

Site Investigation
Final
Site-Specific Field Sampling Plan Attachment
for the Ground Scar with Trenches, Parcel 200(7)

Fort McClellan
Calhoun County, Alabama

Prepared for:

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IT Project No. 774645

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List of Acronyms

ADEM	Alabama Department of Environmental Management
CERFA	Community Environmental Response Facilitation Act
CESAS	Army Corps of Engineers South Atlantic Savannah
CLP	Contract Laboratory Program
COC	chain of custody
CSEM	conceptual site exposure model
DOD	U.S. Department of Defense
DQO	data quality objective
EBS	environmental baseline survey
EM	electromagnetic
EPA	U.S. Environmental Protection Agency
ESE	Environmental Science and Engineering, Inc.
FTMC	Fort McClellan
GPR	ground-penetrating radar
GPS	global positioning system
IDW	investigation-derived waste
IT	IT Corporation
N-S	north to south
PID	photoionization detector
PSSC	potential site-specific chemical(s)
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
SAP	installation-wide sampling and analysis plan
SFSP	site-specific field sampling plan
SHP	installation-wide safety and health plan
SI	site investigation
SSHP	site-specific safety and health plan
STB	supertropical bleach
TCL	target compound list
USACE	U.S. Army Corps of Engineers
USATHMA	U.S. Army Toxic and Hazardous Materials Agency
VSI	visual site inspection
WMP	waste management plan
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 (SI) at the Ground Scar with Trenches, Parcel 200(7) at Fort McClellan (FTMC), Calhoun County, Alabama. The purpose of this site-specific field sampling plan (SFSP) is to provide technical guidance for sampling activities at the Former Ground Scar with Trenches at Parcel 200(7). The investigation conducted under this SFSP will include the collection and analysis of four surface soil samples, six subsurface soil samples, four groundwater samples, two sediment samples, two surface water samples, and three depositional soil samples. In addition, a surface geophysical survey will be conducted to verify the existence of the trenches and locate the proposed sample locations within the proper area of concern.

The ground scar is visible at the southwest corner of the intersection of 22nd Street and Rocky Hollow Road on aerial photographs taken in 1954, Photograph No. GR-10M, Frame No. 58 (Environmental Science and Engineering, Inc. [ESE]). The ground scar appeared to contain five trenches, all oriented northeast to southwest. The ground scar and trenches appear on aerial photographs taken in 1941, 1949, 1959, 1961, and 1969. However, the ground scar and trenches are not visible on aerial photographs taken in 1982 (U.S. Army Toxic and Hazardous Materials Agency, 1990). It is not known if these trenches were used in training activities or used for disposal activities. Personal interviews suggest that the trenches identified in the aerial photographs may have been used to dispose of excess supertropical bleach (STB). STB was sometimes disposed of into trenches after decontamination exercises (ESE, 1998). STB is a white powder containing 30 percent chlorine and is often referred to as bleach, supertropical bleach, and chlorinated lime (U.S. Department of the Army and Air Force, 1963).

In June, 1998, a visual site inspection was done at the site by IT personnel. Construction debris, boulder size rocks, and a 5-gallon (Jerry-Cam) corroded container were found at the site and in the approximate location of the former ground scar and trenches. It appeared the area may have been used for some type of waste disposal. Because of the lack of information concerning potential contaminants at this site, a site investigation will be conducted to determine the presence or absence of potential contaminants.

This 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 Ground Scar with Trenches, Parcel 200(7) (Figure 1-1). The SFSP will be used in conjunction

with the site-specific safety and health plan developed for the Ground Scar with Trenches, Parcel 200(7), and the installation-wide work plan (IT, 1998b) and SAP. The SAP includes the installation-wide safety and health plan, waste management plan, and quality assurance plan.

1.0 Project Description

1.1 Introduction

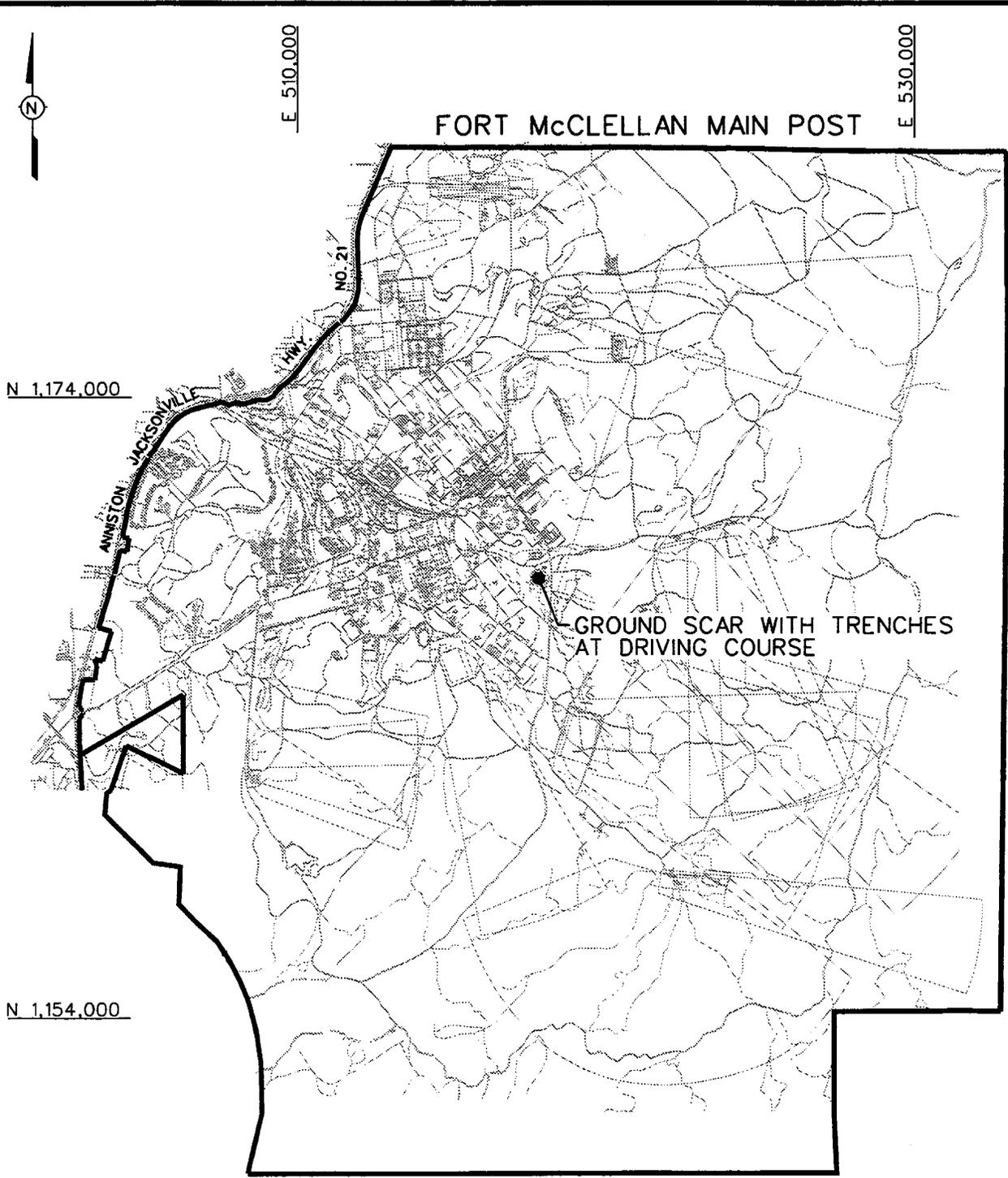
The U.S. Army is conducting studies of the environmental impact of suspected contaminants at Fort McClellan (FTMC) in Calhoun County, Alabama, under the management of the U.S. Army Corps of Engineers (USACE)-Mobile District. The USACE has contracted IT Corporation (IT) to provide environmental services for the site investigation (SI) of the Ground Scar with Trenches, Parcel 200(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, Calhoun County, Alabama, has been prepared to provide technical guidance for sample collection and analysis at the Ground Scar with Trenches at Parcel 200(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 PSSC of concern. The SFSP will be used in conjunction with the site-specific safety and health plan (SSHP) developed for the Ground Scar with Trenches, Parcel 200(7), 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 (WMP), and quality assurance plan (QAP).

1.2 Site Description

The Ground Scar with Trenches at Parcel 200(7) is located in the southwest corner of the intersection of 22nd Street and Rocky Hollow Road (Figure 1-2). The area of investigation, the Former Ground Scar with Trenches, Parcel 200(7), covers approximately 1 acre. The ground scar appeared to contain five trenches oriented northeast-southwest on aerial photographs taken in 1954 (Photograph No. GR-10M, Frame No. 58) (Environmental Science and Engineering, Inc. [ESE], 1998). Review of aerial photographs taken by the U.S. Army Toxic and Hazardous Material Agency (USATHAMA) indicates the ground scar was present on aerial photographs taken in 1941, 1949, 1954, 1961, 1969, and 1972. However, the ground scar and associated trenches are no longer visible on recent aerial photographs taken in 1982. The ground scar was not observed during the Environmental Baseline Survey (EBS) visual site inspection (ESE, 1998), or by IT personnel during a site walkover in June, 1998. The area the ground scar occupied is currently covered with thick vegetation (mostly kudzu) and pine trees. Various construction debris, boulder size rocks, and a 5-gallon corroded container were found in the approximate

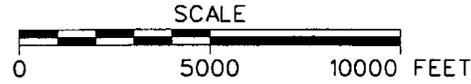
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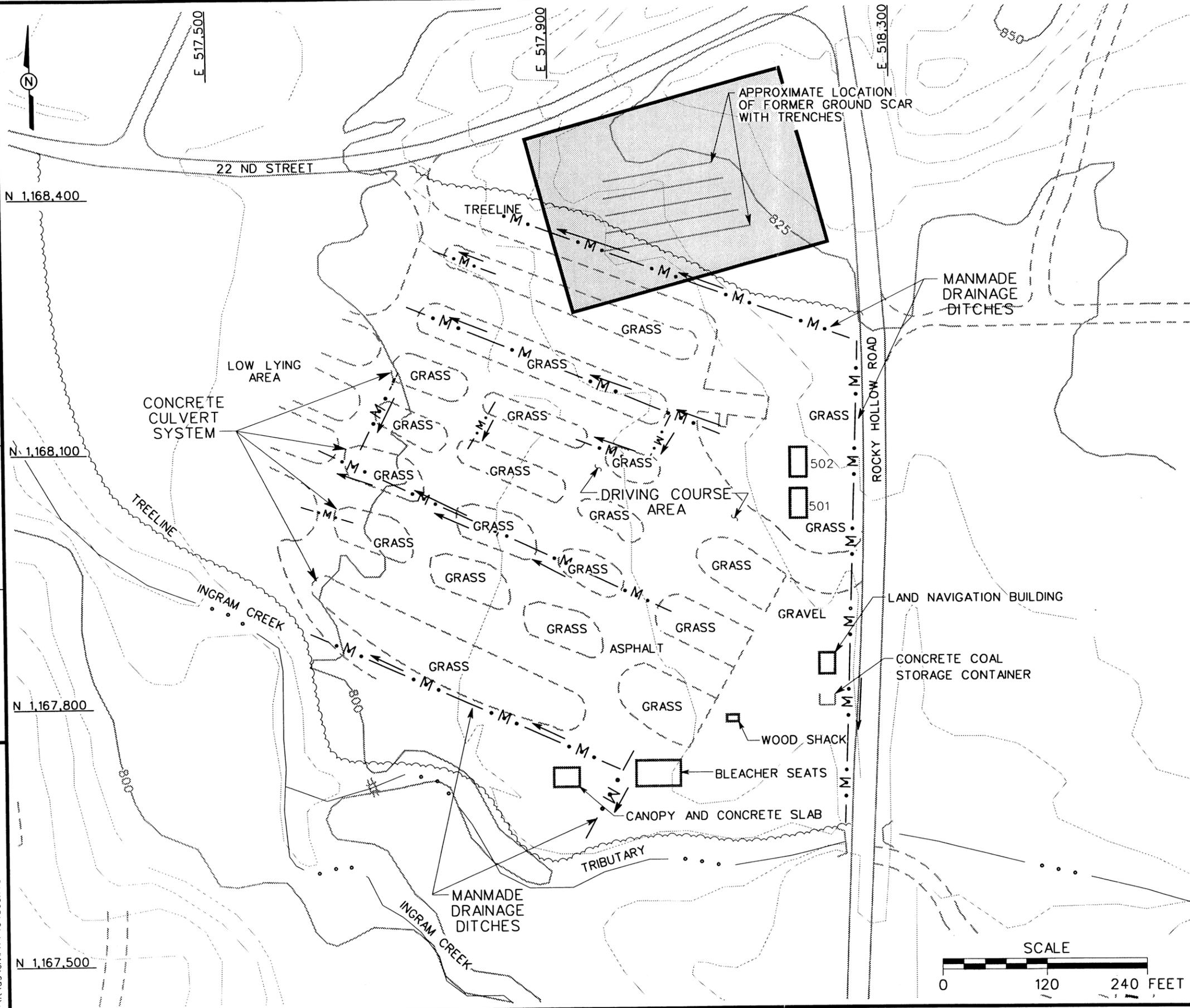
FIGURE 1-1
SITE LOCATION MAP
GROUND SCAR WITH TRENCHES
PARCEL 200(7)



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



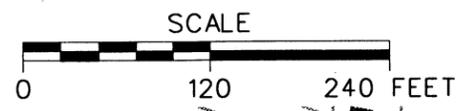
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- LEGEND**
- UNIMPROVED ROADS AND PARKING
 - PAVED ROADS AND PARKING
 - BUILDING
 - TOPOGRAPHIC CONTOURS
 - TREES / TREELINE
 - PARCEL BOUNDARY
 - SURFACE DRAINAGE / CREEK
 - MANMADE SURFACE DRAINAGE FEATURE
 - DRAINAGE DITCH FLOW DIRECTION

FIGURE 1-2
SITE MAP
GROUND SCAR WITH TRENCHES
PARCEL 200(7)

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



former location of the ground scar with trenches. The remainder of the area near the site is occupied by a vehicle driving course. The area south/southwest of the ground scar contains raised asphalt areas sloped to direct the flow of rainwater to grassy areas. The grassy areas are connected with a system of concrete culverts, which concentrate the flow of runoff to the west side of the site. There are five west end outlets for runoff recovered by the grassy areas. There are four drainage ditches located on the parcel, which flow to the west and two drainage ditches which flow to the south. Trenches running along the northern tree line and the southern boundary flow toward the west, while a trench running parallel to Rocky Hollow Road and the trench running between the canopy and bleachers flow to the south. Ingram Creek is located approximately 100 feet southwest of the site. A small tributary flows into Ingram Creek from the east. The site slopes from the northeast to the southwest. Shallow groundwater is probably controlled by surface drainage and/or topography and Ingram Creek. Site elevation is approximately 815 to 830 feet above mean sea level. A site map with the surface features shown as described above is provided on Figure 1-2.

Soil type at Parcel 200(7) is classified as Anniston and Allen Gravelly Loam (AcC2 and AcD2). These soils consist of well-drained stony loam or stony clay loam over stratified local alluvium with limestone or shale bedrock. The soils are deep, friable, well drained, medium to strongly acidic soils that have developed in old alluvium on foot slopes and fans along the bases of mountains. The alluvium typically ranges in thickness from 2 feet to 8 feet. The color of the surface soil ranges from very dark brown to reddish-brown and dark reddish-brown. These soils are suitable for cultivation, but erosion is a risk because of the slopes. Severely eroded benches and shallow gullies are common in most areas. The soils are moderately permeable to roots and water. Infiltration is slow to moderate; capacity to hold moisture is moderate to low. Depth to groundwater is typically 20 feet or greater. Typically, depth to bedrock is 2 to 10 feet below land surface (U.S. Department of Agriculture, 1961).

1.3 Scope of Work

The scope of work for activities associated with the SI at the Ground Scar with Trenches, Parcel 200(7), as specified in the statement of work (USACE, 1998), includes the following tasks:

- Develop the SFSP attachment.
- Develop the SSHP attachment.
- Conduct a surface geophysical survey to verify the location of the trenches.

- Collect four surface soil samples, six subsurface soil samples, four groundwater samples, two surface water samples, two sediment samples, and three depositional soil samples to determine if PSSC are present at the Ground Scar with Trenches, Parcel 200(7) and to provide data to determine any future planned corrective measures and closure activities.

At completion of the field activities and sample analyses, draft and final SI summary reports will be prepared to evaluate the absence or presence of PSSC at this site, and to recommend further actions, 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 Existing Environmental Studies

ESE conducted an environmental baseline survey (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, U.S. Environmental Protection Agency (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 addition, visual site inspections (VSI) were conducted to verify conditions of specific property parcels. The Ground Scar with Trenches, Parcel 200(7) was identified as a Category 7 site: a site where further evaluation is required.

A VSI of the Parcel 200(7) site was performed by IT personnel in June 1998. In addition, aerial photographs were reviewed to determine if the ground scar and trenches were visible. The ground scar is visible at the southwest corner of the intersection of 22nd Street and Rocky

Hollow Road on aerial photographs taken in 1954 (photograph GR-10M, Frame No. 58). The ground scar appears largely unchanged in 1964 aerial photographs; however, the trenches are no longer visible (ESE, 1998). The ground scar appears on aerial photographs taken in 1941, 1949, 1954, 1961, 1969, and 1972. However, the area is highly vegetated and the ground scar is no longer visible on the 1982 aerial photographs (USATHMA, 1990). Documentation of past disposal operations at this site were not available. However, personal interviews suggest that the trenches identified in the aerial photographs may have been used to dispose of excess STB. Excess STB was sometimes disposed of into trenches after decontamination exercises. STB is a white powder containing 30 percent chlorine and sometimes calcium hydroxide and hypochlorite. STB is often referred to as bleach, supertropical bleach, bleaching material, and chlorinated lime. STB is an effective decontaminant for destroying nerve agents and is applied manually using brooms and brushes or by means of a portable decontaminating apparatus (U.S. Department of the Army and Air Force, 1963). During the VSI, it appeared the area where the former ground scar and trenches were located had been used for land navigation training. Construction debris, boulder size rocks, and a 5-gallon corroded container were found on the ground and in the approximate location of the former ground scar and trenches.

Other information regarding this site, dates of use, or its operation is not available. To the best of IT's knowledge, this parcel has not been the subject of any environmental investigation or remediation.

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 Ground Scar with Trenches, Parcel 200(7). This section incorporates the components of the DQO process described in the EPA publication EPA 540-R-93-071 *Data Quality Objectives for Superfund Interim Final Guidance* (EPA, 1993). The DQO process as applied to the Ground Scar with Trenches, Parcel 200(7) is described in more detail in Section 4.3 of the WP (IT, 1998b). 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 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 via hard copy data packages by the laboratory using 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 SI at the Ground Scar with Trenches, Parcel 200(7), presented in Table 3-1, have been used to formulate a site-specific conceptual model presented in Section 3.3. This conceptual site exposure model (CSEM) 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 PSSC in the site media.

Table 3-1

**Summary of Data Quality Objectives
Ground Scar with Trenches, Parcel 200(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	ESE, 1998*	Contaminant Source Fill area (unknown materials in trenches). Migration Pathways <ul style="list-style-type: none"> Infiltration and leaching to groundwater. Erosion and runoff to surface water and sediment. Dust emissions and volatilization from soil to air. Infiltration to subsurface soil. Discharge of groundwater to the surface. Volatilization from surface water. Venison uptake. Potential Receptors Groundskeeper (future) Recreational site user (current and future) Construction worker (future) Resident (future) Venison consumption (current and future)	<u>Subsurface Soil</u>	SI to determine if PSSC are present. Obtain sufficient data to support, as appropriate the following: <ul style="list-style-type: none"> Screening level risk assessment Implementing an immediate response. No further action. Proceeding with a RI. 	<u>Surface Soil</u> TCL-VOCs, TCL-SVOCs TAL-metals, Cl Pesticides, Cl-Herbicides, OP Pesticides, PCBs, Nitroexplosives	Definitive + CESAS Level B data package	4 direct-push samples
			<u>Surface Soil</u>		<u>Subsurface Soil</u> TCL-VOCs, TCL-SVOCs TAL-metals, Cl Pesticides, Cl-Herbicides, OP Pesticides, PCBs, Nitroexplosives		
			<u>Groundwater</u>		<u>Groundwater</u> TCL-VOCs, TCL-SVOCs TAL-metals, Cl Pesticides, Cl-Herbicides, OP Pesticides, PCBs, Nitroexplosives	Definitive + CESAS Level B data package	4 direct-push + QC
			<u>Surface Water</u>		<u>Surface Water</u> TCL-VOCs, TCL-SVOCs TAL-metals, Cl Pesticides, Cl-Herbicides, OP Pesticides, PCBs, Nitroexplosives		
			<u>Sediment</u>		<u>Sediments</u> TCL-VOCs, TCL-SVOCs TAL-metals, Cl Pesticides, Cl-Herbicides, OP Pesticides, PCBs, TOC, Grain size, Nitroexplosives	Definitive + CESAS Level B data package	2 samples + QC
			<u>Depositional Soil</u>		<u>Depositional Soil</u> TCL-VOCs, TCL-SVOCs TAL-metals, Cl Pesticides, Cl-Herbicides, OP Pesticides, PCBs, TOC, Grain size, Nitroexplosives		
			PSSC Unknown materials in trenches.				

ADEM - Alabama Department of Environmental Management.
 ASTM - American Society for Testing and Materials.
 CESAS - Corps of Engineers South Atlantic Savannah.
 Cl - Chlorinated.
 DOD - U.S. Department of Defense.
 EPA - U.S. Environmental Protection Agency
 ESE - Environmental Science and Engineering, Inc.
 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.

*Environmental Science and Engineering, Inc., *Final Environmental Baseline Survey*, 1998.

3.3 Conceptual Site Exposure Model

The CSEM provides the basis for identifying and evaluating the potential risks to human health to support the risk assessment. The CSEM includes all plausible receptor scenarios and potential exposure pathways. The CSEM graphically presents all possible pathways, by which a potential receptor may be exposed, including all sources, release and transport pathways, and exposure routes. In addition, it facilitates consistent and comprehensive evaluation of human health risks, and helps 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
- Receptor scenarios
- Exposure pathways.

Contaminant release mechanisms and migration pathways are not relevant for direct receptor contact with a contaminated source media. Parcel 200 has been identified as a former ground scar that includes linear features that may have been formed in association with past decontamination agent disposal activities. The precise contents of the area are not known. Potential contamination migration pathways identified for Parcel 200 include surface soil, subsurface soil, groundwater, air, and venison uptake and consumption. The area is slated for industrial reuse (FTMC, 1997).

Surface and runoff groundwater from the area adjacent to the ground scars generally reenters surrounding surface and subsurface soils through leaching and infiltration. Other potential contaminant migration pathways include erosion and runoff to surface water and sediment, dust emissions and volatilization from soil and groundwater to air, infiltration to subsurface soil, venison uptake, and groundwater discharge to surface water. The nearest surface water body is Ingram Creek. However, it is unlikely that this creek is directly impacted by contamination from the suspected area in question. Furthermore, Ingram Creek does not support significant game fish populations. Therefore, a fish pathway will not be considered. The area could be used for recreational purposes such as hunting or camping.

Plausible receptors identified in the CSEM include:

- The resident scenario, although currently inapplicable, is considered for future usage, for purposes of conservatism.

- The groundskeeper scenario, although highly unlikely, is considered for future purposes only, because the site is currently not maintained by a groundskeeper.
- The construction worker scenario is considered for future purposes only, because the site is currently not under construction.
- The recreational site user scenario, which includes hunting, youthful and other intruders, hikers, campers and other recreational users, is considered for both current and future purposes, although it is not known with certainty that the site is currently used for any of these activities.
- The venison consumption scenario is considered for both current and future purposes, as associated hunting and fishing activities may currently take place at the site and probably will take place in the future.

The fish consumption scenario is excluded, because the only relevant body of water, Ingram Creek, is too far from the potential source of contamination and is unsuitable for fishing.

A summary of relevant contaminant release and transport mechanisms, source and exposure media, and receptors and exposure pathways is provided by Figure 3-1 and Table 3-1.

3.4 Decision-Making Process, Data Uses, and Needs

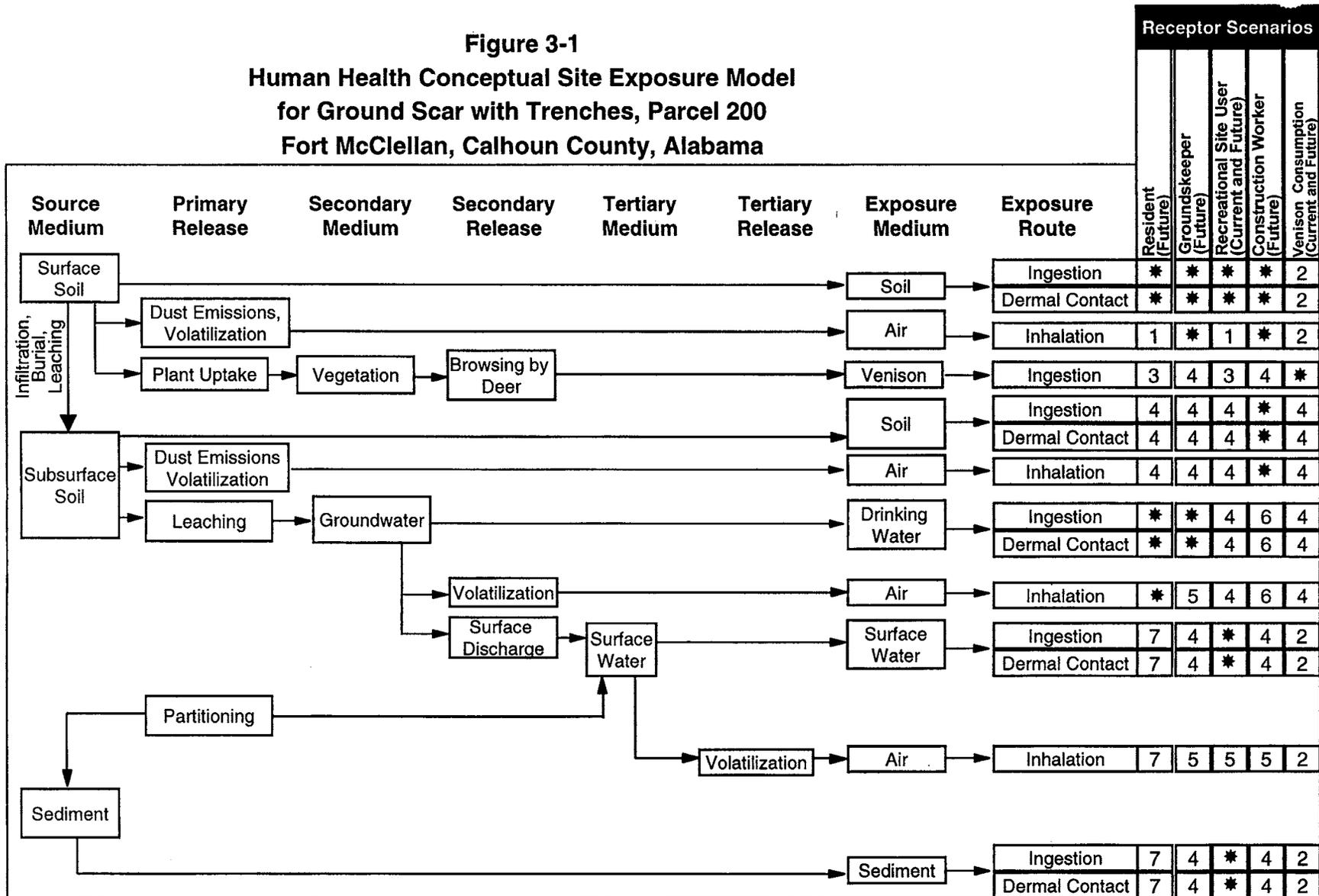
The decision-making process consists of a seven-step process that is presented in detail in Sections 3.2 and 4.3 of the WP and will be followed during the SI at the Ground Scar with Trenches, Parcel 200(7). Data uses and needs are summarized in Table 3-1.

3.4.1 Risk Evaluation

Confirmation of contamination at the Ground Scar with Trenches, Parcel 200(7) will be based upon comparing detected site chemical concentrations with site-specific screening levels and background concentrations developed in the installation-wide WP (IT, 1998b). 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, if necessary.

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 the installation-wide work plan.

Figure 3-1
Human Health Conceptual Site Exposure Model
for Ground Scar with Trenches, Parcel 200
Fort McClellan, Calhoun County, 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.

3.4.2 Data Types and Quality

Surface and subsurface soil, groundwater, surface water, sediment, and depositional soil will be sampled and analyzed to meet the objectives of the SI at the Ground Scar with Trenches, Parcel 200(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 applicable; comply with EPA definitive data requirements, and be reported using hardcopy data packages. In addition to meeting the quality needs of this SI, data analyzed at this level of quality are appropriate for all phases of site characterization, remedial investigation, and risk assessment.

3.4.3 Precision, Accuracy, and Completeness

Laboratory requirements of precision, accuracy, and completeness for this SI are provided in Chapter 9.0 of the QAP (IT, 1998).

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 need additional investigation. To meet the objectives of Section 1.3 and Chapter 3.0, the environmental sampling program will consist of a geophysical survey to determine the boundaries of the ground scar and associated trenches, collection of four surface soil samples, six subsurface soil samples, four groundwater samples, two surface water samples, two sediment samples, and three 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 (IT, 1998a). 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 Surface Geophysical Survey

A surface geophysical survey will be conducted over the Ground Scar with Trenches, Parcel 200(7) to determine the ground scar and trench boundaries, and to locate the proposed sample locations within the proper area of concern. 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. Due to the thick vegetation present at this site, a global positioning system (GPS) will be used to provide geophysical survey control.

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 SAP (IT, 1998a) and the following IT standard operating procedures for geophysical investigations:

- ITGP-001: Surface magnetic surveys
- ITGP-002: Surface frequency-domain EM surveys
- ITGP-003: GPR surveys
- ITGP-005: GPS 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 VSIs to verify the likely location of the ground scar 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 VSIs and evaluation of reconnaissance scans with the instruments, a base grid will be staked throughout the site such that the resolution objectives of the investigation are achieved. The base grid will be established using the GPS surveying technique. The geophysics base grid will be referenced to the Alabama State Plane Coordinate System using the base grid as a reference. The vegetation removal crew will clear approximately 3-foot-wide lanes, spaced 20 foot apart through the brush. Following brush removal, the geophysics crew will mark the GPS to establish control points on 20-foot centers throughout the site with surveyor's paint and/or plastic pin flags. To the extent possible, the grids will be oriented in the north to south (N-S) direction. If 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 200(7) will be incorporated into the SI report. Geophysical results will be used to properly position the proposed sample locations at Parcel 200(7).

4.2.2 Areal Coverage

Parcel 200(7) geophysical surveys will encompass an area of approximately 200 by 300 feet. The following steps 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 10 feet apart.
- EM31 survey data will be collected at 5-foot intervals along N-S and east to west oriented survey lines spaced 10 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 the Ground Scar with Trenches, Parcel 200(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

Surface soil samples will be collected from four soil borings at Parcel 200(7).

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

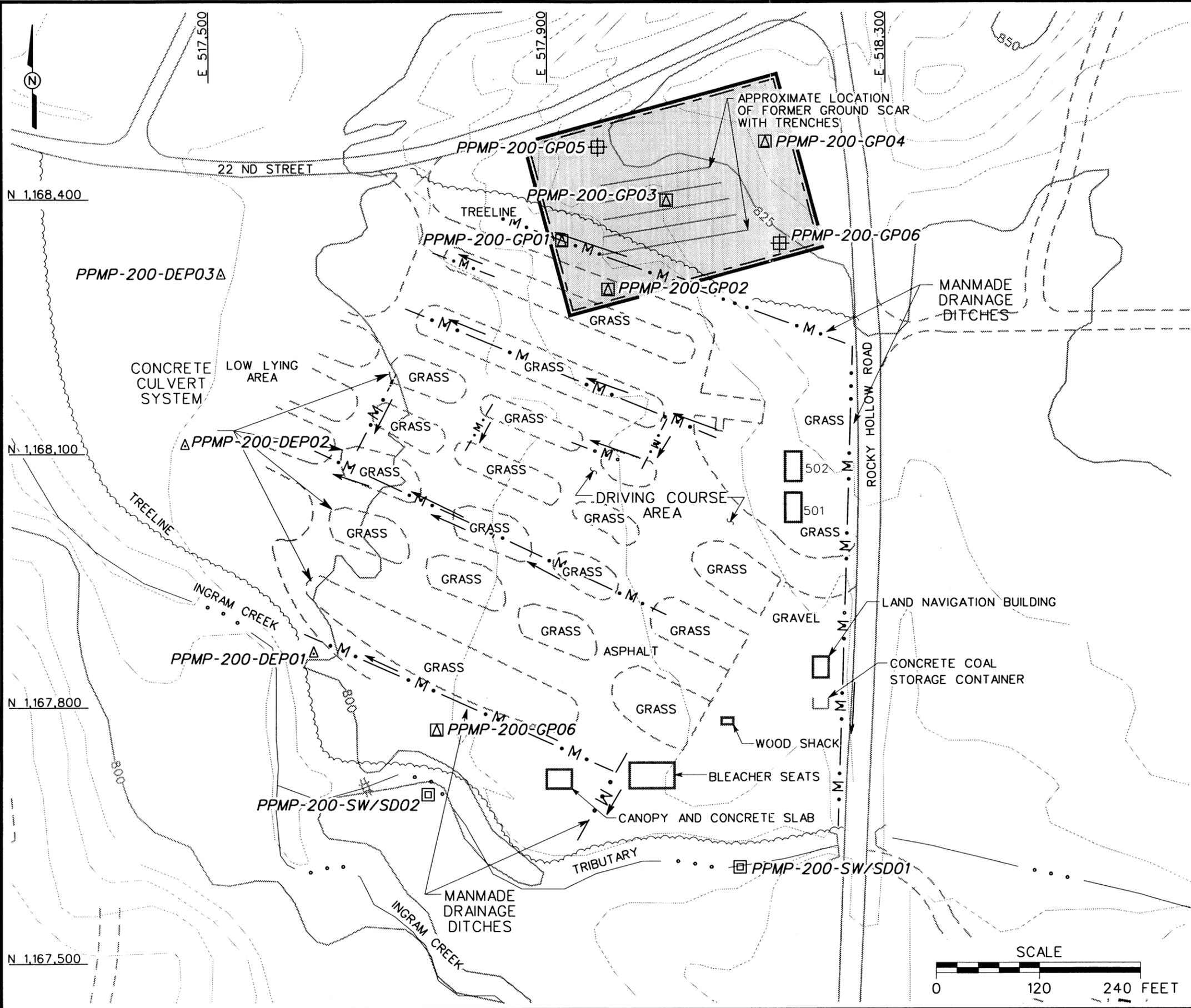
Subsurface soil samples will be collected from six soil borings at Parcel 200(7). Subsurface soil samples will be collected from the four locations where surface soil samples are collected, plus one subsurface soil sample each will be collected from locations in the northwestern and southeastern sections of the parcel, respectively.

Table 4-1

**Sample Locations and Rationale
Ground Scar with Trenches at Driving Course, Parcel 200(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Media	Sampling Location Rationale
PPMP-200-GP01	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Direct-push samples will be collected topographically downgradient and southwest of the approximate location of the former trenches to determine if potential site-specific chemicals (PSSC) are present. Sample location may be relocated pending results of the surface geophysical survey.
PPMP-200-GP02	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Direct-push samples will be collected south and topographically downgradient of the approximate location of the former trenches. Potential contaminants would most likely migrate towards this sample location from the suspected source area (trenches). Sample location may be relocated pending results of the surface geophysical survey.
PPMP-200-GP03	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Direct-push samples will be collected in the approximate center of the approximate location of the former trenches to determine if PSSC are present. Sample location may be relocated pending results of the surface geophysical survey.
PPMP-200-GP04	SURFACE SOIL SUBSURFACE SOIL GROUNDWATER	Direct-push samples will be collected topographically upgradient and northeast of the approximate location of the former trenches. Upgradient sample location to determine if potential contaminants are from the site or upgradient of the site. Sample location may be relocated pending results of the surface geophysical survey.
PPMP-200-GP05	SUBSURFACE SOIL	Direct-push samples will be collected north of direct-push sample PPMP-200-GP03 to confirm or deny the presence of potential contaminants from the suspected source area (trenches).
PPMP-200-GP06	SUBSURFACE SOIL	Direct-push samples will be collected topographically downgradient and to the southeast of the former trenches. Sampling location represents a lower elevation area where surface water runoff could collect, and potentially percolate into the substratum.
PPMP-200-SWSD01	SURFACE WATER SEDIMENT	Sample location is the most probable point of exit from the site for surface water runoff. Evidence of contaminant mobility at any point within the site would likely be integrated at this location.
PPMP-200-SW/SD02	SURFACE WATER SEDIMENT	Sample location is the most probable point of exit from the site for surface water runoff. Evidence of contaminant mobility at any point within the site would likely be integrated at this location.
PPMP-200-DEP01	DEPOSITIONAL SOIL	Sampling location represents a lower elevation area where surface water runoff could collect, and potentially percolate into the substratum, or potentially deposit dissolved material after evaporation.
PPMP-200-DEP02	DEPOSITIONAL SOIL	Sampling location represents a lower elevation area where surface water runoff could collect, and potentially percolate into the substratum, or potentially deposit dissolved material after evaporation.
PPMP-200-DEP03	DEPOSITIONAL SOIL	Sampling location represents a lower elevation area where surface water runoff could collect, and potentially percolate into the substratum, or potentially deposit dissolved material after evaporation.

DWG. NO.: 4645es.149
 PROJ. NO.: 774645
 INITIATOR: J. TARR
 PROJ. MGR.: J. YACOUB
 DRAFT. CHK. BY: A. MAYILA
 ENGR. CHK. BY: A. MAYILA
 DATE LAST REV.:
 DRAWN BY:
 STARTING DATE: 07/07/98
 DRAWN BY: D. BILLINGSLEY
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LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS
- TREES / TREELINE
- PARCEL BOUNDARY
- EXTENT OF PROPOSED GEOPHYSICAL SURVEY
- SURFACE DRAINAGE / CREEK
- MANMADE SURFACE DRAINAGE FEATURE
- DRAINAGE DITCH FLOW DIRECTION
- PROPOSED SURFACE WATER/SEDIMENT SAMPLE
- PROPOSED SUBSURFACE SOIL SAMPLE
- PROPOSED GROUNDWATER, SURFACE AND SUBSURFACE SOIL SAMPLE
- PROPOSED DEPOSITIONAL SOIL SAMPLE

FIGURE 4-1
PROPOSED SAMPLE LOCATIONS
GROUND SCAR WITH TRENCHES
PARCEL 200(7)

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

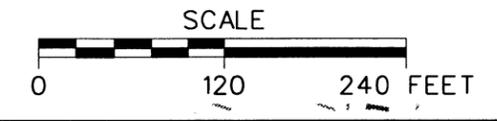


Table 4-2

Surface, Subsurface, and Depositional Soil Sample Designations and QA/QC Sample Quantities
Ground Scar with Trenches, Parcel 200(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-200-GP01	PPMP-200-GP01-SS-KX0001-REG PPMP-200-GP01-DS-KX0002-REG	0 - 1.0 a			PPMP-200-GP01-SS-KX0001-MS PPMP-200-GP01-SS-KX0001-MSD	TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP02	PPMP-200-GP02-SS-KX0003-REG PPMP-200-GP02-DS-KX0006-REG	0 - 1.0 a	PPMP-200-GP02-SS-KX0004-FD	PPMP-200-GP02-SS-KX0005-FS		TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP03	PPMP-200-GP03-SS-KX0007-REG PPMP-200-GP03-DS-KX0008-REG	0 - 1.0 a				TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP04	PPMP-200-GP04-SS-KX0009-REG PPMP-200-GP04-DS-KX0010-REG	0 - 1.0 a				TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP05	PPMP-200-GP05-DS-KX0011-REG	a	PPMP-200-GP05-DS-KX0012-FD	PPMP-200-GP05-DS-KX0013-FS		TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP06	PPMP-200-GP06-DS-KX0014-REG	a				TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-DEP01	PPMP-200-DEP01-DEP-KX0016-REG	0 - 0.5				TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, TOC, Grain Size, Nitroexplosives
PPMP-200-DEP02	PPMP-200-DEP02-DEP-KX0017-REG	0 - 0.5				TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, TOC, Grain Size, Nitroexplosives
PPMP-200-DEP03	PPMP-200-DEP03-DEP-KX0018-REG	0 - 0.5				TCL VOCs, SVOCs, Cl Pesticides, Cl Herbicides, OP Pesticides, PCBs, TAL Metals, TOC, Grain Size, Nitroexplosives

* 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.

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. Subsurface soil samples will be collected from soil borings at a depth greater than 1 foot bgs in the unsaturated zone.

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. The entire length of the soil sample will be field screened using a PID in accordance with Section 4.15 of the SAP to measure samples exhibiting elevated readings above background in ambient air. Typically, the soil samples exhibiting the highest reading on a PID will be sent to the laboratory for analysis. 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 four direct-temporary wells installed at the Ground Scar with Trenches, Parcel 200(7). Direct-push temporary wells will be installed in each soil boring described in Section 4.3.1.

4.3.3.1 Sample Locations and Rationale

Four groundwater samples will be collected from direct-push temporary 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 wells 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

Two surface water samples will be collected during the SI. One surface water sample will be collected from Ingram Creek and one surface water sample will be collected from the tributary that flows into Ingram Creek to the east.

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
Ground Scar with Trenches at Driving Course, Parcel 200(7)
Fort McClellan, Calhoun County, Alabama**

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-200-GP01	PPMP-200-GP01-GW-KX3001-REG	a			PPMP-200-GP01-GW-KX3001-MS PPMP-200-GP01-GW-KX3001-MSD	TCL VOCs, SVOCs, CI Pesticides, CI Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP02	PPMP-200-GP02-GW-KX3002-REG	a	PPMP-200-GP02-GW-KX3003-FD	PPMP-200-GP02-GW-KX3004-FS		TCL VOCs, SVOCs, CI Pesticides, CI Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP03	PPMP-200-GP03-GW-KX3005-REG	a				TCL VOCs, SVOCs, CI Pesticides, CI Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives
PPMP-200-GP04	PPMP-200-GP04-GW-KX3006-REG	a				TCL VOCs, SVOCs, CI Pesticides, CI Herbicides, OP Pesticides, PCBs, TAL Metals, Nitroexplosives

*Direct-push temporary well will be installed to depth where sufficient first water is encountered to collect a sample.

MS/MSD - Matrix spike/matrix spike duplicate.

QA/QC - Quality assurance/quality control.

TCL - Target compound list.

VOC - Volatile organic compound.

CI - Chlorinated.

SVOC - Semivolatile organic compound.

OP - Organophosphorus.

TAL - Target analyte list.

Table 4-4

Surface Water and Sediment Sample Designations and QA/QC Sample Quantities
 Ground Scar with Trenches at Driving Course, Parcel 200(7)
 Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-200-SW/SD01	PPMP-200-SW/SD01-SW-KX1001-REG	N/A				TCL VOCs, TCL SVOCs, PCBs, Cl. Pesticides, TAL Metals, OP Pesticides, Cl Herbicides, Nitroexplosives
	PPMP-200-SW/SD01-SD-KX2001-REG	0 - 0.5				TCL VOCs, TCL SVOCs, PCBs, Cl. Pesticides, TAL Metals, OP Pesticides, Cl Herbicides, TOC, Grain size, Nitroexplosives
PPMP-200-SW/SD02	PPMP-200-SW/SD02-SW-KX1002-REG	N/A				TCL VOCs, TCL SVOCs, PCBs, Cl. Pesticides, TAL Metals, OP Pesticides, Cl Herbicides, Nitroexplosives
	PPMP-200-SW/SD02-SD-KX2002-REG	0 - 0.5				TCL VOCs, TCL SVOCs, PCBs, Cl. Pesticides, TAL Metals, OP Pesticides, Cl Herbicides, TOC, Grain size, Nitroexplosives

Cl - Chlorinated.

MS/MSD - Matrix spike/matrix spike duplicate.

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

Two sediment samples will be collected at the site. The sediment samples will be collected at the same locations as the surface water samples described 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. Sample containers, sample volume, preservatives and holding times for the analysis required in this SFSP are listed in Section 5.0, Table 5-1 of the QAP. Sediment samples will be analyzed for the parameters listed in Section 4.6 of this SFSP.

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

The depositional soil samples will be collected in the low lying areas downgradient of the former ground with trenches. The sampling rationale is listed in Table 4-1. The proposed 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 sampling locations 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 primarily to ensure that contaminants are not introduced into samples from location to location. Decontamination of sampling equipment will be performed in accordance with the requirements presented in Section 4.10.1.1 of the SAP. 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 all soil, sediment, and surface water locations will be recorded using a GPS to provide accuracy within 1 meter. 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.

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 the locations specified in this chapter of this SFSP will be analyzed for the 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 the Former Ground Scar with Trenches, Parcel 200(7) consist of the following analytical suite:

- Target Compound List (TCL) Volatile Organic Compounds - Method 5035/8260B
- TCL Semivolatile Organic Compounds - Method 8270C
- Target Analyte Metals - Method 6010B/7000
- Polychlorinated Biphenyls - Method 8082
- Chlorinated Herbicides - Method 8151A
- Chlorinated Pesticides - Method 8081A
- Organophosphorus Pesticides - Method 8141A
- Nitroexplosives - Method 8330.

The sediment samples will be analyzed for the following list of parameters:

- Total organic carbon - Method 9060
- Grain size - ASTM-421/D-422.

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.

4.7 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping will follow the procedures specified in Section 4.13 of the SAP. Completed analysis request/COC 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

**Table 4-5
Analytical Samples
Ground Scar with Trenches, Parcel 200(7)
Fort McClellan, Calhoun County, Alabama**

Parameters	Analysis Method	Sample Matrix	TAT Needed	Field Samples			QA/QC Samples ^a					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							
Ground Scar with Trenches - Parcel 200(7): 6 water matrix: 4 groundwater, 2 surface water; 15 soil matrix: 4 surface, 6 subsurface, 3 depositional, 2 sediment																				
TCL VOCs	8260B	water	normal	6	1	6	1	1	1	1	1	11	1							
TCL SVOCs	8270C	water	normal	6	1	6	1	1	1	1	10	1								
Cl Pesticides	8081A	water	normal	6	1	6	1	1	1	1	10	1								
PCBs	8082	water	normal	6	1	6	1	1	1	1	10	1								
OP Pesticides	8141A	water	normal	6	1	6	1	1	1	1	10	1								
Cl Herbicides	8151A	water	normal	6	1	6	1	1	1	1	10	1								
Tot TAL Metals	6010B/7000	water	normal	6	1	6	1	1	1	1	10	1								
Nitroexplosives	8330	water	normal	6	1	6	1	1	1	1	10	1								
TCL VOCs	8260B	soil	normal	15	1	15	2	2	1	1	20	2								
TCL SVOCs	8270C	soil	normal	15	1	15	2	2	1	1	20	2								
Cl Pesticides	8081A	soil	normal	15	1	15	2	2	1	1	20	2								
PCBs	8082	soil	normal	15	1	15	2	2	1	1	20	2								
OP Pesticides	8141A	soil	normal	15	1	15	2	2	1	1	20	2								
Cl Herbicides	8151A	soil	normal	15	1	15	2	2	1	1	20	2								
TAL Metals	6010B/7000	soil	normal	15	1	15	2	2	1	1	20	2								
Nitroexplosives	8330	soil	normal	15	1	15	2	2	1	1	20	2								
Tot Org Carb	9060	sediment	normal	2	1	2					2	0								
Grain Size	ASTM	sediment	normal	2	1	2					2	0								
Ground Scar with Trenches Subtotal:				172			24		24		16		1		16		236		24	

^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

USACE Laboratory split samples
are shipped to:

Fax: 423-584-4315

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.

TOC - Total organic carbon.
CA - Chemical agent.
TCL - Target compound list.
PCB - Polychlorinated biphenyl.

TAL - Target analyte list.
TAT - Turnaround time.
Cl - Chlorinated.
OP - Organophosphorus.

Split samples collected for the USACE laboratory will be shipped to the following address:

Sample Receiving
USACE South Atlantic Division laboratory
611 South Cobb Drive
Marietta, Georgia 30060-3112
Telephone: (770) 421-5270.

4.8 Investigation-Derived Waste Management

Management and disposal of the investigation-derived wastes (IDW) will follow procedures and requirements as described in Appendix D of the SAP (IT, 1998a). The IDW expected to be generated at the Ground Scar with Trenches, Parcel 200(7) will include decontamination fluids and disposable personal protective equipment. The IDW will be staged in 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 attachment for the Ground Scar with Trenches, Parcel 200(7). The SSHP attachment will be used in conjunction with the SHP.

5.0 Project Schedule

The project schedule for all 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, 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. Army Toxic and Hazardous Materials Agency (USATHMA), 1990, *Installation Assessment Army Base Closure Program, Fort McClellan, Anniston, Alabama*, August.

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

U.S. Department of the Army and Air Force, 1963, *Military Chemistry and Chemical Agents*, TM 3-215 AFM 355-7, December.

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

Site-Specific Safety and Health Plans

Trenches Near Range 20 Firing Line, Parcel 239(7) and Parcel 240(7)

Ground Scar with Trenches, Parcel 200(7)