



RI/FS SAMPLING AND ANALYSIS PLAN

**FORT McCLELLAN, ALABAMA
TASK ORDER 005
Contract Number DAAA15-91-D-0017**

FINAL

Administrative Copy

Volume I: FIELD SAMPLING PLAN

Prepared for:

**U.S. Army Environmental Center
Installation Restoration Division
Aberdeen Proving Ground, Maryland 21010-5401**

April 6, 1994



**SAMPLING AND ANALYSIS PLAN
FOR
FORT McCLELLAN RI/FS
ANNISTON, ALABAMA**

Volume I: FIELD SAMPLING PLAN

FINAL

Submitted to:

**U.S. Army Environmental Center
Installation Restoration Division
SFIM-AEC-IRB
Aberdeen Proving Ground, Maryland 21010-5401**

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**USATHAMA Contract DAAA15-91-D-0017
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SAIC Project No. 01-0827-03-6520-006

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LIST OF ACRONYMS AND ABBREVIATIONS

AC	Hydrogen Cyanide
ADEM	Alabama Department of Environmental Management
AMPS	U.S. Army Military Police School
AMCLS	U.S. Army Chemical School
ARAR	Applicable or Relevant and Appropriate Requirement
ASTM	American Society of Testing and Materials
BG	Bacillus globigii
BLS	Below Land Surface
CBR	Chemical, Biological, and Radiological
CCV	Continuing Calibration Verification
CE	U.S. Army Corps of Engineers
CG	Phosgene (Carbonyl chloride)
CK	Cyanogen chloride
COC	Chain-of-Custody
COD	Chemical Oxygen Demand
CRF	Central Record Facility
CWA	Chemical Warfare Agent
CX	Phosgene oxime
DCL	DataChem Laboratories
DCN	Document Control Number
DES ₂	bis(2-diisopropylaminoethyl)
DFP	Diisopropyl Phosphorofluoridate
DIMP	Diisopropyl Methylphosphonate
DMMP	Dimethyl Methylphosphonate
DS2	Decontamination Solution #2
DQO	Data Quality Objective
EM	Electromagnetic
EOD	Explosive Ordnance Disposal
ES&E	Environmental Science & Engineering
FFID	Federal Facility Identification
FS	Feasibility Study
FID	Flame Ionization Detector
FP	Field Procedure
FPD	Flame Photometric Detector
GB	Sarin or (Isopropyl methyl phosphonofluoridate)
GC	Gas Chromatography
GPR	Ground Penetrating Radar
GPS	Global Positioning System
GW	Groundwater
H&SP	Health and Safety Plan
HC	Hexachloroethane (Smoke Agent)
HD	Distilled Mustard
HO	Mustard Sulfoxide
HRS	Hazard Ranking System

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

HMX	Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IC	Initial Calibration
ID	Inside Diameter
IDW	Investigation Derived Waste
IRDMIS	Installation Restoration Data Management Information System
IRP	Installation Restoration Program
lb	Pound
LEL	Lower Explosive Limit
LF	Landfill
LPM	Liter per Minute
MCL	Maximum Contaminant Level
MPH	Miles Per Hour
MP	Military Police
MSA	Mine Safety Appliances, Inc.
MSL	Mean Sea Level
NIST	National Institute of Standards and Technology
OD	Outside Diameter
OLF	Old Landfill
OP	Observation Post
OSDMP	O,5-Diethyl Methylphosphonate
OVA	Organic Vapor Analyzer
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
PID	Photoionization Detector
ppm	Parts per Million
ppt	Parts per Thousand
PRI	Potomac Research, Inc.
POW	Prisoner of War
PVC	Polyvinyl chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RF	Response Factor
RI/FS	Remedial Investigation/Feasibility Study
RPD	Relative Percent Difference
RSD	Relative Standard Deviation
SAIC	Science Applications International Corporation
SAP	Sampling Analysis Plan
SD	Standard Deviation
SI	Site Investigation

LIST OF ACRONYMS AND ABBREVIATIONS
(continued)

SM	Serratia mercesans
SOP	Standard Operating Procedure
SPT	Standard Penetration Test
STB	Supertropical Bleach
STS	Sample Tracking System
SVOC	Semivolatile Organic Compound
SW	Surface Water
1,1,2,2-TCA	1,1,2,2-Tetrachloroethane
TCE	Trichloroethene
TCLP	Toxicity Characteristic Leaching Properties
TETRYL	N-Methyl-N,2,4,6-tetranitrobenzenamine
TRADOC	U.S. Army Training and Doctrine Command
TWA	Time Weighted Average
USAEC	U.S. Army Environmental Center
USAEHA	U.S. Army Environmental Hygiene Agency
USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USATEU	U.S. Army Technical Escort Unit
UXO	Unexploded Ordnance
VOA	Volatile Organic Analysis
VOC	Volatile Organic Compound
VX	O-ethyl-S(diisopropylaminoethyl)-methylphosphonothiolate
YSI	Yellow Springs Instrument

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1. INTRODUCTION

1.1 PURPOSE AND SCOPE

Science Applications International Corporation (SAIC) is conducting a remedial investigation/feasibility study (RI/FS) at 12 sites located on Fort McClellan, Alabama. The purpose of the investigation is to determine the nature, extent, and potential ecological and human health impacts of environmental contamination resulting from controlled U.S. Army chemical warfare agent training activities and uncontrolled munitions and municipal waste disposal historically conducted at the sites. Assessment of the sources of potential contamination, delineation of the areal extent of detected contamination, detailed geologic/hydrogeologic characterization of several of the sites, and site remediation are additional objectives of the RI/FS. The sites to be investigated are summarized in Table 1-1 and include seven former training areas (T-4, T-5, T-24A, T-38, Range J, Range K, and Detection and Identification (D&I) Area), two former munitions disposal sites (Old Water Hole, Range L [Lima Pond]), and three former municipal or demolition debris landfills (Landfills #1, #2, and #3). The work to be conducted at Fort McClellan will be completed at the request of the U.S. Army Environmental Center (USAEC) pursuant to Contract DAAA15-91-D-0017, Task Order 5. Field work for the project will be conducted jointly by SAIC and the U.S. Army Technical Escort Unit (USATEU).

1.2 SITE BACKGROUND

The chemical and biological agent training sites under investigation during the RI/FS were used for the controlled training of personnel in various facets of chemical and biological warfare decontamination, detection, and munitions/agent disposal. Training at these sites occurred at various times between the early 1950's and 1973, with operations involving various chemical agents. Limited, controlled usage of fixed quantities of dilute chemical warfare agent was typical during the training exercises. Usage included establishment of identification stations in which agent samples were set up for field identification. In addition, field equipment was contaminated with limited quantities of agent for identification and decontamination training. SAIC has not identified evidence of widespread dispersal or usage of training materials at the

**Table 1-1. Sites to be Investigated Under RI/FS Program
Fort McClellan, Alabama**

Site	Location
Detection and Identification Area	Main Post
Area T-4 Biological Stimulant Test Area	Main Post
Area T-5 Toxic Hazards Detection and Decontamination Training Area	Main Post
Area T-24A Chemical Munitions Disposal Training Area	Main Post
Area T-38 Technical Escort Reaction Area	Main Post
Range J Agent Training Area	Pelham Range
Range K Agent Training Area	Pelham Range
Range L (Lima Pond) Chemical Munitions Disposal Area	Pelham Range
Old Water Hole	Pelham Range
Former Landfill #1	Main Post
Former Landfill #2	Main Post
Former Landfill #3	Main Post

sites of concern based on review of records at the U.S. Army Chemical Museum at Fort McClellan and discussions with site personnel who were present during the training exercises.

Because of the controlled, surface usage of the chemical warfare agents and biological agent simulants, a general impersistence of the agents in the environment, and the lack of agent detection at sites T-4, T-5, and Range K, SAIC does not anticipate that these sites will warrant significant remediation. Subsurface burials at the four additional training sites (T-24A, T-38, Range J, and D&I) may require remediation of the buried materials. Based on qualitative metal detection surveys conducted by the USATEU (SAIC 1993), the potential requirement for remediation of buried munitions at the Old Water Hole and Lima Pond sites is significant. The results of a preliminary surface geophysical survey and a site reconnaissance indicate that remedial action at Former Landfill #1 may not be warranted. Uncontrolled disposal of municipal and demolition wastes at Landfills #2 and #3 will warrant additional site characterization and will likely require remediation to mitigate surface exposure of waste materials and known or potential releases to groundwater and surface water. The results of the planned RI activities at each of these sites may require a reassessment of the necessity for remedial action at a particular site during the RI/FS process.

1.3 ADDITIONAL SAMPLING REQUIREMENTS

Surface and subsurface point sampling and chemical warfare agent (CWA) analyses at high probability locations within the agent training areas has been completed during previous investigations at Fort McClellan (SAIC 1993). Chemical warfare agents and CWA breakdown products have not been detected in the soils at the sampled sites. Several sites have not been previously sampled including Range L, Old Water Hole, and Area T-4. Additional sampling to confirm the absence of CWA over broader areas within the RI/FS sites and to characterize potential contaminants at previously unsampled sites is necessary for the environmental and risk assessment of these areas on the Post.

Because of the controlled surface usage at some of the sites (Areas T-4, T-5, Range K, Landfill #2) additional sampling will be confined to field analyses of surface soil for CWA in the training areas with laboratory analyses of CWA breakdown products in soil. Additional soil

samples for laboratory analysis will be obtained from areas on each site that have not been previously sampled to maximize the areal extent of the analytical data. Soil samples will not be collected at Landfill #2 because the landfilled materials are predominantly surface-deposited, demolition debris. Surface water and sediment samples will be collected and analyzed upgradient and downgradient of each site where a surface water source is accessible from the site. Groundwater is not anticipated to have been adversely affected by the surface activities at these sites and will not be sampled during the RI/FS with the exception of existing wells at Landfill #2.

Former Landfill #1, Range J, Area T-24A, and the D&I area are similar to the previously discussed sites in that the areas were predominantly surface usage. Additional surface sampling and analysis in these areas will be completed as at the previous sites (except at Landfill #1). However, subsurface locations at these sites (unconfirmed at Landfill #1) warrant additional sampling. Hydrogeologic assessments and groundwater sampling will be conducted at Former Landfill #1 and at Range J. The need for groundwater assessments at Area T-24A and the D&I Area will be reevaluated based on the intrusive sampling and field screening data.

RI/FS sites involving the disposal of possible CWA munitions (Range L, Old Water Hole) will require extensive investigation and sampling. Based on detailed topographic mapping, geophysical surveying, and USATEU field analysis of surface soils for CWA at these sites, subsurface soil samples will be collected, field analyzed for CWA, and selected samples will be laboratory analyzed for CWA breakdown products, volatile organic, semivolatile organic, metals, pesticides/PCB's, and explosive compounds. Groundwater samples will be obtained from monitoring wells to be installed at the sites and will be analyzed for the same parameters as the subsurface soils.

Former Landfill #3 and Area T-38 have site histories that have included the disposal of municipal and hazardous wastes in uncontrolled subsurface trenches. Low-level groundwater contamination with organic and inorganic compounds has been documented (SAIC 1993) at Landfill #3. Previous field and laboratory analyses of surface and subsurface soil at Area T-38 did not detect CWA or CWA breakdown products. Additional groundwater sampling is needed

at Landfill #3 to confirm the initial analyses (SAIC 1993) and to determine the extent of contamination around the site. Groundwater analyses are needed at Area T-38 because of the historical subsurface disposal activities at the site. Surface soil at Area T-38 will require surface soil sampling and analysis by USATEU for CWA. Subsurface soil samples for laboratory analysis will be obtained from strategic locations across the site and from a borehole to be drilled by SAIC/USATEU through the disposal sump.

The RI/FS activities will follow site-specific project plans that include field sampling and laboratory chemical analyses conducted under project specific quality assurance/quality control (QA/QC) and health and safety protocols. RI/FS activities will be conducted utilizing U.S. Environmental Protection Agency (USEPA) and USAEC guidance including "*Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA*" (USEPA 1988), and "*Data Quality Objectives for Remedial Response Activities*" (USEPA 1987), "*Environmental Compliance Branch Standard Operating Procedures and Quality Assurance Manual*" (USEPA, Region IV, 1991), "*Geotechnical Requirements for Drilling, Monitor Wells, Data Acquisition, and Reports*" (USATHAMA 1987), and "*Quality Assurance Program*" (USATHAMA 1990).

2. SAMPLING OBJECTIVES

This section provides an overview of SAIC's approach for investigating the RI/FS sites at Fort McClellan. The objectives of the sampling activities are to provide quantitative information regarding the contaminants present and their concentrations in the site media, to characterize the extent of identified contaminants, to obtain information pertinent to the sources of the contaminants, and to assess the potential for contaminant migration from the areas of concern.

2.1 RI/FS OBJECTIVES

Data obtained from the RI/FS tasks will provide detailed information to support engineering and risk assessment activities. The objectives of the RI/FS at Fort McClellan require that sufficient data be obtained to:

- Determine the presence, chemical nature, concentration, and distribution of identified constituents
- Evaluate the potential for contaminant release and migration
- Conduct quantitative human health and ecological risk assessment
- Evaluate potential hazards associated with site remediation
- Evaluate the necessity for immediate response actions
- Prepare recommendations for remedial actions to mitigate quantified contamination.

2.2 DATA QUALITY OBJECTIVES

Analytical data are required from the Fort McClellan RI/FS to support site characterization, hazardous constituent characterization, risk assessment, and evaluation of immediate response alternatives. These data use requirements indicate that the minimum appropriate analytical level is equivalent to U.S. Environmental Protection Agency (USEPA) data quality objective (DQO) Levels II and III. Recognized standards, such as American Society for Testing and Materials (ASTM) methods, will be used procedurally where appropriate. Specific DQOs for accuracy, precision, comparability, representativeness, and completeness, and

specific analytical methods to be used during the initial RI/FS, are detailed in the Quality Assurance Project Plan (QAPP).

Chemical assessment of the RI/FS sites will be accomplished through field screening and laboratory analysis of soil and water media. A summary of the field and laboratory analyses to be conducted during the Fort McClellan RI/FS is provided in Table 2-1. Chemical and physical data regarding the nature and extent of site contamination and the distribution of buried munitions will be integrated for risk assessment and engineering evaluations. Ecological risk assessment will be ongoing during the RI using data collected by the Fort McClellan Natural Resources office supplemented by field observations.

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary

Site Name	Site History and Suspected Contamination	Planned Field Activities	<u>Analysis/Methodology</u>	
			Soil	Water
Site 1: Area T-4 (Biological Test Area)	<ul style="list-style-type: none"> Area used for biological (i.e., <i>Bacillus goldbigii</i> [BG] and <i>Serratia marcescens</i> [SM]) agent training until 1971. Possible HD storage area and VX usage. Surface use is not restricted; however, subsurface sampling has not been conducted at site. Unable to locate site area during October 1991 walkover. No evidence of former site. 	<ul style="list-style-type: none"> MINICAMS soil screening for chemical warfare agents HD, VX. Ten samples 0 to 0.5 feet (USATEU). Surface soil sampling and analysis (USATEU) 	<ul style="list-style-type: none"> ES&E Mustard (HD) breakdown products (LW18/LT03/LL03) VX breakdown products (LT03/IC) 	<ul style="list-style-type: none"> None

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 2: Area T-5 (Agent Training Area)	<ul style="list-style-type: none"> • Training area for detection and decontamination of chemical (i.e., mustard [HD], sarin [GB], and VX) and biological (i.e., Bacillus globbigii [BG] and Serratia marcescens [SM]) agents from 1961 to 1973. • Reported location of a 110-gallon HD spill, which has been remediated. • Area cleared for surface use. 	<ul style="list-style-type: none"> • 26 soil samples will be collected (0-6") for onsite agent analyses (USATEU). • 4 soil/sediment samples will be collected and submitted to Environmental Science and Engineering, Inc. (ES&E) based on the onsite results. • 2 surface water/sediment samples will be collected and submitted to ES&E and DataChem Laboratories (DCL) for analysis. 	<p><i>MINICAMS Onsite Screening Analyses (USATEU)</i></p> <ul style="list-style-type: none"> • VX • HD • GB <p><i>ES&E</i></p> <ul style="list-style-type: none"> • HD breakdown products (LW18/LT03/LL03) • GB breakdown products (LT03/TT9) • VX breakdown products (LT03/IC) <p><i>DCL</i></p> <ul style="list-style-type: none"> • VOCs (LM23) • SVOCs (LM25) • Metals (JS12) • Pesticides/PCBs (LH17) • Explosives (LW23, LW27) 	<ul style="list-style-type: none"> • None • None <p><i>DCL</i></p> <ul style="list-style-type: none"> • VOCs (UM21) • SVOCs (UM25) • Metals (SS12) • Pesticides/PCBs (UH20) • Explosives (UW25, UW27)

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 3: Area 24A (Agent Disposal Training Area)	<ul style="list-style-type: none"> Training area used for decontamination of chemical (i.e., mustard [HD], sarin [GB], phosgene [CG], and BZ) agents and as a chemical munitions disposal training range until 1973. Approximately 4.46 kg of HD used during each training exercise. Other volumes typically used included 40 mL CG, one M-6 canister BZ, and 740g GB. Two decontamination burn pits were located onsite to process "significant" quantities of training materials. HD, BG, and their breakdown products were not detected in samples collected during the limited investigation conducted in April and July 1973, or in 1992. Two 81 mm mortar shells were discovered at the site during an October 1991 walkover. 	<ul style="list-style-type: none"> Site vegetation clearing and ordnance sweep (USATEU). Magnetometer and electromagnetic induction surveys (SAIC). 2 test pits to be located in reported burn pits (USATEU). 7 shallow soil samples will be collected for onsite MINICAMS agent analyses (USATEU). 6 soil, 1 sediment, and 1 surface water sample will be collected (USATEU/SAIC) and submitted to Environmental Science and Engineering, Inc. (ES&E) and DataChem Laboratories (DCL). 	<p>MINICAMS Onsite Screening Analyses (USATEU)</p> <ul style="list-style-type: none"> VX HD GB <p>ES&E</p> <ul style="list-style-type: none"> HD breakdown products (UW22/UT03/UL04) GB breakdown products (UT03/T8) VX breakdown products (UT03/IC) <p>DCL</p> <ul style="list-style-type: none"> VOC (UM21) SVOC (UM25) Metals (SS12) Pesticides/PCBs (UH20) Explosives (UW25/UW27) 	<ul style="list-style-type: none"> None <p>ES&E</p> <ul style="list-style-type: none"> HD breakdown products (UW22/UT03/UL04) GB breakdown products (UT03/T8) VX breakdown products (UT03/IC) <p>DCL</p> <ul style="list-style-type: none"> VOC (UM21) SVOC (UM25) Metals (SS12) Pesticides/PCBs (UH20) Explosives (UW25/UW27)

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 4: Area T-38 (Technical Escort Reaction Area)	<ul style="list-style-type: none"> • Chemical agents (i.e., mustard [HD], sarin [GB], and VX) and other unspecified chemicals were used and stored from 1961 to 1972. Area was last used for training in 1972. • Extensive decontamination was conducted on spills and training aids, including railroad flat cars. • Residual HD contamination report January 1973; however, HD was not detected during a later investigation. • Subsurface sampling conducted in 1992 did not detect CWA or CWA breakdown products. 	<ul style="list-style-type: none"> • Install 4 groundwater monitoring wells (SAIC). • Drill 1 soil boring in sump area (SAIC). • Geophysical surveys including magnetometry, EM, and GPR to locate former sump area (SAIC). • 56 shallow and subsurface soil samples for onsite CWA analyses (USATEU/SAIC). • 6 soil samples to be submitted, based on the onsite screening results, to Environmental Science and Engineering, Inc. (ES&E) and DataChem Laboratories (DCL), if necessary (USATEU/SAIC). • Sample groundwater from 4 wells (two rounds) to be installed at site and submit to ES&E and DCL for analysis (SAIC). 	<p><i>MINICAMS Onsite Screening Analyses (USATEU)</i></p> <ul style="list-style-type: none"> • VX • HD • GB <p><i>ES&E</i></p> <ul style="list-style-type: none"> • HD breakdown products (LW18/LT03/LL03) • GB breakdown products (LT03/TT9) • VX breakdown products (LT03/IC) <p><i>DCL</i></p> <ul style="list-style-type: none"> • VOC (LM23) • SVOC (LM25) • Metals (JS12) • Pesticides/PCBs (LH17) • Explosives (LW23, LW27) 	<ul style="list-style-type: none"> • None • None <p><i>DCL</i></p> <ul style="list-style-type: none"> • VOC (UM21) • SVOC (UM25) • Metals (SS12) • Pesticides/PCBs (UJH20) • Explosives (UW25, UW27)

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 5: Range K CWA Shell Tapping Area	<ul style="list-style-type: none"> • Shell tapping area where CWA rounds were opened and decontaminated. • No residual contamination detected during previous investigation. • Area cleared for surface use; however, subsurface sampling has not been conducted. • Evidence of former training area not observed during October 1991 site walkover. Site has apparent recent usage as bivouac area. • USAEC observed empty agent (GB, HD) rounds and decontamination (DS-2) canisters onsite in 1993. 	<ul style="list-style-type: none"> • 10 shallow soil samples will be analyzed (MINICAMS) onsite for CWA (USATEU). • 4 soil samples will be submitted to Environmental Science and Engineering, Inc. (ES&E) based on the onsite results. 	<p>MINICAMS Onsite Screening Analyses (USATEU)</p> <ul style="list-style-type: none"> • VX • HD • GB <p>ES&E</p> <ul style="list-style-type: none"> • HD breakdown products (LW18/LT03/LL03) • GB breakdown products (LT03/TT9) 	<ul style="list-style-type: none"> • None • None

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 6: Range J Agent Training and Disposal	<ul style="list-style-type: none"> Area used to dispose of drums filled with chemical (i.e., mustard [HD]) agent contaminated soils collected during a 110-gallon spill remediation. Actual agent use is not known. Area recommended for further investigation and use restriction (i.e., fencing and posting) by USAEHA, 1975. Pit contained corroded drums, some filled with soil, observed during October 1991 walkover. Soil sampling within fenced area and drums did not detect CWA in 1992. 	<ul style="list-style-type: none"> USATEU will clear vegetation from within fenced area and sweep for ordnance. SAIC will conduct magnetometer and EM geophysical surveys within fenced area. 11 soil samples will be analyzed (MINICAMS) onsite for CWA (USATEU). Install/sample 3 wells; 4 soil samples will be submitted to Environmental Science and Engineering, Inc. (ES&E) based on the onsite results (USATEU). 	<p>MINICAMS Onsite Screening Analyses (USATEU)</p> <ul style="list-style-type: none"> VX HD GB <p>ES&E</p> <ul style="list-style-type: none"> HD breakdown products (LW18/LT03/LL03) 	<ul style="list-style-type: none"> None None

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 11: Detection and Identification Area	<ul style="list-style-type: none"> • Area for chemical (i.e., sarin [GB], cyanogen chloride [CK], GC, CX, and hydrogen cyanide [AC]) agent training from 1950 (estimated) until 1973. • One burn pit located onsite that was used to dispose of training aids. • Subsurface sampling did not detect CWA in 1992. 	<ul style="list-style-type: none"> • 13 soil samples will be analyzed onsite for CWA (USATEU). • 4 soil samples will be submitted to Environmental Science and Engineering, Inc. (ES&E) based on the onsite results for agent breakdown products analyses (USATEU). 	<p><i>MINICAMS Onsite Screening Analyses (USATEU)</i></p> <ul style="list-style-type: none"> • VX • HD • GB <p>ES&E</p> <ul style="list-style-type: none"> • HD breakdown products (LW18/LT03/LL03) • GB breakdown products (LT03/TT9) 	<ul style="list-style-type: none"> • None

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 8: Range L (Lima Pond) Agent and Munitions Disposal Area	<ul style="list-style-type: none"> Area contains small manmade pond. Reportedly, this site was used to dispose of captured munitions from World War II. No agents were detected in surface samples collected during a 1982 investigation. 	<ul style="list-style-type: none"> Fallen trees will be cleared from inside pond area (Fort McClellan). SAIC will conduct magnetometer, EM, and GPR surveys in pond area and in areas to be drilled. SAIC will install up to 7 monitoring wells. Topographic survey of site area (SAIC). 50 subsurface soil samples for CWA will be analyzed onsite (USATEU/SAIC). 8 soils and 2 sediment samples will be submitted to Environmental Science and Engineering, Inc. (ES&E) based on the onsite results for agent breakdown products analyses (USATEU/SAIC). 8 soils and 2 sediment samples will be submitted to DataChem Laboratories (DCL) for all other analyses (USATEU/SAIC). Groundwater samples (minimum 8/two rounds) will be collected from installed monitoring wells (SAIC). 2 surface water samples will be collected and submitted to ES&E and DCL for analysis (SAIC). 	<p><i>MINICAMS Onsite Screening Analyses (USATEU)</i></p> <ul style="list-style-type: none"> VX HD GB <p>ES&E</p> <ul style="list-style-type: none"> HD breakdown products (UW22/UT03/UL04) GB breakdown products (UT03/T8) VX breakdown products (UT03/IC) <p>DCL</p> <ul style="list-style-type: none"> VOCs (LM23) SVOCs (LM25) Explosives (LW23/LW27) Metals (JS12) Pesticides/PCBs (LH17) 	<ul style="list-style-type: none"> VX HD GB <p>ES&E</p> <ul style="list-style-type: none"> HD breakdown products (UW22/UT03/UL04) GB breakdown products (UT03/T8) VX breakdown products (UT03/IC) <p>DCL</p> <ul style="list-style-type: none"> VOCs (UM21) SVOCs (UM25) Explosives (UW25/UW27) Metals (SS12) Pesticides/PCBs (UH20)

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology		
			Soil	Water	
Site 9: Former Landfill #1	<ul style="list-style-type: none"> Area allegedly operated as sanitary landfill from 1945 to 1947; however, documentation supporting this use at the identified location is not available. This area contains no topographic evidence or physical debris (i.e., trash) that indicates the site was a landfill. 	<ul style="list-style-type: none"> Magnetometer, EM survey (SAIC). Install 4 groundwater monitoring wells. Submit 8 (two rounds) groundwater samples to DataChem Laboratories (DCL) for analysis (SAIC). 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> VOCs (UM21) SVOCs (UM25) Pesticides/PCBs (UH20) Metals (SS12) Explosives (UW25/UW27)
Site 10: Former Landfill #2	<ul style="list-style-type: none"> Area was developed as landfill in 1947 following Landfill #1 closure. The date that landfill ceased accepting sanitary waste is not known. Rusted debris (drums, machinery) observed during October 1991 walkover. 	<ul style="list-style-type: none"> 6 groundwater samples (two rounds) will be collected and submitted to DCL for analysis (SAIC). 2 surface water/sediment samples will be collected and submitted to DCL for analysis (SAIC). 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> VOCs (LM23) SVOCs (LM25) Pesticides/PCBs (LH17) Metals (JS12) Explosives (LW23/LW27) 	<ul style="list-style-type: none"> VOCs (UM21) SVOCs (UM25) Pesticides/PCBs (UH20) Metals (SS12) Explosives (UW25/US27)

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Site 11: Former Landfill #3	<ul style="list-style-type: none"> Landfill operated between 1946 to 1967 using trench and fill waste disposal method. 5 groundwater monitoring wells were installed in 1986 (USAEHA) and 5 additional wells were installed in 1992 (SAIC) to investigate potential contaminant migration. 	<ul style="list-style-type: none"> Install 9 groundwater monitoring wells (SAIC). Collect 18 (two rounds) groundwater samples at new monitoring wells and 20 (two rounds) at existing groundwater wells (SAIC). Collect 2 surface water/sediment samples (SAIC). Submit 12 soil samples for laboratory analysis (SAIC). 	<p>DCL</p> <ul style="list-style-type: none"> VOCs (UM21) SVOCs (UM25) Pesticides/PCBs (UH20) Total metals (SS12) Explosives (UW25/UW27) <p>DCL</p> <ul style="list-style-type: none"> VOCs (LM23) SVOCs (LM25) Pesticides/PCBs (LH17) Metals (JS12) Explosives (LW23/LW27) 	<p>DCL</p> <ul style="list-style-type: none"> VOCs (UM21) SVOCs (UM25) Pesticides/PCBs (UH20) Metals (SS12) Explosives (UW25/UW27)
Site 12: Old Water Hole	<ul style="list-style-type: none"> Possible munitions and chemical agent disposal area 	<ul style="list-style-type: none"> Topographic survey and contour mapping (SAIC). Magnetometer, EM, and GPR surveys (SAIC). 50 soil samples will be field (MINICAMS) screened (USATEU). Collect 8 soil samples (USATEU/SAIC). Install 5 monitoring wells and collect 10 groundwater samples (two rounds) (SAIC). 	<p>ES&E</p> <ul style="list-style-type: none"> HD breakdown products (LW18/LT03/LL03) GB breakdown products (LT03/TT9) VX breakdown products (LT03/IC) <p>DCL</p> <ul style="list-style-type: none"> VOCs (LM23) SVOCs (LM25) Pesticides/PCBs (LH17) Metals (JS12) Explosives (LW23/LW27) 	<p>ES&E</p> <ul style="list-style-type: none"> HD breakdown products (UW22/UT03/UL04) GB breakdown products (UT03/T8) VX breakdown products (UT03/IC) <p>DCL</p> <ul style="list-style-type: none"> VOCs (UM21) SVOCs (UM25) Pesticides/PCBs (UH20) Metals (SS12) Explosives (UW25/UW27)

Table 2-1. Fort McClellan Remedial Investigation/Feasibility Study Summary (continued)

Site Name	Site History and Suspected Contamination	Planned Field Activities	Analysis/Methodology	
			Soil	Water
Background	<ul style="list-style-type: none"> Background samples will be obtained from Pelham Range (1 location) and Main Post (3 locations). 	<ul style="list-style-type: none"> Collect 4 soil samples, and 4 groundwater samples (SAIC). <ul style="list-style-type: none"> - Well at Reilly Lake (Main Post) - Well east of operating landfill (Main Post) - Well upgradient of Area T-24A (Main Post) - Well at Rideout Hall (Pelham) Install 1 groundwater monitoring well (SAIC). 	<p><i>ES&E</i></p> <ul style="list-style-type: none"> HD breakdown products (LW18/LT03/LL03) GB breakdown products (LT03/TT9) VX breakdown products (LT03/IC) <p><i>DCL</i></p> <ul style="list-style-type: none"> VOCs (LM23) SVOCs (LM25) Pesticides/PCBs (LH17) Metals (JS12) Explosives (LW23/LW27) 	<p><i>ES&E</i></p> <ul style="list-style-type: none"> HD breakdown products (UW22/UT03/UL04) GB breakdown products (UT03/T8) VX breakdown products (UT03/IC) <p><i>DCL</i></p> <ul style="list-style-type: none"> VOCs (UM21) SVOCs (UM25) Pesticides/PCBs (UH 20) Metals (SS12) Explosives (UW25/UW27)

3. SAMPLE LOCATIONS AND FREQUENCY

This section presents information regarding sample matrixes, locations, frequency, and analyses to be conducted during the RI at Fort McClellan, Alabama. The rationale for planned sampling locations is provided for each RI site. Representatives from the U.S. Army Environmental Center (USAEC), the Alabama Department of Environmental Management (ADEM), and Science Applications International Corporation (SAIC) will meet approximately one week prior to the commencement of field activities to formally review the proposed locations. The following sections provide a general summary of the RI tasks and site specific descriptions of the sampling program. Sites located on Main Post and Pelham Range are shown on Figures 3-1 and 3-2, respectively.

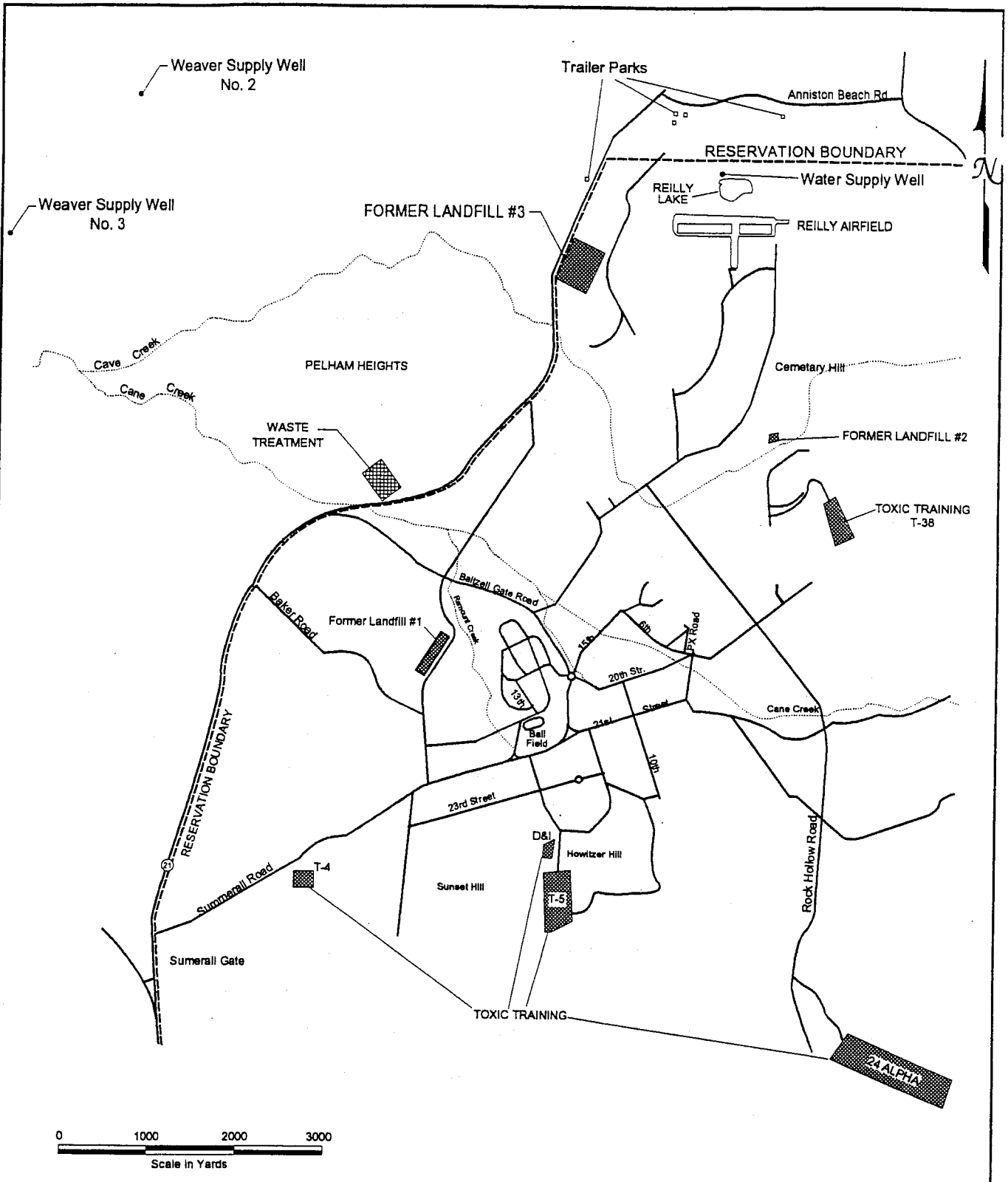
3.1 SUMMARY OF SAMPLING ACTIVITIES

SAIC's overall approach to investigating the RI/FS sites at Fort McClellan emphasizes the use of multiple tiers of project information. The data tiers will range from assessment of aerial photography to field screening surveys to well installation, field sampling, and hydrogeologic assessments. The combination of the multiple layers of information will result in sufficient characterization to support engineering and risk evaluations. A flow diagram for the RI project tasks is provided in Figure 3-3.

3.1.1 *Field Sampling Plan Overview*

The search for additional historical information for the sites is an ongoing process that will continue throughout the RI/FS process. Available aerial photography for the sites, additional field reconnaissance, interviews with identified personnel with first-hand site experience, and the results of previous investigations will be used to update the initial assessments of the project sites.

Field screening of shallow soil, sediment, surface water, and groundwater using MINICAMS detectors will provide the foundation for the RI assessment of chemical warfare agent contamination at the former training areas and the munitions disposal sites. The MINICAMS instrumentation uses a flame ionization detector or a flame-photometric detector and

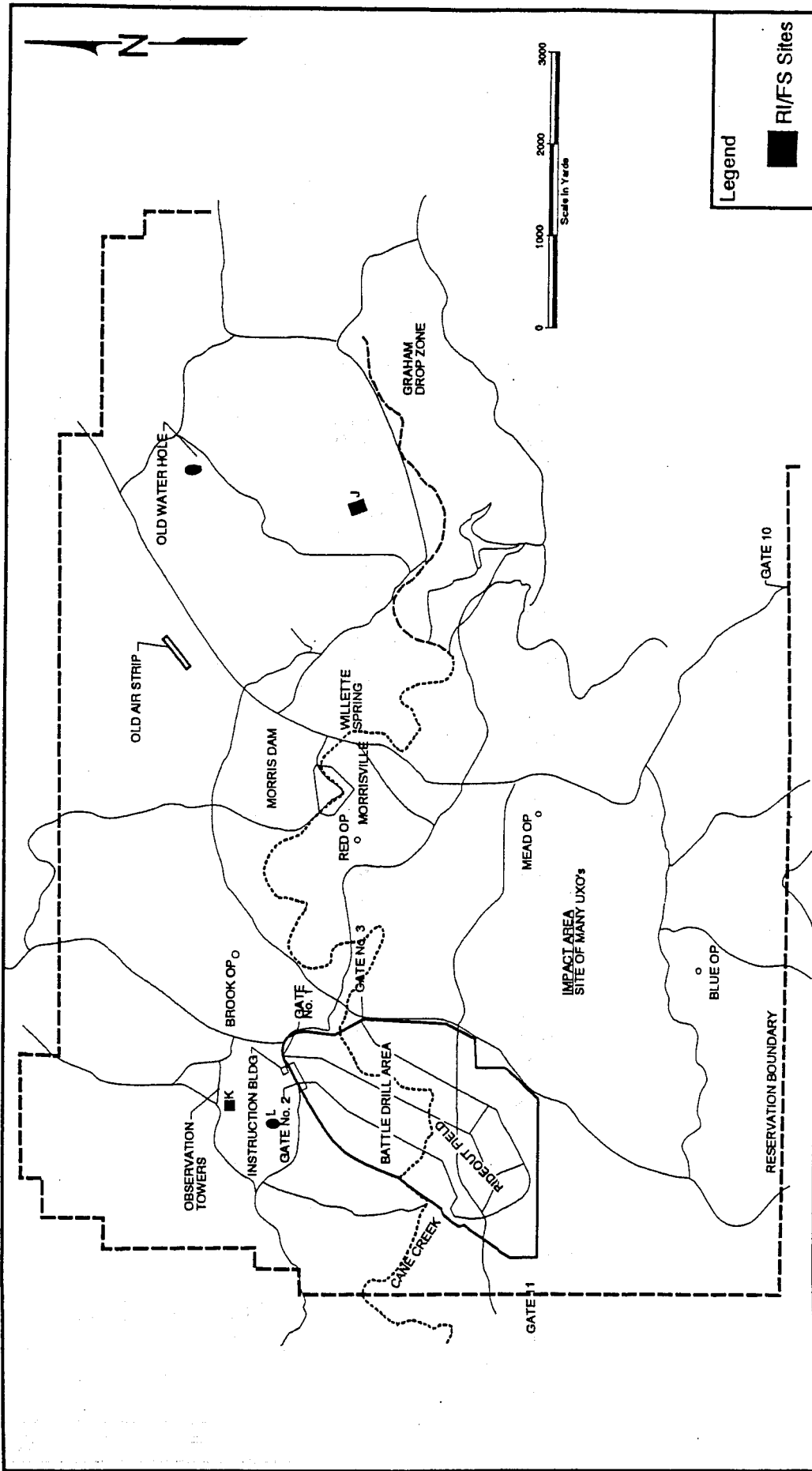


SITE LOCATIONS MAP : MAIN POST FORT McCLELLAN, ALABAMA

Prepared for:
**U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland**



Figure 3-1

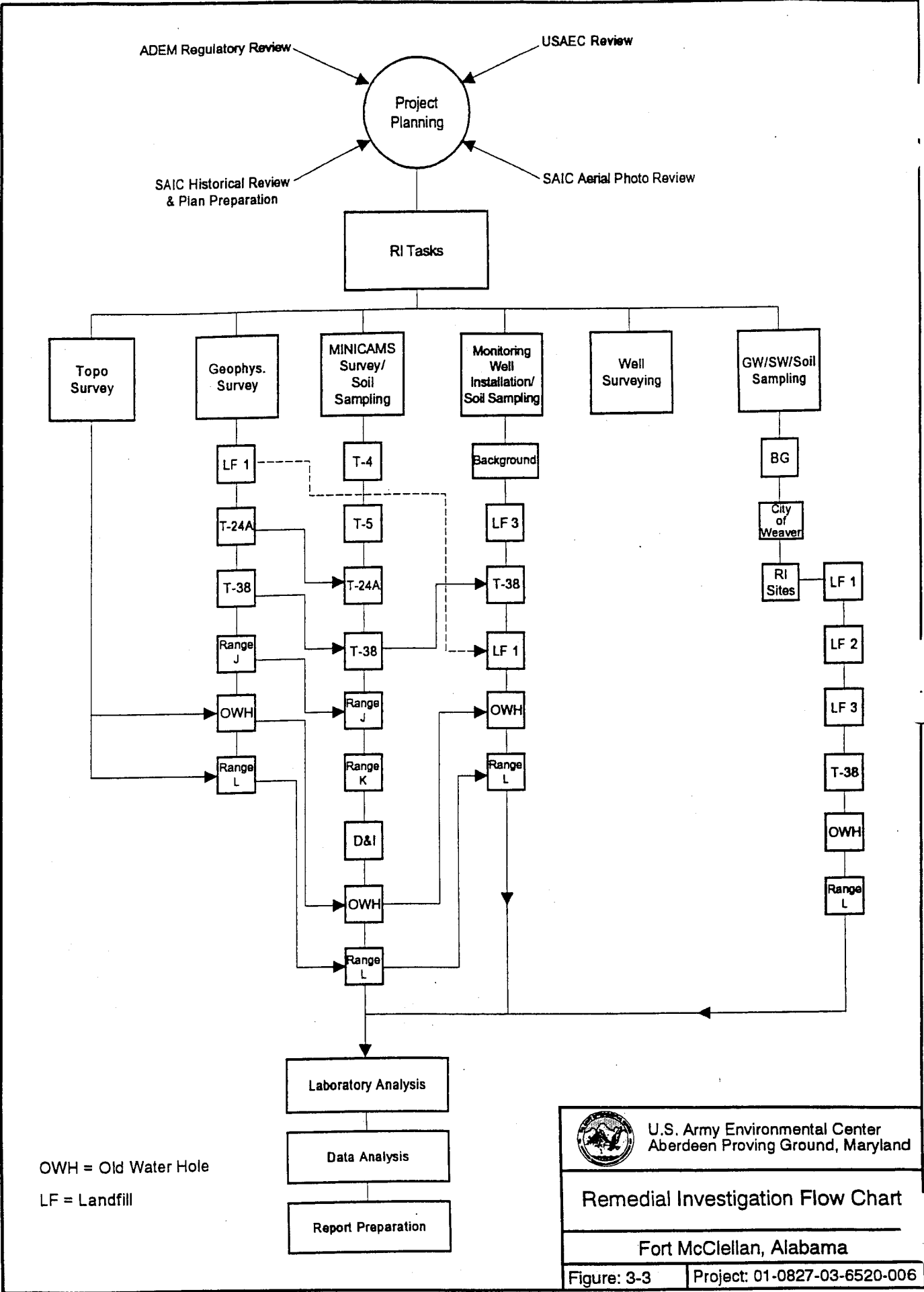


Prepared for:
 U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland



**SITE LOCATION MAP - PELHAM RANGE
 FORT MCCLELLAN RI/FS**

Figure 3-2



can detect sulfur and phosphorous-bearing chemical warfare agents (CWA) and simulants in addition to other volatile organic compounds. Chemical field screening in this manner will provide broader site coverage and can be used to locate areas where more intensive subsurface sampling may be warranted. Additional field screening will be accomplished using geophysical methods to characterize source areas particularly at sites T-38, Old Water Hole, and Range L.

Intrusive sampling and monitoring well installation will be conducted in areas that are identified during the field screening process, in areas where potential groundwater contamination is suspected, and in areas that warrant additional hydrogeologic characterization. These areas presently include T-38, Old Water Hole, Range L, and Former Landfills #2 and #3. Monitoring well installation at Former Landfill #1 will be installed only in the event that further geophysical surveying and assessment of historical aerial photographs indicate the presence of a former landfill. Intrusive sampling will include collection of subsurface soil and groundwater samples. Surface water and sediment samples will be collected at influent and effluent points at each site that is impacted by surface streams. A minimum of two groundwater sampling rounds will be conducted for the project. Intrusive sampling will not be conducted within suspected landfill or munitions disposal sites (Range L, Old Water Hole) but will concentrate around the known periphery of the sites. U.S. Army Technical Escort Unit (USATEU) sampling will be conducted within identified burial pit locations (excluding Range L and Old Water Hole). Test pit excavations by the USATEU at areas T-24A, Range J, and the Detection and Identification Area will also be completed.

Hydrogeologic assessment of the RI/FS sites will be accomplished through measurement of water levels in monitoring wells and slug testing for aquifer properties. Groundwater elevations will be obtained on a monthly basis at all installed well locations surrounding the RI/FS sites. Hydrogeologic assessments are not planned at areas T-4, T-5, T-24A, Range K, and the Detection and Identification Area because of the predominantly surface usage of the sites and the absence of detected subsurface contamination from previous sampling. The need for groundwater assessments at the sites with a history of subsurface burial (Area T-24A, D&I Area) will be reevaluated based on the results of test pit excavations at these sites.

3.1.2 Surveying

Topographic surveying will be conducted by SAIC during the RI/FS to accurately locate field monitoring and sampling points, to provide location data for site cultural features, to locate geophysical survey grids and transects, and to provide topographic information for site control. The survey data will be recorded in the Alabama State Plane Coordinate system.

3.1.2.1 Monitoring Wells and Geophysical Survey Grids/Transects

Installed monitoring wells will be surveyed for horizontal coordinates and for the vertical elevation relative to sea level of the top of the well casing and the ground surface at each well. Each well will be topographically surveyed by a licensed surveyor in the State of Alabama to determine its map coordinates in the Alabama state plane coordinate system grid to within ± 1 foot. The center of the well cap (not the outer protective casing) will be surveyed for horizontal control. The elevation of the top of the well casing and the ground surface elevation adjacent to each well will be determined to within ± 0.05 feet. The ground surface elevation and horizontal location will be measured for each geophysical survey grid and transect point. Each point will be marked by the surveyor using a driven hub with a nail and flagging affixed. All surveys will be tied to National Geodetic Vertical Datum of 1929.

3.1.2.2 Field Screening, Soil, Surface Water, and Sediment Sample Location

Approximately 300 field screening, sampling, and cultural locations will be measured in the field using Global Positioning System (GPS) technology. In addition to field screening and sampling locations, cultural features for which no location data is currently available will also be measured during the survey. These features will include concrete monuments, markers, or other structures. The GPS will utilize a dual-receiver differential mode with one receiver operating as a static base station and the second receiver used to locate each individual point. The base station data will be used to correct the measured locations to achieve a survey accuracy of approximately 1 to 3 meters.

3.1.2.3 Topographic Mapping

Detailed topographic maps for Fort McClellan and Pelham Range available from the U.S. Army Corps of Engineers, Mobile District have been adapted by SAIC for use as site maps for the RI/FS. However, topographic detail on the corps' maps is insufficient to resolve the berm structure and surrounding topography at Range L, or the subtle depressions at the Old Water Hole site. SAIC will topographically survey approximately 7.2 acres at Range L with survey point density sufficient to resolve the terrain and bermed area to a 2' contour interval. The area of the survey will extend from the unpaved access road east of the site, across the central bermed area (main feature of survey), and will include the stream located west of bermed area.

Approximately 3 acres in the area of the Old Water Hole site will be topographically surveyed with a survey point density sufficient to resolve the terrain and site depressions (main feature of survey) to a 1' (or less) contour interval. The area of the survey will extend from unpaved access road south of the site across an area of rectangular surface depressions, and will include sufficient area surrounding the site to characterize the terrain immediately surrounding the depressions.

3.2 SITE-SPECIFIC SAMPLING ACTIVITIES

This section will provide an overview of previous military activities at the sites of concern including training and disposal actions, and previous environmental sampling or site analyses. Rationale for additional sampling and investigation activities are provided for each RI site.

3.2.1 Site 1 - Area T-4

Area T-4 reportedly consisted of a .25 acre area used between 1965 and 1971 for training using the biological simulants BG and SM. The identified area of the former site has been extensively reworked and no evidence of a former site was observed during an October 1991 site visit by SAIC and USAEC personnel. Previous sampling has not been conducted at the site because the location was tentative and the biological simulants used at the site are short-lived and nonpersistent in the environment. In the absence of physical evidence for the site, SAIC

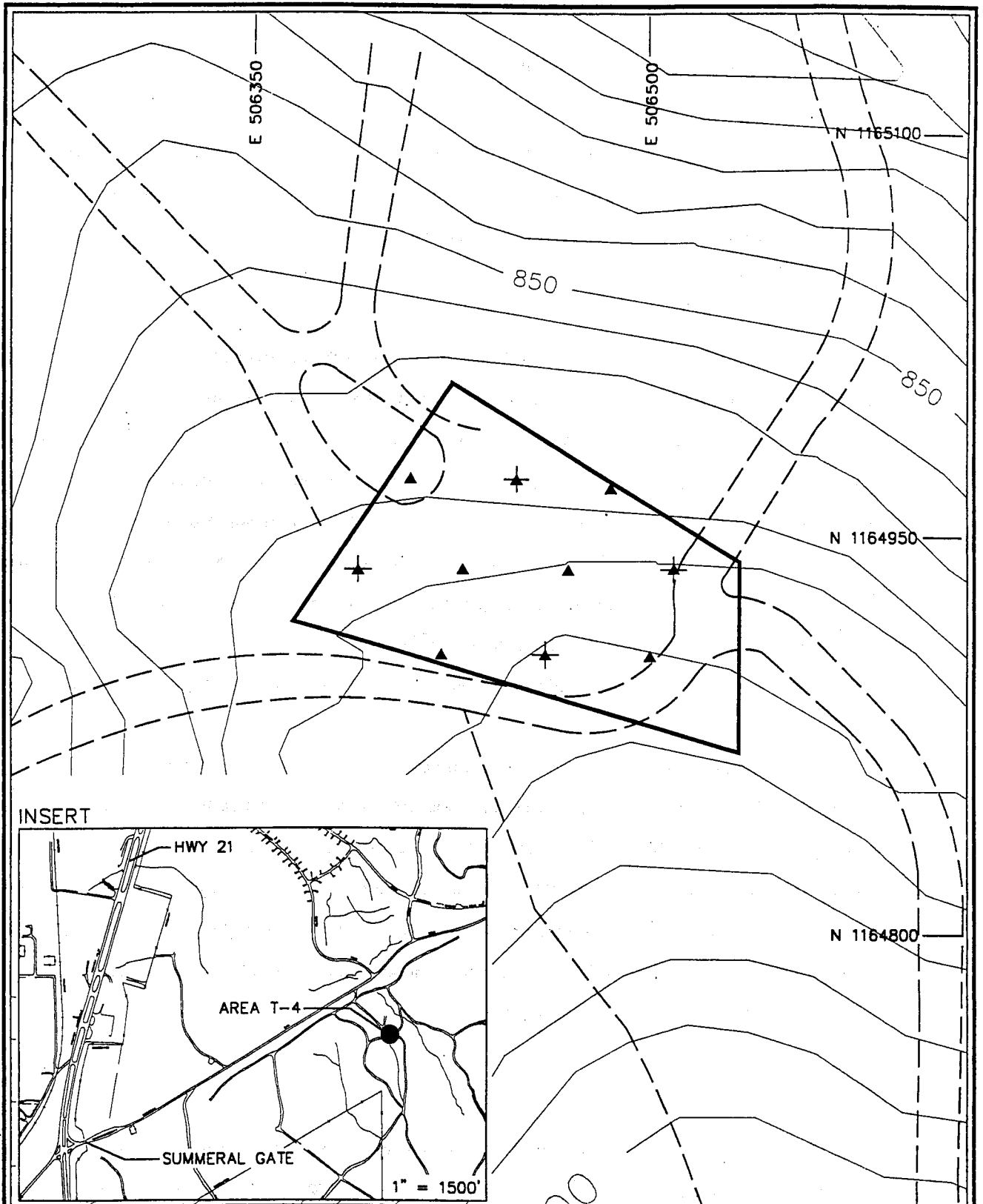
will attempt to delineate Area T-4 using survey data, historical aerial photographs, and additional field reconnaissance.

Field analysis of surface soil at Area T-4 will be completed across the site by the USATEU using MINICAMS units. Sampling points will be located systematically from a randomly generated origin coordinate within the site boundaries. Data gathered from the field analyses will be used to determine the locations of 4 shallow soil samples (land surface to 0.5 feet BLS). Preliminary sample locations are shown on Figure 3-4. In absence of definitive results from the MINICAMS screening, soil sample locations will be based on observed site features and will attempt to maximize areal coverage of the site.

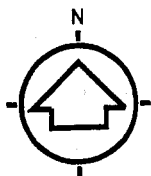
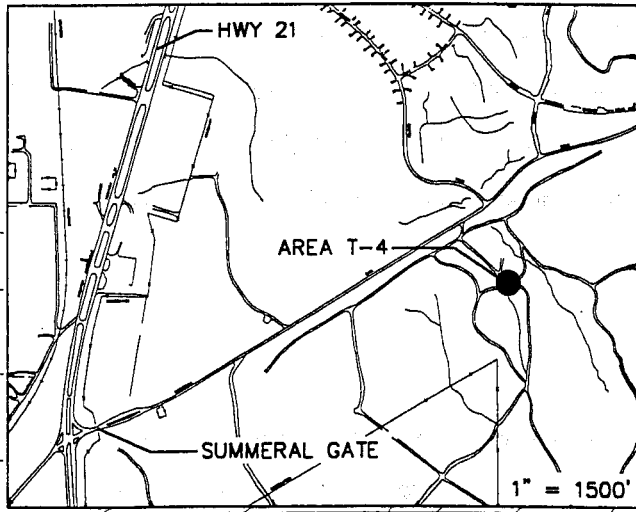
Four shallow soil samples will be collected at Area T-4 and analyzed for HD and VX breakdown products. The samples will be collected by USATEU from the surface (0 to 0.5 feet BLS). Soil sampling locations will be based on the MINICAMS field screening results. If HD or VX agent is not detected in any of the nine screening samples, soil samples will be collected at 4 field screening locations that maximize areal coverage of the site. The planned soil sampling points are shown on Figure 3-4.

3.2.2 Site 2 - Area T-5

Area T-5 is an 11.4-acre wooded site used between 1961 and 1973 for toxic hazards detection and decontamination training. The quantities of agent (HD, GB, and VX) used for training purposes ranged from 20 to 40 milliliters per exercise. The training sites were decontaminated and checked at the end of each exercise. Decontamination of the agents on soils was performed by adding STB and/or DS-2. In addition to HD, GB, and VX used during training, Area T-5 may have been the location of a 110-gallon HD spill. Available information indicates that the contaminated soil was chemically decontaminated, removed, and ultimately disposed of at Range J (Pelham Range). Surface soil samples collected by the U.S. Army in December 1972, April 1973, and July 1973 did not detect HD, GB, or VX. SAIC and USATEU did not detect chemical warfare agents or their breakdown products in sediment, surface water, or shallow soil samples collected from five high probability locations at Area T-5 (SAIC 1993).



INSERT



0 50
SCALE IN FEET

LEGEND:

- ▲ USATEU Minicams Sample
- ⊕ Soil Sample
- Site Boundary

Site boundary from USATHATMA 1977.
Base map from U.S. Army Corps of Engineers,
Mobile District, 1989.

U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

SITE LOCATION MAP AREA T-4

Fort McClellan RI/FS, Anniston, Alabama
Figure: 3-4 Project: 01-0827-03-6520-006

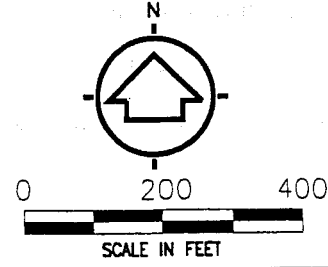
Field analyses will be conducted by USATEU on surface soils (0 to 0.5 feet BLS) at Area T-5 using MINICAMS units to screen for chemical warfare agents (HD, GB, and VX) at 25 locations. Sampling points will be systematically located from a randomly generated origin coordinate within the site boundaries. Data gathered from the field screening procedures will be used to determine the locations of 4 shallow soil samples. The field screening sample locations are shown on Figure 3-5.

Four shallow soil samples (0 to 0.5 feet BLS) will be collected at Area T-5 for HD, GB, and VX agent breakdown products laboratory analyses. The soil sampling locations will be based on the USATEU field screening results and will be obtained at screened locations to provide areal coverage of the site area. These locations will also consider previous (1992) sampling locations (SAIC 1993) at Area T-5. If any of the field screening samples are above the time weighted average (TWA) concentrations for GB, HD, or VX, analytical soil samples will be collected from the closest topographically downgradient field screening sampling point that did not show any detectable quantities of CWAs. The analytical soil sampling locations shown on Figure 3-5 were distributed in a way to complete areal coverage of the site.

Two surface water and 2 sediment samples will be collected for VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds analyses. The sediment samples will also be analyzed for HD, GB, and VX agent breakdown products. The surface water and sediment samples will be collected at upgradient and downgradient locations at the site. These locations will be used to assess possible contaminant migration through these pathways. The upgradient sample for Area T-5 also will be used as a background location. The surface water and sediment sample locations are shown on Figure 3-5.

3.2.3 Site 3 - Area T-24A

Area T-24A is a 1.5-acre site that was used until 1973 as a chemical munitions disposal training area for training with CG, BZ, GB, and HD munitions. During each training exercise, approximately 4.46 kilograms of HD were reportedly used; however, first-hand observers reported that as much as 2 gallons of HD was poured on six howitzers and later on armored personnel carriers during training exercises (Harvey, written communication). In addition,



LEGEND:

- ▲ USATEU Minicams Sample
- ◆ RI Soil Sample
- Site Boundary
- Surface Water/Sediment Sample

Site boundary from USATHATMA 1977.
 Base map from U.S. Army Corps of Engineers, Mobile District, 1989.

U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland

SITE LOCATION MAP—AREA T-5

Fort McClellan RI/FS, Anniston, Alabama

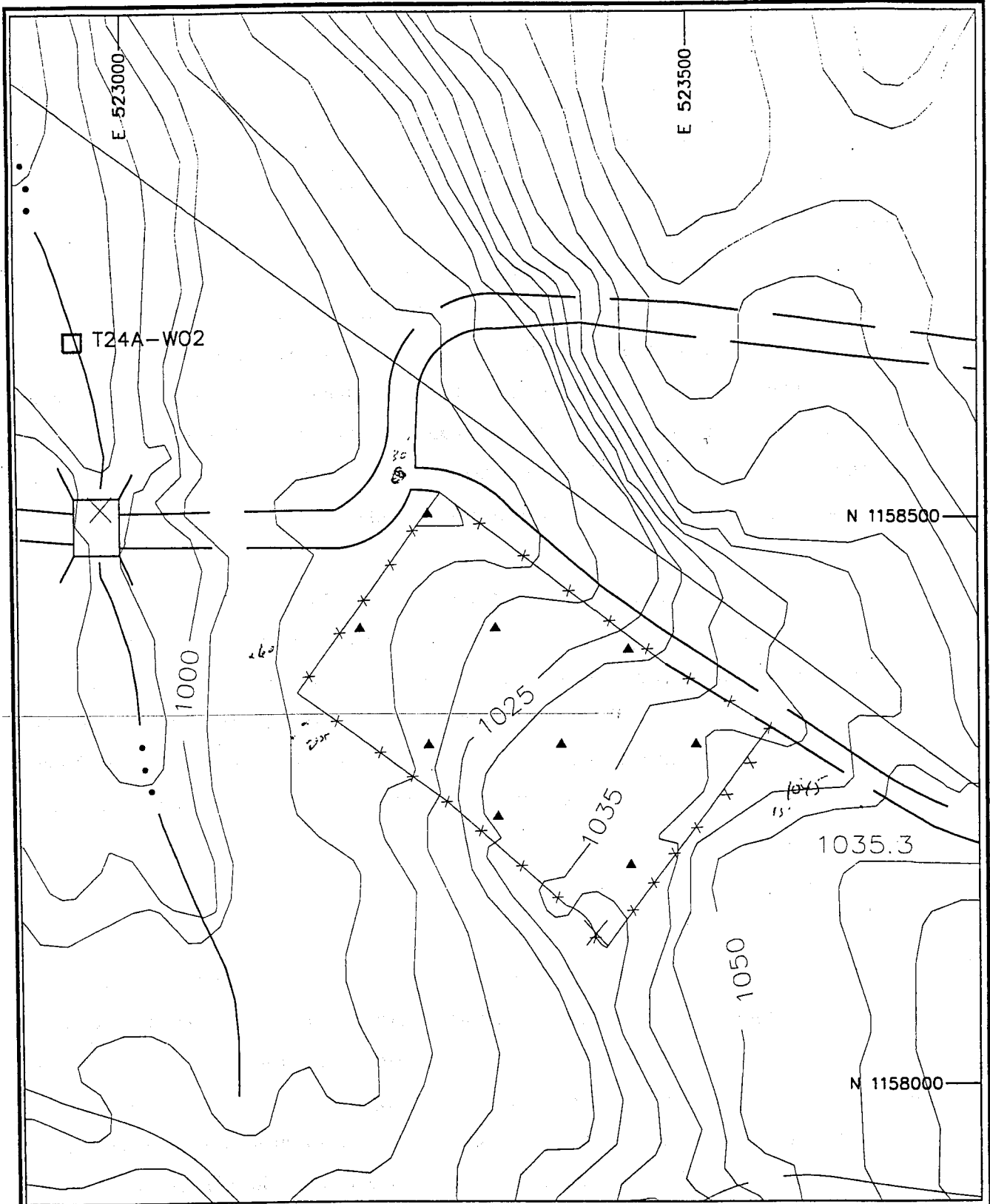
Figure: 3-5 Project: 01-0827-03-6520-006

40 milliliters of CG, one M-6 canister of BZ, and 740 grams of GB were used per exercise. Two square (256 ft²) burning pits were used for training exercises and were enclosed by a fenced area measuring 40 by 80 meters. The depths of the pits are unknown; however, standard operating procedures (SOPs) recommended a depth of 6 feet. At closure, the pits reportedly were filled with soil, although some depressions were observed in 1988. Decontamination of agent on site soils was performed with STB and DS-2. Field and laboratory analysis (SAIC 1993) of four shallow soil samples at two high-probability locations within Area T-24A did not detect the presence of chemical agent or agent breakdown products at the sampled locations. Because the actual burn pits were not observable at the surface, assurance that the samples were collected from the actual burn pit locations is based solely on the reference marker identified at the site. The location of the reference marker with respect to the overall pit area is unknown.

SAIC will conduct magnetometer and EM surveys inside the fenced area at T-24A to attempt to delineate the location of the 2 burn pits and to ensure that metallic objects (i.e. drums, munitions) are not present. Prior to conducting any geophysical survey activities at Area T-24, USATEU will clear surface brush and sweep the surface for any ordnance. The survey grid will cover an area of approximately 12,000 square feet within the fenced enclosure. Geophysical measurements on ten foot centers will provide sufficient resolution for locating the burn pits (16' by 16') at the site.

Field screening activities will be conducted on surface and subsurface soil samples at Area T-24A by the USATEU using MINICAMS units. Soil samples at 7 surface (0-0.5 feet) locations and 6 subsurface locations (collected from test pits) will be screened for chemical warfare agents (HD and GB). Field sampling points will be located systematically from a randomly generated origin within the fenced area of the site as shown in Figure 3-6. Data gathered from the field screening of surface soils will be used to ensure that the samples are free of CWAs.

Six shallow soil samples will be collected at Area T-24A for chemical agent (HD, GB), agent break down products, and explosive related compounds analyses. Samples will be collected from an approximate depth of 5 to 7 feet BLS based on the reported estimated depth



<p>SCALE IN FEET</p>	<p>LEGEND:</p> <ul style="list-style-type: none"> ▲ USATEU Sample ◆ RI Soil Sample □ Surface Water/Sediment Sample 	<p>U.S. Army Environmental Center Aberdeen Proving Ground, Maryland</p>
	<p>Site boundary from USATHATMA 1977. Base map from U.S. Army Corps of Engineers, Mobile District, 1989.</p>	<p>SITE LOCATION MAP—AREA T-24A</p> <p>Fort McClellan RI/FS, Anniston, Alabama</p> <p>Figure: 3-6 Project: 01-0827-03-6520-006</p>

of the burn pits (approximately 6 feet BLS). The soil samples will be collected from test pits excavated within the fenced area at Area T-24A. The test pit locations will be based on the MINICAMS data from the site and the results of the geophysical surveys. Planned test pit locations shown on Figure 3-6 will be based on geophysical data. These locations will be sampled in the event that the field screening and additional geophysical surveys do not show any evidence of previous activity. The test pit locations were placed in a diamond pattern to provide aerial coverage of each suspected burn pit location. The estimated volume of excavated soil (114 yd³) will be retained on site pending the results of the laboratory analyses. Sample depths will be field-determined and based on field screening results and visual observations (i.e. soil discoloration). The test pits will be excavated over the identified area of each pit to an approximate depth between 5 and 7 feet BLS using a backhoe.

A surface water and sediment sample will be collected from Cane Creek at a location immediately downgradient from the site. This location will provide information on potential contaminant migration to adjacent surface water bodies near Area T-24A. The sediment sample will be collected for HD and GB agent breakdown products and explosive related compounds analyses. The surface water samples will be collected for HD, GB, and VX breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds analyses. The planned sampling location is shown on Figure 3-6.

3.2.4 Site 4 - Area T-38

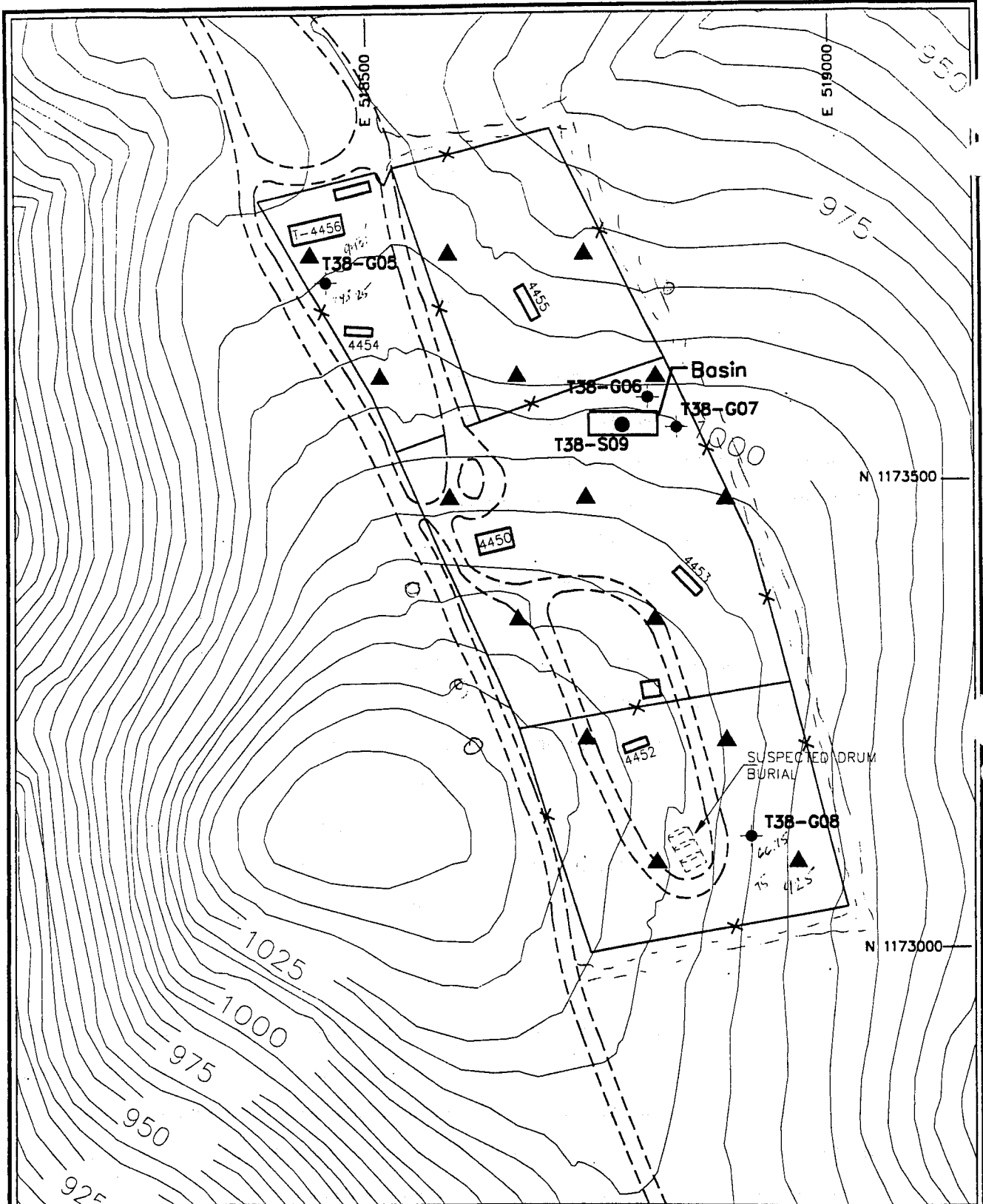
Area T-38 is a 6-acre site that was used between 1961 and 1972 for training escort personnel in techniques of eliminating toxic hazards caused by mishaps to chemical munitions during transport. The area was used to store, demonstrate, and dispose of toxic agents and munitions, including GB, VX, and HD. In addition, unspecified decontaminants (likely STB, DS-2, and DANC) were stored on at least two sites, were used for demonstration purposes, and were disposed on site. Extensive decontamination was conducted on this site for reported spills and contaminated training aids. Liquid materials including tetrachloroethane and decontaminants containing benzene and carbon tetrachloride were poured into an unlined pit (sump). The former disposal sump area was approximately 10 by 20 by 10 feet and was reportedly used to dispose of decontaminants and other hazardous wastes at the site. The sump was approximately located

in the field during the April 1992 site visit (G. Harvey, oral communication). In addition, there is an unconfirmed report of the burial of a drum of chemical agent (mustard) in the southern portion of the site; however, efforts to determine the precise location of the drum have been unsuccessful (SAIC 1993).

Magnetometer and electromagnetic surveys will be conducted by SAIC over a 250 foot by 250 foot grid at Area T-38. The grid will be established using 10 to 20 foot centers providing better resolution of subsurface anomalies. The planned location of the grid will be in the vicinity of the suspected sump. In addition to the geophysical surveys over the grid area, magnetometer readings will be collected directly over each planned borehole location at this site. This will ensure that shallow metallic objects will not be encountered during drilling activities. Ground penetrating radar (GPR) profiles will be obtained across the suspected sump area to potentially image the location for nonmetallic debris.

Field analyses will be conducted on surface and subsurface soil at Area T-38 by the USATEU using MINICAMS units to screen soil samples for chemical warfare agents (HD, GB, and VX) at 31 surface locations and 25 subsurface locations. The surface screening sample points will be located systematically from a randomly generated origin within the site area as shown in Figure 3-7. Data gathered from the field screening of surficial soils will be used in the risk assessment and screening results from the shallow analytical soil samples will be used to assure that laboratory samples do not contain CWA. The planned field screening sample locations are shown on Figure 3-7.

Six soil samples will be collected from locations downgradient and inside the sump at Area T-38. USATEU personnel will collect 4 soil samples from a soil boring within the sump area. Field screening samples will be collected simultaneously with laboratory samples and analyzed for CWAs (HD, GB, and VX) by USATEU. If the screening samples are negative, the samples selected for analysis will be sent to the analytical laboratory. Two soil samples will be collected from the monitoring well immediately downgradient of the sump. Samples collected during well drilling activities will be screened using an organic vapor analyzer (OVA) equipped



- LEGEND:**
- Monitoring Well
 - USATEU Soil Boring
 - ▲ USATEU Minicams Sample

U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

SITE LOCATION MAP-AREA T-38

Base map from U.S. Army Corps of Engineers,
Mobile District, 1989.

Fort McClellan RI/FS, Anniston, Alabama

Figure:3-7 Project: 01-0827-03-6520-006

with a flame ionization detector (FID). FID readings and MINICAMS field screening results will be used to differentiate samples for laboratory analysis. If screening results do not indicate potential contamination, one soil sample near the surface and one sample from the water table interface will be sent for laboratory analysis.

Four monitoring wells will be located at Area T-38 as shown in Figure 3-7. Three of the 4 monitoring wells will be located in a triangular pattern to determine the groundwater flow direction for the site. The fourth well will be installed hydraulically downgradient of the sump to assess the groundwater quality downgradient from the sump. The exact location of this well will be based on groundwater levels collected during drilling activities for the first three wells. The monitoring wells will be set to monitor the first encountered groundwater. The depth to groundwater at Area T-38 is anticipated to occur at greater depth because the site is located on a topographic ridge.

Groundwater samples will be collected from Area T-38 monitoring wells for CWA (HD, GB, and VX) breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds. The analytical parameters for groundwater were selected due to reported past disposal of hazardous waste into the sump.

3.2.5 Site 5 - Range K

Range K is a 2-acre area located on Pelham Range that was formerly used as a CWA training area. Limited information for the site is available, including time of operation and agents used. A reported shell tapping area where munitions were opened and decontaminated was operated in Range K prior to 1961 through the summer of 1963. During training exercises, breaking open of one 55-mm round of HD, one 105-mm GB, and one 4.2-mortar round of CG was standard practice (G. Harvey, written communication). The identified site has been physically rearranged (bulldozed) and records indicate that the area was cleared for surface usage in 1967. During Soil chemistry data (RK-D01) for Range K (SAIC 1993) did not detect agent breakdown products. Spent 105- mm GB and 155-mm HD rounds and DS-2 cans were observed by USAEC beyond the tree line in November 1992 (T. Perry, written communication).

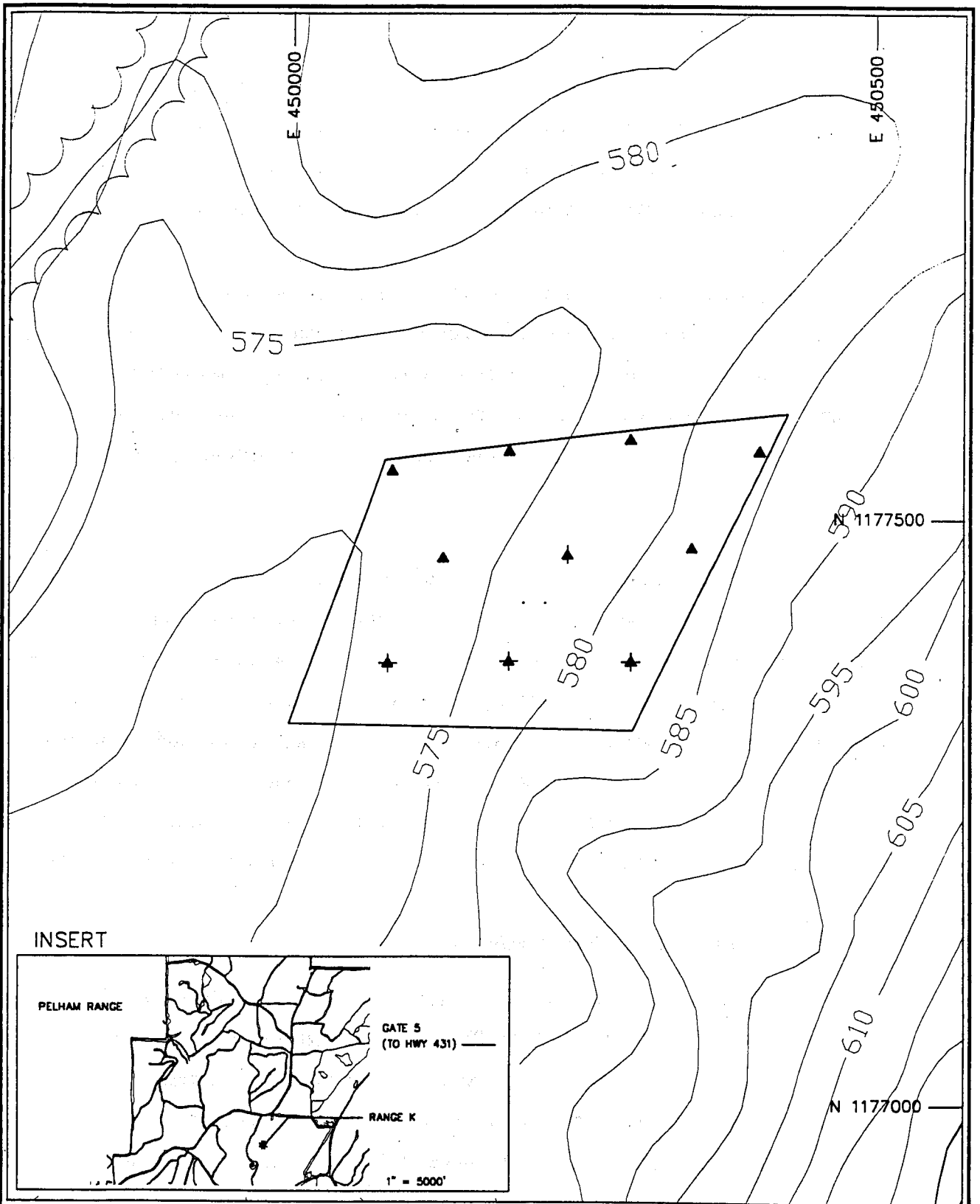
Field analysis of surface soils (0 to 1 foot BLS) at Range K will be conducted by the USATEU using MINICAMS units to screen soil samples for chemical warfare agents (HD, GB, and VX) at 9 locations. The sampling points will be located systematically from a randomly generated origin within the site boundaries as shown in Figure 3-8. Data results gathered from the field screening of surficial soils will be used to determine the locations of soil sampling points for laboratory analysis. Coincident with the field screening survey, the USATEU will remove and dispose of spent CWA rounds and decontaminant canisters.

Four shallow soil samples will be collected by the USATEU between land surface and 2 feet BLS for agent breakdown products (HD) and explosive related compounds analyses at Range K. The planned sampling points are shown on Figure 3-8 and are placed to provide areal coverage of the site. If chemical agents are detected in any of the field screening samples, laboratory samples will be collected from the closest topographically downgradient location that has a negative screening result.

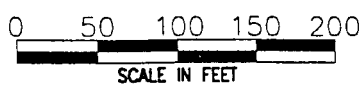
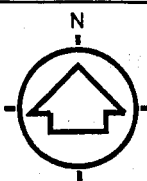
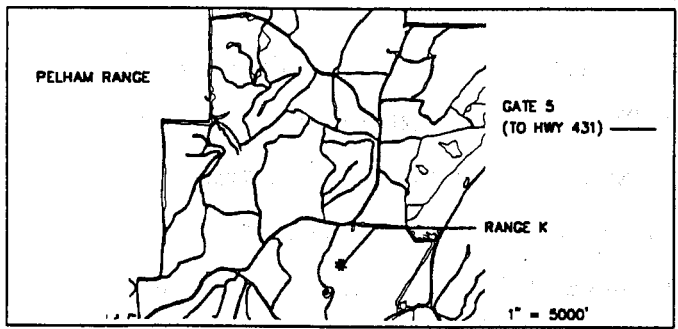
3.2.6 Site 6 - Range J

Range J is a former CWA training area located on Pelham Range. The 50- by 139-meter fenced area was used until 1963 for training and agent disposal. The agents used at the site are unknown, but are believed to be HD. The site also was reportedly used for disposal of contaminated soil from a 110-gallon HD spill that occurred on the Main Post in 1955. Drummed soil disposed of in a surface pit at the site was observed during October 1991, April 1992, and September 1993 site walkovers. Chemical data from soil samples collected at Range J (SAIC 1993) did not detect the presence of HD or HD break down products. However, electromagnetic surveying indicated a broad area of subsurface disturbance in the vicinity of the shallow burial pit at the site.

Prior to beginning sampling at Range J, the USATEU will clear the fenced area of surface vegetation and any ordnance or metallic surface debris. SAIC will conduct electromagnetic and magnetometer surveys within the fenced area to locate additional potential burials at the site. Field screening activities will be conducted on surface and subsurface soils at Range J by the USATEU. MINICAMS units will be used to screen soil samples for chemical



INSERT



LEGEND:

- ▲ USATEU Minicams Sample
- ✦ Soil Sample

Site boundary from USATHATMA 1977.
 Base map from U.S. Army Corps of Engineers,
 Mobile District, 1989.

U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland

SITE LOCATION MAP—RANGE K

Fort McClellan RI/FS, Anniston, Alabama

Figure: 3-8 | Project: 01-0827-03-6520-006

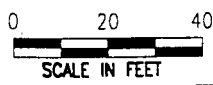
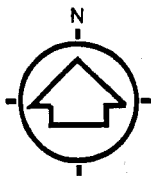
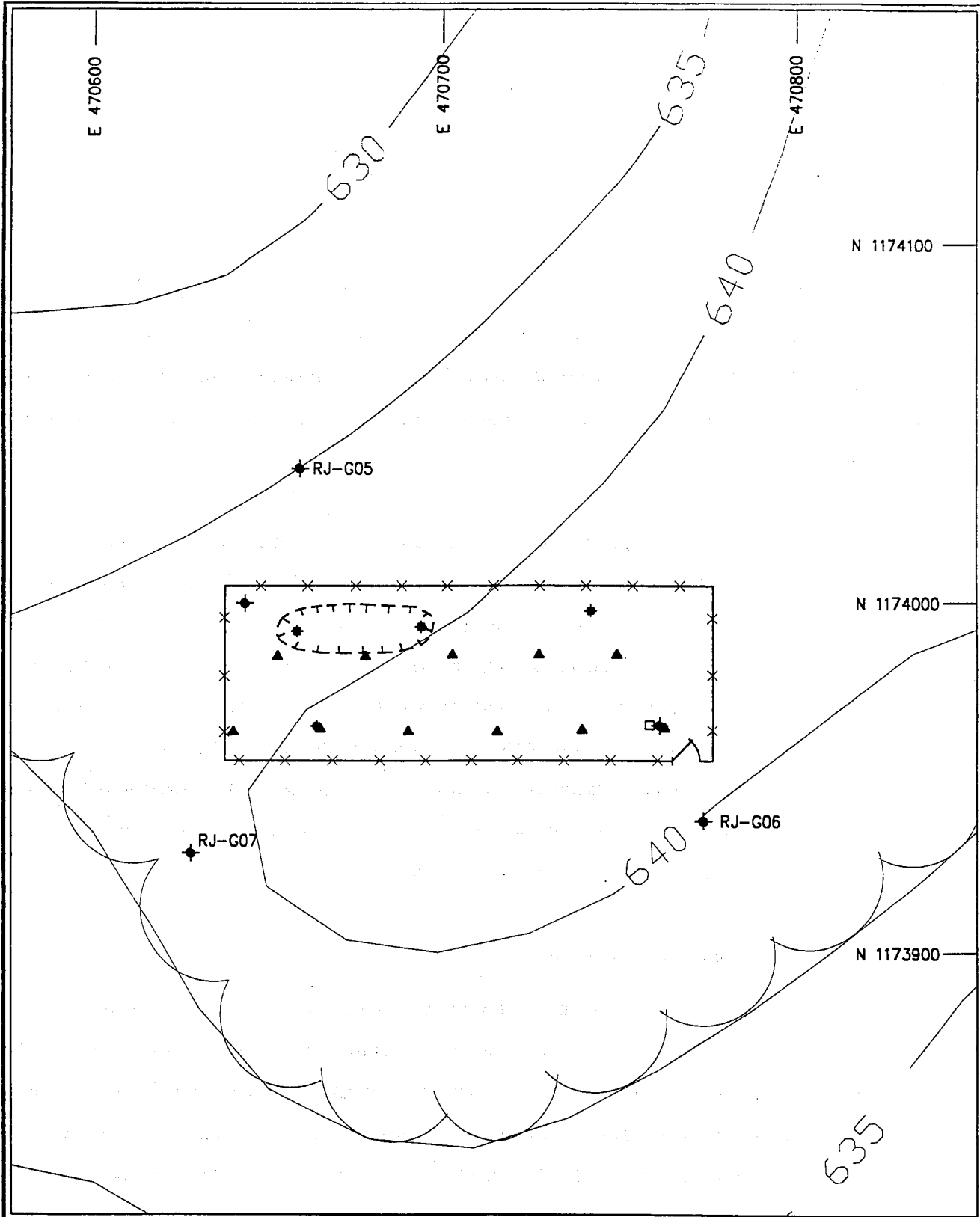
warfare agents at 12 surface locations (0 to 1 feet BLS) and 4 laboratory sample locations (5 to 7 feet BLS) (HD). The surface sampling points will be systematically located from a randomly generated origin within the fenced area at the site as shown in Figure 3-9. Data obtained from the surface soil analyses will be used to locate test pits and to screen laboratory samples for CWA.

Three groundwater monitoring wells will be installed at Range J at the locations shown on Figure 3-9. The wells will be set to monitor the first encountered groundwater beneath the site. Soil samples from the wells will be collected for lithologic description. Range J is established on a topographic divide, therefore, groundwater may be anticipated to flow to the northwest or to the southeast. Groundwater samples will be analyzed for HD breakdown products.

Four shallow soil samples will be collected at Range J for chemical agent (HD) breakdown products analyses. Samples will be collected from an approximate depth of 5 to 7 feet because very little information is known about the depth of the burial area at the site. The soil samples will be collected from test pits dug within the fenced area. The test pit locations will be based on the MINICAMS screening results and on geophysical surveys conducted on the site prior to intrusive activity. Test pit locations are shown on Figure 3-9. The planned test pit locations were placed across the site to provide areal coverage. Excavated soil will be maintained on site pending approval for removal. A plastic tarp will be placed over the soil.

3.2.7 Site 7 - Detection and Identification Area

The Detection and Identification (D&I) Area is located on the Main Post. The 1.1-acre site was used from the 1950's to 1972 for GB training. The Navy may have used HD at the site in the late 1950's for training purposes. Training routinely consisted of application of test kits to detect and identify agents contained in 40-milliliter vials. Agents often were mixed as a 10 percent solution with water. The agent simulants CK, GC, CX, and AC also were reportedly used in the training area. All training aids from this site and a building from Area T-4 were burned twice in a dug pit and buried. The remains are reportedly still located in the pit. The pit containing the burned materials is identified by stake F which was located during an October 1991 walkover. However, the position of stake F with respect to the pit boundary and



LEGEND:

- ▲ USATEU Minicams Sample
- ◆ RI Soil Sample
- Drum Disposal Pit
- Fence
- Concrete Monument
- ◆ SI Soil Sample

Site boundary from USATHATMA 1977.
 Base map from U.S. Army Corps of Engineers,
 Mobile District, 1989.

U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland

SITE LOCATION MAP—RANGE J

Fort McClellan RI/FS, Anniston, Alabama
 Figure: 3-9 | Project: 01-0827-03-6520-006

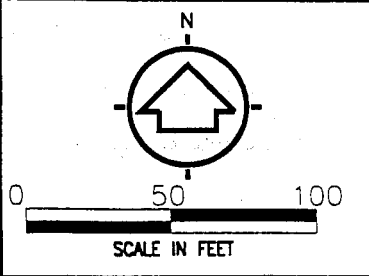
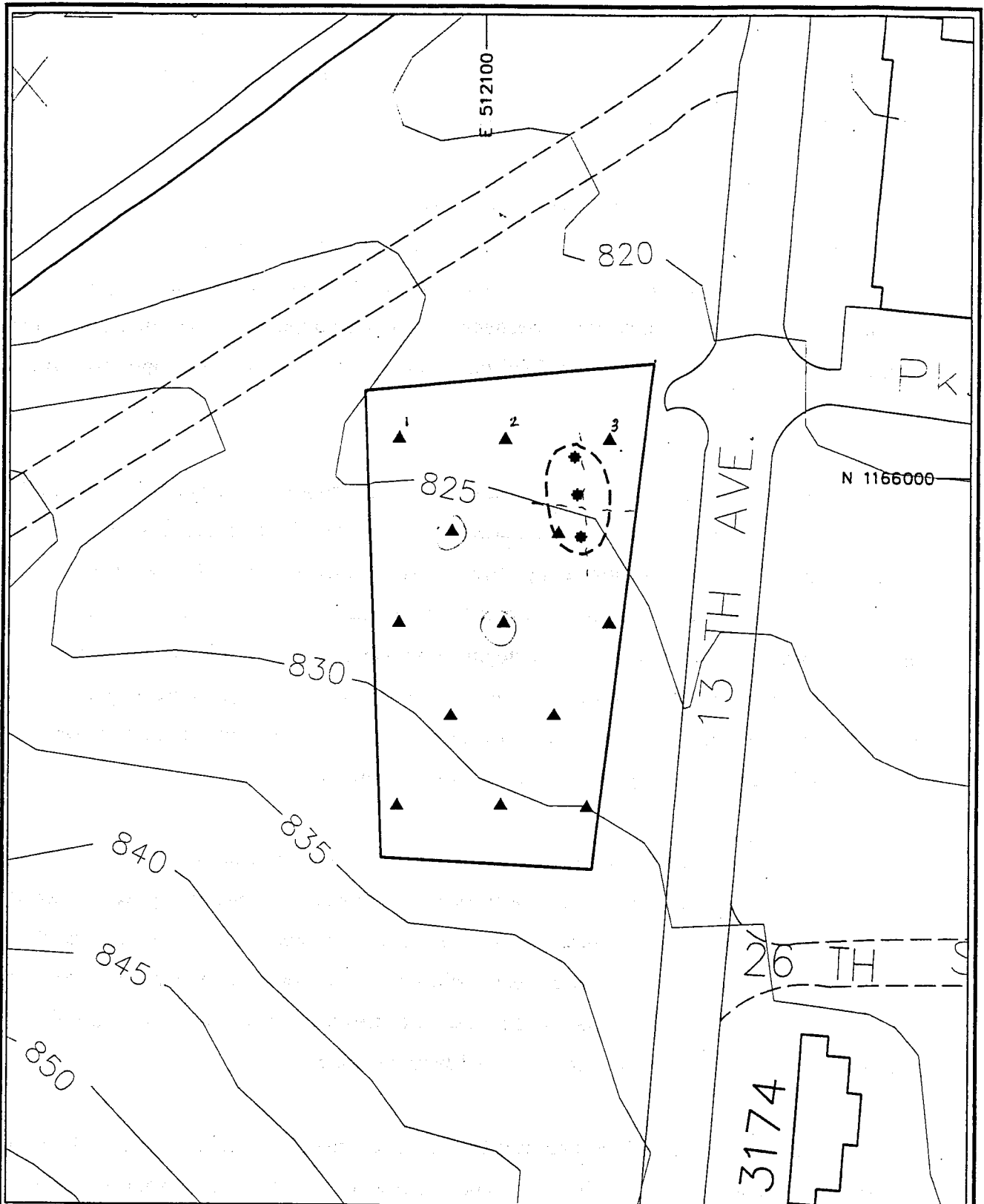
the pit dimensions are unknown. Samples collected from two high-probability locations at the site (SAIC 1993) did not detect chemical warfare agent or agent breakdown products in the subsurface soils.

Field screening of surface and subsurface soils will be conducted at the D&I range by the USATEU. MINICAMS units will be used to field analyze soil samples at 13 surface locations for chemical warfare agents (HD and GB). The sampling points will be systematically located from a randomly generated origin within the fenced area at the site as shown in Figure 3-10.

Four shallow soil samples will be collected from the D&I area for chemical agent (HD and GB) breakdown products analyses. Samples will be collected from an intermediate depth of 5 to 7 feet because the dimensions and depth of the pit are unknown. Two soil samples will be collected from a test pit located within the area of the burn/burial pit. The test pit will be excavated until a sample can be collected from a depth below the pit debris (not to exceed 10 feet BLS) based on visual observations (i.e. soil discoloration, natural soil, no debris). The remaining samples will be collected from 2 test pit locations based on the field screening results. These pits will be excavated to a depth of 0 to 2 feet. Soil samples for laboratory analysis will be collected from the backhoe bucket at the surface.

3.2.8 Site 8 - Range L (Lima Pond)

Range L is a former chemical munitions disposal area located on Pelham Range. The 0.5-acre site reportedly was used to dispose of captured World War II munitions, including chemical munitions. The pond is within a bermed area that is approximately 15 feet higher than the surrounding wooded terrain. The pond is estimated to be approximately 30 feet deep from the top of the berm, although the actual depth of potential burials below the pit bed is unknown. Ordnance and chemical munitions potentially buried in Range L have not been extensively studied to determine the types of materials and their aerial distribution within the pond area. Previous undocumented surface soil sampling at Lima Pond did not indicate the presence of contamination, although the location of the sampling in the pond area is unknown. USATEU



LEGEND:
 ▲ USATEU Minicams Sample
 ◆ Soil Sample
 ⊕ Burial Pit

Site boundary from USATHATMA 1977.
 Base map from U.S. Army Corps of Engineers, Mobile District, 1989.

U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland

SITE LOCATION MAP-D & I AREA

Fort McClellan RI/FS, Anniston, Alabama

Figure: 3-10 | Project: 01-0827-03-6520-006

conducted a qualitative metal detection survey and identified instrument signatures indicative of large metal objects around the pond area (SAIC 1993).

Prior to initiating field investigations at Range L, a detailed (2-foot contour interval) topographic map of the site will be developed by land surveying. Site specific detail in the vicinity of Range L is currently lacking and will be necessary for accurate location of geographic data and for quantitative engineering assessments. The topographic map will incorporate the entirety (interior and exterior) of Lima Pond and will incorporate surface topography around the pond.

Dependent on site accessibility, magnetometer, EM, and ground penetrating radar (GPR) surveys will be conducted over an approximately 100 foot by 200 foot area within Range L. Several transects will be established by SAIC at approximately 15 to 25 foot intervals to characterize the geophysical signature within the pond area. Transects will be used due to mobility constraints caused by drastically sloping terrain and the pond. Additionally, a site visit conducted September 1993 showed the area to be littered with fallen trees due to the February 1993 blizzard. A magnetometer will be used to screen every monitoring well location prior to drilling and ensure metallic objects will not be encountered.

MINICAMS screening for HD, GB, and VX CWA will be conducted by USATEU on subsurface soils at Range L. Subsurface samples will be obtained at 7 monitoring well locations located around the exterior perimeter of the site berm. The boreholes will be advanced to 10 feet below the encountered water table (estimate 35 feet total depth) with soil samples collected every 5 feet. Results obtained from the field analyses will be used to segregate CWA contaminated soils and to identify samples for laboratory analysis.

Eight soil samples will be submitted for laboratory analysis of HD, GB, and VX agent breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds. Samples collected during well drilling activities will also be screened using an OVA. The results of the field screening will be used to differentiate samples for laboratory analysis. If MINICAMS and FID screening results do not indicate potential contamination, one

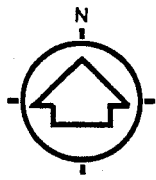
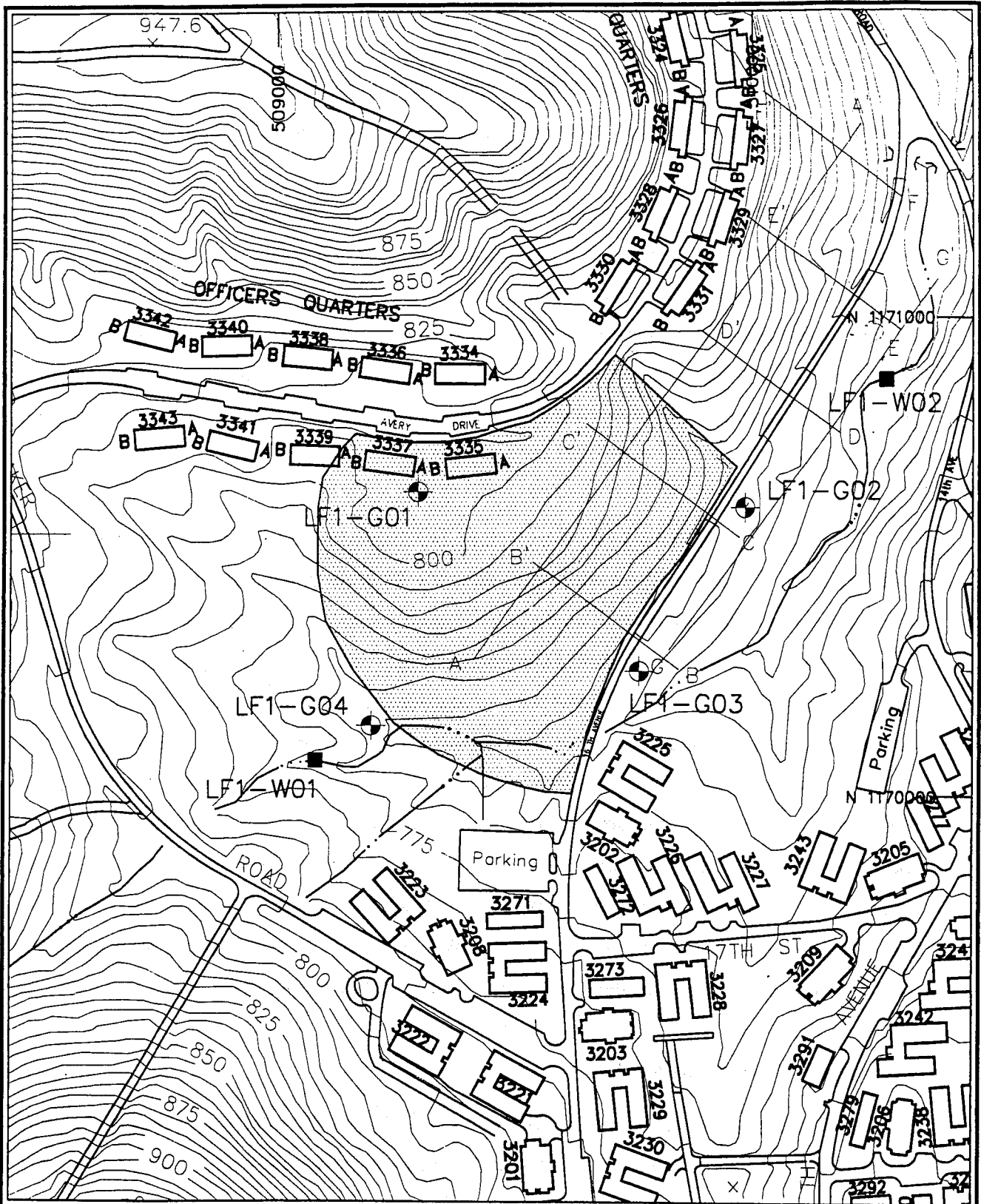
soil sample near the surface and one sample from the water table interface will be sent from four boreholes (one upgradient, three downgradient) for laboratory analysis.





Two sediment and 2 surface water samples will be collected from the Range L area. One surface water/sediment sample will be obtained from the pond area and a second sample will be obtained from a tributary to Cane Creek that flows approximately 250 feet west of the pond. The surface water and sediment samples will be analyzed for HD, GB, and VX agent breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds analyses. Prior to sample shipment, the field screening results for both media will be negative for chemical surety material.

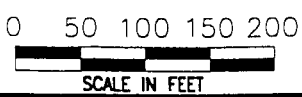
A total of 7 monitoring wells are planned to be installed outside of the bermed area around Range L. Initial monitoring well placements will be triangulated (three wells) to estimate the direction of groundwater flow at the site. Estimates of the groundwater elevation will be obtained during drilling using a detailed topographic map of the site area. Groundwater levels will again be measured from these wells after completion, development, and surveying activities to quantitatively determine the groundwater flow direction for the site. The distribution of the remaining 4 monitoring wells will be determined using the groundwater flow direction to locate wells upgradient and downgradient of the site. Depending on the hydrogeologic conditions encountered in the field, the disposition of the additional four wells will be evaluated to determine the need for more areal coverage or well pairs. Groundwater samples will be collected from Range L monitoring wells for CWA (HD, GB, and VX) breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds.

3.2.9 Site 9 - Former Landfill #1

Former Landfill #1 reportedly operated as the Post sanitary landfill between 1945 and 1947. The assumed site covers approximately 2 densely wooded acres and is located between 16th Avenue and Avery Drive, adjacent to the floodplain of an unnamed intermittent stream draining into Remount Creek (Figure 3-11). The site slopes to the southeast toward 16th Avenue. Information concerning the operation or content of the landfill has not been located. Known or suspected releases have not been documented and evidence of releases



- LEGEND:**
-  Approximate Site Boundary
 -  Stream
 -  RI Monitoring Well Location
 -  A-A' SI Geophysical Survey Transect



Site boundary from USDA-ASCS Aerial Photograph (12-09-54)
 Base map from U.S. Army Corps of Engineers, Mobile District, 1989.

U.S. Army Environmental Center
 Aberdeen Proving Ground, Maryland

SITE LOCATION MAP-FORMER LANDFILL #1

Fort McClellan RI/FS, Anniston, Alabama

Figure:3-11 Project: 01-0827-03-6520-006

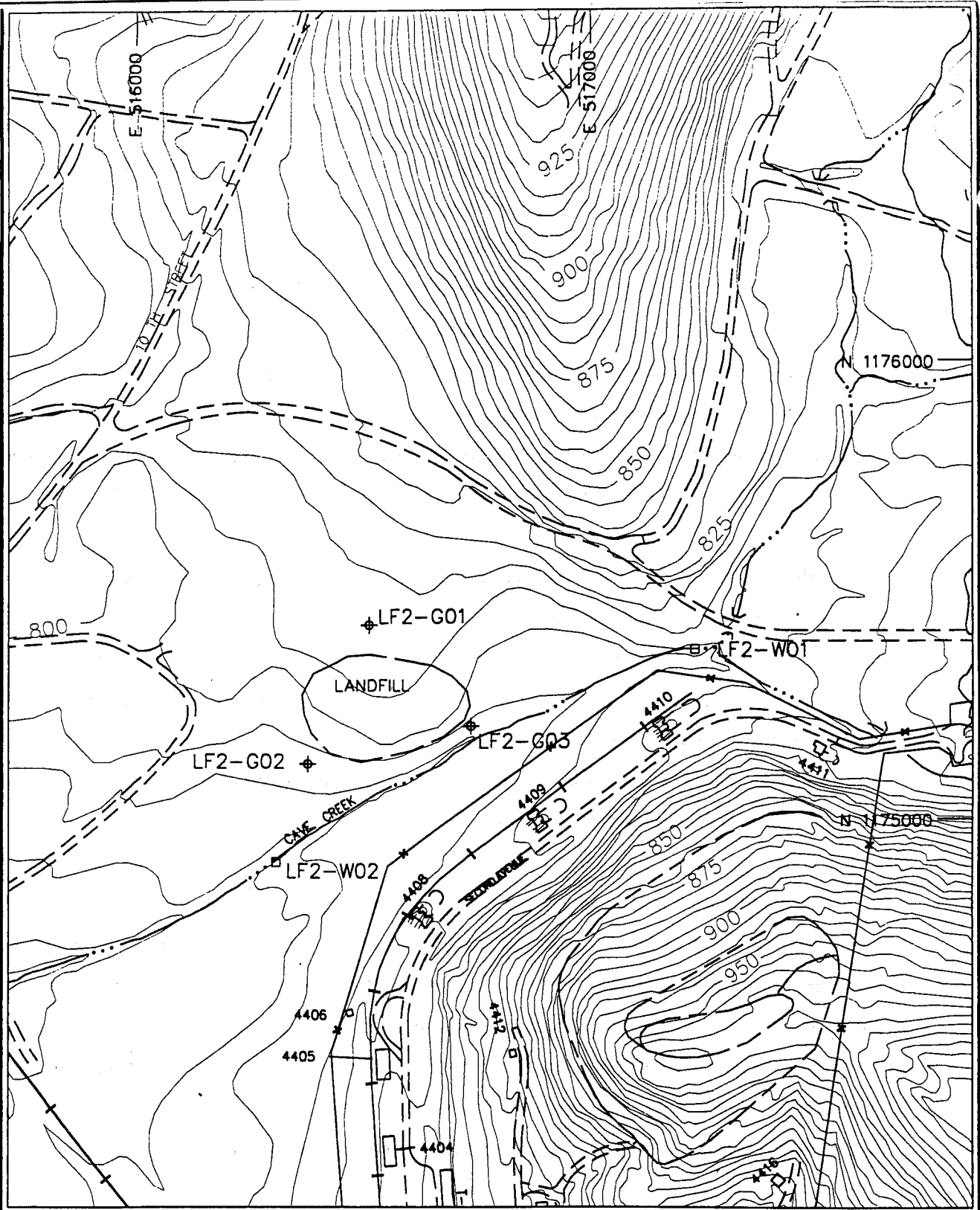
(leachate seeps) was not observed during the site preliminary assessment (USATHAMA 1990) or the October 1991 site visit. Aerial photographs of the site dated 1944, 1954, and 1957 suggest that portions of the area may have been cleared, although the purpose for the clearing is unknown. The location of the site on a steeply sloping hillside is inconsistent with large scale landfilling operations. Magnetometer data obtained along seven transects at Former Landfill #1 during the 1992 SI did not indicate large-scale landfilling over the surveyed area. The initial geophysical survey using magnetometry identified several anomalous areas indicative of buried metallic objects. In many instances these anomalies were attributed to near surface phenomena associated with uncontrolled dumping as opposed to large-scale landfilling. Additional anomalies and surface debris were observed in the southern portion of the investigated area.

EM surveys will be conducted at this site along seven transects established by SAIC in 1992 to determine if the site area was previously excavated. Additional magnetometer surveys will be conducted in anomalous areas identified by SAIC in 1992 in the northwest portion of the site and along previously established profile A. Survey readings will be obtained at approximately 20 foot intervals along each transect using a portable proton precession magnetometer system. Twenty foot intervals will provide the needed resolution to geophysically characterize the site as a landfilled location.

Depending on the results of the additional geophysical surveys, site reconnaissance, and aerial photograph evaluation, four monitoring wells may be installed at Landfill #1 to characterize groundwater quality and to determine the groundwater flow direction for the site. Preliminary well locations are shown on Figure 3-11 and are triangulated to assess the groundwater flow direction in the area. A fourth well will be established downgradient of the inferred site. Groundwater samples will be collected from Landfill #1 monitoring wells for VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds.

3.2.10 Site 10 - Former Landfill #2

Former Landfill #2 (Figure 3-12) reportedly was used as the Post sanitary landfill after the closure of Former Landfill #1 and was active from 1947 to an unknown date. The landfill covers approximately 4 acres and is located west of the southern tip of Cemetery Hill, between



<p>SCALE IN FEET</p>	<p>LEGEND:</p> <ul style="list-style-type: none"> ◆ Monitoring Well (SAIC 1992) ▣ Surface Water/Sediment Sample - - - Landfill Boundary <p>Site boundary from USATHATMA 1977. Base map from U.S. Army Corps of Engineers, Mobile District, 1989.</p>	<p>U.S. Army Environmental Center Aberdeen Proving Ground, Maryland</p>
	<p>SITE LOCATION MAP-FORMER LANDFILL #2</p> <p>Fort McClellan RI/FS, Anniston, Alabama</p> <p>Figure: 3-12 Project: 01-0827-03-6520-006</p>	

2nd Avenue and 10th Street. This site is located in the floodplain of Cave Creek, which is an intermittent stream flowing south-southeast of the landfill. The landfill was used to dispose of waste during deactivation of the installation. Rusted drums, metal, small containers (5-gallon cans and bottles), assorted building materials, and machinery parts were observed at the site in October 1991. Known or suspected releases have not been documented and evidence of releases (leachate seeps) was not observed during SAIC's October 1991 site visit. Based on the results of groundwater sampling at Former Landfill #2 (SAIC 1993), environmental contamination was not detected in groundwater at this site. The groundwater flow direction was determined to move in a southern direction under the site toward Cave Creek. Groundwater samples will be collected from the three monitoring wells at Landfill #2 and will be analyzed for VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds.

Two surface water and 2 sediment samples will be collected from Cave Creek at Former Landfill #2 and analyzed for VOCs, SVOCs, metals, pesticides, and PCBs. One surface water and sediment sample will be collected at an upgradient location in the creek bed and the other sample will be collected at a location downgradient of the site. The upgradient sample location was selected to provide data on possible contaminant migration onto to the site via the stream. The downgradient sampling location will determine if contamination is migrating from the of the site through other pathways (i.e. groundwater, surface runoff). The sample locations are shown on Figure 3-12.

3.2.11 Site 11 - Former Landfill #3

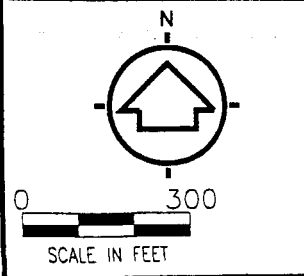
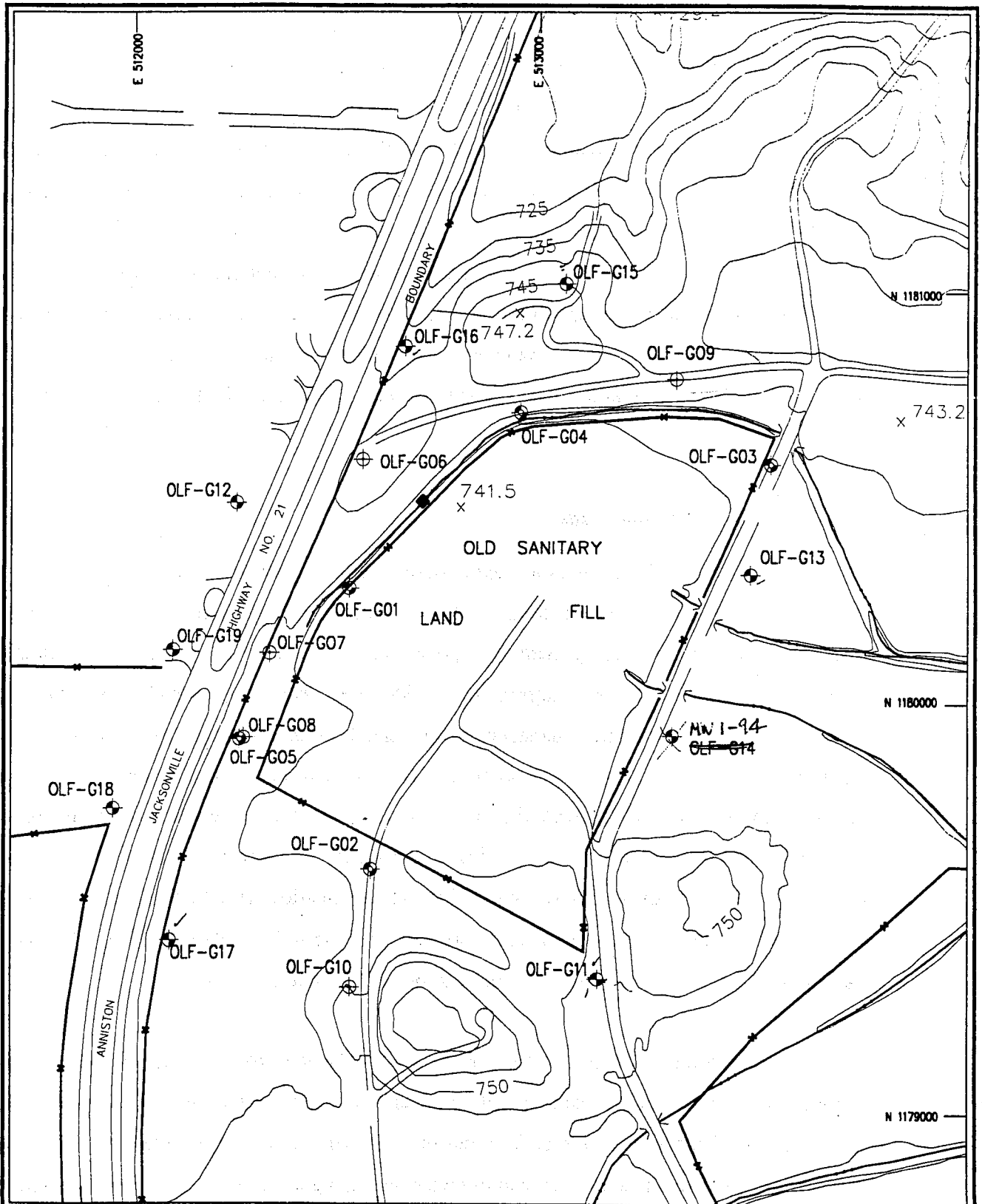
Former Landfill #3 was the Post sanitary landfill in operation between 1946 and 1967. The landfill was operated using the trench and fill method, with trenches trending northwest to southeast. Traces of the trenches due to settling over the old landfill cells have been noted in the past and have also been observed on aerial photographs. The landfill covers approximately 22 wooded acres and is located east of State Route 21 and north of Cane Creek. This location is northwest of and adjacent to active Sanitary Landfill #4. Access to the landfill area is obtained along unpaved perimeter roads.

Groundwater contamination by organic compounds and metals has been detected at former Landfill #3 (SAIC 1993). Concentrations of organics (trichloroethylene, 1,1-dichloroethene, benzene, methyl isobutyl ketone, and 1,1,2,2-trichloroethane) were detected below or slightly exceeding regulatory maximum contaminant levels (MCLs). Metals concentrations, including chromium, nickel, lead, and beryllium, exceeded MCLs at wells OLF-2 and OLF-3. Explosive-related compounds 1,3,5-trinitrobenzene and 2,4-dinitrotoluene were detected in well OLF-10. The detection of chemical constituents in the site groundwater, including VOCs, SVOCs, pesticides, metals, and explosive-related compounds during groundwater sampling conducted in 1986 and 1992, indicates that leakage from the site is occurring. The extent of the aquifer contamination resulting from the leakage is unknown.

Two sediment and 2 surface water samples will be collected from tributaries that enter and egress the site. A surface water and sediment sample will be collected from Cane Creek which leaves Fort McClellan southwest of Former Landfill #3. This location was sampled during the SI, but has been reselected for sampling because it is the closest significant downgradient tributary exiting the post. The second surface water sample will be collected from one of the intermittent streams entering Landfill # 3 along the central portion of the eastern boundary as shown on Figure 3-13. The sediment and surface water samples will be analyzed for VOCs, SVOCs, metals, pesticides/PCBs, and explosive related compounds analyses.

Twelve soil samples will be collected from the planned borehole locations nearest the landfill to characterize soil contamination at the site. The soil samples will be collected for VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds analyses. Samples collected during well drilling will be screened using an OVA. OVA readings will be used to differentiate samples for laboratory analysis. In the event that OVA screening results do not indicate potential contamination, one soil sample near the surface and one sample from the water table interface will be sent for laboratory analysis.

A total of 9 monitoring wells will be installed in and around Landfill #3. The planned well locations are shown on Figure 3-13. Three monitoring wells (OLF-11, OLF-13, and OLF-14) will be installed east (upgradient) of the landfill to characterize groundwater flowing



LEGEND:

- RI Well Location
- ⊕ SI Well Location (SAIC 1992)
- ⊙ USAEHA Well Loc.(USAEHA 1986)
- ◆ Surface Water/Sediment Sample

Site boundary from USATHATMA 1977.
Base map from U.S. Army Corps of Engineers, Mobile District, 1989.

U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

SITE LOCATION MAP-FORMER LANDFILL #3

Fort McClellan RI/FS, Anniston, Alabama

Figure: 3-13 Project: 01-0827-03-6520-006

from the direction of active landfill #4. Landfill #4 is the current landfill used by Fort McClellan and is located east of Landfill #3. Four wells OLF-12, OLF-17, OLF-18, and OLF-19 will be placed downgradient of Landfill #3 wells which had detected concentrations of target compounds (SAIC 1993) at locations that have the greatest potential for detecting contaminants migrating off site. The remaining 2 wells (OLF-15 and OLF-16) will be installed within Fort McClellan boundaries but outside of Landfill #3 boundaries. Wells OLF-15 and OLF-16 will be placed downgradient of well OLF-4, which had detected concentrations of VOCs, SVOCs, mercury, and pesticides. Groundwater samples will be collected from Landfill #3 monitoring wells for VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds analyses.

3.2.12 Site 12 - Old Water Hole

The Old Water Hole site is located between New Mt. Sellers Cemetery and the prisoner of war (POW) camp on Pelham Range. The site was reportedly used for the disposal of a variety of munitions, including chemical agents, and is possibly a sinkhole. A rectangular, shallow, topographic depression approximately 35 by 85 feet was located by Fort McClellan Department of Environmental Management personnel in the approximate area between the cemetery and the POW camp. An additional circular depression was located near the main depression in this area. Fort McClellan personnel indicate that the depression periodically fills with water, although it was dry during SAIC's October 1991 site visit. The area was under water during SAIC's April 1992 site visit. Several small-caliber bullet shells were found at the site in 1992. Metal detection sweeps conducted by USATEU (SAIC 1993) indicated the possibility of a large concentration of metallic objects buried at the site.

Prior to initiating field investigations at the Old Water Hole, a detailed (2-foot contour interval) topographic map of the site will be developed by land surveying. Site specific detail in the vicinity of the Old Water Hole is currently lacking and will be necessary for accurate location of geographic data and for quantitative engineering assessments. The topographic map will incorporate the area of the topographic depressions and will incorporate surface topography around the area.

SAIC will conduct magnetometer, EM, and GPR surveys at the Old Water Hole over a 100 foot by 200 foot grid to evaluate the site for potential buried metallic objects (i.e. drums, munitions). The GPR survey will be conducted on several transects to provide a real time profile of the site. The size of the grid will adequately cover the rectangular and circular depressions at the site. The grid will initially be measured on 20 foot centers and the spacing will be decreased if necessary to providing better resolution of detected anomalies. Soil sample and monitoring well locations will be based partially on geophysical survey results. A magnetometer will be used to screen all monitoring well locations prior to the commencement of drilling activities to ensure metallic objects will not encountered.

Field analyses will be conducted on surface and subsurface soil samples at the Old Water Hole using MINICAMS units field screening soil samples at 15 surface locations and 35 subsurface locations. Surface soil samples (0-0.5 feet BLS) will be analyzed for chemical warfare agents (HD, GB, and VX). Surface sample locations will be systematically placed from a randomly generated origin within the site boundary. The results obtained from the MINICAMS analyses will be used to characterize surface contamination with regard to chemical warfare agents.

Eight soil samples will be collected from the well locations directly downgradient of the two suspected burial locations at the site for HD, GB, and VX agent breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds analyses. Field screening samples will be collected simultaneously with laboratory samples and analyzed for CWAs (HD, GB, and VX) by USATEU to ensure chemical assurity. Samples collected during well drilling activities will also be screened using a OVA. OVA readings and field screening results will be used to differentiate samples for laboratory analysis. If MINICAMS and OVA screening results do not indicate potential contamination, one soil sample near the surface and one sample from the water table interface will be sent for laboratory analysis.

A total of 5 monitoring wells will be installed around the two burial areas at the Old Water Hole. The planned locations will be placed to provide areal coverage of the site based on the known geometry of the topographic depressions. Actual well locations will be based on

the data collected from field screening and geophysical survey activities. The water table is anticipated to be fairly high at this site because it is a low lying area that has been observed on occasion to have standing water. Initial well installations at the site will be triangulated to determine the groundwater flow direction for the site. The remaining two wells will be completed at locations downgradient of the two burial areas. Preferred well locations would be hydrogeologically downgradient of the suspected disposal site to determine if potential contaminants are migrating off site. All well locations will be screened with a magnetometer to ensure metallic objects (i.e. drums, munitions) are not encountered during drilling. Groundwater samples will be collected from Old Water Hole monitoring wells for CWA (HD, GB, and VX) breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds.

3.2.13 Background

Background samples will be obtained from three locations on the Main Post and from one location on Pelham Range. Background groundwater samples will be obtained from the existing well at Reilly Lake, from a planned well east of the operating Landfill #4 (to be installed as part of a RCRA action at the landfill), and from a planned well southeast of Range T-24A. A potable well at Rideout Hall on Pelham Range will also be sampled. Upgradient wells at individual sites may also be regarded as representative of background conditions if the well is determined to be consistently upgradient. Background soil samples will also be collected at these locations. Surface water and sediment samples collected upgradient of sites T-5, T-24A, Landfill #2, and landfill #3 will be treated as background for the Main Post and Pelham Range.

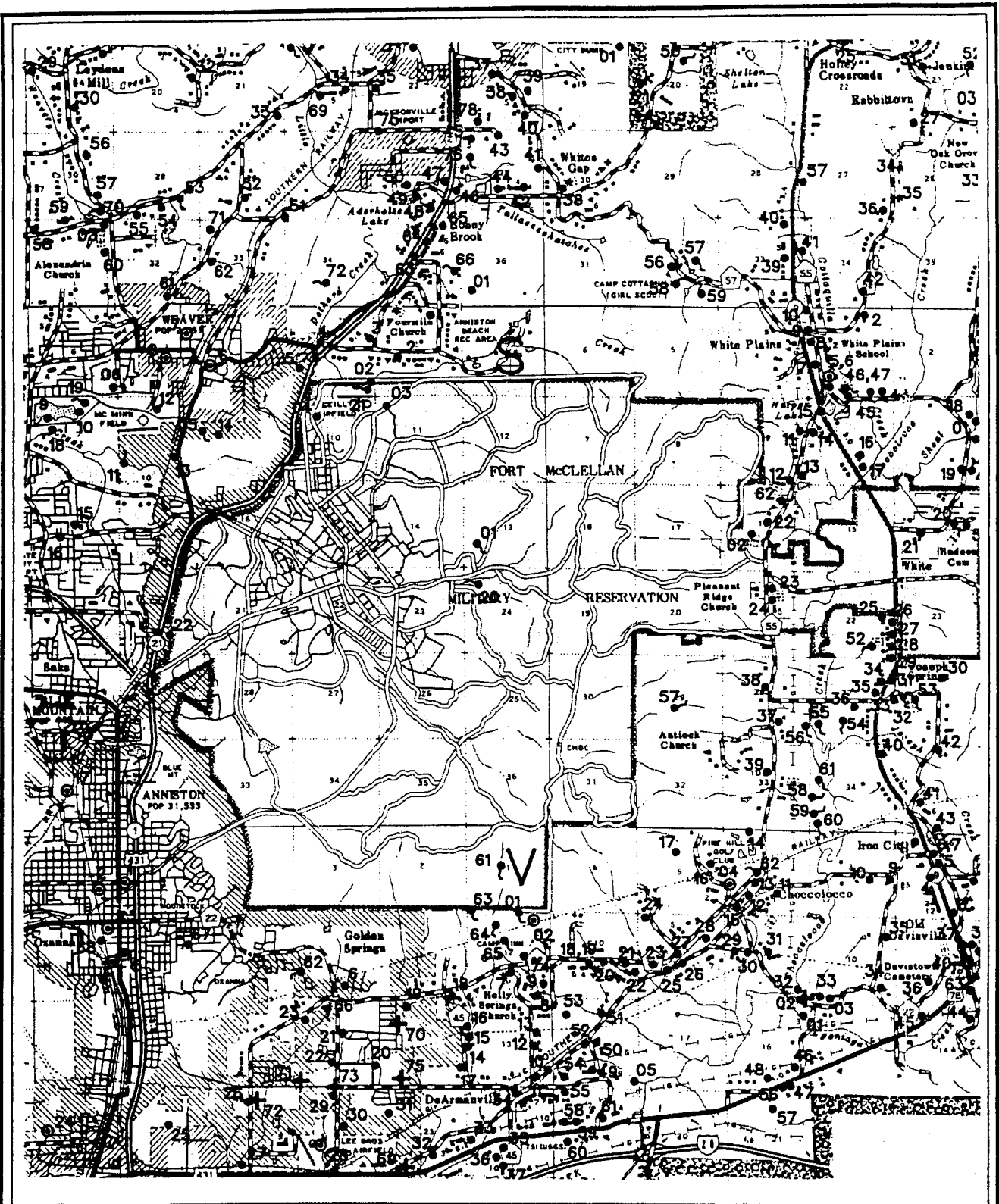
One groundwater sample will be collected from the well at each background site and a shallow soil sample will also be collected in the vicinity of the well. The shallow soil sample will be collected at a depth between land surface and 0.5 feet BLS. Background samples will be analyzed for CWA (HD, GB, and VX) breakdown products, VOCs, SVOCs, metals, pesticides, PCBs, and explosive related compounds analyses.

3.2.14 City of Weaver Well Samples

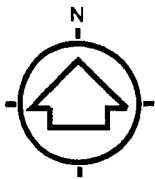
Groundwater samples will be obtained by SAIC from municipal supply wells (Nos. 1,3) operated by the City of Weaver located northwest of Fort McClellan. Collected groundwater samples will be analyzed for volatile and semivolatile organic compounds, metals, pesticides/PCB's, and explosives.

3.2.15 Off-Post Potable Wells

Moser and DeJarnette (1992) identify potable wells and springs supplying groundwater for municipal, industrial, private, military, and agricultural users. Approximately 11 wells are located within a 2-mile radius of Former Landfill #3 and approximately 40 wells are located within a 4-mile radius of Landfill #3 (Figure 3-14). Several of the wells are listed as abandoned or plugged and many of the wells within the 2-mile radius area date from the mid-1950's. Depending on the distribution and concentration of contaminants detected in the monitoring wells, groundwater sampling of potable wells that are currently supplying populations in the vicinity of Landfill #3 may be warranted.



APPROX. SCALE 1" = 2.42 MILES



SOURCE: GROUND-WATER AVAILABILITY
IN CALHOUN COUNTY, ALABAMA
GEOLOGICAL SURVEY OF ALABAMA, 1992

U.S. Army Environmental Center
Aberdeen Proving Ground, Maryland

POTABLE WATER WELLS IN THE
VICINITY OF FORT McCLELLAN

Fort McClellan RI/FS, Anniston, Alabama

Figure: 3-14 | Project: 01-0827-03-6520-006

4. SAMPLE DESIGNATION

Environmental samples collected and analyzed during the Fort McClellan remedial investigation (RI) will be assigned unique sample designation numbers for use by field, laboratory, and data management personnel. Databases in the U.S. Army Environmental Center's (USAEC) Installation Restoration Data Management Information System (IRDMIS) will be used to archive analytical and geotechnical information generated during the RI. This section discusses the IRDMIS requirements as they apply to sample designations at Fort McClellan. Additional information regarding the IRDMIS is provided in Section 7 and in the *IRDMIS User's Guide, Volume II, Data Dictionary* (PRI 1993).

4.1 IRDMIS REQUIREMENTS

A unique series of designations will be assigned to each environmental sample collected during the RI. The sample designations for the Fort McClellan RI/FS are provided in Table 4-1. The complete sample designation will consist of a site identification number, a field sample number, and the site type from which the sample was collected. The site identification number consists of a site designator (e.g., T4, T5, OLF), a media type (i.e., soil, groundwater, surface water, sediment) designator, and a boring number. Each sample collected from a unique location (not from same borehole) is given a boring number in the IRDMIS. Multiple samples collected from the same location (borehole) are identified with an additional sequential numeric designator to distinguish individual samples collected from the same borehole. A site type designator is used in the IRDMIS to identify the source of a sample (i.e., soil boring, well, surface water, QA/QC sample). These designators will be recorded on the samples by the field investigators and will be forwarded to the analytical laboratories for ultimate usage in the generation of data files for input to the IRDMIS. An example of a sample designator number is illustrated below:

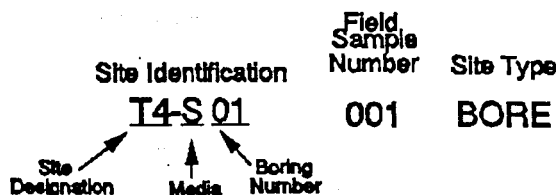


Table 4-1. Site Identification for Samples Collected During the RI/FS at FT. McClellan, Aniston Alabama

Location	Site Designation	Installation Code (11.04)	Site Type (9.17)	Site ID (9.16)	Location	Site Designation	Installation Code (11.04)	Site Type (9.17)	Site ID (9.16)
Area T-4	T4	MC	AHOL	T4-S01 to T4-S04	Former Landfill #1	LF1	MC	BORE	LF1-S01 to LF1-S04
Area T-5	T5	MC	CREK	T5-D02 to T5-D03				CREK	LF1-D01 to LF1-D02
			CREK	T5-W02 to T5-W03				WELL	LF1-G01 to LF1-G04
			AHOL	T5-S05 to T5-S08				CREK	LF1-W01 to LF1-W02
Area T-24A	T24A	MC	CREK	T24A-D02	Former Landfill #2	LF2	MC	CREK	LF2-D01 to LF2-D02
			CREK	T24A-W02				CREK	LF2-W01 to LF2-W02
			EXCV	T24A-S03 to T24A-S08				WELL	LF2-G01 to LF2-G03
Area T-38	T38	MC	BORE	T38-S05 to T38-S10	Former Landfill #3	OLF	MC	BORE	OLF-S11 to OLF-S19
			WELL	T38-G05 to T38-G08				CREK	OLF-D02 to OLF-D03
								CREK	OLF-W02 to OLF-W05
Range K	RK	PR	AHOL	RK-S01 to RK-S04				WELL	OLF-G01 to OLF-G19
Range J	RJ	PR	BORE	RJ-S05 to RJ-S08	Old Water Hole	OWH	MC	BORE	OWH-S0 to OWH-S05
			EXCV	RJ-S05 to RJ-S07				WELL	OWH-G01 to OWH-G05
			WELL	RJ-G05 to RJ-G07	Background	BK	MC	BORE	BK-S02 to BK-S04
Detection and Identification Area	DIA	MC	EXCV	DIA-S03 to DIA-S06				AHOL	BK-S02 to BK-S04
Range L (Lima Pond)	RL	PR	POND	RL-D01				CREK	BK-D02
			STRM	RL-D02				BORE	BK-G02 to BK-G04*
			POND	RL-W01				WELL	BK-G02 to BK-G04*
			STRM	RL-W02 to RL-W04					
			BORE	RL-S01 to RL-S07	Background	BK	PR	BORE	BK-S05
			WELL	RL-G01 to RL-G07				AHOL	BK-S05
								CREK	BK-D01
								BORE	BK-G01
								WELL	BK-G01
						FPR	PR	TAPW	FPR001
					Potable Water - Main Post	FMP	MC	TAPW	FMP001
						FRL	MC	TAPW	FRL-1
					City of Weaver	CW	MC	WELL	CW-G01 to CW-G02

* - This background monitoring well will be installed by a different contractor.

4.2 IRDMIS SITE IDENTIFICATIONS

The site identification character string comprises the initial portion of the sample location designator. Sample locations, such as monitoring wells, soil borings or surface samples, are each assigned a unique site identification with a maximum of 10 characters for usage in the IRDMIS. As illustrated above, the site ID contains three pieces of information. The first portion of the site ID is the site designation, which is a 2 to 4 character abbreviation representing the site name (i.e., T4 to designate samples collected from the Area T-4). The site ID will also include the medium (soil, groundwater, surface water, sediment) from which the samples were collected. Each medium is abbreviated with a unique character attribute within the IRDMIS. The following media and their IRDMIS abbreviations will be sampled at Fort McClellan:

- D = sediment
- G = groundwater
- S = soil
- W = surface water.

The number of sampling locations for each medium will be numbered consecutively. Numbering will begin with "01" where samples were not collected during the site investigation (SAIC 1993). Using an example from Table 4-1, 1 sediment sample was collected from Area T-5 during the site investigation (SAIC 1993). Therefore, the first site ID for a sediment sample collected from Area T-5 during the RI will be designated "T5-D02."

4.3 IRDMIS FIELD SAMPLE NUMBERS

Soil samples may be collected from various depths within a soil boring and several groundwater samples may be collected from a well. The field sample number will be used to distinguish samples with identical site identifications. As illustrated, the first sample will be assigned 001 as the field sample number. Additional samples will, including field duplicates, be numbered consecutively. The additional requirements for entering duplicate sample results into IRDMIS are explained in Section 7.

4.4 IRDMIS SITE TYPES

The site type, which is a 4-character code that is used within the IRDMIS to characterize the general source of each sample. The following site types will be used in this investigation:

- BORE = soil boring
- WELL = monitoring well
- CREK = surface water and sediment samples collected from a creek
- TRIP = trip blank
- RNSW = equipment rinsate
- AHOL = surface soil
- EXCV = excavation pit
- STRM = surface water and sediment samples collected from a stream
- POND = surface water and sediment samples collected from a pond
- TAPW = tap water.

Field quality control (QC) samples will be collected during this investigation. The site identifier of the sampling location nearest to the location where QC samples will be prepared will be used to identify the trip blanks and equipment rinsate samples within the IRDMIS. Field sample numbers and site types will be used to discriminate environmental samples from field QC samples.