly Airfield, Parcel 227(7). Parcel 227(7) covers approximately 22 acres bounded on the west by Reilly Lake, on the north by trees and dense foliage, and on the south by Reilly Airfield. Prior to collecting samples, a geophysical survey will be used to delineate the boundaries of the fill areas. IT will collect three surface soil, thirteen subsurface soil, thirteen groundwater, five surface water, five sediment, and three depositional soil samples.

Since this area contains several potential disposal areas, and information is not available regarding past operations at this parcel, chemical analysis of the samples collected during the site investigation will include volatile organic compounds, semivolatile organic compounds, metals, chlorinated pesticides, and herbicides, organophosphorus pesticides, polychlorinated biphenyls, and nitroexplosives. Results from these analyses will be compared with site-specific screening levels specified in the installation-wide work plan (WP), and regulatory agency guidelines.

This SFSP attachment to the installation-wide sampling and analysis plan (SAP) (IT, 1998a) for the Fill Area East End Reilly Airfield, Parcel 227(7) will be used in conjunction with the site-specific safety and health plan (SSHP), and the installation-wide WP (IT, 1998b) and SAP. The SAP includes the installation-wide safety and health plan, waste 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 for the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of Fill Area East End Reilly Airfield, Parcel 227(7) under Task Order CK005, Contract No. DACA21-96-D-0018.

This site-specific field sampling plan (SFSP) attachment to the installation-wide sampling and analysis plan (SAP) (IT, 1998a) for FTMC has been prepared to provide technical guidance for sample collection and analysis at the Fill Area East End Reilly Airfield, Parcel 227(7) (Figure 1-1). IT will collect samples at this site as part of the SI to characterize the source of potential site-specific chemicals (PSSC) of concern in various site matrices, determine the nature and extent of contamination and evaluate the level of risk to human health and the environment posed by releases of the PSSC of concern. The SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) developed for Fill Area East End Reilly Airfield, Parcel 227(7) site, and the installation-wide work plan (WP) (IT, 1998b) and SAP. The SAP includes the installation-wide safety and health plan (SHP), waste management plan, and quality assurance plan (QAP).

1.2 Site Description

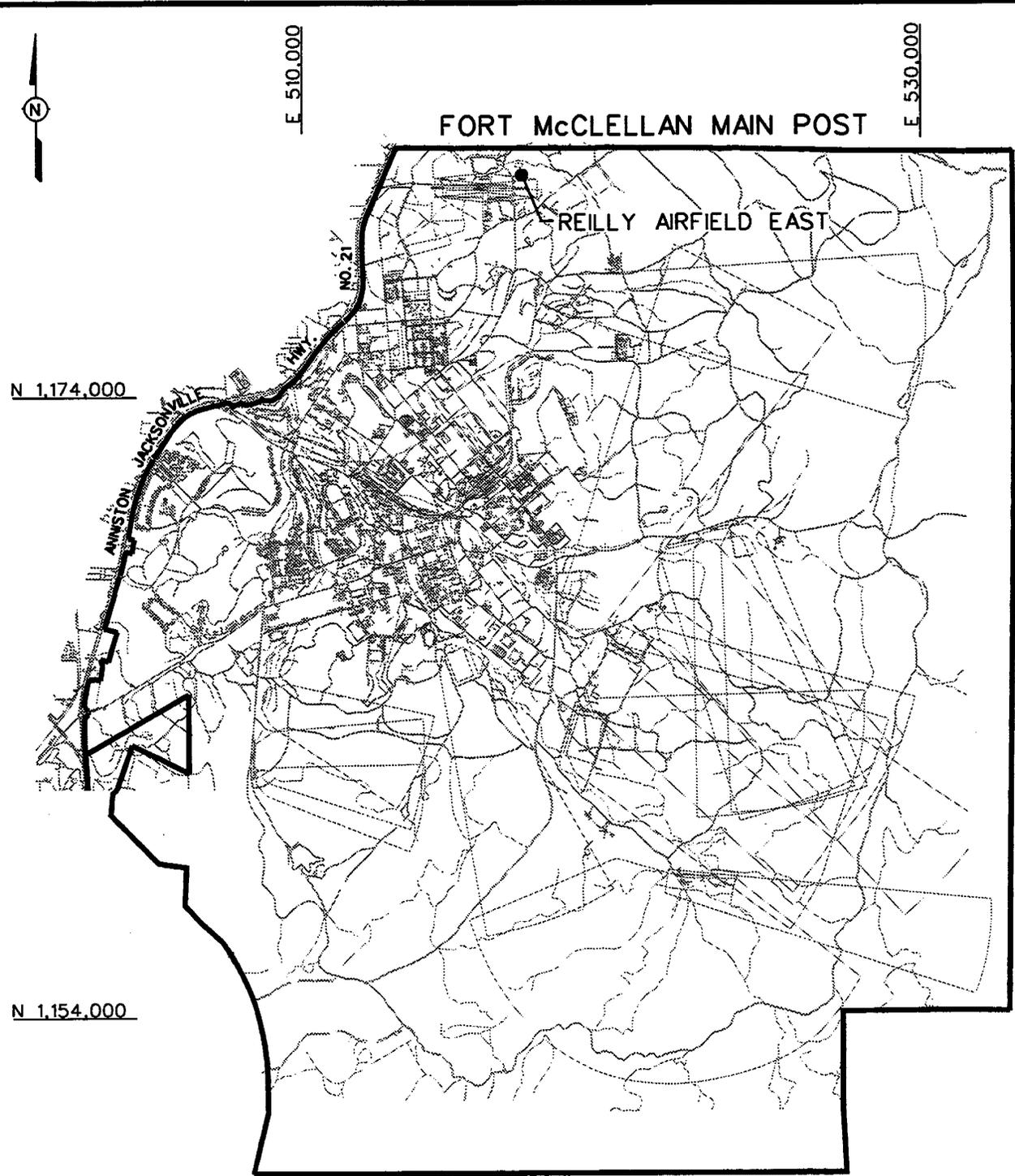
Parcel 227(7) is located on the northern portion of the Main Post at the eastern end of Reilly Airfield (Figure 1-2). The parcel contains several potential disposal areas identified in the Environmental Photographic Interpretation Center (EPIC) report (U.S. Environmental Protection Agency [EPA], 1990). The EPIC aerial photo composite dated 1949 annotates two ground scars with the label "Fill Area." The aerial photo composite dated 1961 annotates one site as "Pit" and another as "TR" (trench). Parcel 227(7) encompasses four sites identified by EPIC. The parcel also includes an adjacent area of disturbed ground that was not identified in the EPIC report, but which appears to possibly contain mounded material (ESE, 1998).

Parcel 227(7) is approximately 22 acres bounded on the west by Reilly Lake, on the north by trees and dense foliage, which also cover the adjacent Parcel 126(7) about midway of the site boundary; on the west by trees, and on the south by Reilly Airfield. Site elevation is approxi-

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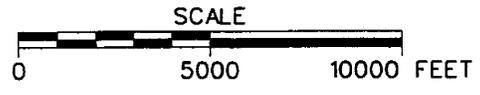


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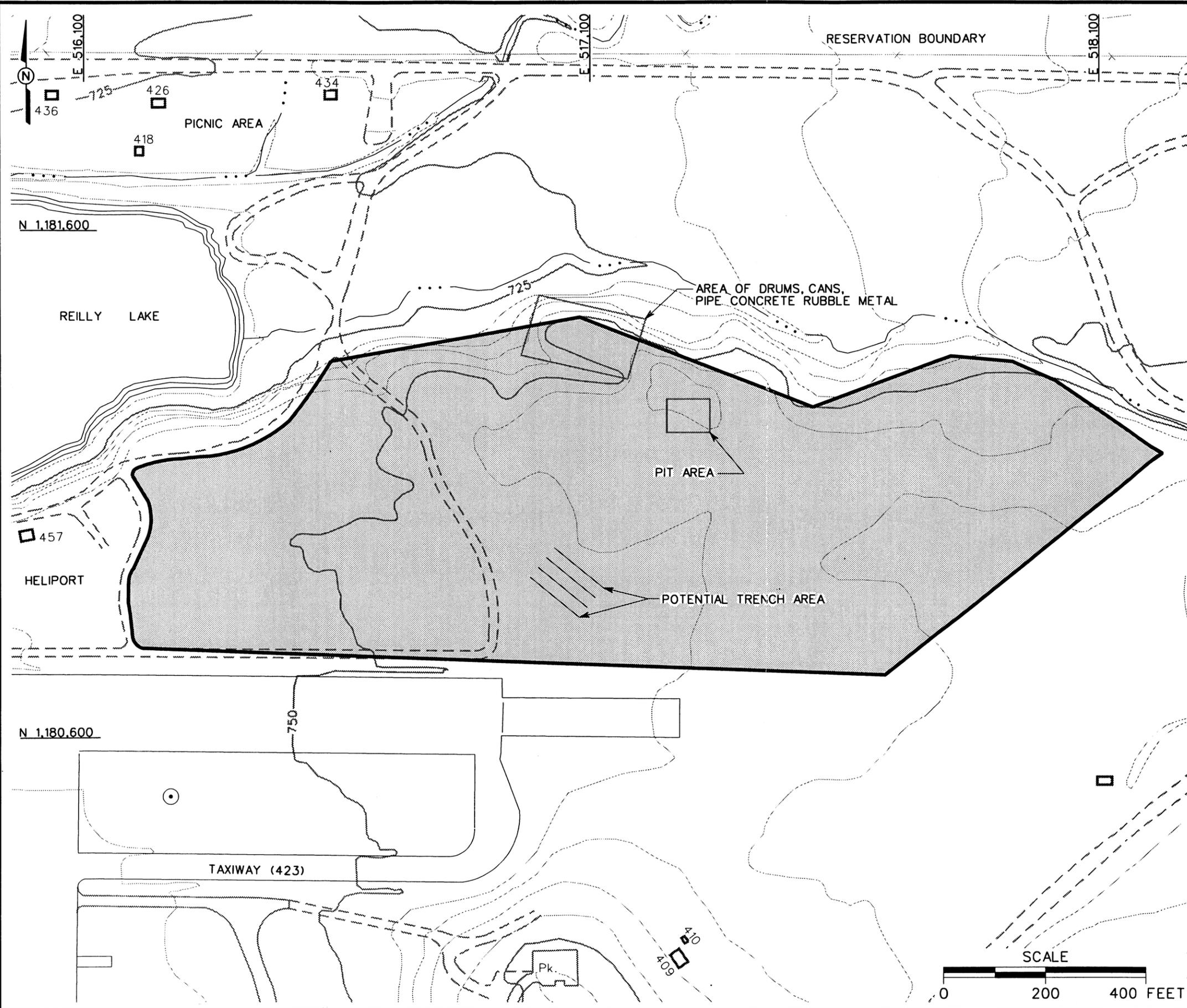
 FORT McCLELLAN BOUNDARY

FIGURE 1-1
SITE LOCATION MAP
FILL AREA EAST END REILLY
AIRFIELD
PARCEL 227(7)

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

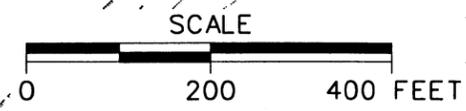


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- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - TOPOGRAPHIC CONTOURS
 - PARCEL BOUNDARY
 - BRIDGE
 - CULVERT WITH HEADWALL
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - FENCE
 - SANITARY SEWER LINE
 - STORM DRAINAGE LINE

FIGURE 1-2
SITE MAP
FILL AREA EAST END REILLY
AIRFIELD
PARCEL 227(7)
 U. S. ARMY CORPS OF ENGINEERS
 MOBILE DISTRICT
 FORT McCLELLAN
 CALHOUN COUNTY, ALABAMA
 Contract No. DACA21-96-D-0018



mately 720 feet and ground slope is north-northwest toward Reilly Lake. Site walk-overs by IT revealed several drums and other discarded material on the northern boundary; however, it is unknown if this material is associated with Parcel 126(7) or Parcel 227(7). Parcel 126(7) is known as the Post Garbage Dump North of Reilly Airfield. The area is densely vegetated, the precise location and site boundaries are not clearly defined. It is not certain that the site was ever used as a dump or landfill. Information regarding this site and dates of use have not be located. Geophysical surveys will be conducted to identify parcel boundaries and the features indicated in the environmental baseline survey (EBS) (ESE, 1998).

Two pits (approximately 5 feet wide and 4 feet deep) were observed in the north central portion of the site. In the south central portion of the site, several linear features were observed in a cleared area immediately adjacent to and north of the airfield. These features appeared to be old trenches that had experienced some cave-in.

Information regarding operations at this parcel is not available, nor is it known if any disposal activities have occurred at this location. Although interviews were conducted with current and retired personnel regarding past activities at this site, no one interviewed could recall disposal activities occurring at Parcel 227(7).

This parcel is adjacent to and southeast of Reilly Lake. The soil map identifies the body of water as Training Lake. The soil type associated with the southern lake area extending parallel (east and west) to the airfield is called Terrace Escarpment. This miscellaneous soil type is on short, abrupt, steep slopes. It is fairly extensive in the southwestern part of the county near Mount Olive Church. A mantle of stream terrace material, ranging from 10 to 30 inches in thickness, overlies residuum of varied origin. The surface layer normally ranges from dark grayish brown to reddish brown in color and from gravelly loamy fine sand to clay loam in texture. The subsoil material also varies in color, texture, thickness, and degree of development. Runoff is moderate to rapid, and infiltration is slow to medium. Permeability ranges from slow to rapid, and the capacity for available moisture is low.

Immediately adjacent to the airfield and south of the Terrace Escarpment soil is the Cumberland gravelly loam, 2 to 6 percent slopes, eroded type soil. The surface soil ranges from very dark brown to reddish brown. The subsoil ranges from dark red to red and from silty clay loam to clay in texture. The thickness of the alluvium ranges from 2 to 15 feet or more. In some areas, this soil is underlain by beds of gravel or sand. Infiltration is medium, permeability is moderate, and

the capacity for available moisture is high. Runoff is medium and is a slight hazard. These soils have developed in old general alluvium that washed from soils derived mainly from limestone and cherty limestone, and to some extent, shale and sandstone. Rounded chert, sandstone, and quartzite gravel, as much as 3 inches in diameter, are on and in the soil. Depth to water is greater than 20 feet and depth to bedrock is from 4 feet to greater than 20 feet (U.S. Department of Agriculture, 1961).

1.3 Scope of Work

The scope of work for activities associated with the Fill Area East End Reilly Airfield, as specified in the statement of work (USACE, 1998), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a geophysical survey to delineate the boundaries of the Fill Areas.
- Collect three surface soil, thirteen subsurface soil, thirteen groundwater, five surface water, five sediment, and three depositional soil samples to define the nature and extent of contamination, if any, at the site and provide data useful in any future planned corrective measures and closure activities.

At the completion of the field activities and sample analyses, draft and final reports will be prepared to evaluate the absence or presence of contaminants at this site, and to recommend further remedial action, if appropriate. Reports will be prepared in accordance with current EPA Region IV and the Alabama Department of Environmental Management (ADEM) requirements.

2.0 Summary of Previous Environmental Studies

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

1. Areas where no storage, release, or disposal (including migration) has occurred.
2. Areas where only storage has occurred.
3. Areas of contamination below action levels.
4. Areas where all necessary remedial actions have been taken.
5. Areas of known contamination with removal and/or remedial action underway.
6. Areas of known contamination where required response actions have not been taken.
7. Areas that are not evaluated or require further evaluation.

The EBS was conducted in accordance with the Community Environmental Response Facilitation Act (CERFA) (CERFA-Public Law 102-426) protocols and DOD 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 Comprehensive Environmental Response, Compensation, and Liability Act-regulated substances, petroleum products, and Resource Conservation and Recovery Act-regulated facilities. Available historic maps and aerial photographs were reviewed to document historic land uses. Personal and telephone interviews of past and present FTMC employees and military personnel were conducted in an attempt to determine past operations and activities at the site. In addition, visual site inspections were conducted to verify conditions of specific property parcels. The Fill Area East End Reilly Airfield, Parcel 227(7) site was identified as a Category 7: a site where further evaluation is needed. Previous environmental studies have not been conducted at this site.

3.0 Site-Specific Data Quality Objectives

3.1 Overview

The data quality objectives (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 the Fill Area East End Reilly Airfield, Parcel 227(7). This section incorporates the components of the DQO process described in the EPA publication EPA 540-R-93-071 *Data Quality Objectives Process for Superfund, Interim Final Guidance* (EPA, 1993). The DQO process as applied to the Fill Area East End Reilly Airfield, Parcel 227(7) is described in more detail in Section 4.3 of the WP. Table 3-1 provides a summary of the factors used to determine the appropriate quantity of samples, the procedures necessary to meet the objectives of the site investigation, and to establish a basis for future action at this site.

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Chapter 4.0 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah (CESAS) Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported by the laboratory in Contract Laboratory Program (CLP)-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

3.2 Data Users and Available Data

The intended data users and available data related to the site investigation at the Fill Area East End Reilly Airfield, Parcel 227(7), presented in Table 3-1, have been used to formulate a site-specific conceptual model presented in Section 3.3 below. This conceptual model was developed to support the preparation 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 the EPA, USACE, ADEM, FTMC, and the 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 potential site-specific chemical (PSSC) in the site media.

Table 3-1

**Summary of Data Quality Objectives
Site Investigation, Reilly Airfield East, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

| Potential Data Users | Available Data | Conceptual Site Model | Media of Concern | Data Uses and Objectives | Data Types | Analytical Level | Data Quantity |
|--|--|---|--|--|---|-----------------------------------|---------------------|
| EPA ADEM USACE DOD IT Corporation Other Contractors Possible future land users | None | <u>Contaminant Source</u> Fill material Potential trench area | <u>Surface soil</u> <u>Subsurface soil</u> <u>Groundwater</u> <u>Surface water</u> <u>Sediment</u> <u>Depositional soil</u> | SI to confirm whether potential site-specific chemicals of concern are present at the site | <u>Surface soil</u> TCL VOCs, TCL SVOCs, TAL Metals, PCBs, CI Pesticides, CI Herbicides, OP Pesticides, N. Explosives | Definitive data and CESAS Level B | 3 direct-push + QC |
| | | <u>Migration Pathways</u> Infiltration to subsurface soil Infiltration and leaching to groundwater Erosion and runoff to surface water and sediment Dust emissions and volatilization to air. Biotransfer to fish and venison. | | Definitive quality data for future decision-making | <u>Subsurface Soil</u> TCL VOCs, TCL SVOCs, TAL Metals, PCBs, CI Pesticides, CI Herbicides, OP Pesticides, N. Explosives | Definitive data and CESAS Level B | 13 direct-push + QC |
| | | | <u>Groundwater</u> TCL VOCs, TCL SVOCs, Total TAL Metals, PCBs, CI Pesticides, CI Herbicides, OP Pesticides, N. Explosives | | Definitive data and CESAS Level B | 13 direct-push + QC | |
| | | | <u>Surface Water</u> TCL VOCs, TCL SVOCs, Total TAL Metals, PCBs, CI Pesticides, CI Herbicides, OP Pesticides, N. Explosives | | Definitive data and CESAS Level B | 5 + QC | |
| | | | <u>Sediment</u> TCL VOCs, TCL SVOCs, TAL Metals, PCBs, CI Pesticides, CI Herbicides, OP Pesticides, N. Explosives TOC, Grain Size | | Definitive data and CESAS Level B | 5 + QC | |
| | | | <u>Depositional Soil</u> TCL VOCs, TCL SVOCs, TAL Metals, PCBs, CI Pesticides, CI Herbicides, OP Pesticides, N. Explosives | | Definitive data and CESAS Level B | 3 + QC | |
| | <u>PSSC</u> VOCs SVOCs PCBs Herbicides Pesticides Metals Explosives | | | | | | |

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.
OP - Organophosphorus.
PCB - Polychlorinated biphenyl.
PSSC - Potential site-specific chemicals.
QC - Quality control.

SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target Compound list.
TOC - Total organic carbon.
USACE - U.S. Army Corps of Engineers.
VOC - Volatile organic compound.

3.3 Conceptual Site Exposure Model

The conceptual site exposure model (CSEM) provides the basis for identifying and evaluating the potential risks to human health in the risk assessment. The CSEM includes the receptors appropriate to all plausible scenarios, and the potential exposure pathways. Graphically presenting all possible pathways by which a potential receptor may be exposed, including all sources, release and transport pathways, and exposure routes, facilitates consistent and comprehensive evaluation of risk to human health, and helps to ensure that potential pathways are not overlooked. The elements necessary to construct a complete exposure pathway and develop the CSEM include:

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

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

Chemicals of potential concern (COPC) at this site are unknown. The site contains several possible areas that may have been used for waste disposal, including a "pit" and a "trench". If it occurred at this site, contaminant release was probably to surface and subsurface soil. Potential contaminant transport pathways include infiltration to subsurface soil, infiltration and leaching to groundwater, erosion and runoff to the surface water and sediment in Reilly Lake and dust emissions and volatilization to ambient air. Biotransfer to fish and deer may also be considered a valid transport pathway.

Site 227 is a densely wooded area used for recreational purposes. The most likely plausible receptor under current site usage is the recreational site user. Reilly Lake may support sport fishing and the site may support sport hunting. Thus, fish and venison ingestion are plausible receptor scenarios, as well. Other potential receptor scenarios considered but not included under current site use are:

- Groundskeeper: The site is currently not maintained by a groundskeeper.
- Construction worker: The site is currently not under construction.
- Resident: The site is not currently used for residential purposes.

Parcel 227(7) may be developed for industrial use in the future (FTMC, 1997). Residential use is possible, although not likely. Alternatively, the area may remain open space. Thus, plausible receptors under future site usage scenario(s) include the groundskeeper, construction worker, recreational site user, resident, and fish and venison consumption.

Contaminant release and transport mechanisms, source and exposure media, receptors and exposure pathways are summarized in Table 3-1 and Figure 3-1.

3.4 Decision-Making Process, Data Uses, and Needs

The decision-making process consists of a seven-step process that is presented in detail in Section 4.3 of the WP and will be followed during the site investigation at the Fill Area East End Reilly Airfield, Parcel 227(7). Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

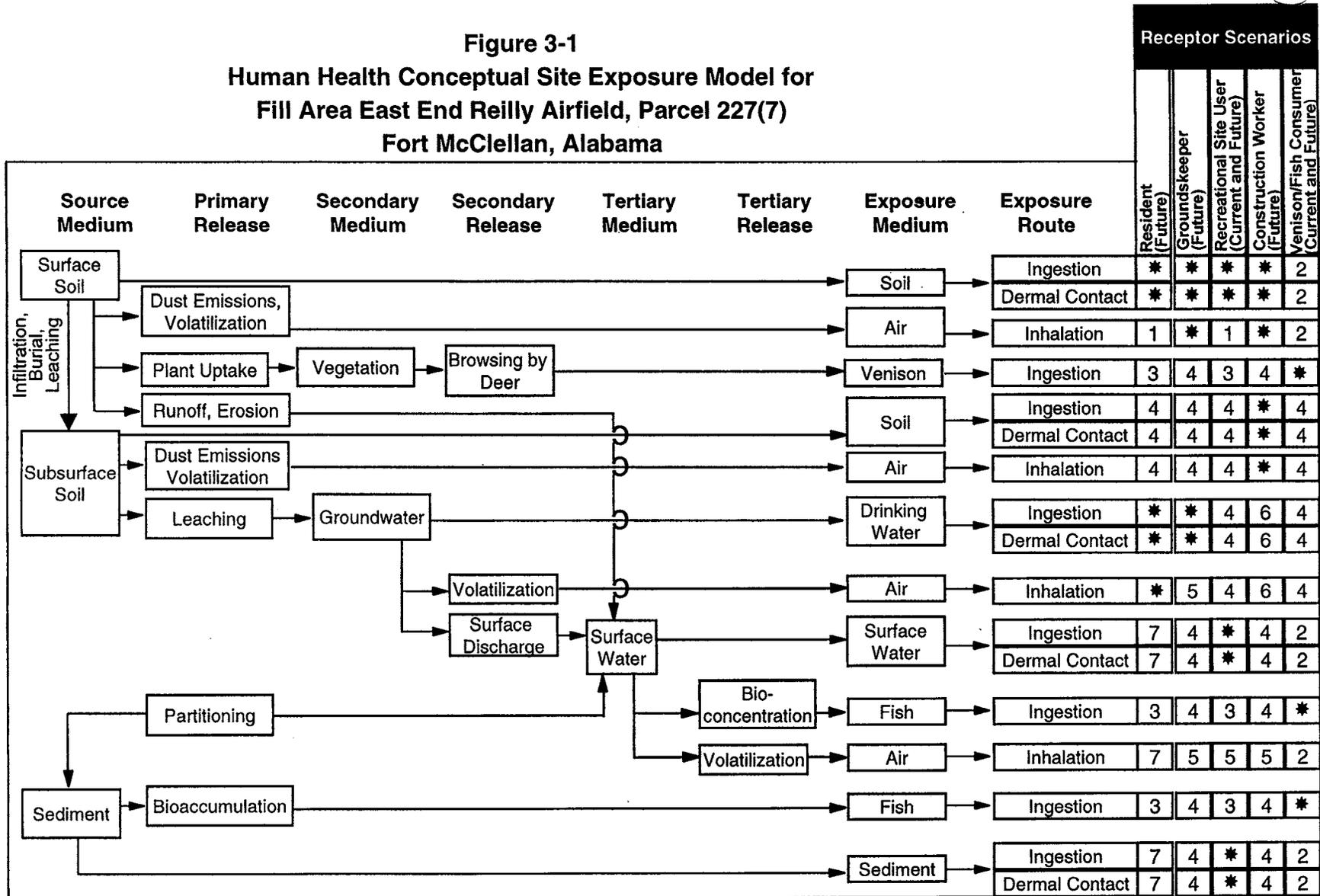
Confirmation of contamination at the Fill Area East End Reilly Airfield, Parcel 227(7), will be based on comparing detected site chemicals concentrations with site-specific screening levels and background concentrations developed in the WP. EPA definitive data with CESAS Level B data packages will be used to achieve detection limits sufficient to determine whether or not the established guidance criteria are exceeded in site media. 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.) is addressed in the installation-wide WP.

3.4.2 Data Types and Quality

Surface and subsurface soil, groundwater, surface water, sediment, and depositional soil will be sampled and analyzed in order to meet the objectives of the site investigation at the Fill Area East End Reilly Airfield, Parcel 227(7). Quality assurance/quality control (QA/QC) samples will be collected for all sample types as described in Chapter 4.0 of this SFSP. Samples will be analyzed by EPA-approved SW-846 methods, including Update III methods where applicable. Samples will be analyzed by EPA-approved SW-846 methods, where available; comply with EPA definitive data requirements; and be reported using hard copy data packages. In addition to meeting

Figure 3-1
Human Health Conceptual Site Exposure Model for
Fill Area East End Reilly Airfield, Parcel 227(7)
Fort McClellan, Alabama



* = Complete exposure pathway quantified in SSSL development.

1 = Volatilization from undisturbed surface soil deemed insignificant; soil is likely to be paved or vegetated, reducing dust emissions to insignificant levels; inhalation pathway not quantified.

2 = This scenario is created to assess indirect (food chain) exposure to surface soil, surface water and sediment.

3 = Evaluated under venison and fish consumption scenario.

4 = Incomplete exposure pathway.

5 = Although theoretically complete, this pathway is judged to be insignificant.

6 = Although theoretically complete, these pathways are not quantified for the construction worker because SSSLs developed for the groundskeeper would be at least as restrictive.

7 = Although theoretically complete, SSSLs for these pathways are developed only for the recreational site user. SSSLs developed for the recreational site user may be used to estimate

risk for this receptor.

the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Section 9.0 of the QAP.

4.0 Field Activities

The parcel of property being investigated under this SI was identified during the EBS (ESE, 1998) and categorized as a Category 7 site. Category 7 indicates the sites that have not been evaluated or that need additional investigation. To meet the objectives of Section 1.3 and Chapter 3.0, the environmental sampling program will consist of the collection of surface soil and subsurface soil samples, groundwater samples, surface water samples and sediment samples, and depositional soil samples.

4.1 Utility Clearances

Prior to performing any intrusive sampling, a utility clearance will be performed at all locations where soil and groundwater samples will be collected, using the procedure outlined in Section 4.2.6 of the SAP. The site manager will mark the proposed locations with stakes, coordinate with the installation to clear the proposed locations for utilities, and obtain digging permits. Once the locations are cleared, the stakes will be labeled as cleared.

4.2 Geophysical Survey

A surface geophysical survey will be conducted over the Fill Area East End Reilly Airfield to verify the existence and determine the boundaries of the fill area, and to locate the proposed sample locations. The geophysical methods to be used include magnetics, frequency-domain electromagnetic (EM) induction, and ground penetrating radar (GPR). These combined methods offer the best approach to screening sites for buried metallic debris, a common component of most landfill operations.

4.2.1 Methodology and Instrumentation

The magnetic surveys will be conducted using a Geometrics G-858G magnetic gradiometer (for collecting survey data) and a Geometrics G-856AX magnetometer or equivalent (for collecting base station data). Frequency-domain EM surveys will be conducted using a Geonics EM31 terrain conductivity meter, coupled to an Omnidata DL720 digital data logger. The GPR survey will be conducted using a Geophysical Survey Systems Inc. System-2P or equivalent, coupled to either 200- or 400-megahertz antennas, depending on site conditions and signal attenuation. If required, a Metrotech 9860-NRL EM utility locator or equivalent, will be used confirm the presence or absence of metallic subsurface utilities, which may be evident as linear anomalies in the EM31 contour maps.

Geophysical survey procedures to be used to conduct the investigation, including survey control, equipment calibration, field base station and data validation, data processing and interpretation, and file tracking procedures, will be in accordance with the methods and procedures outlined in Chapter 4.0 of the installation-wide SAP and the following IT standard operating procedures (SOP) for geophysical investigations:

- ITGP-001; Surface Magnetic Surveys
- ITGP-002; Surface Frequency-Domain EM Surveys
- ITGP-003; GPR Surveys
- ITGP-005; Global Positioning System (GPS) System Surveys.

The following tasks will be performed prior to conducting the survey:

- Review existing site surface and subsurface information (e.g., aerial photographs, utility maps, boring logs, etc.).
- Evaluate the potential influence of cultural features (e.g., overhead and subsurface utilities, fences, buildings, etc.).
- Conduct a visual inspection of the sites to verify the likely location of the former dump area.
- Conduct reconnaissance scans across the general area of the sites with the magnetic and/or EM instruments to determine whether geophysical anomalies exist within the proposed survey areas and/or near the proposed boundaries. The geophysical survey area boundaries for each site will be chosen in the field based on these results.

Following visual inspection of the site and evaluation of reconnaissance scans with the instruments, base grids will be staked throughout each site such that the resolution objectives of the investigation are achieved (typically 50- to 100-foot centers). The base grids will be established using either a GPS or conventional civil surveying techniques. The geophysics base grids will be referenced to the Alabama State Plane Coordinate System. Using the base grids as a reference, the geophysics crew will mark control points on 20-foot centers throughout each site with surveyor's paint and/or plastic pin flags. Due to vegetation at the site, GPS will likely be used to establish and mark control points. To the extent possible, the grids will be oriented in the north to south (N-S) direction. If vegetation or surface metal is present, it shall be removed where necessary prior to collecting geophysical data.

After the survey grids are complete and control points are marked, all surface objects that could potentially affect the geophysical data (e.g., surface metal, variations in topography, overhead utilities, etc.) will be mapped using the GPS so that anomalies caused by these objects can be correctly interpreted.

Geophysical data processing will be completed in the field following the survey. The EM and magnetic data will be presented as color-enhanced contour maps to facilitate recognition of subtle anomalies. Geophysical anomalies will be field-checked to verify their source as either surface culture or subsurface objects/debris. Surface source materials responsible for the observed geophysical anomalies will be documented on the contour maps. Digital GPR data will be collected where necessary to aid with interpreting anomalies seen in the EM and magnetic data maps.

The conclusions from the geophysical survey at Parcel 227(7) will be incorporated into the SI report. Geophysical results will be used to properly position the proposed sample locations at Parcel 227(7).

4.2.2 Areal Coverage

Parcel 227(7) geophysical surveys will encompass the shaded area shown on Figure 4-1, approximately 22 acres. The following is a list of steps that will be performed at the site:

- G-858G magnetic gradiometer data will be collected at 0.5-second intervals (approximate 2.0- to 2.5-foot intervals) along N-S oriented survey lines spaced 20 feet apart.
- EM31 survey data will be collected at 5-foot intervals along N-S and east to west (E-W) oriented survey lines spaced 20 feet apart.
- GPR profile data will be collected to further characterize anomalies seen in the magnetic and/or EM data. The orientation and length of the GPR lines will be chosen in the field to yield the most usable results.
- In areas of the site where linear EM31 anomalies potentially representing pipelines/utilities are observed in the contoured data, the lines will be verified with the Metrotech 9860-NRL EM utility locator. Verification is necessary since the anomalous response caused by subsurface utilities may sometimes be mistaken for large buried metal objects. The locations of interpreted pipelines will be marked in the field with paint and placed on the site map.

4.3 Environmental Sampling

The environmental sampling performed during the SI at Fill Area East End Reilly Airfield, Parcel 227(7), will include the collection of surface soil samples, subsurface soil samples, groundwater samples, sediment and surface water samples, and depositional soil samples for chemical analysis. The placement of sample locations was determined by site physical characteristics noted during a site walk-over, and by review of historical documents pertaining to activities conducted at the site. The sample locations may be revised based on the results of the geophysical survey. The sample locations, media, and rationale are summarized in Table 4-1. Samples will be submitted for laboratory analyses of site related parameters listed in Section 4.6.

4.3.1 Surface Soil Sampling

Three surface soil samples will be collected from three locations on the southern boundary of the Fill Area East End Reilly Airfield, Parcel 227(7) site.

4.3.1.1 Sample Locations and Rationale

Surface soil sampling rationale is presented in Table 4-1. Proposed sampling locations are shown on Figure 4-1. Surface soil sample designations, depths, and required QA/QC sample quantities are listed in Table 4-2. The exact soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions and on the results of the geophysical survey.

4.3.1.2 Sample Collection

Surface soil sample designations, depths, and required QA/QC sample quantities are listed in Table 4-2. Surface soil samples will be collected from the upper 1 foot of soil by direct-push technology using the methodology specified in Section 4.7.1.1 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.6 of this SFSP.

4.3.2 Subsurface Soil Sampling

Thirteen subsurface soil samples will be collected during the SI. Subsurface soil samples will be collected from 13 soil borings at the Fill Area East End Reilly Airfield, Parcel 227(7) site. The soil sample from each soil boring exhibiting the highest reading on a photoionization detector (PID) will be sent to the laboratory for analysis. If none of the sample intervals indicate elevated PID readings, the deepest sample interval will be submitted to the laboratory.

Table 4-1

**Site Sampling Rationale
Fill Area East End Reilly Airfield, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

(Page 1 of 3)

| Sample Location | Media | Rationale* |
|------------------------|--------------------------------|--|
| PPMP-227-GP01 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected on the southern boundary of the site adjacent to the unimproved road to determine if PSSC are present. |
| PPMP-227-GP02 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected at the southwest end of the site 200 feet from the south intersection of the unimproved road to determine if PSSC are present. |
| PPMP-227-GP03 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected at the west end of the site 200 feet from the north intersection of the unimproved roads to determine if PSSC are present. |
| PPMP-227-GP04 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected at the western side of the parcel near the unimproved road to determine if PSSC are present. |
| PPMP-227-GP05 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected at the northwest intersection of the unimproved road at the site boundary to determine if PSSC are present. |
| PPMP-227-GP06 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected at the top edge of the escarpment (northern-most point of boundary) to determine if PSSC are present. |
| PPMP-227-GP07 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected on the west side of the Pit Area to determine if PSSC are present. |
| PPMP-227-GP08 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected at the edge of the escarpment in the fill area to determine if PSSC are present. |

Table 4-1

**Site Sampling Rationale
Fill Area East End Reilly Airfield, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

| Sample Location | Media | Rationale^a |
|------------------------|--------------------------------|---|
| PPMP-227-GP09 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected northeast of the potential trench area and midway down the escarpment to determine if PSSC are present. |
| PPMP-227-GP10 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected for coverage at the extreme eastern end of the site to determine if PSSC are present. |
| PPMP-227-GP11 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and ground water will be collected in the eastern portion of the parcel to determine if PSSC are present. |
| PPMP-227-GP12 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and ground water will be collected in the center of the parcel near the trench area to determine if PSSC are present. |
| PPMP-227-GP13 | SUBSURFACE SOIL GROUNDWATER | Subsurface soil and groundwater samples will be collected at the trench area to determine if PSSC are present. |
| PPMP-227-GP14 | SURFACE SOIL | A surface soil sample will be collected near the unimproved road that parallels the airfield at the southern site boundary to determine if PSSC are present. |
| PPMP-227-GP15 | SURFACE SOIL | A surface soil sample will be collected at the end of the airfield and at the southern site boundary to determine if PSSC are present |
| PPMP-227-GP16 | SURFACE SOIL | A surface soil sample will be collected midway of the distance between the road that crosses the parcel and the road at the southwestern end of the parcel to determine if PSSC are present. |
| PPMP-227-SW/SD01 | SURFACE WATER SEDIMENT | Surface water and sediment samples will be collected from the stream on the east side of the unimproved road to determine if PSSC are present. |
| PPMP-227-SW/SD02 | SURFACE WATER SEDIMENT | Surface water and sediment samples will be collected at the east edge of the lake. Evidence of contaminant mobility at any point within the site would likely be integrated at this location. |

Table 4-1

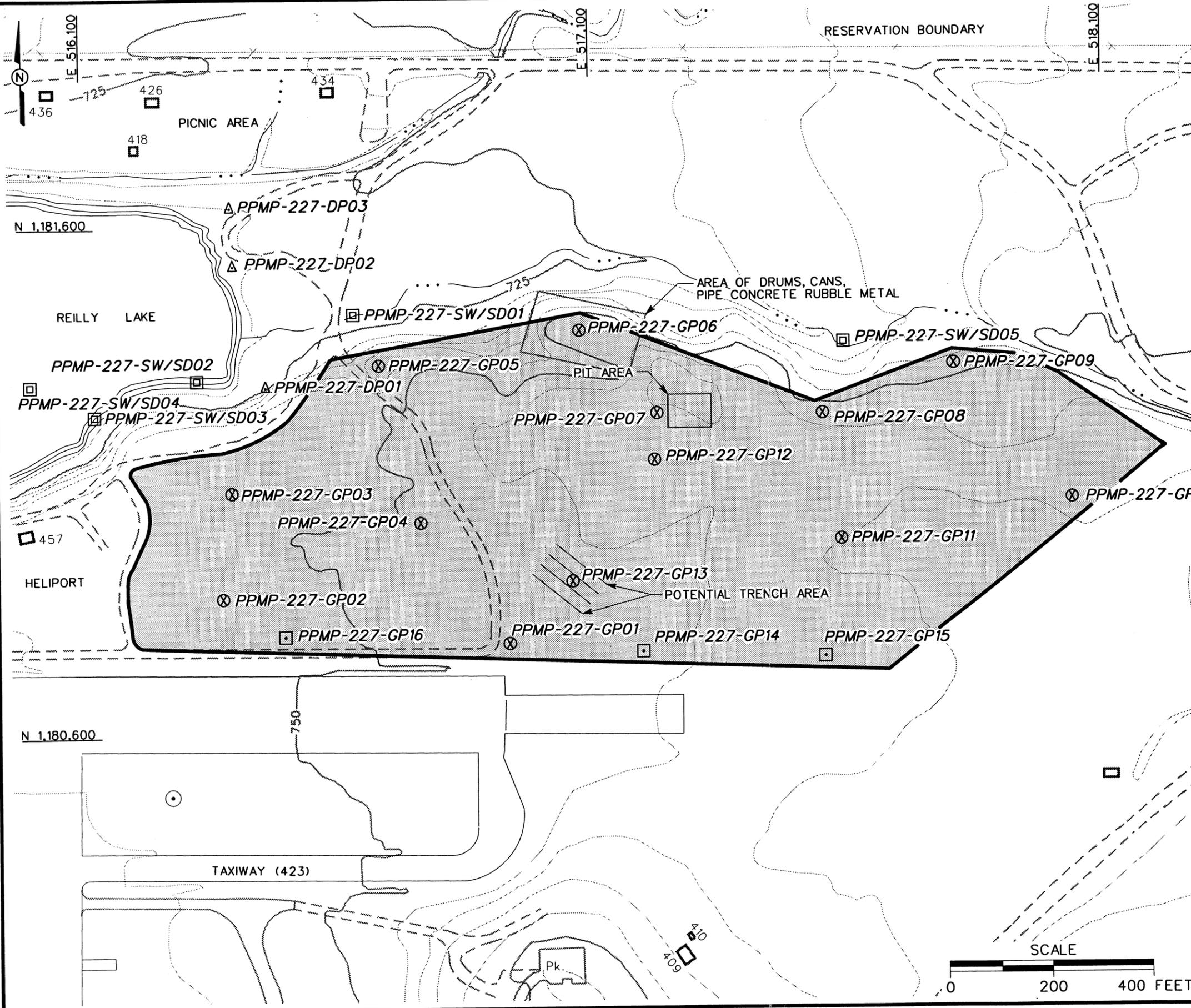
**Site Sampling Rationale
Fill Area East End Reilly Airfield, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

| Sample Location | Media | Rationale* |
|------------------------|---------------------------|--|
| PPMP-227-SW/SD03 | SURFACE WATER SEDIMENT | Surface water and sediment samples will be collected at the edge of the lake at a point below the unimproved road and the extreme western edge of the site to determine if PSSC are present. |
| PPMP-227-SW/SD04 | SURFACE WATER SEDIMENT | Surface water and sediment samples will be collected from Reilly Lake to determine if PSSC are present. |
| PPMP-227-SW/SD05 | SURFACE WATER SEDIMENT | Surface water and sediment samples will be collected along the stream to determine possible contamination from natural background or upgradient sources. The sampling location represents an upgradient sample location to determine if PSSC are present. |
| PPMP-227-DEP01 | DEPOSITIONAL SOIL | A depositional soil sample will be collected from the bottom edge of the escarpment near the lake. Sampling location represents a lower elevation area associated with the wetland/marsh where surface water runoff could collect, and potentially percolate into the substratum, or potentially deposit dissolved materials after evaporation. |
| PPMP-227-DEP02 | DEPOSITIONAL SOIL | A depositional soil sample will be collected from the northern side of the stream where it enters the lake. Sampling location represents a lower elevation area associated with the wetland/marsh where surface water runoff could collect, and potentially percolate into the substratum, or potentially deposit dissolved materials after evaporation. |
| PPMP-227-DEP03 | DEPOSITIONAL SOIL | A depositional soil sample will be collected beside the unimproved road, between the road and the stream at the eastern edge of the lake to determine if PSSC are present. |

*Sample locations are subject to change based upon results of the geophysical survey and field observations.

DWG. NO.: 4645es.140
 PROJ. NO.: 774645
 INITIATOR: C. SHORT
 PROJ. MGR.: J. YACOUB
 DRAFT. CHK. BY: A. MAYILA
 ENGR. CHK. BY: A. MAYILA
 DATE LAST: 07/02/98
 DRAWN BY: D. BILLINGSLEY
 STARTING DATE: 07/02/98
 DRAWN BY: D. BILLINGSLEY
 30 NOV 98 10:01:06
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| LEGEND | |
|--------|---|
| | UNIMPROVED ROADS AND PARKING |
| | PAVED ROADS AND PARKING |
| | BUILDING |
| | TOPOGRAPHIC CONTOURS |
| | PARCEL BOUNDARY |
| | BRIDGE |
| | CULVERT WITH HEADWALL |
| | SURFACE DRAINAGE / CREEK |
| | MANMADE SURFACE DRAINAGE FEATURE |
| | FENCE |
| | SANITARY SEWER LINE |
| | STORM DRAINAGE LINE |
| | PROPOSED SURFACE WATER/SEDIMENT SAMPLE |
| | PROPOSED SURFACE SOIL SAMPLE |
| | PROPOSED GROUNDWATER AND SUBSURFACE SOIL SAMPLE |
| | PROPOSED DEPOSITIONAL SOIL SAMPLE |

FIGURE 4-1
PROPOSED SAMPLE LOCATIONS
FILL AREA EAST END REILLY
AIRFIELD
PARCEL 227(7)

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

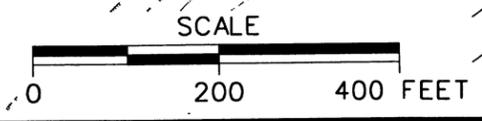


Table 4-2

Surface, Subsurface, Depositional Soil Sample Designations and QA/QC Sample Quantities
 Fill Area East End Reilly Airfield, Parcel 227(7)
 Fort McClellan, Calhoun County, Alabama

(Page 1 of 3)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|-----------------|-----------------------------|-------------------|------------------|--------------|---|--|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-GP01 | PPMP-227-GP01-DS-KB0001-REG | a | | | PPMP-227-GP01-DS-KB0001-MS PPMP-227-GP01-DS-KB0001-MSD | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP02 | PPMP-227-GP02-DS-KB0002-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP03 | PPMP-227-GP03-DS-KB0003-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP04 | PPMP-227-GP04-DS-KB0004-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP05 | PPMP-227-GP05-DS-KB0005-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP06 | PPMP-227-GP06-DS-KB0006-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP07 | PPMP-227-GP07-DS-KB0007-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |

Table 4-2

Surface, Subsurface, Depositional Soil Sample Designations and QA/QC Sample Quantities
 Fill Area East End Reilly Airfield, Parcel 227(7)
 Fort McClellan, Calhoun County, Alabama

(Page 2 of 3)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|-----------------|-----------------------------|-------------------|----------------------------|----------------------------|--------|--|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-GP08 | PPMP-227-GP08-DS-KB0008-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP09 | PPMP-227-GP09-DS-KB0009-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP10 | PPMP-227-GP10-DS-KB0010-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP11 | PPMP-227-GP11-DS-KB0011-REG | a | PPMP-227-GP11-DS-KB0012-FD | PPMP-227-GP11-DS-KB0013-FS | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP12 | PPMP-227-GP12-DS-KB0014-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP13 | PPMP-227-GP13-DS-KB0015-REG | a | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |
| PPMP-227-GP14 | PPMP-227-GP14-SS-KB0016-REG | 0-1 | | | | TCL VOCs, TCL SVOCs, CI Pesticides/PCBs, OP Pesticides, CI Herbicides, TAL Metals, |

Table 4-2

**Surface, Subsurface, Depositional Soil Sample Designations and QA/QC Sample Quantities
Fill Area East End Reilly Airfield, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|-----------------|-------------------------------|-------------------|------------------------------|------------------------------|--------|--|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-GP15 | PPMP-227-GP15-SS-KB0017-REG | 0-1 | | | | TCL VOCs, TCL SVOCs, Cl Pesticides/PCBs, OP Pesticides, Cl Herbicides, TAL Metals, |
| PPMP-227-GP16 | PPMP-227-GP16-SS-KB0018-REG | 0-1 | | | | TCL VOCs, TCL SVOCs, Cl Pesticides/PCBs, OP Pesticides, Cl Herbicides, TAL Metals, |
| PPMP-227-DEP01 | PPMP-227-DEP01-DEP-KB0019-REG | 0-1 | | | | TCL VOCs, TCL SVOCs, Cl Pesticides/PCBs, OP Pesticides, Cl Herbicides, TAL Metals, |
| PPMP-227-DEP02 | PPMP-227-DEP02-DEP-KB0020-REG | 0-1 | PPMP-227-DEP02-DEP-KB0021-FD | PPMP-227-DEP02-DEP-KB0022-FS | | TCL VOCs, TCL SVOCs, Cl Pesticides/PCBs, OP Pesticides, Cl Herbicides, TAL Metals, |
| PPMP-227-DEP03 | PPMP-227-DEP03-DEP-KB0023-REG | 0-1 | | | | TCL VOCs, TCL SVOCs, Cl Pesticides/PCBs, OP Pesticides, Cl Herbicides, TAL Metals, |

* Actual sample depth selected for analysis will be at the discretion of the onsite geologist and will be based on field observation.

Cl - Chlorinated.

MS/MSD - Matrix spike/matrix spike duplicate.

N - Nitroaromatic.

OP - Organophosphorus

QA/QC - Quality assurance/quality control.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

4.3.2.1 Sample Locations and Rationale

Subsurface soil samples will be collected from the soil borings indicated by specific symbols on Figure 4-1. Subsurface sampling rationale is presented in Table 4-1. Subsurface soil sample designations, depths, and required QA/QC sample quantities are listed in Table 4-2. The exact soil boring sampling locations will be determined in the field by the on-site geologist, based on actual field conditions and the results of the geophysical survey.

4.3.2.2 Sample Collection

Subsurface soil samples will be collected using direct-push methodology specified in Section 4.7.1.1 of the SAP.

Soil samples will be collected continuously from 1 to 12 feet bls or until either groundwater or refusal is reached at each proposed soil boring location. A detailed lithological log will be written by the on-site geologist for each borehole. The log will serve as an aide to the on-site geologist to determine if additional sampling locations are necessary or determine if a change in the proposed sampling depth is warranted. Samples will be field screened using a PID in accordance with Section 4.15 of the SAP. Samples will be collected for headspace screening as specified in Section 4.15 of the SAP. If none of the samples collected indicate readings above background on the PID, the deepest sample interval collected will be sent to the laboratory for analysis. If none of the sample intervals indicate elevated PID readings, the deepest sample interval will be submitted to the laboratory.

Sample documentation and chain-of-custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. Sample documentation and chain-of-custody will be recorded as specified in Section 4.13 of the SAP. The samples will be analyzed for the parameters listed in Section 4.6 of this SFSP.

4.3.3 Groundwater Sampling

Groundwater samples will be collected from direct-temporary wells installed at the Fill Area at the East End of Reilly Field, Parcel 227(7). Direct-push temporary wells will be installed in each soil boring described in Section 4.3.2.

4.3.3.1 Sample Locations and Rationale

Thirteen groundwater samples will be collected from direct-push temporary wells at the site. Groundwater samples will be collected from the well locations shown on Figure 4-1. The groundwater sampling rationale is presented in Table 4-1. The groundwater sample designations and required QA/QC sample quantities are listed in Table 4-3. The exact sampling locations will be determined in the field by the on-site geologist.

4.3.3.2 Sample Collection

Groundwater samples will be collected in accordance with the procedures specified in Section 4.7.1.1 of the SAP. Direct-push temporary well will be completed in soil borings advanced to the water table (to a depth where sufficient water is encountered) to collect groundwater samples.

At direct-push temporary well locations, where either refusal is reached before encountering water or direct-push temporary wells do not yield sufficient groundwater for laboratory analysis, conventional drilling methods will be utilized to install temporary monitoring wells. Temporary monitoring wells will be completed as specified in the addendum to Appendix C of the SAP, Section C.5.7 (IT, 1998c).

Sample documentation and chain-of-custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.6 of this SFSP.

4.3.4 Surface Water Sampling

Five surface water samples will be collected during the SI. One sample will be collected from Reilly Lake, two samples will be collected from the southeastern bank of Reilly Lake between the lake and the northeast boundary of Parcel 227, one sample will be collected from the western portion of the wetland/marsh area north of the parcel, and an upgradient sample will be collected along the eastern-most reach of the creek meandering along the northern boundary of the site.

4.3.4.1 Sample Locations and Rationale

The surface water sampling rationale is listed in Table 4-1. Surface water samples will be collected from the locations proposed on Figure 4-1. The surface water sample designations and required QA/QC sample quantities are listed in Table 4-4. The exact sampling locations will be determined in the field, based on drainage pathways and actual field observations.

Table 4-3

Groundwater Sample Designations and QA/QC Sample Quantities
 Fill Area East End Reilly Reilly AirField, Parcel 227(7)
 Fort McClellan, Calhoun County, Alabama

(Page 1 of 3)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|-----------------|-----------------------------|-------------------|------------------|--------------|---|---|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-GP01 | PPMP-227-GP01-GW-KB3001-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP02 | PPMP-227-GP02-GW-KB3002-REG | a | | | PPMP-227-GP02-GW-KB3002-MS PPMP-227-GP02-GW-KB3002-MSD | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP03 | PPMP-227-GP03-GW-KB3003-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP04 | PPMP-227-GP04-GW-KB3004-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP05 | PPMP-227-GP05-GW-KB3005-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP06 | PPMP-227-GP06-GW-KB3006-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Fill Area East End Reilly Reilly AirField, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 3)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|-----------------|-----------------------------|-------------------|----------------------------|----------------------------|--------|---|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-GP07 | PPMP-227-GP07-GW-KB3007-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP08 | PPMP-227-GP08-GW-KB3008-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP09 | PPMP-227-GP09-GW-KB3009-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP10 | PPMP-227-GP10-GW-KB3010-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP11 | PPMP-227-GP11-GW-KB3011-REG | a | PPMP-227-GP11-GW-KB3012-FD | PPMP-227-GP11-GW-KB3013-FS | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |
| PPMP-227-GP12 | PPMP-227-GP12-GW-KB3014-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, N. Explosives |

Table 4-3

**Groundwater Sample Designations and QA/QC Sample Quantities
Fill Area East End Reilly Reilly AirField, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

(Page 3 of 3)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|-----------------|-----------------------------|-------------------|------------------|--------------|--------|---|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-GP13 | PPMP-227-GP13-GW-KB3015-REG | a | | | | TCL VOCs, TCL SVOCs, PCBs, Cl Pesticides, OP Pesticides, Cl Herbicides, Total TAL Metals, N. Explosives |

*Actual sample depth will depend on where sufficient groundwater to collect a sample is encountered.

Cl - Chlorinated.

MS/MSD - Matrix spike/matrix spike duplicate.

N - Nitroaromatic.

OP - Organophosphorus.

QA/QC - Quality assurance/quality control.

SVOC - Semivolatile organic compound.

TAL - Target analyte list.

TCL - Target compound list.

VOC - Volatile organic compound.

Table 4-4

Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
 Fill Area East End Reilly Airfield, Parcel 227(7)
 Fort McClellan, Calhoun County, Alabama

(Page 1 of 2)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|------------------|--------------------------------|-------------------|-------------------------------|-------------------------------|--------|---|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-SW/SD01 | PPMP-227-SW/SD01-SW-KB2001-REG | N/A | PPMP-227-SW/SD01-SW-KB2002-FD | PPMP-227-SW/SD01-SW-KB2003-FS | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, Nitroexplosives |
| | PPMP-227-SW/SD01-SD-KB1001-REG | 0-0.5 | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, Nitroexplosives w/TOC, Gr. Size |
| PPMP-227-SW/SD02 | PPMP-227-SW/SD02-SW-KB2004-REG | N/A | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, Nitroexplosives |
| | PPMP-227-SW/SD02-SD-KB1002-REG | 0-0.5 | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, Nitroexplosives w/TOC, Gr. Size |
| PPMP-227-SW/SD03 | PPMP-227-SW/SD03-SW-KB2005-REG | N/A | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, Nitroexplosives |
| | PPMP-227-SW/SD03-SD-KB1003-REG | 0-0.5 | | | | TCL VOCs, TCL SVOCs, PCBs, CI Pesticides, OP Pesticides, CI Herbicides, Total TAL Metals, Nitroexplosives w/TOC, Gr. Size |

Table 4-4

**Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
Fill Area East End Reilly Airfield, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

(Page 2 of 2)

| Sample Location | Sample Designation | Sample Depth (ft) | QA/QC Samples | | | Analytical Suite |
|------------------|--|-------------------|------------------|--------------|--------|---|
| | | | Field Duplicates | Field Splits | MS/MSD | |
| PPMP-227-SW/SD04 | PPMP-227-SW/SD04-SW-KB2006-REG | N/A | | | | TCL VOCs, TCL SVOCs, PCBs, Cl Pesticides, OP Pesticides, Cl Herbicides, Total TAL Metals, Nitroexplosives |
| PPMP-227-SW/SD05 | PPMP-227-SW/SD05-KB2007-REG PPMP-227-SW/SD05-KB1005-REG | 0-0.5 | | | | TCL VOCs, TCL SVOCs, PCBs, Cl Pesticides, OP Pesticides, Cl Herbicides, Total TAL Metals, Nitroexplosives w/TOC, Gr. Size |

- Cl - Chlorinated.
- MS/MSD - Matrix spike/matrix spike duplicate.
- N - Nitroaromatic.
- OP - Organophosphorus.
- QA/QC - Quality assurance/quality control.
- SVOC - Semivolatile organic compound.
- TAL - Target analyte list.
- TCL - Target compound list.
- TOC - Total organic carbon.
- VOC - Volatile organic compound.

4.3.4.2 Sample Collection

Surface water samples will be collected in accordance with the procedures specified in Section 4.9.1.3 of the SAP. Sample documentation and chain-of-custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.6.

4.3.5 Sediment Sampling

Five sediment samples will be collected at the same locations as the surface water samples presented in Section 4.3.4.

4.3.5.1 Sample Locations and Rationale

The tentative locations for the sediment samples are shown in Figure 4-1. Sediment sampling rationale is presented in Table 4-1. The sediment sample designations and required QA/QC sample quantities are listed in Table 4-4. The actual sediment sample points selected will be at the discretion of the ecological sampler based on the drainage pathways and actual field observations.

4.3.5.2 Sample Collection

Sediment sample collection will be conducted in accordance with the procedures specified in Section 4.9.1.2 of the SAP. Sample documentation and chain-of-custody will be recorded as specified in Section 4.13 of the SAP. The sediment samples will be analyzed for the parameters listed in Section 4.6.

4.3.6 Depositional Soil Sampling

Three depositional soil samples will be collected at the locations specified in Figure 4-1.

4.3.6.1 Sample Locations and Rationale

Depositional soil samples will be collected from three locations at the eastern side of Reilly Lake. The sampling rationale is listed in Table 4-1. The proposed tentative sampling locations are shown in Figure 4-1. The depositional soil sample designations and required QA/QC sample quantities are listed in Table 4-2. The actual depositional soil sample points selected will be at the discretion of the ecological sampler based on the drainage pathways and on actual field observations.

4.3.6.2 Sample Collection

Depositional soil samples will be collected in accordance with the procedures for surface soil sample collection specified in Section 4.9.1.1 of the SAP. Sample documentation and chain-of-custody will be recorded as specified in Section 4.13 of the SAP. Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SFSP are listed in Section 5.0, Table 5-1, of the QAP. The samples will be analyzed for the parameters listed in Section 4.6.

4.4 Decontamination Requirements

Decontamination will be performed on sampling and nonsampling equipment to prevent cross contamination between sampling locations. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP (IT, 1998b). Decontamination of nonsampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.2 of the SAP.

4.5 Surveying of Sample Locations

Sampling locations will be marked with pin flags, stakes, and/or flagging and will be surveyed using either GPS or conventional civil survey techniques, as necessary to obtain the required level of accuracy. Horizontal coordinates will be referenced to the Alabama State Plane Coordinate System, 1983 North American Datum (NAD83). Elevations will be referenced to the National Geodetic Vertical Datum of 1929 or the North American Vertical Datum of 1988 (soon to be established on site).

Horizontal coordinates for soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. Because of the need to use direct-push temporary wells to determine water levels, a higher level of accuracy is required. Temporary wells will be surveyed to an accuracy of 0.1 foot for horizontal coordinates and 0.01 feet for elevations, using survey-grade GPS techniques and/or conventional civil survey techniques, as required. Permanent monitor well locations will be surveyed by a registered professional land surveyor to provide the required accuracy of 0.1 foot for horizontal coordinates and 0.01 foot for elevations.

Procedures to be used for GPS surveying are described in Section 4.3 of the SAP. Conventional land survey requirements are presented in Section 4.19 of the SAP.

4.6 Analytical Program

Samples collected at locations specified in Chapter 4.0 will be analyzed for various physical and chemical properties. The on-site sample coordinator will provide sampling containers and preservatives, and will coordinate sampling procedures with the field sampling crews in accordance with Table 5-1 in the QAP. The specific suite of analyses to be performed is based on the PSSC historically at the site and EPA, ADEM, FTMC, and USACE requirements. Target analyses for samples collected from Fill Area East End Reilly Airfield, Parcel 227(7), include the following list of parameters:

- Target Compound List Volatile Organic Compounds - Method 5035/8260B
- Target Compound List Semivolatile Organic Compounds - Method 8270C
- Target Analyte List Metals - Method 6010B/7000
- Chlorinated Pesticides - Method 8081A
- Polychlorinated Biphenyls - Method 8082
- Organophosphorus Pesticides - Method 8141A
- Chlorinated Herbicides - Method 8151A
- Nitroexplosives - Method 8330
- Total organic carbon - Method 9060 (sediment only)
- Grain size - American Society for Testing and Materials D421/D422 (sediment only).

The samples will be analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 4-5 in this SFSP and Table 6-1 in the QAP. Data will be reported and evaluated in accordance with CESAS Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of the QAP). Chemical data will be reported via hard copy data packages by the laboratory using CLP-like forms. These packages will be validated in accordance with EPA National Functional Guidelines by Level III criteria.

Table 4-5

**Analytical Samples
Fill Area East End Reilly Airfield, Parcel 227(7)
Fort McClellan, Calhoun County, Alabama**

| Parameters | Analysis Method | Sample Matrix | TAT Needed | Field Samples | | | QA/QC Samples ⁽¹⁾ | | | | | Quanterra | QA Lab |
|--|-----------------|---------------|------------|----------------------|---------------|----------------------|------------------------------|-----------------------|-------------|---------------------|-------------------------|--------------------|--------------------|
| | | | | No. of Sample Points | No. of Events | No. of Field Samples | Field Dups (10%) | Splits w/ QA Lab (5%) | MS/MSD (5%) | Trip Blank (1/ship) | Eq. Rinse (1/wk/matrix) | Total No. Analysis | Total No. Analysis |
| Reilly Air Field East - Parcel 227(7): 18 water matrix: 5 surface water, 13 groundwater; 24 soil matrix: 3 surface, 13 subsurface, 5 sediment, and 3 depositional soils | | | | | | | | | | | | | |
| TCL VOCs | 8260B | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | 5 | 1 | 28 | 2 |
| TCL SVOCs | 8270C | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | | 1 | 23 | 2 |
| Cl Pesticides | 8081A | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | | 1 | 23 | 2 |
| PCBs | 8082 | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | | 1 | 23 | 2 |
| OP Pesticides | 8141A | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | | 1 | 23 | 2 |
| Cl Herbicides | 8151A | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | | 1 | 23 | 2 |
| Tot TAL Metals | 6010B/7000 | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | | 1 | 23 | 2 |
| N. Explosives | 8330 | water | normal | 18 | 1 | 18 | 2 | 2 | 1 | | 1 | 23 | 2 |
| TCL VOCs | 8260B | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| TCL SVOCs | 8270C | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| Cl Pesticides | 8081A | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| PCBs | 8082 | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| OP Pesticides | 8141A | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| Cl Herbicides | 8151A | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| TAL Metals | 6010B/7000 | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| Nitroexplosives | 8330 | soil | normal | 23 | 1 | 23 | 2 | 2 | 1 | | 1 | 28 | 2 |
| Tot Org Carb | 9060 | sediment | normal | 5 | 1 | 5 | | | | | | 4 | 0 |
| Grain Size | ASTM | sediment | normal | 5 | 1 | 5 | | | | | | 4 | 0 |
| Fill Area East End Reilly Air Field Subtotal: | | | | 338 | | | 32 | 32 | 16 | 5 | 16 | 421 | 32 |

^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 in association 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 are anticipated to last more than 1 week. Assumed 20 field samples will be collected per week to estimate number of equipment blanks.

Ship samples to: Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Attn: John Reynolds
Tel: 423-588-6401
Fax: 423-584-4315

USACE laboratory split samples are shipped to:

USACE South Atlantic Division Laboratory
Attn: Sample Receiving
611 South Cobb Drive
Marietta, Georgia 30060-3112
Tel: 770-919-5270

QA/QC - Quality assurance/quality control.
MS/MSD - Matrix spike/matrix spike duplicate.
VOC - Volatile organic compound.
SVOC - Semivolatile organic compound.
TCL - Target compound list.

4.7 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow requirements specified in Section 4.13.2 of the SAP (IT, 1998a).

Completed analysis request/chain of custody records will be secured and included with each shipment of coolers to:

Sample Receiving
Quanterra Environmental Services
5815 Middlebrook Pike
Knoxville, Tennessee 37921
Telephone: (423) 588-6401.

Split samples will be shipped to:

Sample Receiving
Attn: USACE South Atlantic Division Laboratory
611 South Cobb Drive
Marietta, Georgia 30060
Telephone: (770) 919-5270.

4.8 Investigation-Derived Waste Management and Disposal

Investigation-derived waste (IDW) will be managed and disposed of as outlined in Appendix D of the SAP. The IDW expected to be generated from the field sampling at FTMC will consist of purge water from direct-push temporary well development and sampling activities, decontamination fluids, spent well materials, and personal protective equipment (PPE). IDW will be stored inside the fenced area surrounding Buildings 335 and 336 while awaiting final disposal.

4.9 Site-Specific Safety and Health

Safety and health requirements for this SI are provided in the SSHP for the Fill Area East End Reilly Airfield, Parcel 227(7). The SSHP attachment will be used in conjunction with the SHP.

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 on a monthly basis.

6.0 References

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

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

IT Corporation (IT), 1998a, *Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama*, August.

IT Corporation (IT), 1998b, *Final Installation-Wide Work Plan, Fort McClellan, Calhoun County, Alabama*, August.

IT Corporation (IT), 1998c, Letter to Ellis Pope from Jeanne Yacoub, "Procedures for Temporary Residuum Monitoring Well Installation, Conversion, and Abandonment," November, 1998.

U.S. Army Corps of Engineers (USACE), 1998, *Statement of Work for Task Order CK005, Modification No. 1, Site Investigations at Fort McClellan, Alabama, Including Ecological Screening Sites (Creeks and Tribes), and Removal of Indoor Firing Ranges*, May.

U.S. Army Corps of Engineers (USACE), 1994, *Requirements for the Preparation of Sampling and Analysis Plans*, Engineer Manual EM 200-1-3, September 1.

U.S. Department of Agriculture, 1961, *Soil Survey, Calhoun County, Alabama*, USDA Soil Conservation Service in cooperation with Alabama Department of Agriculture and Industries, Alabama Agricultural Experiment Station, Series 1958, No. 9, September.

U.S. Environmental Protection Agency (EPA), 1993, *Data Quality Objectives Process for Superfund Interim Final Guidance*, EPA 540-R-93-071, September.

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