Final

Site Investigation Report
Former Motor Pool Area 1000,
Parcels 150(7), 13(7), and 139(7)

Fort McClellan
Calhoun County, Alabama

Prepared for:

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

Prepared by:

IT Corporation
312 Directors Drive
Knoxville, Tennessee 37923

Task Order CK05
Contract No. DACA21-96-D-0018
IT Project No. 774645

March 2001

Revision 0

Table of Contents

Page

Table of Contents *(Continued)*

Page

List of Appendices

List of Tables

List of Figures

List of Acronyms

See Attachment I - List of Abbreviations and Acronyms

Executive Summary

In accordance with Contract No. DACA21-96-D-0018, Task Order CK05, IT Corporation (IT) completed a site investigation (SI) at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), at Fort McClellan (FTMC) in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site, and, if so, whether the concentrations present an unacceptable risk to human health or the environment. The SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), consisted of a geophysical survey and the sampling and analysis of one surface soil sample, two depositional soil samples, 11 subsurface soil samples, and six groundwater samples. In addition, seven temporary groundwater monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and to provide site-specific geological and hydrogeological characterization information.

The geophysical survey identified one anomaly at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). The source of the anomaly was interpreted to be a metallic object other than an underground storage tank.

Chemical analysis of samples collected at Former Motor Pool Area 1000 indicated that metals, volatile organic compounds (VOC), and semivolatile organic compounds were detected in the environmental media sampled. To evaluate whether detected constituents pose an unacceptable risk to human health or the environment, analytical results were compared to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC.

The potential impact to human receptors is expected to be minimal. Although the site is projected for industrial land reuse, the analytical data were screened against residential human health SSSLs to evaluate the site for possible unrestricted land reuse. The concentrations of five metals (aluminum, chromium, iron, manganese, and selenium) exceeded SSSLs and their respective background concentration in a limited number of samples collected at the site. With the exception of selenium in one groundwater sample, the concentrations of these metals were within the range of background values and do not pose a threat to human health. Selenium was not detected in any of the other groundwater samples collected. The concentrations of five polynuclear aromatic hydrocarbon (PAH) compounds exceeded SSSLs in soils. PAH concentrations in soils ranged from 0.046 milligrams per kilogram to 6 milligrams per kilogram.

Based on the low concentrations and spatial distribution at the site, these PAH compounds are believed to be related to anthropogenic activities (i.e., asphalt pavement) and not related to operations conducted at the site. VOC concentrations in site media were below SSSLs.

Several metals were detected in surface and depositional soil samples at concentrations exceeding ESVs and background concentrations. In addition, three PAHs were detected in surface and depositional soil samples at concentrations exceeding ESVs but below PAH background screening values. However, the potential impact to ecological receptors is expected to be minimal. The site is a well-developed area, consisting of buildings and pavement interspersed with limited grassed areas. Viable ecological habitat is presently limited and is not expected to increase in the future land use scenario. Consequently, the potential threat to ecological receptors is expected to be low.

Based on the results of the SI, past operations at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), do not appear to have adversely impacted the environment. The metals and organic compounds detected in site media do not pose an unacceptable risk to human health and the environment. Therefore, IT recommends "No Further Action" with unrestricted land reuse at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7).

1.0 Introduction

The U.S. Army has selected Fort McClellan (FTMC), located in Calhoun County, Alabama, for closure by the Base Realignment and Closure (BRAC) Commission under Public Laws 100-526 and 101-510. The 1990 Base Closure Act, Public Law 101-510, established the process by which U.S. Department of Defense (DOD) installations would be closed or realigned. The BRAC Environmental Restoration Program requires investigation and cleanup of federal properties prior to transfer to the public domain. The U.S. Army is conducting environmental studies of the impact of suspected contaminants at parcels at FTMC under the management of the U.S. Army Corps of Engineers (USACE), Mobile District. The USACE contracted with IT Corporation (IT) to perform the site investigation (SI) at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), under Contract No. DACA21-96-D-0018, Task Order CK05.

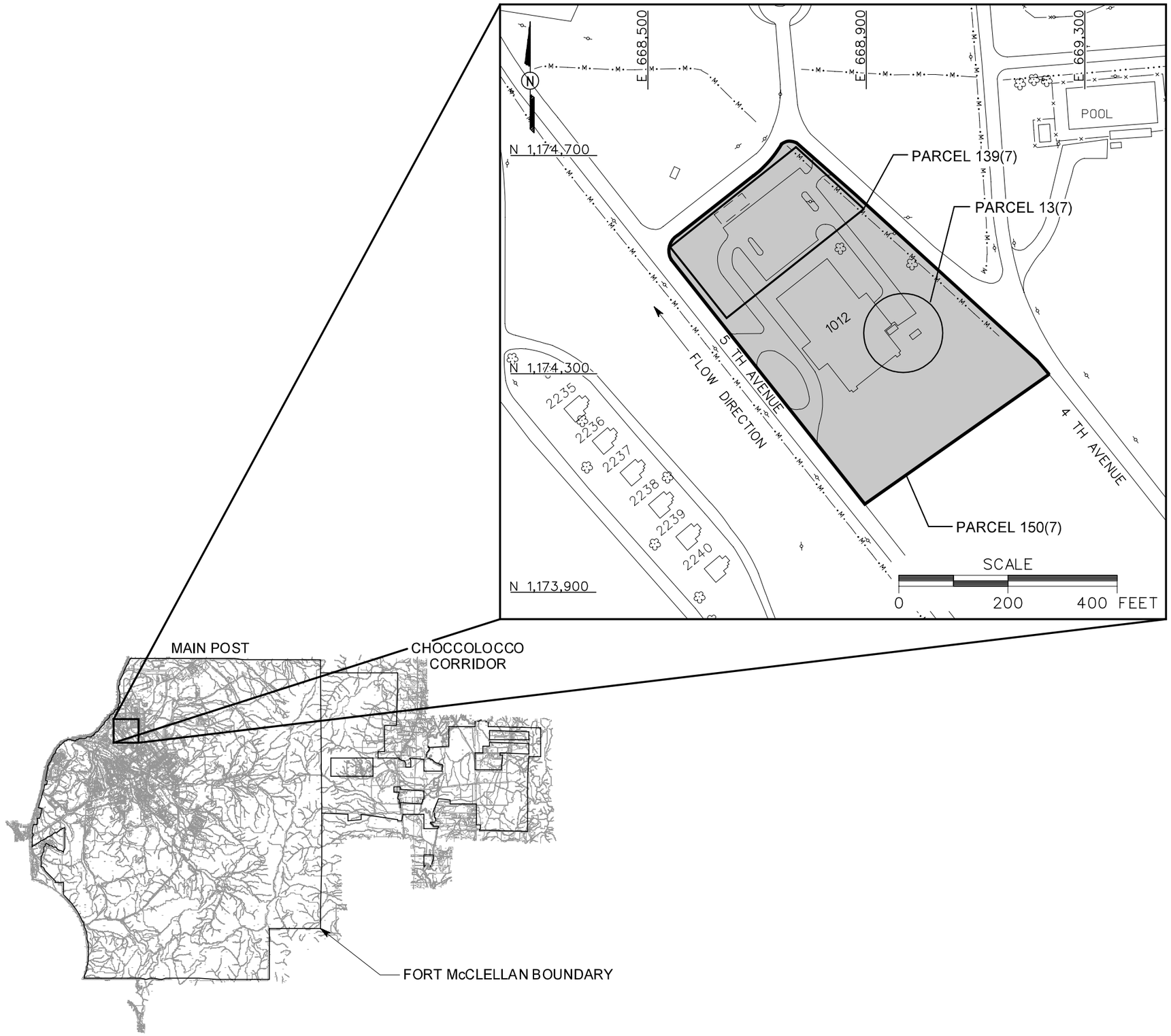
This report presents specific information and results compiled from the SI, including geophysical survey, field sampling and analysis, and monitoring well installation activities, conducted at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7).

1.1 Project Description

Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), (Figure 1-1) was identified as an area to be investigated prior to property transfer. Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), was classified as a Category 7 site in the environmental baseline survey (EBS) (Environmental Science and Engineering, Inc. [ESE], 1998). Category 7 sites are areas that are not evaluated and/or that require additional evaluation.

A site-specific field sampling plan (SFSP) attachment (IT, 1998a) and a site-specific safety and health plan (SSHP) attachment were finalized in November 1998. The SFSP and SSHP were prepared to provide technical guidance for sample collection and analysis at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). The SFSP was used in conjunction with the SSHP as attachments to the installation-wide work plan (IT, 1998b), and the installation-wide sampling and analysis plan (SAP) (IT, 2000a). The SAP includes the installation-wide safety and health plan (SHP) and quality assurance plan (QAP).

The SI included a geophysical survey and field work to collect one surface soil sample, two depositional soil samples, 11 subsurface soil samples, and six groundwater samples. Data from



LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TREES / TREELINE
- PARCEL BOUNDARY
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE

FIGURE 1-1
SITE LOCATION MAP
FORMER MOTOR POOL AREA 1000
PARCELS 150(7), 13(7), AND 139(7)

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

IT CORPORATION
A Member of The IT Group

DBILLNG 02/22/01 10:29:45 AM c:\cadd\design\774645es.474
STARTING DATE: 03/02/00 DRAWN BY: D. BILLINGSLEY
DATE LAST REV.: DRAWN BY:
DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. JENKINS
INITIATOR: T. WINTON
PROJ. MGR.: J. YACOUB
DWG. NO.:...\774645es.474
PROJ. NO.: 774645

the field investigation were used to determine whether potential site-specific chemicals are present at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7).

1.2 Purpose and Objectives

The SI program was designed to collect data from site media and provide a level of defensible data and information in sufficient detail to determine whether chemical constituents are present at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), at concentrations that present an unacceptable risk to human health or the environment. The conclusions of the SI in Chapter 6.0 are based on the comparison of the analytical results to human health site-specific screening levels (SSSL), ecological screening values (ESV), and background screening values for FTMC. The SSSLs and ESVs were developed by IT as part of the human health and ecological risk evaluations associated with SIs being performed under the BRAC Environmental Restoration Program at FTMC. The SSSLs, ESVs, and polynuclear aromatic hydrocarbon (PAH) background screening values are presented in the *Final Human Health and Ecological Screening Values and PAH Background Summary Report* (IT, 2000b). The PAH background screening values were developed by IT at the direction of the BRAC Cleanup Team (BCT) to address the occurrence of PAH compounds in surface soils as a result of anthropogenic activities at FTMC. Background metals screening values are presented in the *Final Background Metals Survey Report, Fort McClellan, Alabama* (Science Applications International Corporation [SAIC], 1998).

Based on the conclusions presented in this SI report, the BCT will decide either to propose "No Further Action" at the site or to conduct additional work at the site.

1.3 Site Description and History

Former Motor Pool Area 1000 is located in the northwestern area of the FTMC Main Post (Figure 1-1). Parcel 150(7) encompasses Parcels 13(7) and 139(7). Presently, Parcel 150(7) is the site of Building 1012, also known as the Truman Gymnasium. Former Motor Pool Area 1000 comprises an area of approximately 5 acres and is located between 4th Avenue and 5th Avenue (Figure 1-2). Historic operations at Parcel 150(7) are believed to have been primarily vehicle storage. Information was not available concerning dates or details of operations at this motor pool (ESE, 1998). The area southeast of Building 1012 is an open area possibly used for parking or staging of vehicles or equipment; however, little was observed in this area in the review of available aerial photographs.

E 668,500

E 668,900

E 669,300

N 1,174,600

N 1,174,100

PARCEL 139(7)

PARCEL 150(7)

PARCEL 13(7)

4 TH AVENUE

5 TH AVENUE

WAC CIRCLE

APPROXIMATE LOCATION OF FORMER BUILDING 1094 SHOWN IN A 1954 AERIAL PHOTOGRAPH

PARKING

PROBABLE LOCATION OF HEATING OIL UST EXCAVATION

ACTIVE UST (HEATING OIL)

FLOW DIRECTION

1012

2236

2237

2238

775

800

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- SANITARY SEWER LINE
- STORM DRAINAGE LINE

SCALE

0 80 160 FEET

FIGURE 1-2
SITE MAP
FORMER MOTOR POOL AREA 1000
PARCELS 150(7), 13(7), AND 139(7)

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

IT CORPORATION
A Member of The IT Group

DBILLING 03/06/01 09:48:46 AM c:\cadd\design\774645es.475 | STARTING DATE: 03/02/00 | DRAWN BY: D. BILLINGSLEY | DRAWN BY: | DATE LAST REV.: | PROJ. MGR.: J. YACOUB | ENGR. CHCK. BY: J. JENKINS | DRAFT. CHCK. BY: | INITIATOR: T. WINTON | PROJ. NO.: 774645 | DWG. NO.: ...\774645es.475

Parcel 13(7) is an underground storage tank (UST) location on the southeast side of Building 1012 (Figure 1-2). Building 1012 was originally heated with heating oil; it is now heated with natural gas (ESE, 1998). Two 5,000-gallon steel USTs were installed in 1977 when the building was constructed. One of the heating oil tanks was removed about 1990 or 1991; however, a closure report documenting this removal could not be located (ESE, 1998). The other heating oil tank (located closest to the southeast corner of Building 1012) was removed in October 1996 and replaced with a 5,000-gallon fiberglass UST (Southern Environmental Management & Specialties [SEMS], 1997). This tank is still present on the site.

Parcel 139(7) is approximately one acre in size and is located along the northwest end of Parcel 150(7) (Figure 1-2). Parcel 139(7) was believed to be the site of a FTMC gas station (ESE, 1998). However, there is not any evidence of a building foundation at this location (ESE, 1998). Apparently the site was demolished prior to the construction of Building 1012 and the adjacent parking lot. A review of available aerial photographs, including photographs prepared by the Environmental Photographic Interpretation Center (U.S. Environmental Protection Agency [EPA], 1990), did not reveal the location of the former gas station. However, an approximately 40- by 80-foot building is seen on a 1954 aerial photograph and is believed to be Building 1094.

FTMC gas stations were constructed in 1941 and were associated with motor pool areas. The typical gas station buildings were of similar construction, consisting of a 9- by 21-foot concrete foundation with corrugated steel walls. Usually, two fuel pumps were located on an island directly in front of each building, approximately 20 feet away. The original gas station plans called for two 10,000-gallon tanks at each location (ESE, 1998). Closure reports for UST activities from this period were not available at FTMC or the Alabama Department of Environmental Management (ADEM) (ESE, 1998). The status of the USTs associated with Parcel 139(7) is not known. In addition, evidence of the former gas station or of any potential USTs was not observed during an IT site visit in June 1998.

2.0 Previous Investigations

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

1. Areas where no storage, release, or disposal of hazardous substances or petroleum products has occurred (including no migration of these substances from adjacent areas)

2. Areas where only release or disposal of petroleum products has occurred

3. Areas where release, disposal, and/or migration of hazardous substances has occurred, but at concentrations that do not require a removal or remedial response

4. Areas where release, disposal, and/or migration of hazardous substances has occurred, and all removal or remedial actions to protect human health and the environment have been taken

5. Areas where release, disposal, and/or migration of hazardous substances has occurred, and removal or remedial actions are underway, but all required remedial actions have not yet been taken

6. Areas where release, disposal, and/or migration of hazardous substances has occurred, but required actions have not yet been implemented

7. Areas that are not evaluated or require additional 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 addition, visual site inspections were conducted to verify conditions of specific property parcels.

One of the steel 5,000-gallon heating oil USTs, located near the southeast corner of Building 1012, was removed and replaced with a 5,000-gallon fiberglass UST in October 1996 (SEMS, 1997). Tank closure samples were not collected during the UST removal action in 1996. The UST excavation was extended to 5 feet below the bottom of the UST excavation (exact depth not given in the closure report); groundwater was not encountered. Free product or petroleum odors were not encountered in the excavation. There was not any evidence of other studies performed at this site.

Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), is identified as a CERFA Category 7 area. As a former motor pool area, this CERFA site is a parcel where petroleum products were stored, and possibly released onto the site or to the environment, and/or were disposed on site property. Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), lacked adequate documentation and, therefore, required additional evaluation to determine the environmental condition of the parcel.

3.0 Current Site Investigation Activities

This chapter summarizes SI activities conducted by IT at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), including geophysical survey, environmental sampling and analysis, and monitoring well installation activities.

3.1 Geophysical Survey

A geophysical survey was conducted at Parcel 139(7) to identify potential USTs associated with the former gas station. The area surveyed was approximately 59,800 square feet (1.4 acres), as shown on the geophysical survey map (Figure 3-1). A detailed discussion of the geophysical investigation, including theory of operation of the instruments, field procedures, data processing, and interpreted results of the investigation, is presented as Appendix A.

The survey was conducted using magnetic, electromagnetic (EM), and ground-penetrating radar (GPR) techniques. Initially, a survey grid was established at the site to encompass suspect tank locations. Survey control was accomplished using a survey-grade total station global positioning system (GPS). The GPS survey data were referenced to the U.S. State Plane Coordinate System (Alabama East Zone, North American Datum of 1983 (NAD83).

A detailed site map was drawn in the field. The map included any surface cultural features within the survey area, or near its perimeter, that could potentially affect the geophysical data (e.g., vehicles, overhead utilities, and/or manhole covers). Magnetic and EM data were initially acquired to provide site-screening for large, buried metal objects the size of a UST. Preliminary color contour maps of the data were analyzed and compared with the site sketch to differentiate between anomalies caused by surface and subsurface source materials. The locations of magnetic and EM anomalies caused by subsurface features the size of a UST were marked in the field for further characterization with the GPR. GPR was used to discriminate between EM and magnetic anomalies potentially caused by USTs and those caused by significant buried metallic debris, metal reinforced utility vaults and junction boxes, and localized concentrations of metal along (or very near) utilities. Linear EM anomalies thought to be caused by underground utilities were verified with an EM utility locator and the locations placed on the field maps.

Geophysical anomalies most likely to be caused by USTs are designated rank (1). Geophysical anomalies with a ranking of (2) are more uncertain, and those with a ranking of (3) are highly uncertain and generally interpreted to be caused by a metallic source object other than a UST.

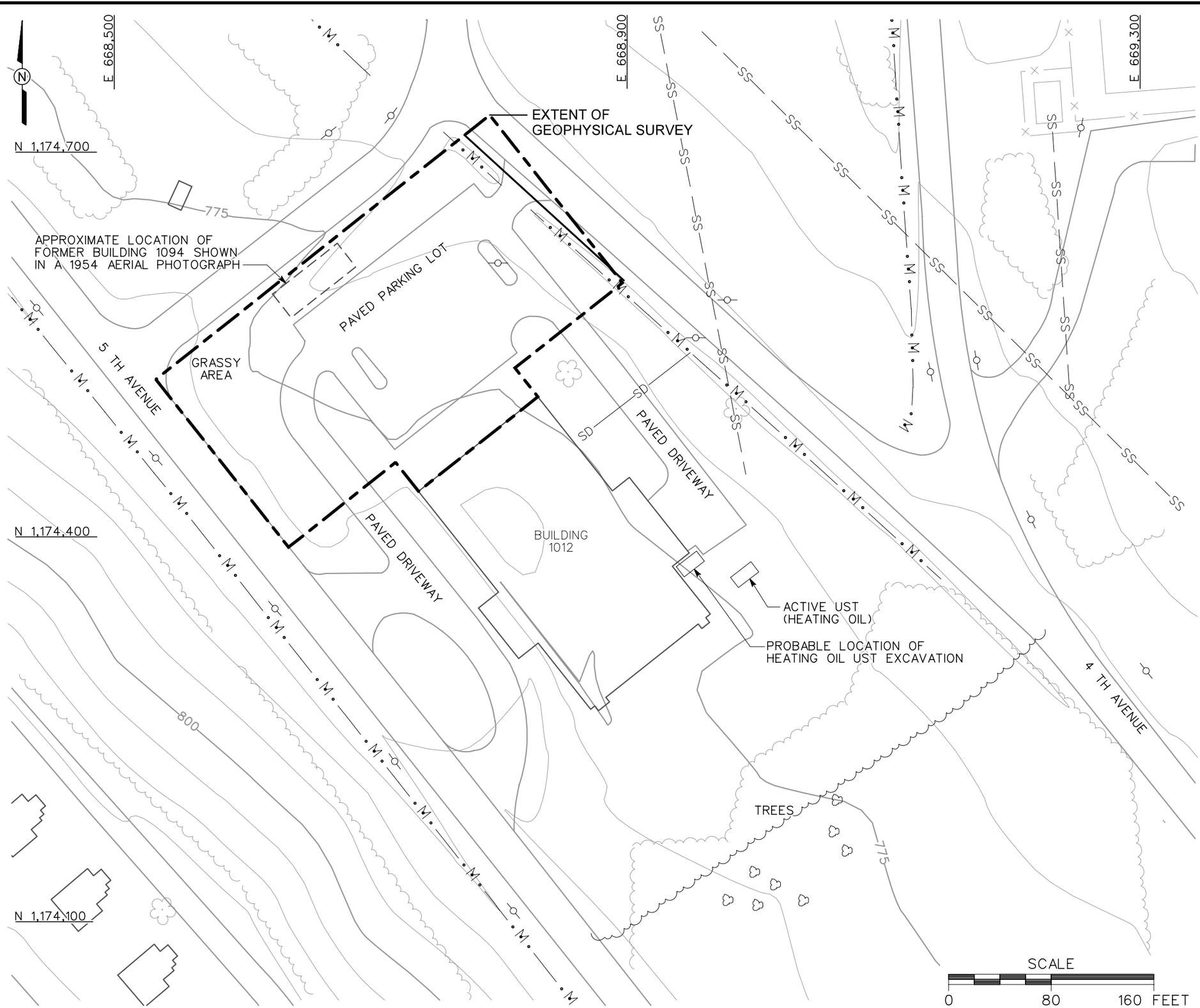


FIGURE 3-1
GEOPHYSICAL SURVEY AREA
FORMER MOTOR POOL AREA 1000
PARCELS 150(7), 13(7), AND 139(7)

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

IT CORPORATION
A Member of The IT Group

DBILLING 03/07/01
c:\cadd\design\774645es.414 03:17:47 PM

DRAFT. CHCK. BY:	DATE LAST REV.:
ENGR. CHCK. BY: M. MAKI	DRAWN BY:
PROJ. MGR.: J. YACOUB	STARTING DATE: 11/22/99
INITIATOR: M. MAKI	DRAWN BY: D. BILLINGSLEY
PROJ. NO.: 774645	DWG. NO.: ...\774645es.414

Based on the criteria established in the SFSP for UST identification, anomalies that are of typical size (8 feet by 14 feet) and in logical areas for USTs (i.e., adjacent to typical FTMC gas station foundations) are identified and labeled as USTs. Anomalies that are either typical in size or in a logical location for a UST are labeled as potential USTs. The results of the geophysical survey are summarized in Section 4.1.

3.2 Environmental Sampling

The environmental sampling performed during the SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), included the collection of a surface soil sample, subsurface soil samples, groundwater samples, and depositional soil samples for chemical analysis. The sample locations were determined by noting site physical characteristics during a site walkover, by reviewing historical documents pertaining to activities conducted at the site, and based on the geophysical survey results. The sample locations, media, and rationale are summarized in Table 3-1. Sampling locations are shown on Figure 3-2. Samples were submitted for laboratory analyses of site-related parameters listed in Section 3.4.

3.2.1 Surface and Depositional Soil Sampling

A surface soil sample was collected from one location, and depositional soil samples were collected from two locations at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). Soil sampling locations and rationale are presented in Table 3-1. Sampling locations are shown on Figure 3-2. Sample designations and quality assurance/quality control (QA/QC) samples are listed in Table 3-2. Soil sampling locations were determined in the field by the on-site geologist based on the geophysical survey, sampling rationale, presence of surface structures, site topography, and proximity to utilities.

Sample Collection. The surface and depositional soil samples were collected from the upper 1 foot of soil with a 3-inch diameter stainless-steel hand auger using the methodology specified in Section 4.9.1.1 of the SAP (IT, 2000a). Surface and depositional soil samples were collected by first removing surface debris, such as rocks and vegetation, from the immediate sample area. The soil was collected with the sampling device and screened with a photoionization detector (PID) in accordance with Section 4.7.1.1 of the SAP (IT, 2000a). Samples for volatile organic compound (VOC) analysis were collected directly from the sampling device with three EnCore® samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4. Sample collection logs are included in Appendix B.

Table 3-1

Sampling Locations and Rationale
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Media	Sample Location Rationale
PPMP-150-GP01	Subsurface soil Groundwater	Subsurface soil and groundwater samples were collected downgradient (east of the east driveway between the driveway and the street) of the former motor pool area and the likely location of the gas station.
PPMP-150-GP02	Subsurface soil Groundwater	Subsurface soil and groundwater samples were collected between the east side of Building 1012 and the east driveway near the former motor pool area and the likely location of the gas station.
PPMP-150-GP03	Subsurface soil Groundwater	Subsurface soil and groundwater samples were collected downgradient of the former motor pool area at the southeast corner of the east driveway between the driveway and 4th Avenue.
PPMP-150-GP04	Subsurface soil	A subsurface soil sample was collected south of the west driveway on the southwestern portion of the parcel.
PPMP-150-GP05	Subsurface soil Groundwater	Subsurface soil and groundwater samples were collected between the west side of Building 1012 and the west driveway near the northwest corner of the building.
PPMP-150-GP06	Subsurface soil Groundwater	Subsurface soil and groundwater samples were collected in the northwest corner of the parcel adjacent to the cross-street between 4th Avenue and 5th Avenue.
PPMP-150-GP07	Subsurface soil Groundwater	Subsurface soil and groundwater samples were collected downgradient in the northeast corner of the parcel near the cross-street between 4th Avenue and 5th Avenue.
PPMP-150-GP08	Subsurface soil	A subsurface soil sample was collected downgradient of the existing heating oil underground storage tank (UST).
PPMP-150-GP09	Subsurface soil	A subsurface soil sample was collected south of the existing UST.
PPMP-150-GP10	Subsurface soil	A subsurface soil sample was collected adjacent to the probable UST excavation near the southeast corner of Building 1012.
PPMP-150-GP11	Subsurface soil	A subsurface soil sample was collected at the north end of Building 1012 near the suspected former gas station site.
PPMP-150-GP12	Surface soil	A surface soil sample was collected near the southeast corner of the parcel adjacent to 4th Avenue.
PPMP-150-DEP01	Depositional soil	A depositional soil sample was collected at a low elevation in the northeast corner of the parcel where surface water could collect, percolate into the substratum, or deposit suspended or dissolved materials after evaporation.
PPMP-150-DEP02	Depositional soil	A depositional soil sample was collected at a low elevation on the southeast portion of the parcel adjacent to 4th Avenue where surface water could collect, percolate into the substratum, or deposit suspended or dissolved materials after evaporation.

E 668,500

E 668,900

E 669,300

N

N 1,174,600

N 1,174,100

PARCEL 139(7)

PARCEL 150(7)

PARCEL 13(7)

4 TH AVENUE

5 TH AVENUE

APPROXIMATE LOCATION OF FORMER BUILDING 1094 SHOWN IN A 1954 AERIAL PHOTOGRAPH

PARKING

PROBABLE LOCATION OF HEATING OIL UST EXCAVATION

ACTIVE UST (HEATING OIL)

FLOW DIRECTION

WAC CIRCLE

PPMP-150-DEP01

PPMP-150-GP07

PPMP-150-GP01

PPMP-150-GP06

PPMP-150-GP11

PPMP-150-GP02

PPMP-150-GP03

PPMP-150-DEP02

PPMP-150-GP05

PPMP-150-GP08

PPMP-150-GP12

PPMP-150-GP10

PPMP-150-GP09

PPMP-150-GP04

A

A'

775

1012

800

2236

2237

2238

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- TREES / TREELINE
- PARCEL BOUNDARY
- MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- SANITARY SEWER LINE
- STORM DRAINAGE LINE
- SURFACE SOIL SAMPLE LOCATION
- SUBSURFACE SOIL SAMPLE LOCATION
- GROUNDWATER AND SUBSURFACE SOIL SAMPLE LOCATION
- DEPOSITIONAL SOIL SAMPLE LOCATION
- MONITORING WELL INSTALLED (NOT SAMPLED DUE TO LACK OF WATER) SUBSURFACE SOIL SAMPLE COLLECTED
- A A' CROSS SECTION LOCATION

SCALE

0 80 160 FEET

FIGURE 3-2
SAMPLE LOCATION MAP
FORMER MOTOR POOL AREA 1000
PARCELS 150(7), 13(7), AND 139(7)

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

IT CORPORATION
A Member of The IT Group

DWG. NO.: ...\774645es.476	
PROJ. NO.: 774645	
INITIATOR: T. WINTON	
PROJ. MGR.: J. YACOUB	
DRAFT. CHCK. BY:	
ENGR. CHCK. BY: J. JENKINS	
DATE LAST REV.:	
DRAWN BY:	
STARTING DATE: 03/02/00	
DRAWN BY: D. BILLINGSLEY	
03/02/01 03:30:57 PM	
c:\cadd\design\774645es.476 DBILLING	

Table 3-2

Surface Soil, Subsurface Soil, and Depositional Soil Sample Designations and QA/QC Samples
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	Sample Depth (ft. bgs)	QA/QC Samples			Analytical Suite
			Field Duplicates	Field Splits	MS/MSD	
PPMP-150-GP01	PPMP-150-GP01-DS-KM0001-REG	11-13				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP02	PPMP-150-GP02-DS-KM0002-REG	6-6.5				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP03	PPMP-150-GP03-DS-KM0005-REG	6-9				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP04	PPMP-150-GP04-DS-KM0006-REG	6-9				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP05	PPMP-150-GP05-DS-KM0007-REG	3-6				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP06	PPMP-150-GP06-DS-KM0008-REG	8-10				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP07	PPMP-150-GP07-DS-KM0009-REG	4-6			PPMP-150-GP07-DS-KM0009-MS PPMP-150-GP07-DS-KM0009-MSD	TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP08	PPMP-150-GP08-DS-KM0010-REG	1-3				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP09	PPMP-150-GP09-DS-KM0011-REG	3-5				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP10	PPMP-150-GP10-DS-KM0012-REG	7-10				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP11	PPMP-150-GP11-DS-KM0013-REG	1-3				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP12	PPMP-150-GP12-SS-KM0014-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-DEP01	PPMP-150-DEP01-DEP-KM0015-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-DEP02	PPMP-150-DEP02-DEP-KM0016-REG	0-1				TCL VOCs, TCL SVOCs, TAL Metals

ft. bgs - feet below ground surface
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

3.2.2 Subsurface Soil Sampling

Subsurface soil samples were collected from 11 soil borings at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), as shown on Figure 3-2. Subsurface soil sampling locations and rationale are presented in Table 3-1. Subsurface soil sample designations, depths, and QA/QC samples are listed in Table 3-2. Soil boring sampling locations were determined in the field by the on-site geologist based on the geophysical survey, sampling rationale, presence of surface structures, site topography, and proximity to utilities. IT contracted TEG, Inc., a direct-push technology subcontractor, to assist in subsurface soil sample collection.

Sample Collection. Subsurface soil samples were collected from soil borings at depths greater than 1 foot below ground surface (bgs) in the unsaturated zone. At each location except PPMP-150-GP02, borings were advanced and soil samples collected using the direct-push sampling procedures specified in Section 4.9.1.1 of the SAP (IT, 2000a). At sample location PPMP-150-GP02, the soil boring was advanced and the sample collected using a 3-inch diameter stainless-steel hand auger. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Table 3-2 using methods outlined in Section 3.4.

Soil samples were collected continuously until direct-push sampler or hand auger refusal was encountered. Subsurface soil samples were field-screened using a PID in accordance with Section 4.7.1.1 of the SAP (IT, 2000a) to measure for volatile organic vapors. The sample displaying the highest reading was selected and sent to the laboratory for analysis; however, at those locations where PID readings were not greater than background, the deepest sample interval above the saturated zone was submitted for analysis. Samples to be analyzed for VOCs were collected directly from the sampler with three EnCore samplers. The remaining portion of the sample was transferred to a clean stainless-steel bowl, homogenized, and placed in the appropriate sample containers. Samples submitted for laboratory analysis are summarized in Table 3-2. The on-site geologist constructed a detailed boring log for each soil boring. The lithological log for each borehole is included in Appendix C.

At the completion of soil sampling, boreholes were abandoned with bentonite pellets hydrated with potable water following borehole abandonment procedures summarized in Appendix B of the SAP (IT, 2000a).

3.2.3 Well Installation

Seven temporary wells were installed in the residuum groundwater zone at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), to collect groundwater samples for laboratory analysis. The well/groundwater sample locations are shown on Figure 3-2. Table 3-3 summarizes the construction details of the wells installed at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). The well construction logs are included in Appendix C.

IT contracted Miller Drilling, Inc. to install the temporary wells with a hollow-stem auger rig at the sample locations shown on Figure 3-2. The wells were installed following procedures outlined in Section 4.7 and Appendix C of the SAP (IT, 2000a). The boreholes at these locations were advanced with a 4.25-inch inside diameter (ID) hollow-stem auger from ground surface to the first water-bearing zone in residuum at the well location. The borehole was augered to the depth of direct-push sampler refusal and samples were collected at the depth of direct-push refusal to the bottom of the borehole. A 2-foot-long, 2-inch ID carbon steel split-spoon sampler was driven at 5-foot intervals to collect residuum for observing and describing lithology. Where split-spoon refusal was encountered, the auger was advanced until the first water-bearing zone was encountered. The on-site geologist logging the auger boreholes at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), continued the detailed lithological log for each borehole from the depth of split-spoon refusal to the bottom of the auger borehole. The lithological log for each borehole is included in Appendix C.

Upon reaching the target depth, a 10- to 20-foot length of 2-inch ID, 0.010-inch factory slotted, Schedule 40 polyvinyl chloride (PVC) screen with a 3-inch PVC end cap was placed through the auger to the bottom of the borehole. The screen and end cap were attached to 2-inch ID, flush-threaded Schedule 40 PVC riser. A sand pack consisting of number 1 filter sand (environmentally safe, clean fine sand, sieve size 20 to 40) was tremied around the well screen to approximately 2 feet above the top of the well screen as the augers were removed. The wells were surged using a solid PVC surge block approximately 10 minutes or until no more settling of the filter sand occurred inside the borehole. A bentonite seal, consisting of approximately 2 feet of bentonite pellets hydrated with potable water, was placed immediately on top of the sand pack. A locking well cap was placed on the PVC well casing. The temporary well surface completion included attaching plastic sheeting around the PVC riser using duct tape. Additionally, sandbags were used to secure the sheeting to the ground surface around the temporary well.

The temporary wells were developed by surging and pumping with a submersible pump in accordance with methodology outlined in Section 4.8 and Appendix C of the SAP (IT, 2000a).

Table 3-3

Temporary Well Construction Summary
Former Motor Pool Area 1000, Parcel 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Temporary Well	Northing	Easting	Ground Elevation (ft msl)	TOC Elevation (ft msl)	Well Depth (ft bgs)	Screen Length (ft)	Screen Interval (ft bgs)	Well Material
PPMP-150-GP01	1174556.30	668872.63	774.80	774.24	24.25	20	4 - 24	2" ID Sch. 40 PVC
PPMP-150-GP02	1174492.63	668874.58	777.63	777.18	19.45	15	4.2 - 19.2	2" ID Sch. 40 PVC
PPMP-150-GP03	1174478.92	668968.93	773.45	775.53	20.00	15	4.75 - 19.75	2" ID Sch. 40 PVC
PPMP-150-GP04	1174228.21	668851.15	785.28	787.29	13.00	10	2.75 - 12.75	2" ID Sch. 40 PVC
PPMP-150-GP05	1174397.34	668748.84	786.63	787.54	19.50	15	4.25 - 19.25	2" ID Sch. 40 PVC
PPMP-150-GP06	1174536.94	668569.40	781.81	781.51	21.45	15	6.2 - 21.2	2" ID Sch. 40 PVC
PPMP-150-GP07	1174669.34	668758.23	771.51	770.98	20.05	15	4.8 - 19.8	2" ID Sch. 40 PVC

Temporary wells installed using hollow-stem auger.
Horizontal coordinates referenced to the U.S. State Plane Coordinate System, Alabama East Zone, North American Datum, 1983.
Elevations referenced to the North American Vertical Datum of 1988.
2" ID Sch. 40 PVC - 2-inch inside diameter, Schedule 40, polyvinyl chloride.
bgs - Below ground surface.
ft - Feet.
msl - Mean sea level.
TOC - Top of casing.

The submersible pump used for well development was moved in an up-and-down fashion to encourage any residual well installation materials to enter the well. These materials were then pumped out of the well in order to re-establish the natural hydraulic flow conditions. Development continued until the water turbidity was equal to or less than 20 nephelometric turbidity units (NTU), or for a maximum of four hours. The well development logs are included in Appendix D.

3.2.4 Water Level Measurements

The depth to groundwater was measured in the seven temporary wells at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), on March 14, 2000, following procedures outlined in Section 4.18 of the SAP (IT, 2000a). Depth to groundwater was measured with an electronic water-level meter. The meter probe and cable were cleaned after use at each well following decontamination methodology presented in Section 4.10 of the SAP (IT, 2000a). Measurements were referenced to the top of the PVC casing. A summary of groundwater level measurements is presented in Table 3-4.

3.2.5 Groundwater Sampling

Groundwater was sampled from six of the seven temporary wells installed at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). Temporary monitoring well PPMP-150-GP04 was not sampled because of an insufficient volume of water in the well. The well/groundwater sampling locations are shown on Figure 3-2. The groundwater sampling locations and rationale are listed in Table 3-1. The groundwater sample designations and QA/QC samples are listed in Table 3-5.

Sample Collection. Groundwater sampling was performed at the temporary well locations following procedures outlined in Section 4.9 of the SAP (IT, 2000a). Groundwater was sampled after purging a minimum of three well volumes and when the field parameters (i.e., temperature, pH, dissolved oxygen, specific conductivity, oxidation-reduction potential, and turbidity) stabilized. Purging and sampling were performed with a submersible pump equipped with Teflon™ tubing. Field parameters were measured using a calibrated water-quality meter. Field parameter readings are summarized in Table 3-6. Sample collection logs are included in Appendix B. The samples were analyzed for the parameters listed in Section 3.4.

3.3 Surveying of Sample Locations

Sample locations were surveyed using GPS survey techniques described in Section 4.3 of the SAP (IT, 2000a), and conventional civil survey techniques described in Section 4.19 of the SAP (IT, 2000a). Horizontal coordinates were referenced to the U.S. State Plane Coordinate System,

Table 3-4

Groundwater Elevations
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Well Location	Date	Depth to Water (ft BTOC)	Ground Elevation (ft msl)	Top of Casing Elevation (ft msl)	Groundwater Elevation (ft msl)
PPMP-150-GP01	14-Mar-00	8.89	774.80	774.24	765.35
PPMP-150-GP02	14-Mar-00	11.12	777.63	777.18	766.06
PPMP-150-GP03	14-Mar-00	9.29	773.45	775.53	766.24
PPMP-150-GP04	14-Mar-00	8.20	785.28	787.29	779.09
PPMP-150-GP05	14-Mar-00	18.11	786.63	787.54	769.43
PPMP-150-GP06	14-Mar-00	4.21	781.81	781.51	777.30
PPMP-150-GP07	14-Mar-00	8.85	771.51	770.98	762.13

Elevations referenced to the North American Vertical Datum of 1988.

BTOC - Below top of casing.
ft - Feet.
msl - Mean sea level.

Table 3-5

Groundwater Sample Designations and QA/QC Samples
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Sample Designation	QA/QC Samples			Analytical Suite
		Field Duplicates	Field Splits	MS/MSD	
PPMP-150-GP01	PPMP-150-GP01-GW-KM3001-REG				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP02	PPMP-150-GP02-GW-KM3002-REG				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP03	PPMP-150-GP03-GW-KM3003-REG				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP05	PPMP-150-GP05-GW-KM3007-REG				TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP06	PPMP-150-GP06-GW-KM3008-REG	PPMP-150-GP06-GW-KM3005-FD	PPMP-150-GP06-GW-KM3006-FS		TCL VOCs, TCL SVOCs, TAL Metals
PPMP-150-GP07	PPMP-150-GP07-GW-KM3009-REG			PPMP-150-GP07-GW-KM3009-MS PPMP-150-GP07-GW-KM3009-MSD	TCL VOCs, TCL SVOCs, TAL Metals

Groundwater samples were collected from the approximate midpoint of the saturated screened interval of the monitoring well.

FD - Field duplicate.
FS - Field split.
MS/MSD - Matrix spike/matrix spike duplicate.
QA/QC - Quality assurance/quality control.
REG - Field sample.
SVOC - Semivolatile organic compound.
TAL - Target analyte list.
TCL - Target compound list.
VOC - Volatile organic compound.

Alabama East Zone, NAD83. Elevations were referenced to the North American Vertical Datum of 1988. Horizontal coordinates and elevations are included in Appendix E.

3.4 Analytical Program

Samples collected during the SI were analyzed for various chemical parameters. The specific suite of analyses performed was based on the potential site-specific chemicals historically at the site and EPA, ADEM, FTMC, and USACE requirements. Samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), were analyzed for the following parameters:

- Target compound list (TCL) VOCs - Method 5035/8260B
- TCL semivolatile organic compounds (SVOC) - Method 8270C
- Target analyte list metals - Method 6010B/7000.

The samples were analyzed using EPA SW-846 methods, including Update III Methods where applicable, as presented in Table 6-1 in Appendix B of the SAP (IT, 2000a). Data were reported and evaluated in accordance with Corps of Engineers South Atlantic Savannah Level B criteria (USACE, 1994) and the stipulated requirements for the generation of definitive data (Section 3.1.2 of Appendix B of the SAP [IT, 2000a]). Chemical data were reported via hard-copy data packages by the laboratory using Contract Laboratory Program-like forms. These packages were validated in accordance with EPA National Functional Guidelines by Level III criteria. A summary of validated data is included in Appendix F. The Data Validation Summary Report is included as Appendix G.

3.5 Sample Preservation, Packaging, and Shipping

Sample preservation, packaging, and shipping followed requirements specified in Section 4.13.2 of the SAP (IT, 2000a). Sample containers, sample volumes, preservatives, and holding times for the analyses required in this SI are listed in Section 5.0, Table 5-1, of Appendix B of the SAP (IT, 2000a). Sample documentation and chain-of-custody records were recorded as specified in Section 4.13 of the SAP (IT, 2000a).

Completed analysis request and chain-of-custody records (Appendix B) were secured and included with each shipment of sample coolers to Quanterra Environmental Services in Knoxville, Tennessee. Split samples were shipped to USACE South Atlantic Division Laboratory in Marietta, Georgia.

3.6 Investigation-Derived Waste Management and Disposal

Table 3-6

Groundwater Field Parameters
Former Motor Pool Area 1000, Parcel 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location	Date	Specific Conductivity (mS/cm)[a]	Dissolved Oxygen (mg/L)	ORP (mV)	Temperature (°C)	Turbidity (NTU)	pH (SU)
PPMP-150-GP01	8-Apr-99	0.555	0.84	163	19.69	38.2	6.59
PPMP-150-GP02	12-Apr-99	1.480	0.54	92	18.43	151	6.69
PPMP-150-GP03	12-Apr-99	0.974	0.05	134	19.25	14.7	6.71
PPMP-150-GP05	12-Apr-99	0.788	4.26	220	20.72	0.00	7.12
PPMP-150-GP06	12-Apr-99	0.092	5.05	294	19.28	102	5.79
PPMP-150-GP07	13-Apr-99	3.658	0.82	234	18.72	6.85	6.32

[a] Specific conductivity values standardized to millisiemens per centimeter.

°C - Degrees Celsius.
mg/L - Milligrams per liter.
mS/cm - Millisiemens per centimeter.
mV - Millivolts.
NTU - Nephelometric turbidity unit.
ORP - Oxidation-reduction potential.
SU - Standard unit.

Investigation-derived waste (IDW) was managed and disposed as outlined in Appendix D of the SAP (IT, 2000a). The IDW during the SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), was segregated as follows:

- Drill cuttings
- Purge water from well development and sampling activities, and decontamination fluids
- Spent well materials and personal protective equipment (PPE).

Solid IDW was stored inside the fenced area surrounding Buildings 335 and 336 in lined roll-off bins prior to characterization and final disposal. Solid IDW was characterized using toxicity characteristic leaching procedure analysis. Based on the results, drill cuttings, spent well materials, and PPE generated during the SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), were disposed as nonregulated waste at the Industrial Waste Landfill on the Main Post of FTMC.

Liquid IDW was contained in the existing 20,000-gallon sump associated with the Building T-338 vehicle washrack. Liquid IDW was characterized by VOC, SVOC, and metals analyses. Based on the analyses, liquid IDW was discharged as non regulated waste to the FTMC wastewater treatment plant on the Main Post.

3.7 Variances/Nonconformances

Two variances to the SFSP were recorded during completion of the SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). The variances did not alter the intent of the investigation or the sampling rationale presented in Table 4-2 of the SFSP (IT, 1998a). The variances to the SFSP are summarized in Table 3-7 and included in Appendix H. There were not any nonconformances to the SFSP recorded during completion of the SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7).

3.8 Data Quality

The field sample analytical data are presented in tabular form in Appendix F. The field samples were collected, documented, handled, analyzed, and reported in a manner consistent with the SI work plan; the FTMC SAP and QAP; and standard, accepted methods and procedures. Sample collection logs pertaining to the collection of the samples were reviewed and organized for this report and are included in Appendix B. As discussed in Section 3.7, there were two variances to the SFSP; however, the variances did not impact the usability of the data.

Table 3-7

Variances to the Site-Specific Field Sampling Plan
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Variance to the SFSP	Justification for Variance	Impact to Site Investigation
Sample location PPMP-150-GP10 was moved approximately 110 feet north-northwest of the proposed location in the site-specific field sampling plan (SFSP).	Sample location PPMP-150-GP10 was moved because the underground storage tank (UST) excavation shown on Figure 4-1 of the SFSP is actually approximately 110 feet north-northwest of the location shown.	A soil sample was collected downgradient of the UST excavation to justify the sampling rationale.
The final SFSP proposed the collection of a groundwater sample from temporary well location PPMP-150-GP04. A groundwater sample was not collected from temporary well PPMP-150-GP04.	During drilling and monitoring well installation, hollow-stem auger refusal was encountered at 14 feet below ground surface (groundwater was encountered at approximately 11 feet bgs). Therefore, temporary well PPMP-150-GP04 was installed at that depth. Several attempts were made to collect ground-water samples from the temporary well; each attempt was unsuccessful because of insufficient groundwater. Therefore, groundwater samples were not collected for chemical analyses.	PPMP-150-GP04 was located approximately 175 feet upgradient of the UST excavation area. Temporary monitoring well PPMP-150-GP05 provided upgradient groundwater data for the site investigation of the parcel. Therefore, the impact to the site investigation is minimal.

Data Validation. A complete (100 percent) Level III data validation effort was performed on the reported analytical data. Appendix G consists of a data validation summary report that was prepared to discuss the validation results. Selected results were rejected or otherwise qualified based on the implementation of accepted data validation procedures and practices. These qualified parameters are highlighted in the report. The validation-assigned qualifiers were added to the FTMC IT Environmental Management System™ database for tracking and reporting. The qualified data were used in the comparison to the SSSLs and ESVs. Rejected data (assigned an "R" qualifier) were not used in the comparison to the SSSLs and ESVs.

The data presented in this report, except where qualified, meet the principle data quality objective for this SI.

4.0 Site Characterization

IT conducted a geophysical survey at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), to assist in the placement of surface and subsurface soil sample locations and temporary monitoring well locations. Subsurface investigations performed at the site provided soil, bedrock, and groundwater data used to characterize the geology and hydrogeology of the site.

4.1 Geophysical Survey Results

The geophysical survey results indicate that one anomaly exists at Parcel 139(7). A geophysical interpretation map of the site (Figure 4-1) shows the anomaly location (and contains detailed information on permanent site-reference features, as well as GPS coordinates, to aid in relocating the anomaly). The anomaly shown on the interpretation map corresponds to those shown in the magnetic and EM data contour maps and GPR data profiles presented in the geophysics report (Appendix A). The anomaly is indicated by red shading and designated by an alphanumeric symbol.

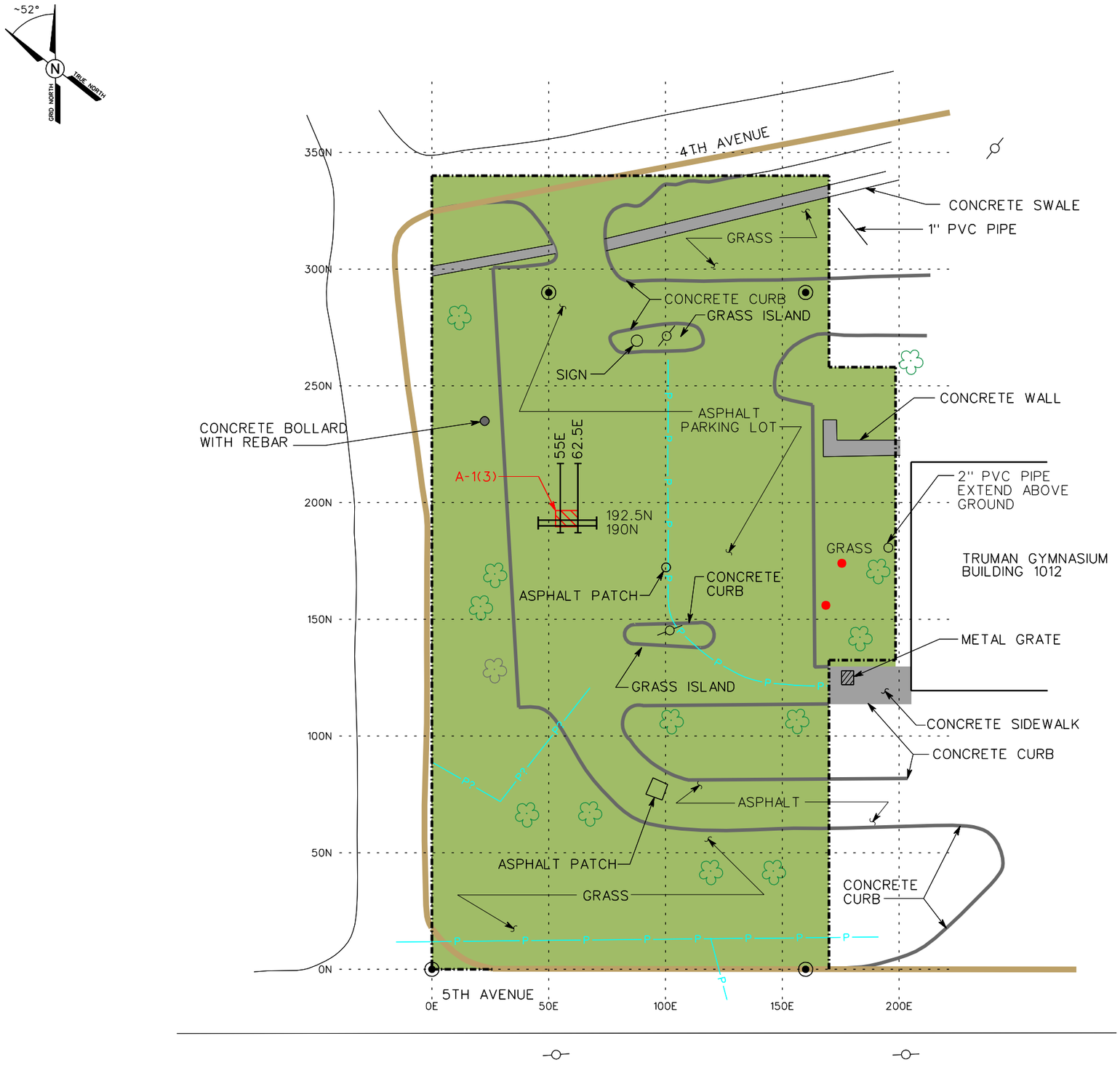
One Rank (3) anomaly (highly uncertain and generally interpreted to be caused by a metallic source object other than a UST) was identified in the geophysical survey. According to the criteria established in the SFSP, this anomaly does not represent a potential UST (a detailed discussion of the qualitative numeric ranking system is included in *Interpretation of Geophysical Data* [Chapter A.4.0 of Appendix A]).

4.2 Regional and Site Geology

4.2.1 Regional Geology

Calhoun County includes parts of two physiographic provinces, the Piedmont Upland Province and the Valley and Ridge Province. The Piedmont Upland Province occupies the extreme eastern and southeastern portions of the county and is characterized by metamorphosed sedimentary rocks. The generally accepted range in age of these metamorphics is Cambrian to Devonian.

The majority of Calhoun County, including the Main Post of FTMC, lies within the Appalachian fold-and-thrust structural belt (Valley and Ridge Province) where southeastward-dipping thrust faults with associated minor folding are the predominant structural features. The fold-and-thrust



LEGEND

- GEOPHYSICAL SURVEY BOUNDARY
- CIVIL SURVEY STAKE LOCATION
- 75N — GPR PROFILES PRESENTED
- A-1(3) — GEOPHYSICAL ANOMALY DISCUSSED IN TEXT; NUMBER SHOWN IN PARENTHESIS INDICATES ANOMALY TYPE FOR POTENTIAL UST
- PARCEL BOUNDARY
- METAL GRATE
- UTILITY POLE
- P — PIPE/BURIED UTILITY
- TREES / TREELINE
- BURIED METAL

NAD 83 SPHEROID, ALABAMA EAST STATE PLANE DATUM		
LOCAL GRID COORDINATES	STATE PLANE COORDINATES	
0N,0E	1174524.66N	668529.28E
0N,160E	1174399.05N	668628.22E
290N,50E	1174662.93N	668787.44E
290N,160E	1174577.33N	668856.53E

SCALE
0 50 100 FEET

FIGURE 4-1
GEOPHYSICAL INTERPRETATION MAP
FORMER MOTOR POOL AREA 1000
PARCELS 150(7), 13(7), AND 139(7)

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

IT CORPORATION
A Member of The IT Group

DRAFT. CHCK. BY:
ENGR. CHCK. BY: J. HACKWORTH
INITIATOR: S. TAKATA
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\774645es.478
PROJ. NO.: 774645
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 01/27/00
DRAWN BY: D. BILLINGSLEY
03/14/01
09:32:59 AM
DBILLING
c:\cadd\design\774645es.478

belt consists of Paleozoic sedimentary rocks that have been asymmetrically folded and thrust-faulted, with major structures and faults striking in a northeast-southwest direction.

Northwestward transport of the Paleozoic rock sequence along the thrust faults has resulted in the imbricate stacking of large slabs of rock referred to as thrust sheets. Within an individual thrust sheet, smaller faults may splay off the larger thrust fault, resulting in imbricate stacking of rock units within an individual thrust sheet (Osborne and Szabo, 1984). Geologic contacts in this region generally strike parallel to the faults, and repetition of lithologic units is common in vertical sequences. Geologic formations within the Valley and Ridge Province portion of Calhoun County have been mapped by Warman and Causey (1962), Osborne and Szabo (1984), and Moser and DeJarnette (1992), and vary in age from Lower Cambrian to Pennsylvanian.

The basal unit of the sedimentary sequence in Calhoun County is the Cambrian Chilhowee Group. The Chilhowee Group consists of the Cochran, Nichols, Wilson Ridge, and Weisner Formations (Osborne and Szabo, 1984) but in Calhoun County is either undifferentiated or divided into the Cochran and Nichols Formations and an upper undifferentiated Wilson Ridge and Weisner Formation. The Cochran is composed of poorly sorted arkosic sandstone and conglomerate with interbeds of greenish-gray siltstone and mudstone. Massive to laminated, greenish-gray and black mudstone makes up the Nichols Formation, with thin interbeds of siltstone and very fine-grained sandstone (Szabo et al., 1988). These two formations are mapped only in the eastern part of the county.

The Wilson Ridge and Weisner Formations are undifferentiated in Calhoun County and consist of both coarse-grained and fine-grained clastics. The coarse-grained facies appear to dominate the unit and consists primarily of coarse-grained, vitreous quartzite, and friable, fine- to coarse-grained, orthoquartzitic sandstone, both of which locally contain conglomerate. The fine-grained facies consists of sandy and micaceous shale and silty, micaceous mudstone which are locally interbedded with the coarse clastic rocks. The abundance of orthoquartzitic sandstone and quartzite suggests that most of the Chilhowee Group bedrock in the vicinity of FTMC belongs to the Weisner Formation (Osborne and Szabo, 1984).

The Cambrian Shady Dolomite overlies the Weisner Formation northeast, east and southwest of the Main Post and consists of interlayered bluish-gray or pale yellowish-gray sandy dolomitic limestone and siliceous dolomite with coarsely crystalline porous chert (Osborne et al., 1989). A variegated shale and clayey silt have been included within the lower part of the Shady Dolomite (Cloud, 1966). Material similar to this lower shale unit was noted in core holes drilled by the

Alabama Geologic Survey on FTMC (Osborne and Szabo, 1984). The character of the Shady Dolomite in the FTMC vicinity and the true assignment of the shale at this stratigraphic interval are still uncertain (Osborne, 1999).

The Rome Formation overlies the Shady Dolomite and locally occurs to the northwest and southeast of the Main Post as mapped by Warman and Causey (1962) and Osborne and Szabo (1984), and immediately to the west of Reilly Airfield (Osborne and Szabo, 1984). The Rome Formation consists of variegated, thinly interbedded grayish-red-purple mudstone, shale, siltstone, and greenish-red and light gray sandstone, with locally occurring limestone and dolomite. The Conasauga Formation overlies the Rome Formation and occurs along anticlinal axes in the northeastern portion of Pelham Range (Warman and Causey, 1962), (Osborne and Szabo, 1984) and the northern portion of the Main Post (Osborne et al. 1997). The Conasauga Formation is composed of dark-gray, finely to coarsely crystalline medium- to thick-bedded dolomite with minor shale and chert (Osborne et al., 1989).

Overlying the Conasauga Formation is the Knox Group, which is composed of the Copper Ridge and Chepultepec dolomites of Cambro-Ordovician age. The Knox Group is undifferentiated in Calhoun County and consists of light medium gray, fine to medium crystalline, variably bedded to laminated, siliceous dolomite and dolomitic limestone that weather to a chert residuum (Osborne and Szabo, 1984). The Knox Group underlies a large portion of the Pelham Range area.

The Ordovician Newala and Little Oak Limestones overlie the Knox Group. The Newala Limestone consists of light to dark gray, micritic, thick-bedded limestone with minor dolomite. The Little Oak Limestone is comprised of dark gray, medium- to thick-bedded, fossiliferous, argillaceous to silty limestone with chert nodules. These limestone units are mapped together as undifferentiated at FTMC and other parts of Calhoun County. The Athens Shale overlies the Ordovician limestone units. The Athens Shale consists of dark-gray to black shale and graptolitic shale with localized interbedded dark gray limestone (Osborne et al., 1989). These units occur within an eroded "window" in the uppermost structural thrust sheet at FTMC and underlie much of the developed area of the Main Post.

Other Ordovician-aged bedrock units mapped in Calhoun County include the Greensport Formation, Colvin Mountain Sandstone, and Sequatchie Formation. These units consist of various siltstones, sandstones, shales, dolomites and limestones, and are mapped as one,

undifferentiated unit in some areas of Calhoun County. The only Silurian-age sedimentary formation mapped in Calhoun County is the Red Mountain Formation. This unit consists of interbedded red sandstone, siltstone, and shale with greenish-gray to red silty and sandy limestone.

The Devonian Frog Mountain Sandstone consists of sandstone and quartzitic sandstone with shale interbeds, dolomudstone, and glauconitic limestone (Szabo et al., 1988). This unit locally occurs in the western portion of Pelham Range.

The Mississippian Fort Payne Chert and the Maury Formation overlie the Frog Mountain Sandstone and are composed of dark- to light-gray limestone with abundant chert nodules and greenish-gray to grayish-red phosphatic shale, with increasing amounts of calcareous chert toward the upper portion of the formation (Osborne and Szabo, 1984). These units occur in the northwestern portion of Pelham Range. Overlying the Fort Payne Chert is the Floyd Shale, also of Mississippian Age, which consists of thin-bedded, fissile brown to black shale with thin intercalated limestone layers and interbedded sandstone. Osborne and Szabo (1984) reassigned the Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of Fort McClellan, to the Ordovician Athens Shale on the basis of fossil data.

The Jacksonville Thrust Fault is the most significant structural geologic feature in the vicinity of FTMC, both for its role in determining the stratigraphic relationships in the area and for its contribution to regional water supplies. The trace of the fault extends northeastward for approximately 39 miles between Bynum, Alabama and Piedmont, Alabama. The fault is interpreted as a major splay of the Pell City fault (Osborne and Szabo, 1984). The Ordovician sequence that makes up the Eden thrust sheet is exposed at FTMC through an eroded "window," or "fenster," in the overlying thrust sheet. Rocks within the window display complex folding, with the folds being overturned and tight to isoclinal. The carbonates and shales locally exhibit well-developed cleavage (Osborne and Szabo, 1984). The FTMC window is framed on the northwest by the Rome Formation, north by the Conasauga Formation, northeast, east, and southwest by the Shady Dolomite, and southeast and southwest by the Chilhowee Group (Osborne et al., 1997).

4.2.2 Site Geology

Soils underlying Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 39(7), are classified as the Rarden series soils. The specific soil type is Rarden silty loams (ReB3), which are moderately well drained, strongly acid to very strongly acid soils that have developed from the

residuum of shale and fine-grained, platy sandstone or limestone (U.S. Department of Agriculture, 1961). The color of the surface soils (2- to 4-inch layers) is yellowish-red or dark-brown silty clay loam. The subsoil is yellowish-red clay or silty clay mottled with strong brown color. Concretions and fragments of sandstone, up to 0.5-inch diameter, are common on the surface and in the soil; however, the surface of some areas has sandstone gravel up to 3 inches in diameter.

Bedrock beneath Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 39(7) is mapped as Ordovician Athens Shale. This unit occurs within the eroded "window," or "fenster," in the uppermost structural thrust sheet at FTMC and underlies much of the developed area of the Main Post. The Mississippian Floyd Shale, which was mapped by Warman and Causey (1962) on the Main Post of FTMC, was reassigned to the Ordovician Athens Shale by Osborne and Szabo in 1984, on the basis of fossil data (SAIC, 1993).

Based on direct-push and hollow-stem auger boring data collected during the SI, soils beneath Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), consist of predominately clay and silt overlying grayish-brown to brown weathered shale. The weathered shale is encountered at approximately 8 to 10 feet bgs across the site. A geologic cross section was constructed with boring log data from Parcel 150(7) and is presented on Figure 4-2. The geologic cross section location is shown on Figure 3-2.

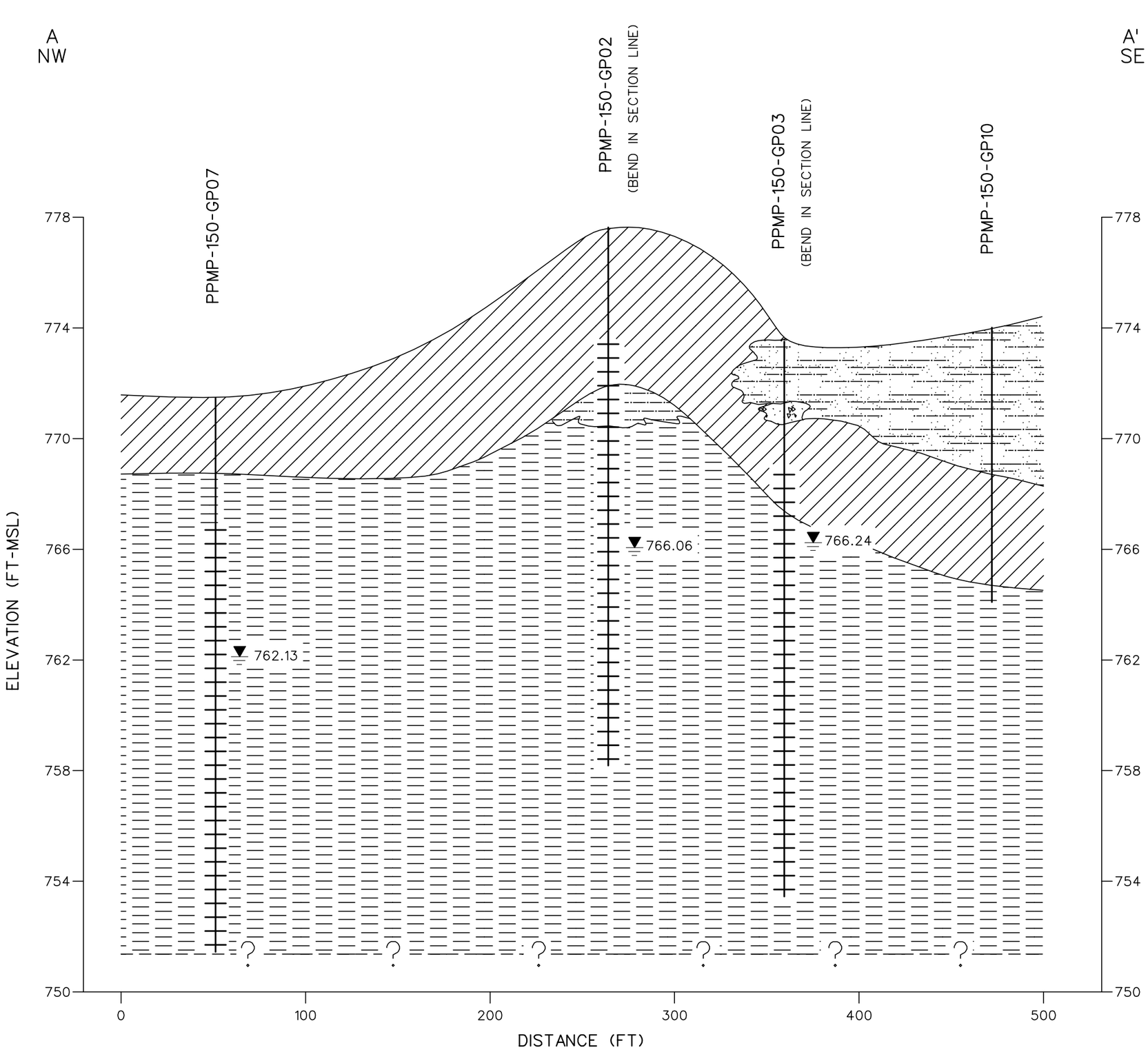
4.3 Site Hydrology

4.3.1 Surface Hydrology

Precipitation in the form of rainfall averages about 54 inches annually in Anniston, Alabama, with infiltration rates annually exceeding evapotranspiration rates (U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1998). The major surface water features at the Main Post of FTMC include Remount Creek, Cane Creek, and Cave Creek. These waterways flow in a general northwest to westerly direction towards the Coosa River on the western boundary of Calhoun County.

Surface runoff at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), follows site topography and flows to the northeast toward a man-made ditch running along the northeast side of the site adjacent to 4th Avenue. Flow in the ditch is to the northwest.

4.3.2 Hydrogeology



LEGEND

- SCREEN INTERVAL
- WATER TABLE (3/14/00)
- 762.13 GROUNDWATER ELEVATION (FT MSL)
- CLAY
- SILTY SAND (FILL ?)
- SILT
- CONCRETE (FILL ?)
- WEATHERED SHALE
- – – ? – – CONTACT INFERRED

NOTES:

1. ELEVATIONS ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988.
2. SEE FIGURE 3-2 FOR CROSS SECTION LOCATION.
3. DASHED WHERE INFERRED.

HORIZONTAL
0 60 120 FEET

FIGURE 4-2
GEOLOGIC CROSS SECTION A-A'
FORMER MOTOR POOL AREA 1000
PARCELS 150(7), 13(7), AND 139(7)

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

IT CORPORATION
A Member of The IT Group

DRAFT. CHCK. BY:
ENGR. CHCK. BY: S. MORAN
INITIATOR: D. HICKIE
PROJ. MGR.: J. YACOUB
DWG. NO.: ...\774645es.520
PROJ. NO.: 774645
REV.:
DATE LAST REV.:
DRAWN BY:
STARTING DATE: 06/15/00
DRAWN BY: D. BILLINGSLEY
03/15/01
02:32:21 PM
DBILLING
c:\cadd\design\774645es.520

During soil boring and well installation activities, groundwater was encountered in silts and clays at depths ranging from 9 feet bgs in PPMP-150-GP04 to 21 feet bgs in PPMP-150-GP01 (Appendix C).

Static groundwater levels were measured in monitoring wells at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), on March 14, 2000, as summarized in Table 3-4. Groundwater elevations were calculated by measuring the depth to groundwater relative to the surveyed top-of-casing elevations. A groundwater elevation contour map was constructed from the March 2000 data and is presented on Figure 4-3. Based on the groundwater elevation contour map, horizontal groundwater flows in a northeasterly direction.

Static groundwater levels summarized in Table 3-4 are at shallower depths than the depth to groundwater encountered during drilling (Appendix C). This indicates that the groundwater has an upward vertical hydraulic head.

PARCEL 139(7)

E 668,500

E 668,900

E 669,300

N 1,174,600

N 1,174,100

PPMP-150-GP07
(762.13)

PPMP-150-GP01
(765.35)

PPMP-150-GP06
(777.30)

PPMP-150-GP02
(766.06)

PPMP-150-GP03
(766.24)

PPMP-150-GP05
(769.43)

PPMP-150-GP04
(779.09)

PARKING

4 TH AVENUE

5 TH AVENUE

PARCEL 150(7)

PARCEL 13(7)

PROBABLE LOCATION OF HEATING OIL UST EXCAVATION

ACTIVE UST (HEATING OIL)

APPROXIMATE LOCATION OF FORMER BUILDING 1094 SHOWN IN A 1954 AERIAL PHOTOGRAPH

1012

2236

2237

2238

WAC CIRCLE

FLOW DIRECTION

G.W. FLOW

G.W. FLOW

770

775

780

760

750

800

SCALE
0 80 160 FEET

LEGEND

- UNIMPROVED ROADS AND PARKING
- PAVED ROADS AND PARKING
- BUILDING
- TOPOGRAPHIC CONTOURS (CONTOUR INTERVAL - 5 FOOT)
- 770 GROUNDWATER ELEVATION CONTOURS (DASHED WHERE INFERRED)
- (766.06) GROUNDWATER ELEVATION (FT MSL) (MARCH 14, 2000)
- G.W. FLOW GROUNDWATER FLOW DIRECTION
- TREES / TREELINE
- PARCEL BOUNDARY
- —•M•— MANMADE SURFACE DRAINAGE FEATURE
- FENCE
- UTILITY POLE
- --SS-- SANITARY SEWER LINE
- —SD— STORM DRAINAGE LINE
- GROUNDWATER AND SUBSURFACE SOIL SAMPLE LOCATION
- MONITORING WELL INSTALLED (NOT SAMPLED DUE TO LACK OF WATER) SUBSURFACE SOIL SAMPLE COLLECTED

FIGURE 4-3
GROUNDWATER ELEVATIONS
FORMER MOTOR POOL AREA 1000
PARCELS 150(7), 13(7), AND 139(7)

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

IT CORPORATION
A Member of The IT Group

DWG. NO.: ...\774645es.483 | PROJ. NO.: 774645
INITIATOR: T. WINTON | PROJ. MGR.: J. YACOUB
DRAFT. CHCK. BY: | ENGR. CHCK. BY: J. JENKINS
DATE LAST REV.: | DRAWN BY:
STARTING DATE: 03/02/00 | DRAWN BY: D. BILLINGSLEY
03/06/01 08:39:45 AM
DBILLING
c:\cadd\design\774645es.483

5.0 Summary of Analytical Results

The results of the chemical analysis of samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), indicate that metals, VOCs, and SVOCs have been detected in the various site media. To evaluate whether the detected constituents present an unacceptable risk to human health and the environment, analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the on-going SIs being performed under the BRAC Environmental Restoration Program at FTMC.

Metal concentrations exceeding the SSSLs and ESVs were subsequently compared to metals background screening values (background concentrations) (SAIC, 1998) to determine if the metals concentrations were within natural background concentrations. Summary statistics for background metals samples collected at FTMC (SAIC, 1998) are included in Appendix I. Additionally, SVOC (PAH compounds) concentrations in surface and depositional soils that exceeded the SSSLs and ESVs were compared to PAH background screening values. The PAH background screening values were derived from PAH analytical data from 18 parcels at FTMC that were determined to represent anthropogenic activity (IT, 2000b). PAH background screening values were developed for two categories of surface soils: beneath asphalt and adjacent to asphalt. The PAH background screening values for soils adjacent to asphalt are the more conservative (i.e., lower) of the PAH background values and are the values used herein for comparison.

Six compounds were quantified by both SW-846 Method 8260B (as VOC) and Method 8270C (as SVOC): 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, 1,3-dichlorobenzene, 1,2-dichlorobenzene, hexachlorobutadiene, and naphthalene. Method 8260B yields a reporting limit of 0.005 milligrams per kilogram (mg/kg), while Method 8270C has a reporting limit of 0.330 mg/kg, which is typical for a soil matrix sample. Because of the direct nature of the Method 8260B analysis and its resulting lower reporting limit, this method should be considered superior to Method 8270C when quantifying low levels (0.005 to 0.330 mg/kg) of these compounds. Method 8270C and its associated methylene chloride extraction step is superior, however when dealing with samples that contain higher concentrations (greater than 0.330 mg/kg) of these compounds. Therefore, all data were considered, and none were categorically excluded. Data validation qualifiers were helpful in evaluating the usability of data, especially if calibration, blank contamination, precision, or accuracy indicator anomalies

were encountered. The validation qualifiers and concentrations reported (e.g., whether concentrations were less than or greater than 0.330 mg/kg) were used to determine which analytical method was likely to return the more nearly accurate result.

The following sections and Tables 5-1 through 5-3 summarize the results of the comparison of detected constituents to the SSSLs, ESVs, and background screening values. Complete analytical results are presented in Appendix E.

5.1 Surface and Depositional Soil Sample Results

One surface soil sample and two depositional soil samples were collected for chemical analysis at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). Surface and depositional soil samples were collected from the upper 1 foot of soil at the locations shown on Figure 3-2. Analytical results were compared to residential human health SSSLs, ESVs, and background screening values (metals and PAHs), as presented in Table 5-1.

Metals. Nineteen metals (aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, sodium, vanadium, and zinc) were detected in surface and depositional soil samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). All of the detected metals were present in each of the samples.

Aluminum (at two locations), arsenic (three locations), iron (three locations), and manganese (two locations) were detected at concentrations exceeding SSSLs. However, with the exception of iron at one location (PPMP-150-DEP02), the concentrations of these metals were below their respective background concentration. The iron result was within the range of background values determined by SAIC (1998) (Appendix I).

The following metals were detected at concentrations exceeding ESVs and their respective background concentration: beryllium (one location), cobalt (one location), iron (one location), lead (one location), mercury (one location), selenium (two locations), and zinc (two locations). However, with the exception of beryllium, lead, and selenium, these concentrations were within the range of background values determined by SAIC (1998).

Volatile Organic Compounds. Methylene chloride was detected in each of the surface and depositional soil samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and

Table 5-1

Surface and Depositional Soil Analytical Results
Former Motor Pool Area 1000, Parcel 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location					PPMP-150-DEP01					PPMP-150-DEP02					PPMP-150-GP12				
Sample Number					KM0015					KM0016					KM0014				
Sample Date					9-Mar-99					9-Mar-99					26-Mar-99				
Sample Depth (Feet)					0- 1					0- 1					0.5- 1				
Parameter	Units	BKG[a]	SSSL[b]	ESV[b]	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV	Result	Qual	>BKG	>SSSL	>ESV
METALS																			
Aluminum	mg/kg	1.63E+04	7.80E+03	5.00E+01	6.02E+03				YES	9.72E+03			YES	YES	8.70E+03			YES	YES
Arsenic	mg/kg	1.37E+01	4.26E-01	1.00E+01	7.80E+00			YES		1.08E+01			YES	YES	5.00E+00			YES	
Barium	mg/kg	1.24E+02	5.47E+02	1.65E+02	4.81E+01					9.74E+01					4.88E+01				
Beryllium	mg/kg	8.00E-01	9.60E+00	1.10E+00	4.70E-01	J				1.20E+00		YES		YES	5.40E-01	J			
Calcium	mg/kg	1.72E+03	NA	NA	1.99E+04		YES			1.15E+03					1.63E+03				
Chromium	mg/kg	3.70E+01	2.32E+01	4.00E-01	1.74E+01				YES	1.34E+01				YES	1.57E+01				YES
Cobalt	mg/kg	1.52E+01	4.68E+02	2.00E+01	5.20E+00	J				2.32E+01		YES		YES	5.10E+00	J			
Copper	mg/kg	1.27E+01	3.13E+02	4.00E+01	1.49E+01		YES			2.51E+01		YES			1.92E+01		YES		
Iron	mg/kg	3.42E+04	2.34E+03	2.00E+02	1.92E+04			YES	YES	4.59E+04		YES	YES	YES	2.38E+04			YES	YES
Lead	mg/kg	4.01E+01	4.00E+02	5.00E+01	1.00E+02		YES		YES	3.59E+01					3.73E+01				
Magnesium	mg/kg	1.03E+03	NA	4.40E+05	1.08E+04		YES			3.57E+03		YES			2.29E+03		YES		
Manganese	mg/kg	1.58E+03	3.63E+02	1.00E+02	4.81E+02			YES	YES	7.91E+02			YES	YES	3.49E+02	J			YES
Mercury	mg/kg	8.00E-02	2.33E+00	1.00E-01	8.10E-02	B	YES			5.70E-02	B				1.30E-01		YES		YES
Nickel	mg/kg	1.03E+01	1.54E+02	3.00E+01	8.30E+00					2.87E+01		YES			1.18E+01		YES		
Potassium	mg/kg	8.00E+02	NA	NA	1.11E+02	J				1.48E+02	J				2.19E+02	J			
Selenium	mg/kg	4.80E-01	3.91E+01	8.10E-01	7.40E-01		YES			1.70E+00		YES		YES	1.40E+00		YES		YES
Sodium	mg/kg	6.34E+02	NA	NA	1.24E+02	B				9.90E+01	B				9.33E+01	B			
Vanadium	mg/kg	5.88E+01	5.31E+01	2.00E+00	2.78E+01				YES	2.93E+01				YES	2.47E+01				YES
Zinc	mg/kg	4.06E+01	2.34E+03	5.00E+01	1.45E+02		YES		YES	7.46E+01		YES		YES	4.56E+01	J	YES		
VOLATILE ORGANIC COMPOUNDS																			
Methylene chloride	mg/kg	NA	8.41E+01	2.00E+00	4.10E-03	B				3.20E-03	B				4.40E-03	B			
SEMIVOLATILE ORGANIC COMPOUNDS																			
Acenaphthylene	mg/kg	8.91E-01	4.63E+02	6.82E+02	4.60E-02	J				ND					ND				
Benzo(a)anthracene	mg/kg	1.19E+00	8.51E-01	5.21E+00	1.80E-01	J				6.00E-02	J				1.40E-01	J			
Benzo(a)pyrene	mg/kg	1.42E+00	8.51E-02	1.00E-01	2.60E-01	J		YES	YES	8.60E-02	J		YES		1.50E-01	J		YES	YES
Benzo(b)fluoranthene	mg/kg	1.66E+00	8.51E-01	5.98E+01	4.90E-01					1.30E-01	J				2.00E-01	J			
Benzo(ghi)perylene	mg/kg	9.55E-01	2.32E+02	1.19E+02	3.50E-01	J				ND					9.00E-02	J			
Benzo(k)fluoranthene	mg/kg	1.45E+00	8.51E+00	1.48E+02	1.70E-01	J				6.70E-02	J				9.10E-02	J			
Chrysene	mg/kg	1.40E+00	8.61E+01	4.73E+00	2.40E-01	J				8.70E-02	J				1.60E-01	J			
Dibenz(a,h)anthracene	mg/kg	7.20E-01	8.61E-02	1.84E+01	9.80E-02	J		YES		ND					ND				
Fluoranthene	mg/kg	2.03E+00	3.09E+02	1.00E-01	2.60E-01	J			YES	1.00E-01	J			YES	2.70E-01	J			YES
Indeno(1,2,3-cd)pyrene	mg/kg	9.37E-01	8.51E-01	1.09E+02	3.30E-01	J				ND					1.10E-01	J			
Phenanthrene	mg/kg	1.08E+00	2.32E+03	1.00E-01	7.30E-02	J				ND					5.10E-02	J			
Pyrene	mg/kg	1.63E+00	2.33E+02	1.00E-01	2.10E-01	J			YES	ND					2.10E-01	J			YES
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	9.30E-01	2.80E-01	J				ND					ND				

Table 5-1

Surface and Depositional Soil Analytical Results
Former Motor Pool Area 1000, Parcel 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July. For SVOCs, value listed is the background screening criterion for soils adjacent to asphalt as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

[b] Residential human health site-specific screening level (SSSL) and ecological screening value (ESV) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than method detection limit but less than or equal to reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-2

Subsurface Soil Analytical Results
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-150-GP01				PPMP-150-GP02				PPMP-150-GP03				PPMP-150-GP04			
Sample Number				KM0001				KM0002				KM0005				KM0006			
Sample Date				22-Mar-99				26-Mar-99				13-Jan-99				13-Jan-99			
Sample Depth (Feet)				11 - 13				6 - 6.5				6 - 9				6 - 9			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	1.17E+04			YES	5.25E+03				1.69E+04		YES	YES	1.81E+04		YES	YES
Arsenic	mg/kg	1.83E+01	4.26E-01	1.90E+00			YES	8.80E+00			YES	4.60E+00			YES	3.40E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	9.35E+01				1.30E+01	J			8.12E+01				3.78E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.20E+00		YES		3.10E-01	B			1.30E+00		YES		1.20E+00		YES	
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				4.60E-01	J	YES		ND			
Calcium	mg/kg	6.37E+02	NA	3.76E+03		YES		1.15E+02	J			1.68E+03		YES		1.24E+02	J		
Chromium	mg/kg	3.83E+01	2.32E+01	1.56E+01				1.32E+01				2.08E+01				2.22E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	1.46E+01				2.60E+00	J			2.30E+00	J			6.00E+00			
Copper	mg/kg	1.94E+01	3.13E+02	2.33E+01		YES		4.20E+00				4.74E+01		YES		4.22E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	2.48E+04			YES	2.94E+04			YES	3.81E+04			YES	3.92E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.11E+01				1.23E+01				1.76E+01				1.67E+01			
Magnesium	mg/kg	7.66E+02	NA	6.66E+03		YES		1.57E+02	J			8.25E+03		YES		7.25E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	1.14E+02	J			1.99E+02	J			1.71E+02				1.88E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	3.30E-02	B			5.00E-02	B			2.40E-02	J			3.00E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	3.38E+01		YES		3.90E+00	J			4.32E+01		YES		3.99E+01		YES	
Potassium	mg/kg	7.11E+02	NA	2.59E+02	J			9.76E+01	J			4.94E+02	J			5.44E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.20E+00		YES		1.60E+00		YES		1.80E+00		YES		1.60E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				2.50E+00		YES		2.50E+00		YES	
Sodium	mg/kg	7.02E+02	NA	3.95E+02	B			8.74E+01	B			4.34E+01	J			9.06E+01	J		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				7.00E-01	J		YES	4.80E-01	J		
Vanadium	mg/kg	6.49E+01	5.31E+01	1.77E+01				3.09E+01				4.60E+00	J			4.00E+00	J		
Zinc	mg/kg	3.49E+01	2.34E+03	8.35E+01	J	YES		6.00E+00	J			1.44E+02		YES		1.14E+02		YES	
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				ND				ND			
Acetone	mg/kg	NA	7.76E+02	ND				ND				3.80E-01	J			3.40E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	ND				ND				1.70E-03	B			1.60E-03	B		
Methylene chloride	mg/kg	NA	8.41E+01	3.00E-03	B			5.60E-03	B			2.10E-03	B			2.50E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS																			
Acenaphthene	mg/kg	NA	4.63E+02	ND				ND				ND				ND			
Acenaphthylene	mg/kg	NA	4.63E+02	ND				ND				ND				ND			
Anthracene	mg/kg	NA	2.33E+03	ND				ND				ND				ND			
Benzo(a)anthracene	mg/kg	NA	8.51E-01	ND				ND				ND				ND			
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND				ND				ND				ND			
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	ND				ND				ND				ND			
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	ND				ND				ND				ND			
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	ND				ND				ND				ND			
Carbazole	mg/kg	NA	3.11E+01	ND				ND				ND				ND			
Chrysene	mg/kg	NA	8.61E+01	ND				ND				ND				ND			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	ND				ND				ND				ND			
Dibenz(a,h)anthracene	mg/kg	NA	8.61E-02	ND				ND				ND				ND			
Fluoranthene	mg/kg	NA	3.09E+02	ND				ND				ND				ND			
Fluorene	mg/kg	NA	3.09E+02	ND				ND				ND				ND			
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	ND				ND				ND				ND			
Phenanthrene	mg/kg	NA	2.32E+03	ND				ND				ND				ND			
Pyrene	mg/kg	NA	2.33E+02	ND				ND				ND				ND			
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				5.50E+00				4.50E-02	B			4.30E-02	B		

Subsurface Soil Analytical Results
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-150-GP05				PPMP-150-GP06				PPMP-150-GP07				PPMP-150-GP08			
Sample Number				KM0007				KM0008				KM0009				KM0010			
Sample Date				13-Jan-99				23-Mar-99				23-Mar-99				2-Feb-99			
Sample Depth (Feet)				3 - 6				8 - 10				4 - 6				0 - 3			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS																			
Aluminum	mg/kg	1.36E+04	7.80E+03	7.92E+03			YES	4.53E+03				1.09E+04			YES	1.02E+04			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	8.00E+00			YES	1.10E+00	J		YES	3.10E+00			YES	2.80E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	5.57E+01				2.26E+01	J			6.48E+01				9.27E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	5.40E-01	J			2.50E-01	B			7.70E-01				8.50E-01			
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	6.79E+01	J			ND				2.72E+03		YES		1.59E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	4.10E+01		YES	YES	7.30E+00				1.64E+01				1.28E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	ND				ND				1.06E+01				1.04E+01			
Copper	mg/kg	1.94E+01	3.13E+02	7.80E+00				4.10E+00				2.45E+01		YES		2.26E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	3.13E+04			YES	1.14E+04			YES	2.57E+04			YES	2.41E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	2.06E+01				7.10E+00				3.04E+01				1.43E+01			
Magnesium	mg/kg	7.66E+02	NA	1.70E+02	J			1.21E+02	J			4.93E+03		YES		5.07E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	9.12E+02			YES	4.30E+00	J			2.12E+02	J			1.53E+02			
Mercury	mg/kg	7.00E-02	2.33E+00	7.00E-02		YES		3.00E-02	B			4.80E-02	B			3.10E-02	J		
Nickel	mg/kg	1.29E+01	1.54E+02	6.10E+00				1.50E+00	J			2.79E+01		YES		2.75E+01		YES	
Potassium	mg/kg	7.11E+02	NA	1.50E+02	J			1.28E+02	J			2.15E+02	J			2.87E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.30E+00		YES		5.40E-01	J	YES		1.50E+00		YES		9.50E-01		YES	
Silver	mg/kg	2.40E-01	3.91E+01	2.20E+00		YES		ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	1.51E+01	J			7.13E+01	B			1.23E+02	B			9.96E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	2.51E+01				1.40E+01				2.19E+01				1.73E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	2.36E+01				7.50E+00	J			8.48E+01	J	YES		7.17E+01		YES	
VOLATILE ORGANIC COMPOUNDS																			
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				4.10E-03	J			ND			
Acetone	mg/kg	NA	7.76E+02	1.50E-01	J			ND				2.10E-02	J			1.30E-01	B		
Bromomethane	mg/kg	NA	1.09E+01	1.40E-03	B			ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	2.90E-03	B			3.60E-03	B			5.00E-03	B			3.70E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				ND				ND			
SEMIVOLATILE ORGANIC COMPOUNDS																			
Acenaphthene	mg/kg	NA	4.63E+02	ND				ND				ND				ND			
Acenaphthylene	mg/kg	NA	4.63E+02	ND				ND				ND				6.70E-02	J		
Anthracene	mg/kg	NA	2.33E+03	ND				ND				ND				6.60E-02	J		
Benzo(a)anthracene	mg/kg	NA	8.51E-01	ND				ND				ND				1.40E-01	J		
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND				ND				ND				2.20E-01	J		YES
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	ND				ND				ND				2.20E-01	J		
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	ND				ND				ND				1.70E-01	J		
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	ND				ND				ND				2.10E-01	J		
Carbazole	mg/kg	NA	3.11E+01	ND				ND				ND				6.40E-02	J		
Chrysene	mg/kg	NA	8.61E+01	ND				ND				ND				2.10E-01	J		
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	ND				ND				ND				9.60E-02	B		
Dibenz(a,h)anthracene	mg/kg	NA	8.61E-02	ND				ND				ND				8.20E-02	J		
Fluoranthene	mg/kg	NA	3.09E+02	ND				ND				ND				2.70E-01	J		
Fluorene	mg/kg	NA	3.09E+02	ND				ND				ND				ND			
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	ND				ND				ND				1.60E-01	J		
Phenanthrene	mg/kg	NA	2.32E+03	ND				ND				ND				6.80E-02	J		
Pyrene	mg/kg	NA	2.33E+02	ND				ND				ND				2.20E-01	J		
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	ND				ND				ND				1.10E-01	B		

Subsurface Soil Analytical Results
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-150-GP09				PPMP-150-GP10				PPMP-150-GP11			
Sample Number				KM0011				KM0012				KM0013			
Sample Date				2-Feb-99				2-Feb-99				22-Mar-99			
Sample Depth (Feet)				3 - 5				7 - 10				1 - 3			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS															
Aluminum	mg/kg	1.36E+04	7.80E+03	1.40E+04		YES	YES	9.64E+03			YES	1.10E+04			YES
Arsenic	mg/kg	1.83E+01	4.26E-01	2.70E+00			YES	4.10E+00			YES	2.00E+00			YES
Barium	mg/kg	2.34E+02	5.47E+02	6.13E+01				8.68E+01				4.24E+01			
Beryllium	mg/kg	8.60E-01	9.60E+00	1.60E+00		YES		1.20E+00		YES		7.40E-01			
Cadmium	mg/kg	2.20E-01	6.25E+00	ND				ND				ND			
Calcium	mg/kg	6.37E+02	NA	3.53E+02	J			4.47E+02	J			1.09E+03		YES	
Chromium	mg/kg	3.83E+01	2.32E+01	1.68E+01				1.29E+01				1.64E+01			
Cobalt	mg/kg	1.75E+01	4.68E+02	4.13E+01		YES		1.39E+01				6.00E+00			
Copper	mg/kg	1.94E+01	3.13E+02	3.64E+01		YES		2.33E+01		YES		2.47E+01		YES	
Iron	mg/kg	4.48E+04	2.34E+03	3.19E+04			YES	2.68E+04			YES	2.56E+04			YES
Lead	mg/kg	3.85E+01	4.00E+02	1.39E+01				1.67E+01				1.47E+01			
Magnesium	mg/kg	7.66E+02	NA	7.81E+03		YES		2.96E+03		YES		3.43E+03		YES	
Manganese	mg/kg	1.36E+03	3.63E+02	1.91E+02				7.38E+01				1.81E+02	J		
Mercury	mg/kg	7.00E-02	2.33E+00	1.90E-02	B			1.70E-02	B			3.90E-02	B		
Nickel	mg/kg	1.29E+01	1.54E+02	5.50E+01		YES		1.90E+01		YES		1.86E+01		YES	
Potassium	mg/kg	7.11E+02	NA	3.51E+02	J			3.13E+02	J			3.72E+02	J		
Selenium	mg/kg	4.70E-01	3.91E+01	1.50E+00		YES		1.80E+00		YES		1.50E+00		YES	
Silver	mg/kg	2.40E-01	3.91E+01	ND				ND				ND			
Sodium	mg/kg	7.02E+02	NA	1.54E+02	B			1.19E+02	B			9.99E+01	B		
Thallium	mg/kg	1.40E+00	5.08E-01	ND				ND				ND			
Vanadium	mg/kg	6.49E+01	5.31E+01	2.23E+01				2.47E+01				2.34E+01			
Zinc	mg/kg	3.49E+01	2.34E+03	1.19E+02		YES		6.20E+01		YES		5.16E+01	J	YES	
VOLATILE ORGANIC COMPOUNDS															
2-Butanone	mg/kg	NA	4.66E+03	ND				ND				1.10E-02	J		
Acetone	mg/kg	NA	7.76E+02	1.60E-01	B			2.20E-02	B			6.10E-02	J		
Bromomethane	mg/kg	NA	1.09E+01	ND				ND				ND			
Methylene chloride	mg/kg	NA	8.41E+01	3.50E-03	B			3.20E-03	B			4.40E-03	B		
Naphthalene	mg/kg	NA	1.55E+02	ND				ND				8.70E-03	J		
SEMIVOLATILE ORGANIC COMPOUNDS															
Acenaphthene	mg/kg	NA	4.63E+02	ND				ND				2.00E-01	J		
Acenaphthylene	mg/kg	NA	4.63E+02	ND				ND				2.40E-01	J		
Anthracene	mg/kg	NA	2.33E+03	ND				ND				8.90E-01	J		
Benzo(a)anthracene	mg/kg	NA	8.51E-01	ND				ND				2.50E+00			YES
Benzo(a)pyrene	mg/kg	NA	8.51E-02	ND				ND				2.40E+00			YES
Benzo(b)fluoranthene	mg/kg	NA	8.51E-01	ND				ND				3.30E+00			YES
Benzo(ghi)perylene	mg/kg	NA	2.32E+02	ND				ND				1.10E+00	J		
Benzo(k)fluoranthene	mg/kg	NA	8.51E+00	ND				ND				1.20E+00	J		
Carbazole	mg/kg	NA	3.11E+01	ND				ND				6.00E-01	J		
Chrysene	mg/kg	NA	8.61E+01	ND				ND				2.60E+00			
Di-n-butyl phthalate	mg/kg	NA	7.80E+02	1.10E-01	B			9.90E-02	B			ND			
Dibenz(a,h)anthracene	mg/kg	NA	8.61E-02	ND				ND				4.20E-01	J		YES
Fluoranthene	mg/kg	NA	3.09E+02	ND				ND				6.00E+00			
Fluorene	mg/kg	NA	3.09E+02	ND				ND				6.90E-01	J		
Indeno(1,2,3-cd)pyrene	mg/kg	NA	8.51E-01	ND				ND				1.20E+00	J		YES
Phenanthrene	mg/kg	NA	2.32E+03	ND				ND				3.10E+00			
Pyrene	mg/kg	NA	2.33E+02	ND				ND				4.70E+00	J		
bis(2-Ethylhexyl)phthalate	mg/kg	NA	4.52E+01	1.30E-01	B			1.20E-01	B			ND			

Table 5-2

Subsurface Soil Analytical Results
Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama,* July.

[b] Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama,* July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than method detection limit but less than or equal to reporting limit.

mg/kg - Milligrams per kilogram.

NA - Not available.

ND - Not detected.

Qual - Data validation qualifier.

Table 5-3

Groundwater Analytical Results
Former Motor Pool Area 1000, Parcel 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-150-GP01				PPMP-150-GP02				PPMP-150-GP03			
Sample Number				KM3001				KM3002				KM3003			
Sample Date				8-Apr-99				12-Apr-99				12-Apr-99			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS															
Aluminum	mg/L	2.34E+00	1.56E+00	5.64E-01				4.58E+00		YES	YES	7.72E-02	B		
Barium	mg/L	1.27E-01	1.10E-01	3.28E-02	J			6.49E-02	J			4.20E-02	J		
Calcium	mg/L	5.65E+01	NA	2.25E+01				8.11E+01		YES		5.24E+01			
Iron	mg/L	7.04E+00	4.69E-01	4.00E-01				3.35E+00			YES	ND			
Lead	mg/L	7.99E-03	1.50E-02	ND				1.90E-03	J			ND			
Magnesium	mg/L	2.13E+01	NA	2.06E+01				8.92E+01		YES		6.38E+01		YES	
Manganese	mg/L	5.81E-01	7.35E-02	4.80E-01			YES	9.69E-01		YES	YES	1.22E-01			YES
Potassium	mg/L	7.20E+00	NA	8.83E-01	J			3.07E+00	J			1.07E+00	J		
Selenium	mg/L	NA	7.82E-03	ND				ND				ND			
Sodium	mg/L	1.48E+01	NA	5.76E+01		YES		1.69E+02		YES		9.23E+01		YES	
Vanadium	mg/L	1.70E-02	1.10E-02	ND				7.40E-03	J			ND			
Zinc	mg/L	2.20E-01	4.69E-01	ND				1.18E-02	J			ND			
VOLATILE ORGANIC COMPOUNDS															
1,2,3-Trichlorobenzene	mg/L	NA	1.32E-03	ND				ND				ND			
1,2,4-Trichlorobenzene	mg/L	NA	1.35E-02	ND				ND				ND			
2-Butanone	mg/L	NA	7.14E-01	ND				2.90E-03	B			ND			
Acetone	mg/L	NA	1.56E-01	ND				7.70E-03	B			2.40E-03	B		
Bromomethane	mg/L	NA	2.17E-03	1.00E-04	B			1.00E-04	B			ND			
Carbon disulfide	mg/L	NA	1.51E-01	ND				ND				ND			
Chloroform	mg/L	NA	1.15E-03	ND				ND				1.60E-04	J		
Chloromethane	mg/L	NA	3.92E-03	ND				ND				ND			
Naphthalene	mg/L	NA	3.00E-03	ND				ND				ND			

Table 5-3

Groundwater Analytical Results
Former Motor Pool Area 1000, Parcel 150(7), 13(7), and 139(7)
Fort McClellan, Calhoun County, Alabama

Sample Location				PPMP-150-GP05				PPMP-150-GP06				PPMP-150-GP07			
Sample Number				KM3007				KM3008				KM3009			
Sample Date				12-Apr-99				12-Apr-99				13-Apr-99			
Parameter	Units	BKG[a]	SSSL[b]	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL	Result	Qual	>BKG	>SSSL
METALS															
Aluminum	mg/L	2.34E+00	1.56E+00	8.27E-02	B			2.51E+00		YES	YES	1.24E-01	B		
Barium	mg/L	1.27E-01	1.10E-01	1.78E-02	J			2.03E-02	J			2.55E-02	J		
Calcium	mg/L	5.65E+01	NA	1.80E+01				4.03E+00	J			3.87E+02		YES	
Iron	mg/L	7.04E+00	4.69E-01	ND				1.62E+00			YES	5.71E-02	B		
Lead	mg/L	7.99E-03	1.50E-02	ND				ND				ND			
Magnesium	mg/L	2.13E+01	NA	2.23E+01		YES		3.13E+00	J			3.16E+02		YES	
Manganese	mg/L	5.81E-01	7.35E-02	4.90E-03	J			9.40E-02			YES	5.92E-01		YES	YES
Potassium	mg/L	7.20E+00	NA	1.23E+00	J			1.22E+00	J			1.80E+00	J		
Selenium	mg/L	NA	7.82E-03	1.04E-02			YES	ND				ND			
Sodium	mg/L	1.48E+01	NA	1.47E+02		YES		1.34E+01				3.05E+02		YES	
Vanadium	mg/L	1.70E-02	1.10E-02	ND				ND				ND			
Zinc	mg/L	2.20E-01	4.69E-01	ND				ND				ND			
VOLATILE ORGANIC COMPOUNDS															
1,2,3-Trichlorobenzene	mg/L	NA	1.32E-03	ND				ND				2.70E-04	B		
1,2,4-Trichlorobenzene	mg/L	NA	1.35E-02	ND				ND				2.00E-04	B		
2-Butanone	mg/L	NA	7.14E-01	ND				ND				ND			
Acetone	mg/L	NA	1.56E-01	1.80E-03	B			1.10E-03	B			1.20E-03	B		
Bromomethane	mg/L	NA	2.17E-03	1.10E-04	B			ND				ND			
Carbon disulfide	mg/L	NA	1.51E-01	1.90E-04	J			ND				ND			
Chloroform	mg/L	NA	1.15E-03	ND				ND				ND			
Chloromethane	mg/L	NA	3.92E-03	3.20E-04	J			ND				ND			
Naphthalene	mg/L	NA	3.00E-03	ND				ND				3.40E-04	B		

Analyses performed by Quanterra Environmental Services using U.S. Environmental Protection Agency (EPA) SW-846 analytical methods, including Update III methods where applicable.

[a] Bkg - Background. Concentration listed is two times (2x) the arithmetic mean of background metals concentration given in Science Applications International Corporation (1998), *Final Background Metals Survey Report, Fort McClellan, Alabama*, July.

[b] Residential human health site-specific screening level (SSSL) as given in IT Corporation (2000), *Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama*, July.

B - Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero).

J - Result is greater than method detection limit but less than or equal to reporting limit.

mg/L - Milligrams per liter

NA - Not available

ND - Not detected

Qual - Data validation qualifier

139(7). The methylene chloride analytical results were flagged with a "B" data qualifier, signifying that the compound was also detected in an associated laboratory or field blank sample. The methylene chloride concentrations were below the SSSL and ESV.

Semivolatile Organic Compounds. Thirteen SVOCs, including twelve PAH compounds and bis(2-ethylhexyl)phthalate, were detected in surface and depositional soil samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). Acenaphthylene, bis(2-ethylhexyl)phthalate, and dibenz(a,h)anthracene were detected at only one sample location (PPMP-150-DEP01). Sample location PPMP-150-DEP01 contained each of the detected SVOCs.

PAH concentrations of benzo(a)pyrene (three locations) and dibenz(a,h)anthracene (one location) exceeded SSSLs but were below PAH background screening values.

The following PAHs were detected at concentrations exceeding ESVs: benzo(a)pyrene (two locations), fluoranthene (three locations), and pyrene (two locations). However, the concentrations of these PAHs were below PAH background screening values.

5.2 Subsurface Soil Sample Results

Eleven subsurface soil samples were collected for chemical analysis at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). Subsurface soil samples were collected at depths greater than 1 foot bgs at the locations shown on Figure 3-2. Analytical results were compared to residential human health SSSLs and metals background screening values as presented in Table 5-2.

Metals. Twenty-two metals were detected in subsurface soil samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). Cadmium was detected at only one sample location (PPMP-150-GP03). Sample location PPMP-150-GP03 contained each of the detected metals.

The following metals were detected at concentrations exceeding SSSLs: aluminum (nine locations), arsenic (eleven locations), chromium (one location), iron (eleven locations), manganese (one location), and thallium (one location). With the exception of aluminum (three locations) and chromium (one location), the concentrations of these metals were below their

respective background concentration. The aluminum and chromium results were within the range of background values determined by SAIC (1998) (Appendix I).

Volatile Organic Compounds. Five VOCs, (2-butanone, acetone, bromomethane, methylene chloride, and naphthalene) were detected in subsurface soil samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). The bromomethane and methylene chloride results were flagged with a "B" data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. Naphthalene was detected in only one of the samples (PPMP-150-GP11). Sample location PPMP-150-GP11 contained four of the five detected VOCs.

The VOC concentrations in subsurface soils were below SSSLs.

Semivolatile Organic Compounds. Eighteen SVOCs, including fifteen PAH compounds and three non-PAH compounds, were detected in subsurface soil samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). SVOCs were not detected at four sample locations (PPMP-150-GP01, PPMP-150-GP05, PPMP-150-GP06, and PPMP-150-GP07). Bis(2-ethylhexyl)phthalate and/or di-n-butyl phthalate were the only detected SVOCs at five sample locations (PPMP-150-GP02, PPMP-150-GP03, PPMP-150-GP04, PPMP-150-GP09, and PPMP-150-GP10). Sample locations PPMP-150-GP08 and PPMP-150-GP11 each contained 16 of the 18 detected SVOCs.

Five PAH compounds (benzo[a]anthracene [PPMP-150-GP11], benzo[a]pyrene [PPMP-150-GP08 and PPMP-150-GP11], benzo[b]fluoranthene [PPMP-150-GP11], dibenz[a,h]anthracene [PPMP-150-GP11], and indeno[1,2,3-cd]pyrene [PPMP-150-GP11]) were detected at concentrations exceeding SSSLs. The concentrations of these five PAHs ranged from 0.22 mg/kg to 3.3 mg/kg.

5.3 Groundwater Sample Results

Six temporary monitoring wells were sampled at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), at the sample locations shown on Figure 3-2. Analytical results were compared to residential human health SSSLs and metals background screening values, as presented in Table 5-3.

Metals. Twelve metals (aluminum, barium, calcium, iron, lead, magnesium, manganese, potassium, selenium, sodium, vanadium, and zinc) were detected in groundwater samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). Lead (PPMP-150-GP02), selenium (PPMP-150-GP05), vanadium (PPMP-150-GP02), and zinc (PPMP-150-GP02) were each detected in only one of the samples. Sample location PPMP-150-GP02 contained each of the detected metals except selenium.

The concentrations of aluminum (two locations), iron (two locations), manganese (five locations), and selenium (one location) exceeded SSSLs. With the exception of aluminum (two locations) and manganese (two locations), the concentrations of these metals were below their respective background concentration. The aluminum and manganese results were within the range of background values determined by SAIC (1998). A background value for selenium was not available in the background metals report (SAIC, 1998).

Volatile Organic Compounds. Nine VOCs (1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, 2-butanone, acetone, bromomethane, carbon disulfide, chloroform, chloromethane, and naphthalene) were detected in groundwater samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). The acetone, 2-butanone, bromomethane, 1,2,3-trichlorobenzene, 1,2,4-trichlorobenzene, and naphthalene results were flagged with a "B" data qualifier, signifying that these compounds were also detected in an associated laboratory or field blank sample. Sample locations PPMP-150-GP05 and PPMP-150-GP07 each contained four of the nine detected VOCs.

The VOC concentrations in groundwater were below SSSLs.

Semivolatile Organic Compounds. SVOCs were not detected in any of the groundwater samples collected at the site.

6.0 Summary and Conclusions and Recommendations

IT, under contract with USACE, completed an SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), at FTMC in Calhoun County, Alabama. The SI was conducted to determine whether chemical constituents are present at the site at concentrations that present an unacceptable risk to human health or the environment. The SI at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), consisted of a geophysical survey and the sampling and analysis of one surface soil sample, two depositional soil samples, 11 subsurface soil samples, and six groundwater samples. In addition, seven temporary monitoring wells were installed in the residuum groundwater zone to facilitate groundwater sample collection and provide site-specific geological and hydrogeological characterization information.

The geophysical survey identified one anomaly at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7). The source of the anomaly was interpreted to be a metallic object other than a UST.

Chemical analysis of samples collected at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), indicates that metals, VOCs, and SVOCs were detected in the environmental media sampled. Analytical results were compared to the human health SSSLs and ESVs for FTMC. The SSSLs and ESVs were developed by IT for human health and ecological risk evaluations as part of the ongoing SIs being performed under the BRAC Environmental Restoration Program at FTMC. Additionally, metal concentrations exceeding SSSLs and ESVs were compared to media-specific background screening values (SAIC, 1998), and SVOC (PAH compounds) concentrations exceeding SSSLs and ESVs in surface and depositional soils were compared to PAH background screening values (IT, 2000b).

The potential impact to human receptors is expected to be minimal. Although the site is projected for industrial land reuse, the analytical data were screened against residential human health SSSLs to evaluate the site for possible unrestricted land reuse. The concentrations of five metals (aluminum, chromium, iron, manganese, and selenium) exceeded SSSLs and their respective background concentration in a limited number of samples collected at the site. With the exception of selenium in one groundwater sample, the concentrations of these metals were within the range of background values and do not pose a threat to human health. Selenium was not detected in any of the other groundwater samples collected. The concentrations of five PAH compounds (anthracene, benzo[a]pyrene, benzo[a]fluoranthene, dibenz[a,h]anthracene, and

indeno[1,2,3-cd]pyrene) exceeded SSSLs in soils. PAH concentrations in soils ranged from 0.046 mg/kg to 6 mg/kg. Based on the low concentrations and spatial distribution at the site, these PAH compounds are believed to be related to anthropogenic activities (i.e., asphalt pavement) and not related to operations conducted at the site. VOC concentrations in site media were below SSSLs.

Several metals were detected in surface and depositional soil samples at concentrations exceeding ESVs and background concentrations. In addition, three PAHs were detected in surface and depositional soil samples at concentrations exceeding ESVs but below PAH background screening values. However, the potential impact to ecological receptors is expected to be minimal. The site is a well-developed area, consisting of buildings and pavement interspersed with grassed areas, and is projected for industrial reuse. Viable ecological habitat is presently limited and is not expected to increase in the future land use scenario. Consequently, the potential threat to ecological receptors is expected to be low.

Based on the results of the SI, past operations at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7), do not appear to have adversely impacted the environment. The metals and organic compounds detected in site media do not pose an unacceptable risk to human health or the environment. Therefore, IT recommends “No Further Action” and unrestricted land reuse at Former Motor Pool Area 1000, Parcels 150(7), 13(7), and 139(7).

7.0 References

Cloud, P. E., Jr., 1966, ***Bauxite Deposits of the Anniston, Fort Payne, and Ashville Areas, Northeast Alabama***, U. S. Geological Survey Bulletin 1199-O, 35p.

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

IT Corporation (IT), 2000a, ***Final Installation-Wide Sampling and Analysis Plan, Fort McClellan, Calhoun County, Alabama***, March.

IT Corporation (IT), 2000b, ***Final Human Health and Ecological Screening Values and PAH Background Summary Report, Fort McClellan, Calhoun County, Alabama***, July.

IT Corporation (IT), 1998a, ***Final Site-Specific Field Sampling Plan Attachment for the Former Motor Pool Area 1000 Parcels 150(7), 13(7) and 139(7), Fort McClellan, Calhoun County, Alabama***, November.

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

Moser, P. H. and S.S. DeJarnette, 1992, ***Groundwater Availability in Calhoun County, Alabama***, Geological Survey of Alabama Special Map 228.

Osborne, W. E., 1999, Personal Communication with John Hofer, IT Corporation.

Osborne, W. E., and Szabo, M. W., 1984, ***Stratigraphy and Structure of the Jacksonville Fault, Calhoun County, Alabama***, Alabama Geological Survey Circular 117.

Osborne, W. E., Irving, G. D., and Ward, W. E., 1997, ***Geologic Map of the Anniston 7.5' Quadrangle, Calhoun County, Alabama***, Alabama Geologic Survey Preliminary Map, 1 sheet.

Osborne, W. E., Szabo, M. W., Copeland, C. W. Jr., and Neathery, T. L., 1989, ***Geologic Map of Alabama***, Alabama Geologic Survey Special Map 221, scale 1:500,000, 1 sheet.

Science Applications International Corporation (SAIC), 1998, ***Final Background Metals Survey Report, Fort McClellan, Alabama***, July.

Science Applications International Corporation (SAIC), 1993, ***Site Investigation Report***, prepared for U.S. Army Environmental Center, Aberdeen Proving Grounds, Maryland, August.
Southern Environmental Management & Specialties (SEMS), 1997, ***Closure Report, Underground Storage Tank Removals, Site Remediation, and Site Restoration, Fort McClellan, Alabama***, February.

Szabo, M. W., Osborne, W. E., Copeland, C. W., Jr., and Neathery, T. L., compilers, 1988, ***Geologic Map of Alabama***, Alabama Geological Survey Special Map 220, scale 1:250,000, 5 sheets.

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***, Soil Conservation Service, Series 1958, No. 9, September.

U.S. Department of Commerce, National Oceanic and Atmospheric Administration, 1998. Unedited Local Climatological Data, Anniston, Alabama, January-December 1998.

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.

Warman, J. C, and Causey, L. V., 1962, ***Geology and Ground-Water Resources of Calhoun County, Alabama***, Alabama Geological Survey County Report 7, 77 p.

ATTACHMENT 1

LIST OF ABBREVIATIONS AND ACRONYMS

List of Abbreviations and Acronyms

2,4-D	2,4-dichlorophenoxyacetic acid
2,4,5-T	2,4,5-trichlorophenoxyacetic acid
2,4,5-TP	silvex
3D	3D International Environmental Group
Abs	skin absorption
AC	hydrogen cyanide
AcB2	Anniston and Allen gravelly loams, 2 to 6 percent slopes, eroded
AcC2	Anniston and Allen gravelly loams, 6 to 10 percent slopes, eroded
AcD2	Anniston and Allen gravelly loams, 10 to 15 percent slopes, eroded
AcE2	Anniston and Allen gravelly loams, 15 to 25 percent slopes, eroded
ACGIH	American Conference of Governmental Industrial Hygienists
ADEM	Alabama Department of Environmental Management
AEL	airborne exposure limit
AHA	ammunition holding area
AL	Alabama
amb.	amber
ANAD	Anniston Army Depot
APT	armor-piercing tracer
ASP	ammunition supply point
ASR	Archives Search Report
AST	aboveground storage tank
ASTM	American Society for Testing and Materials
'B'	Analyte detected in laboratory or field blank at concentration greater than the reporting limit (and greater than zero)
BCT	BRAC Cleanup Team
BEHP	bis(2-ethylhexyl)phthalate
BFB	bromofluorobenzene
BG	Bacillus globigii
bgs	below ground surface
BHC	betahexachlorocyclohexane
bkg	background
bls	below land surface
BOD	biological oxygen demand
BRAC	Base Realignment and Closure
Braun	Braun Intertec Corporation
BTEX	benzene, toluene, ethyl benzene, and xylenes
BTOC	below top of casing
BW	biological warfare
BZ	breathing zone; 3-quinuclidinyl benzilate
C	ceiling limit value
Ca	carcinogen
CCAL	continuing calibration
CCB	continuing calibration blank
CD	compact disc
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERFA	Community Environmental Response Facilitation Act
CESAS	Corps of Engineers South Atlantic Savannah
CG	carbonyl chloride (phosgene)
CFC	chlorofluorocarbon
ch	inorganic clays of high plasticity
CHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
CK	cyanogen chloride
cl	inorganic clays of low to medium plasticity
Cl.	chlorinated
CLP	Contract Laboratory Program
CN	chloroacetophenone
CNB	chloroacetophenone, benzene, and carbon tetrachloride
CNS	chloroacetophenone, chloropicrin, and chloroform
Co-60	cobalt-60
COC	chain of custody
COE	Corps of Engineers
Con	skin or eye contact
CRL	certified reporting limit
CRZ	contamination reduction zone
Cs-137	cesium-137
CS	ortho-chlorobenzylidene-malononitrile
CSEM	conceptual site exposure model
ctr.	container
CWA	chemical warfare agent
CWM	chemical warfare material; clear, wide mouth
CX	dichloroformoxime
D	duplicate; dilution
DANC	decontamination agent, non-corrosive
°C	degrees Celsius
°F	degrees Fahrenheit
DCE	dichloroethene
DDD	dichlorodiphenyldichloroethane
DDE	dichlorodiphenyldichloroethene
DDT	dichlorodiphenyltrichloroethane
DEH	Directorate of Engineering and Housing
DEP	depositional soil
DI	deionized
DIMP	di-isopropylmethylphosphonate
DMMP	dimethylmethylphosphonate
DOD	U.S. Department of Defense
DP	direct-push
DPDO	Defense Property Disposal Office
DPT	direct-push technology
DQO	data quality objective
DRMO	Defense Reutilization and Marketing Office
DRO	diesel range organics
DS	deep (subsurface) soil
DS2	Decontamination Solution Number 2
E&E	Ecology and Environment, Inc.
EBS	environmental baseline survey
Elev.	elevation
EM	electromagnetic
EM31	Geonics Limited EM31 Terrain Conductivity Meter
EM61	Geonics Limited EM61 High-Resolution Metal Detector
EOD	explosive ordnance disposal
EODT	explosive ordnance disposal team
EPA	U.S. Environmental Protection Agency
EPC	exposure point concentration
EPIC	Environmental Photographic Interpretation Center
ER	equipment rinsate
ESE	Environmental Science and Engineering, Inc.
ESV	ecological screening value
Exp.	explosives
E-W	east to west
EZ	exclusion zone
FB	field blank
FD	field duplicate
FedEx	Federal Express, Inc.
FFE	field flame expedient
Fil	filtered
Flt	filtered
FMP 1300	Former Motor Pool 1300
Foster Wheeler	Foster Wheeler Environmental Corporation
Frtn	fraction
FS	field split
ft	feet
ft/ft	feet per foot
FTA	Fire Training Area
FTMC	Fort McClellan
g	gram
G-856	Geometrics, Inc. G-856 magnetometer
G-858G	Geometrics, Inc. G-858G magnetic gradiometer
gal	gallon
gal/min	gallons per minute
GB	sarin
gc	clay gravels; gravel-sand-clay mixtures
GC	gas chromatograph
GC/MS	gas chromatograph/mass spectrometer
GFAA	graphite furnace atomic absorption
gm	silty gravels; gravel-sand-silt mixtures
gp	poorly graded gravels; gravel-sand mixtures
gpm	gallons per minute
GPR	ground-penetrating radar
GPS	global positioning system
GS	ground scar
GSA	General Services Administration
GSBP	Ground Scar Boiler Plant
GSSI	Geophysical Survey Systems, Inc.
GST	ground stain

List of Abbreviations and Acronyms (Continued)

GW	groundwater
gw	well-graded gravels; gravel-sand mixtures
HA	hand auger
HCl	hydrochloric acid
HD	distilled mustard
HDPE	high-density polyethylene
Herb.	herbicides
HNO_3	nitric acid
hr	hour
H&S	health and safety
HSA	hollow-stem auger
HTRW	hazardous, toxic, and radioactive waste
'I'	out of control, data rejected due to low recovery
ICAL	initial calibration
ICB	initial calibration blank
ICP	inductively-coupled plasma
ICS	interference check sample
ID	inside diameter
IDL	instrument detection limit
IDLH	immediately dangerous to life or health
IDW	investigation-derived waste
IMPA	isopropylmethyl phosphonic acid
in.	inch
Ing	ingestion
Inh	inhalation
IP	ionization potential
IPS	International Pipe Standard
IRDMIS	Installation Restoration Data Management Information System
ISCP	Installation Spill Contingency Plan
IT	IT Corporation
ITEMS	IT Environmental Management System ™
'J'	estimated concentration
JeB2	Jefferson gravelly fine sandy loam, 2 to 6 percent slopes, eroded
JeC2	Jefferson gravelly fine sandy loam, 6 to 10 percent slopes, eroded
JfB	Jefferson stony fine sandy loam, 0 to 10 percent slopes have strong slopes
K	conductivity
L	lewisite; liter
LC_{50}	lethal concentration for 50 percent of population tested
LD_{50}	lethal dose for 50 percent of population tested
l	liter
LCS	laboratory control sample
LEL	lower explosive limit
LT	less than the certified reporting limit
max	maximum
MDL	method detection limit
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
mh	inorganic silts, micaceous or diatomaceous fine, sandy or silt soils
MHz	megahertz
µg/g	micrograms per gram
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
µmhos/cm	micromhos per centimeter
min	minimum
MINICAMS	miniature continuous air sampling system
ml	inorganic silts and very fine sands
mL	milliliter
mm	millimeter
MM	mounded material
MOGAS	motor vehicle gasoline
MPA	methyl phosphonic acid
MR	molasses residue
MS	matrix spike
mS/cm	millisiemens per centimeter
MSD	matrix spike duplicate
msl	mean sea level
MtD3	Montevallo shaly, silty clay loam, 10 to 40 percent slopes , severely eroded
mV	millivolts
MW	monitoring well
N/A	not applicable; not available
NAD	North American Datum
NAD83	North American Datum of 1983
NAVD88	North American Vertical Datum of 1988
ND	not detected
NE	no evidence; northeast
NFA	No Further Action
ng/L	nanograms per liter
NGVD	National Geodetic Vertical Datum
NIC	notice of intended change
NIOSH	National Institute for Occupational Safety and Health
No.	number
NOAA	National Oceanic and Atmospheric Administration
NR	not requested
ns	nanosecond
N-S	north to south
nT	nanotesla
NTU	nephelometric turbidity unit
O&G	oil and grease
OD	outside diameter
OE	ordnance and explosives
oh	organic clays of medium to high plasticity
ol	organic silts and organic silty clays of low plasticity
OP	organophosphorus
ORP	oxidation-reduction potential
OSHA	Occupational Safety and Health Administration
OWS	oil/water separator
oz	ounce
PAH	polynuclear aromatic hydrocarbon
Parsons	Parsons Engineering Science, Inc.
Pb	lead
PCB	polychlorinated biphenyl
PCE	perchloroethene
PCP	pentachlorophenol
PDS	Personnel Decontamination Station
PEL	permissible exposure limit
Pest.	pesticide
PG	professional geologist
PID	photoionization detector
PkA	Philo and Stendal soils local alluvium, 0 to 2 percent slopes
POL	petroleum, oils, and lubricants
PP	peristaltic pump
ppb	parts per billion
PPE	personal protective equipment
ppm	parts per million
PPMP	Print Plant Motor Pool
ppt	parts per thousand
PSSC	potential site-specific chemical
pt	peat or other highly organic silts
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAP	installation-wide quality assurance plan
QC	quality control
QST	QST Environmental Inc.
qty	quantity
Qual	qualifier
'R'	rejected; resample
RCRA	Resource Conservation and Recovery Act
RDX	cyclonite
ReB3	Rarden silty clay loams
REG	field sample
REL	recommended exposure limit
RFA	request for analysis
RI	remedial investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RSD	relative standard deviation
RTK	real-time kinematic
SAD	South Atlantic Division
SAE	Society of Automotive Engineers
SAIC	Science Applications International Corporation
SAP	installation-wide sampling and analysis plan

List of Abbreviations and Acronyms *(Continued)*

sc	clayey sands; sand-clay mixtures
Sch.	schedule
SD	sediment
SDG	sample delivery group
SDZ	safe distance zone; surface danger zone
SEMS	Southern Environmental Management & Specialties, Inc.
SFSP	site-specific field sampling plan
SGF	standard grade fuels
SHP	installation-wide safety and health plan
SI	site investigation
SL	standing liquid
sm	silty sands; sand-silt mixtures
SM	Serratia marcescens
SOP	standard operating procedure
sp	poorly graded sands; gravelly sands
SP	sump pump
Sr-90	strontium-90
Ss	stony rough land, sandstone series
SS	surface soil
SSC	site-specific chemical
SSHO	site safety and health officer
SSHP	site-specific safety and health plan
SSSL	site-specific screening level
STB	supertropical bleach
STEL	short-term exposure limit
STOLS	Surface Towed Ordnance Locator System®
Std. units	standard units
SU	standard unit
SVOC	semivolatile organic compound
SW	surface water
SW-846	U.S. EPA *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*
SZ	support zone
TAL	target analyte list
TAT	turn around time
TB	trip blank
TCA	trichloroethane
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TCDF	tetrachlorodibenzofurans
TCE	trichloroethene
TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TDGCL	thiodiglycol
TDGCLA	thiodiglycol chloroacetic acid
TERC	Total Environmental Restoration Contract
TIC	tentatively identified compound
TLV	threshold limit value
TN	Tennessee
TOC	top of casing; total organic carbon
TPH	total petroleum hydrocarbons
TRADOC	U.S. Army Training and Doctrine Command
TRPH	total recoverable petroleum hydrocarbons
TWA	time weighted average
UCL	upper confidence limit
UCR	upper certified range
'U'	not detected above reporting limit
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USACMLS	U.S. Army Chemical School
USAMPS	U.S. Army Military Police School
USATEU	U.S. Army Technical Escort Unit
USATHAMA	U.S. Army Toxic and Hazardous Material Agency
USCS	Unified Soil Classification System
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
UXO	unexploded ordnance
VOA	volatile organic analyte
VOC	volatile organic compound
VOH	volatile organic hydrocarbon
VQlfr	validation qualifier
VQual	validation qualifier
VX	nerve agent (O-ethyl-S-[diisopropylaminoethyl]-methylphosphonothiolate)
Weston	Roy F. Weston, Inc.
WP	installation-wide work plan
WS	watershed
WSA	Watershed Screening Assessment
WWI	World War I
WWII	World War II
XRF	x-ray fluorescence
yd^3	cubic yards

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

N/A – Not analyzed

ND – Not detected

Boolean Codes

LT – Less than the certified reporting limit

Flagging Codes

9 – Non-demonstrated/validated method performed for USAEC

B – Analyte found in the method blank or QC blank

C – Analysis was confirmed

D – Duplicate analysis

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

J – Value is estimated

K – Reported results are affected by interfaces or high background

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

Q – Sample interference obscured peak of interest

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

S – Non-target compound analyzed for and detected (GC/MS methods)

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

U – Analysis in unconfirmed

Z – Non-target compound analyzed for and detected (non-GC/MS methods)

Qualifiers

J – The low-spike recovery is low

N – The high-spike recovery is low

R – Data is rejected