

**FINAL  
WORK PLANS  
  
FOR  
  
EASTERN BYPASS EE/CA  
  
AT  
  
FORT MCCLELLAN, ALABAMA**

**Prepared for:**



**US Army Engineering and  
Support Center, Huntsville**

**Huntsville, Alabama**

**Prepared by:**

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1100 Kenilworth Avenue  
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- C Scope of Work*
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- E USA Environmental Demolition Standard*
- F Demolition/Disposal SOP (Attachment I to the Intrusive Excavation Plan)*

## Acronym List

<b>ASR</b>	Archives Search Report
<b>CADD</b>	Computer-Assisted Drafting and Design
<b>CEHNC</b>	US Army Engineering and Support Center, Huntsville
<b>CERCLA</b>	Comprehensive Environmental Response, Compensation, and Liability Act
<b>CESAM</b>	US Army Engineering District, Mobile
<b>CWM</b>	Chemical Warfare Materiel
<b>DANS</b>	Data Acquisition and Navigation System
<b>EE/CA</b>	Engineering Evaluation/Cost Analysis
<b>EIC</b>	Engineer-in-Charge
<b>EM</b>	Electromagnetic
<b>EOD</b>	Explosive Ordnance Division
<b>EPA</b>	US Environmental Protection Agency
<b>ERP</b>	Emergency Response Plan
<b>EZ</b>	Exclusion Zone
<b>ft</b>	feet
<b>GPO</b>	Geophysical Prove-out
<b>m</b>	meters
<b>NAD83</b>	1983 North American Datum
<b>NCP</b>	National Contingency Plan
<b>OE</b>	Ordnance and Explosive Waste
<b>OSHA</b>	Occupational Safety and Health Administration
<b>PM</b>	Project Manager
<b>QA/QC</b>	Quality Assurance/Quality Control
<b>QC</b>	Quality Control
<b>SOP</b>	Standard Operating Procedures
<b>SOW</b>	Statement of Work
<b>SM</b>	Site Manager
<b>SSHP</b>	Site Safety and Health Plan
<b>SSHO</b>	Site Safety and Health Officer
<b>SUXOS</b>	Senior Unexploded Ordnance Supervisor
<b>TDMD</b>	Time Domain Metal Detector

<b>UNS</b>	Ultrasonic Navigation System
<b>US</b>	United States
<b>USACE</b>	United States Army Corps of Engineers
<b>USC</b>	United States Code
<b>UXO</b>	Unexploded Ordnance
<b>WAA</b>	War Assets Administration
<b>WP</b>	Work Plan
<b>WWII</b>	World War II

EXECUTIVE SUMMARY  
FOR  
EASTERN BYPASS EE/CA  
AT  
FORT MCCLELLAN, ALABAMA

September 1998

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## **1.0 EXECUTIVE SUMMARY**

The Eastern Bypass Engineering Evaluation/Cost Analysis (EE/CA) at Fort McClellan, Alabama is being conducted to determine whether ordnance and explosives (OE) and OE-related scrap exists within the boundary of the proposed bypass and easement. The EE/CA will describe the findings of all field work, with identification and analysis of removal alternatives and institutional controls. The Work Plans describe the work to be performed such that approval to proceed with the project can be granted by the US Army Engineering and Support Center.

### **1.1 Project Authorization**

ZAPATAENGINEERING, P.A. is conducting this work under Contract No. DACA87-95-D-0026 (Task Order Annex E), from the US Army Engineering and Support Center (CEHNC), Huntsville, Alabama. The purpose of this Task Order is to identify ordnance and explosives within the proposed Eastern Bypass, which will bisect Fort McClellan, and prepare an EE/CA fully describing removal and control alternatives, risk analysis, and associated costs.

### **1.2 Purpose and Scope**

The purpose of this project is to identify OE and OE-related scrap within the proposed Eastern Bypass through visual and intrusive investigation activities, and document removal and control alternatives. These actions will be performed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104, and the National Contingency Plan. Chemical warfare material (CWM) is not suspected to exist within the limits of the investigation. If suspected CWM is discovered, ZAPATAENGINEERING will immediately stop work, evacuate the work area, and notify the Fort McClellan Range Control. In order to satisfy the requirements of this contract, ZAPATAENGINEERING has prepared project specific work plans for review by the BRAC Cleanup Team (BCT) and approval by CEHNC. The work plans describe site background and history, investigation objectives, all proposed investigative activities, equipment, procedures, personnel, and schedule.

### **1.3 Site Location and History**

Fort McClellan is an active US Army post located in Calhoun County, Alabama that occupies approximately 18,766 acres. The main post is bounded to the south and west by the City of Anniston and to the northwest by the City of Weaver. Pelham Range is located five (5) miles due west of the main post and adjoins Anniston Army Depot along its northern boundary. Adjoining the main post to the east is the Choccolocco Corridor, which provides an access corridor connecting the post to the Talladega National Forest. Figure 2-1 presents a map showing the location of the site within the State of Alabama. Figure 2-2 presents a map of Fort McClellan and the proposed eastern bypass area of EE/CA investigation.

1.3.1 Documented military use at Fort McClellan began in 1912 when the Alabama National Guard used part of the site as a Field Artillery Range; however there is a possibility that during the Spanish American War (1898), units stationed at Camp Shipp

in the Blue Mountain area used areas in what is now Fort McClellan for artillery training. In 1917, Congress authorized the establishment of Camp McClellan. In 1929, the camp became officially designated as Fort McClellan. Following World War II, in June 1947, the Fort was put into an inactive status. The Fort was reactivated in January 1950, and has remained an active army post.

#### **1.4 Preparation of the Engineering Evaluation/Cost Analysis (EE/CA)**

Prior to preparation of these work plans, ZAPATAENGINEERING conducted a ground reconnaissance in the area of the proposed eastern bypass and easement to identify areas conducive to performing the geophysical prove-out, and to identify areas outside of the known impact areas which might contain OE.

1.4.1 The EE/CA to be prepared in accordance with this SOW will evaluate the results of all investigative and remedial activities conducted within the footprint of the proposed bypass, and will describe removal alternatives and institutional controls for all areas along the bypass. A ground reconnaissance of the known impact areas was previously conducted by CEHNC. The resulting characterization will be incorporated into the EE/CA, and precludes any additional investigation by ZAPATAENGINEERING.

1.4.2 The ground reconnaissance conducted by ZAPATAENGINEERING did not reveal evidence of ordnance within the non-impact areas of the proposed bypass and associated easements. Remnants of field training were evident in several areas of the bypass route, particularly north and south of Summerall Gate Road, as described in the Ground Reconnaissance Trip Report, Appendix A. The Historical Aerial Photography Investigation of the Fort McClellan East Bypass Study Area, Appendix B, was also used for placement of the sample grids. As a result of this ground reconnaissance, the most likely locations for placement of the sample grids are areas in proximity to Summerall Gate Road.

1.4.3 Upon approval of the work plans, the area for the geophysical prove-out will be cleared as necessary and the prove-out conducted. The identified sample location area(s) will also be cleared and land surveyed. A geophysical survey will be conducted in these areas, totaling approximately 10 acres. Anomalies will be randomly excavated and identified. Findings of the sampling effort will be documented in the EE/CA, along with removal or control alternatives and risk analyses for the entire bypass. Upon approval of the EE/CA, an Action Memorandum will be prepared.

PROJECT OVERVIEW  
FOR  
EASTERN BYPASS EE/CA  
AT  
FORT MCCLELLAN, ALABAMA

September 1998

Prepared for:  
US ARMY ENGINEERING AND SUPPORT CENTER  
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## **2.0 PROJECT OVERVIEW**

The Eastern Bypass Engineering Evaluation/Cost Analysis (EE/CA) at Fort McClellan, Alabama is being conducted to determine whether ordnance and explosives (OE) and OE-related scrap exists within the boundary of the proposed bypass and easement and to propose alternatives for addressing ordnance contamination. The EE/CA will describe the findings of all field work, with identification and analysis of removal alternatives and institutional controls. Investigative activities under this contract are limited to the non-impact areas along the proposed bypass alignment. However, the EE/CA will evaluate all data obtained from the ground reconnaissance conducted by CEHNC in the impact areas and include risk assessments and a discussion of removal alternatives and institutional controls for the entire proposed alignment. The Work Plans describe the work to be performed such that approval to proceed with the project can be granted by the US Army Engineering and Support Center.

### **2.1 Objectives of the Work Plans**

#### ***2.1.1 Project Authorization***

ZAPATAENGINEERING, P.A. is conducting this work under Contract No. DACA87-95-D-0026 (Task Order Annex E), from the US Army Engineering and Support Center (CEHNC), Huntsville, Alabama. The purpose of this Task Order is to identify ordnance and explosives within the proposed Eastern Bypass, which will bisect Fort McClellan, and prepare an EE/CA fully describing removal and control alternatives, and associated risk analysis.

#### ***2.1.2 Purpose and Scope***

The purpose of this project is to identify OE and OE-related scrap within the proposed Eastern Bypass through visual and intrusive investigation activities, and document removal and control alternatives. These actions will be performed in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104, and the National Contingency Plan. Chemical warfare material (CWM) is not suspected to exist within the limits of the investigation. If suspected CWM is discovered, ZAPATAENGINEERING will immediately stop work, evacuate the work area, and notify the Fort McClellan Range Control.

2.1.2.1 These Work Plans detail the planned OE investigation activities based on the Statement of Work (SOW) for Task Order Annex E, provided by CEHNC. Refer to Appendix A. The site investigation will focus on OE within the easement of the proposed bypass through Fort McClellan, as well as additional acreage beyond the easement boundaries. The areas of intrusive investigation exclude known impact areas, as these areas have been characterized by CEHNC. The specific objectives of the Work Plan are as follows:

- 1) to present site history and background information,
- 2) to identify areas suspected to contain OE,
- 3) to define procedures for identifying suspected OE, and

- 4) to define the methodology, personnel, and equipment for sampling and disposal of OE unearthed during limited intrusive investigations.

2.1.2.2 The Work Plans describe the components of the work that will be conducted to complete the site characterization and prepare the EE/CA. These components include the following work efforts:

- review existing reports, documents, and historic records, including Archive Search Reports and the Draft Environmental Assessment, and other data that may be provided by CEHNC;
- conduct a ground reconnaissance to visually inspect the site, excluding known impact areas, to identify geophysical prove-out areas and possible sample locations;
- prepare the Work Plans for field investigation activities, specifically addressing the following topics: Site Safety and Health, Site Mobilization and Demobilization, Geophysical Investigations, Intrusive Excavation, and Conventional Ordnance Safe Holding Area;
- conduct brush clearing operations;
- conduct site surveying activities;
- perform geophysical prove-out;
- perform geophysical surveys and sampling in suspect areas;
- conduct location survey(s) and mapping;
- prepare an EE/CA and subsequent Action Memorandum;
- provide technical support to the Government for meetings and public relations activities; and
- provide project management.

## **2.2 Background**

### ***2.2.1 Site Location and History***

Fort McClellan is an active US Army post located in Calhoun County, Alabama that occupies approximately 18,766 acres. The Main Post is bounded on the south and west by the City of Anniston and to the northwest by the City of Weaver. Pelham Range is located five (5) miles due west of the Main Post and adjoins Anniston Army Depot along its northern boundary. Adjoining the main post to the east is the Choccolocco Corridor, which provides an access corridor connecting the post to the Talladega National Forest. Figure 2-1 presents a map showing the location of the site within the State of Alabama. Figure 2-2 presents a map of Fort McClellan and the proposed eastern bypass.

2.2.1.1 Documented military use at Fort McClellan began in 1912 when the Alabama National Guard used part of the site as a Field Artillery Range; however there is a

possibility that during the Spanish American War (1898), units stationed at Camp Shipp in the Blue Mountain area used areas in what is now Fort McClellan for artillery training. In 1917, Congress authorized the establishment of Camp McClellan. In 1929, the camp became officially designated as Fort McClellan. Following World War II, in June, 1947, the Fort was put into an inactive status. The Fort was reactivated in January, 1950, and has remained an active army post.

2.2.1.2 The history of Fort McClellan, as described in the Archives Search Report (ASR) Findings, 1996, and draft Archive Search Report Conclusions and Recommendations, 1998, includes training activities and demonstrations that utilized all organic weapons: mortars, anti-tank guns and artillery pieces. Chemical warfare training occurred during several periods of time that warranted the use of such items as chemical agent identification sets, smoke pots, flame field expedients, rifle and smoke grenades. A review of the ASR Conclusions and Recommendations indicates that the majority of the chemical inventory has been transferred from Fort McClellan in 1976. In 1987, the Chemical Decontamination Training Facility located in the northeast corner of Fort McClellan became operational. The location of the Old Chemical Weapons Demonstration Area is illustrated on Figure 2-3.

## **2.2.2 Previous Investigations**

2.2.2.1 The Archives Search Report was compiled by the US Army Corps of Engineers in 1996. The document was prepared by reviewing all available records and reports documenting the history of the site. Historical information pertaining to site operations, including a listing of site investigations conducted prior to 1996, is contained within this document.

2.2.2.2 A ground reconnaissance of the known impact areas was conducted by CEHNC. The resulting characterization will be incorporated into the EE/CA prepared by ZAPATAENGINEERING. This characterization negates the need for additional inspection or sampling of these areas by ZAPATAENGINEERING.

2.2.2.3 The Archive Search Report Conclusions and Recommendations, prepared by the US Army Corps of Engineers, St. Louis District, presents the findings of the site inspection and evaluation of potential ordnance and explosives contamination at Fort McClellan. Numerous areas suspected of being used for chemical warfare training or chemical warfare material storage were inspected. No indications of chemical training or chemical material storage were noted within the boundaries of the proposed bypass.

2.2.2.3 An Environmental Assessment was prepared for the Alabama Department of Transportation by Barge, Waggoner, Sumner and Cannon, Inc. in 1998. This draft document identifies the economic and environmental impacts of the proposed bypass, and evaluates alignment alternatives for the bypass.

2.2.2.4 A non-intrusive ground reconnaissance was conducted by ZAPATAENGINEERING in August 1998. The purpose of the ground reconnaissance was to identify areas of

contamination, which have not been previously characterized within the proposed bypass area. In addition, possible locations for the geophysical prove-out and subsequent sampling were identified.

2.2.2.5 As documented in the Ground Reconnaissance Trip Report, no evidence of ordnance or ordnance impact areas was identified within the non-impact areas of the proposed bypass route. Several areas revealed evidence of training activities and were identified as potential sample locations. A complete assessment of these areas and recommendations for placement of sample grids is described in the Intrusive Excavation Plan.

### **2.2.3 Scope of the Eastern Bypass EE/CA at Fort McClellan**

The findings of the ZAPATAENGINEERING ground reconnaissance provide the groundwork for the sampling efforts in the area of the proposed eastern bypass at Fort McClellan. As no evidence of OE or OE-impact areas was identified during this ground reconnaissance, sampling efforts will be concentrated in known training areas north and south of Summerall Gate Road. Geophysical surveys will be conducted in these areas, totaling approximately 10 acres. Anomalies will be randomly excavated and identified. Findings of the sampling effort will be documented in the EE/CA, along with removal or control alternatives and risk analyses. Upon approval of the EE/CA, an Action Memorandum will be prepared by ZAPATAENGINEERING.

## **2.3 Project Team Organization**

Intrusive field work at an OE site requires a high level of expertise from many different organizations. An organizational chart for the Fort McClellan project is presented in Figure 2-4 depicting the various organizations and key personnel involved. The Technical Team consists of CEHNC, ZAPATAENGINEERING, USA Environmental, Inc., and Sanford Cohen & Associates. Figure 2-5 presents a matrix identifying the roles and responsibilities of each organization during the specific phases of the project. The roles of these team members are described below.

### **2.3.1 US Army Engineering and Support Center, Huntsville**

CEHNC is the implementing agency for execution of this project and will provide expertise for OE activities. CEHNC responsibilities include procurement of A/E services, direction of the A/E contractor (ZAPATAENGINEERING), control of the budget and schedule, and coordination of document reviews.

### **2.3.2 US Army Engineer District, Mobile**

The US Army Corps of Engineers, Mobile District, is the Life Cycle Project Manager for this project. District responsibilities include review of project work plans and documents, and communication with the news media and public.

### **2.3.3 ZAPATAENGINEERING, P.A.**

ZAPATAENGINEERING is the prime contractor to CEHNC and will provide all engineering support and services for the project activities. ZAPATAENGINEERING is responsible for

performance of the activities detailed in the SOW in Appendix C, as well as the control of the project schedule and budget.

**2.3.4 USA Environmental, Inc.**

USA Environmental is a subcontractor to ZAPATAENGINEERING. As such, USA Environmental will provide all unexploded ordnance (UXO) services necessary to conduct the field investigation. Services provided by USA Environmental will include all visual UXO inspections, performing the geophysical prove-out and data collection, and conducting the sampling activities. They will provide properly trained and qualified personnel for all UXO operations.

**2.3.5 Sanford Cohen & Associates (SC&A)**

SC&A, a subcontractor to ZAPATAENGINEERING, will be responsible for data interpretation and mapping of the results of geophysical investigations.

**2.3.6 Burford's Tree Surgeons**

Burford's Tree Surgeons, a subcontractor to ZAPATAENGINEERING, will conduct brush removal in the prove-out area, sample grids and access routes.

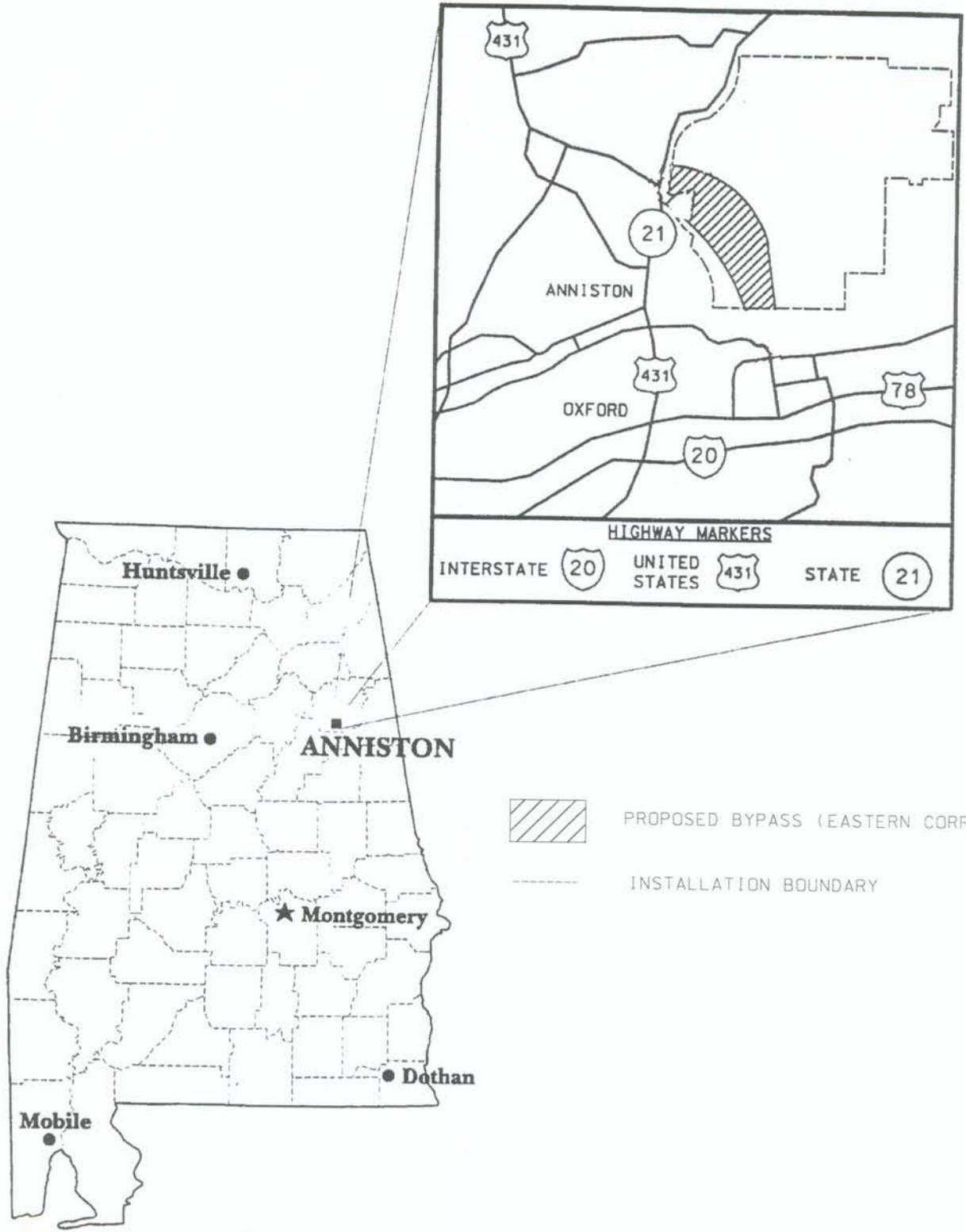
**2.3.7 Johnson & Associates**

Johnson & Associates, a subcontractor to ZAPATAENGINEERING, will conduct location surveys and mapping.

**2.3.8 Project Personnel**

2.3.8.1 Resumes of key personnel scheduled to perform work on this project are included in Appendix D.

2.3.8.1 Project Manager (PM). The ZAPATAENGINEERING Project Manager carries the primary contractual responsibility for implementing contractor-required activities in the SOW, provided in Appendix C. The PM will oversee the performance of all project team members, coordinate subcontract activities, and ensure that technical and contractual



HIGHWAY MARKERS  
 INTERSTATE 20 UNITED STATES 431 STATE 21

PROPOSED BYPASS (EASTERN CORRIDOR)  
 - - - - - INSTALLATION BOUNDARY

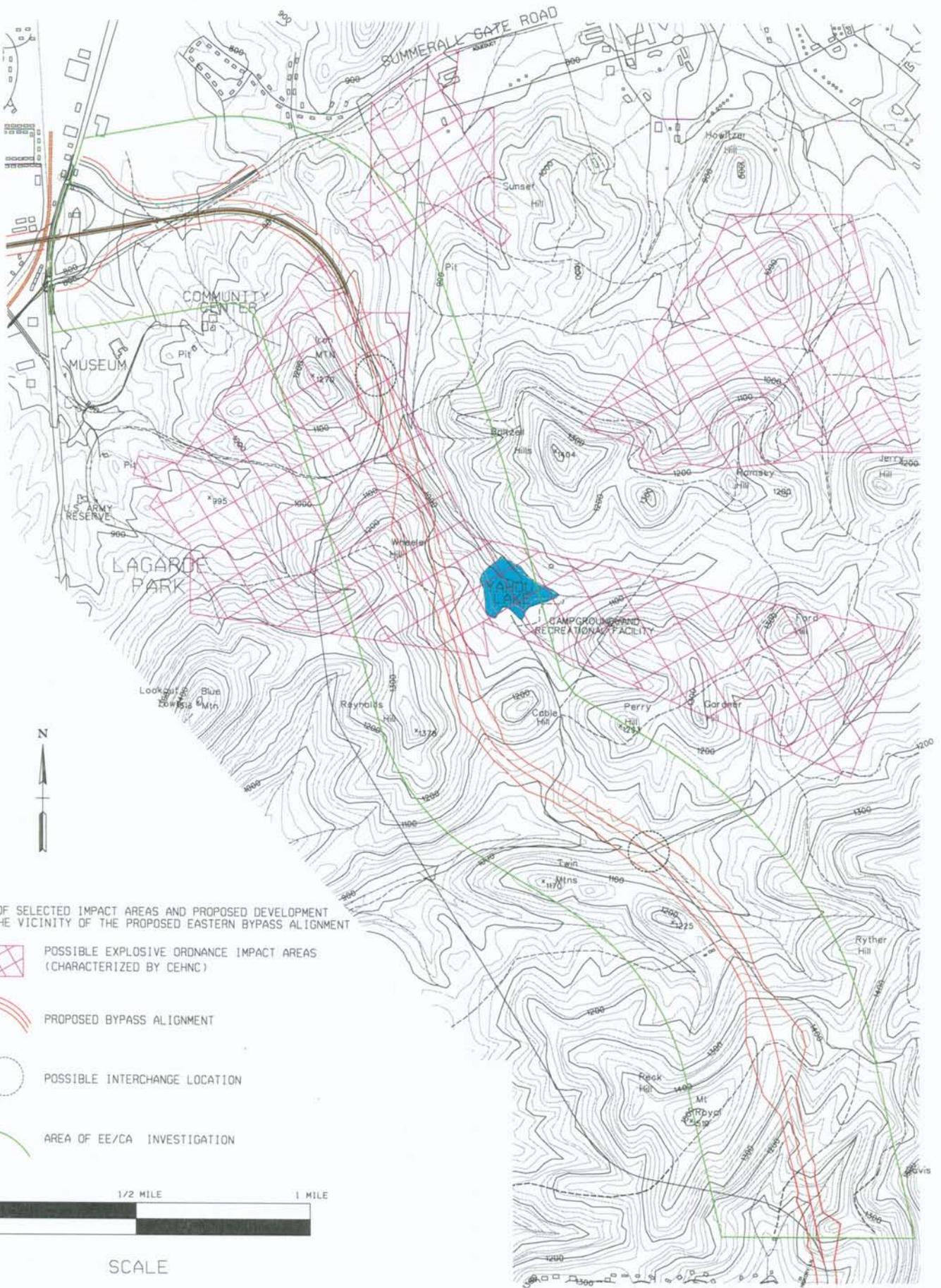
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US ARMY ENGINEERING  
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 HUNTSVILLE, ALABAMA

PROJECT TITLE: FORT McCLELLAN  
 EASTERN BYPASS  
 DRAWING TITLE: VICINITY MAP

PROJECT #:	PAGE #:	DATE:	DRAWN BY:	SCALE:	FIGURE
982503	2-6	09 DEC 98	MSA	NOT TO SCALE	2-1



LOCATION OF SELECTED IMPACT AREAS AND PROPOSED DEVELOPMENT AREAS IN THE VICINITY OF THE PROPOSED EASTERN BYPASS ALIGNMENT

-  POSSIBLE EXPLOSIVE ORDNANCE IMPACT AREAS (CHARACTERIZED BY CEHNC)
-  PROPOSED BYPASS ALIGNMENT
-  POSSIBLE INTERCHANGE LOCATION
-  AREA OF EE/CA INVESTIGATION



SCALE

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PROJECT TITLE: FORT McCLELLAN  
EASTERN BYPASS

DRAWING TITLE: AREA OF EE/CA INVESTIGATION

PROJECT #: 982503

PAGE #: 2-7

DATE: 09 DEC 98

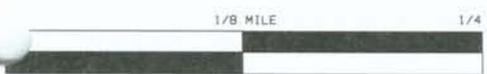
DRAWN BY: MSA

SCALE: AS SHOWN

FIGURE 2-2



- PROPOSED BY-PASS CORRIDOR
- BIOLOGICAL WARFARE AREA (AOC-4)
- OLD CHEMICAL WEAPONS DEMONSTRATION AREA (AOC-5)



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 & SUPPORT CENTER  
 HUNTSVILLE, ALABAMA

PROJECT TITLE: FORT McCLELLAN  
 EASTERN BYPASS

DRAWING TITLE: OLD CHEMICAL WEAPONS AREA

PROJECT #:	PAGE #:	DATE:	DRAWN BY:	SCALE:	FIGURE
982503	2-8	09 DEC 98	MSA	AS SHOWN	2-3

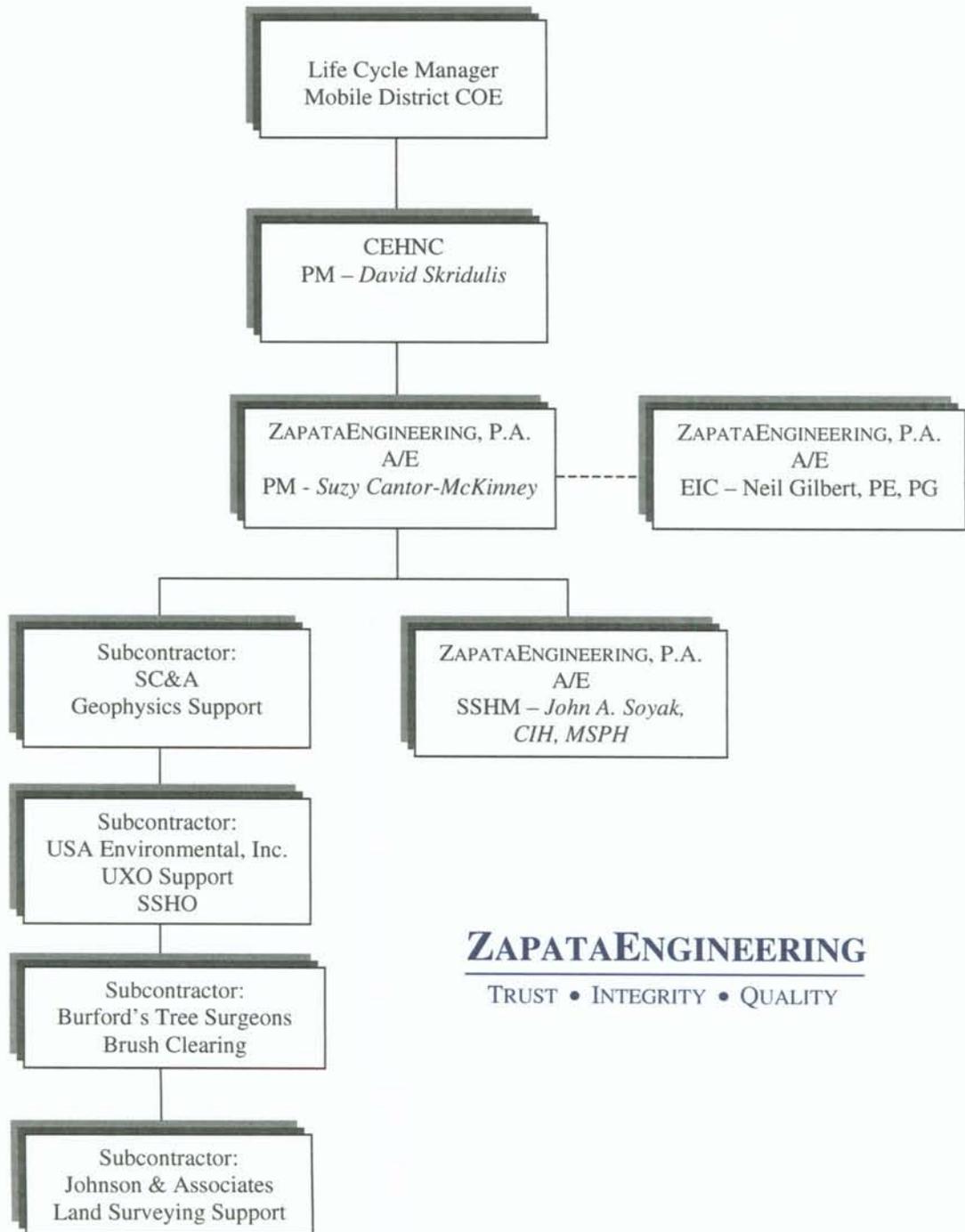
Figure 2-4 Organizational Chart



# Fort McClellan

## Eastern Bypass EE/CA

### Organizational Chart



**ZAPATAENGINEERING**  
TRUST • INTEGRITY • QUALITY

**Figure 2-5 Responsibilities Chart for Fort McClellan**

Organization	TASKS					
	Records Review and Site Visit	Ground Reconnaissance	Work Plans	Geophysics and Mapping	Sampling	EE/CA
<b>CEHNC</b>	Provides ASR, EA, and records / leads site visit.	Approves revised abbreviated SSHP. Participates in ground reconnaissance.	Review and approval.	Program Management.	Program Management.	Review and approval.
<b>ZAPATAENGINEERING A/E CONTRACTOR</b>	Reviews records, prepares abbreviated Site Safety and Health Plan, attends site visit.	Prepares abbreviated Site Safety and Health Plan, conducts ground reconnaissance.	Primary author.	Contracts for surveying and geophysical efforts.	Project Management.	Primary author. Participates in public meetings.
<b>USA Environmental, Inc.</b>	Attends site visit.	Participates in ground reconnaissance.	Secondary author with lead on Intrusive Excavation and Safe Holding Area Plan.	Conducts geophysical prove-out and survey.	Provides UXO escort, performs excavation.	
<b>SC&amp;A</b>	Attends site visit.		Secondary author with lead on Geophysical Investigations Plan.	Data analysis and mapping for geophysical prove-out and survey.		Participates in public meetings.
<b>Johnson &amp; Associates</b>				Performs site surveying.		
<b>Burford's Tree Surgeons</b>				Performs brush clearing for prove-out.	Performs brush clearing prior to intrusive excavation.	
<b>BCT</b>			Review and acceptance.			Review and acceptance.

issues are resolved. The ZAPATAENGINEERING PM is also responsible for controlling cost and schedule targets.

2.3.8.2 Engineer-In-Charge (EIC). The Engineer-in-Charge for ZAPATAENGINEERING has primary responsibility for the technical execution of the work and for reporting the results in the Engineering Evaluation/Cost Analysis. The EIC works with the PM to ensure the quality of the work being produced. As such, the EIC provides technical guidance and direction, as appropriate, to team members, including subcontractors. The EIC is the primary reviewer of the subcontractor technical submittals.

2.3.8.4 Project Site Safety and Health Officer (SSHO). The ZAPATAENGINEERING Project Site Safety and Health Officer will develop the plans governing health and safety aspects of the site work and will also be responsible for:

- Coordinating and observing site operations;
- enforcing the SSHP (a copy will be provided to the Fort McClellan Safety Office and will be available in the Directorate of the Environment's Office);
- fire prevention;
- industrial safety;
- environmental safety;
- site Employee Medical Monitoring Program;
- daily safety briefings;
- visitor access and entry control to the project site;
- coordinating with local emergency response agencies;
- complying with the Code of Federal Regulations (CFR), the Occupational Safety and Health Administration (OSHA), and USACE safety protocols;
- daily inspection of emergency equipment;
- maintaining the site emergency vehicle and supplies; and
- monitoring activities, reports, and document deviations from established procedures.

2.3.8.5 Site Manager. The ZAPATAENGINEERING Site Manager will manage all field investigation activities under the direction of the ZAPATAENGINEERING PM. Specific

responsibilities include scheduling daily safety meetings, scheduling and coordinating field team activities, and submitting a daily activities report to the PM. The Site Manager will be responsible for direct oversight of subcontractor activities during the field investigation and will review the subcontractors' weekly status reports. The Site Manager will coordinate with the PM as necessary to take corrective actions to ensure that budgets and schedules are enforced during the field investigation. Site Manager duties will also include enforcing compliance with the Site Safety and Health Plan and general daily field operating procedures. The Site Manager will report all quality control (QC) failures and corrective actions to the PM and QA Manager.

2.3.8.6 QA Manager. The QA Manager is independent of the project team and is responsible for reviewing all QA/QC procedures to be used in the project, reviewing subcontractor system audits and QC procedures to ensure compliance with the project QC guidelines in the work plan, performing a quality review to ensure the quality of deliverables from the project team to CEHNC, and interaction and communication with subcontractor and CEHNC QA personnel.

2.3.8.7 UXO Contractor Personnel. UXO personnel (provided by USA Environmental, Inc.) required for this project will include Explosive Ordnance Disposal (EOD)-qualified UXO supervisors and specialists. Non-UXO qualified personnel will not perform any handling of ordnance at any time or under any circumstances. Any additional personnel who may be assigned to the project field team will meet the qualifications required in the SOW. The following paragraphs describe the specific responsibilities of USA Environmental, the OE contractor, personnel assigned to the project team.

2.3.8.8 UXO Project Manager. The UXO PM, in the home office, is responsible for communication with and execution of all instructions received from the ZAPATAENGINEERING PM, managing all OE subcontract requirements of the project, overseeing the performance of all individuals on the OE project team, coordinating contract work, and overseeing OE-specific tasks. The UXO PM is also responsible for achieving the subcontract cost and schedule requirements. The UXO PM will schedule field efforts, identify the UXO technical and site personnel to accomplish the specific tasks, as defined in the work plan, implement project quality and safety procedures, and direct UXO personnel to achieve successful and timely completion of the work plan tasks. The USA Environmental PM will interface directly with the ZAPATAENGINEERING Project Manager and Site Manager to keep them advised of progress and to promptly implement approved and authorized changes to on-going work orders, as necessary.

2.3.8.9 Senior UXO Supervisor. The Senior UXO Supervisor (SUXOS) is USA Environmental's most senior OE-qualified on-site representative. The SUXOS will monitor all aspects of the field project to ensure safe and efficient performance of the approved work plan and SSHP. The SUXOS has the authority to temporarily stop work to correct safety deficiencies. The SUXOS prepares daily progress reports to the ZAPATAENGINEERING Site Manager and the UXO PM, and is also responsible for monitoring on-site project expenditures, finances, and equipment use and maintenance. The SUXOS meets the USACE requirements as a graduate of the US Naval School of

Explosive Ordnance Disposal or US Army Bomb Disposal School; 40-hour and 8-hour Hazardous Waste Site Worker and Supervisor courses, in accordance with 29 CFR 1910.120; and has at least 15 years combined active duty EOD and contractor UXO experience, 10 of which have been in supervisory EOD positions. A minimum of 6 years of the required 15 years experience shall be on active duty in military EOD units. The SUXOS is directly responsible for:

- Project site work;
- coordination with other subcontractor activities/work on-site;
- compliance with all safety and work-related standard operating procedures (SOPs), including the SSHP;
- meeting schedule time lines and budgetary control amounts;
- compliance with all federal and state regulations;
- coordination with the Site Safety and Health Officer (SSHO) to ensure all site safety considerations are enforced; and
- equipment and on-site vehicles.

2.3.8.10 UXO Supervisor. The UXO Supervisor takes daily direction from and reports directly to the SUXOS. The UXO Supervisor directs the action of an OE team in accordance with the approved work plan and the daily verbal direction of the SUXOS. The UXO Supervisor maintains continuous communication with the SUXOS during the performance of OE operations and has the authority to temporarily stop the performance of work to resolve and correct any unsafe condition. The UXO Supervisor will be a graduate of the US Naval Explosive Ordnance Disposal School or US Army Bomb Disposal School, 40-hour and 8-hour Hazardous Waste Site Worker and Site Supervisor courses in accordance with 29 CFR 1910.120; has at least 10 years combined active duty military EOD and contractor experience. The UXO Supervisor shall have experience in OE clearance operations and supervising personnel. Duties/responsibilities include:

- Supervision of the direct OE field operations for assigned tasks;
- task/team compliance with all safety and work-related operating procedures; including the SSHP;
- meeting schedules on task/team timelines and budgetary control amounts;
- coordination with the SSHO to ensure that all safety considerations are enforced;
- task/team assigned equipment and vehicles; and
- supervision of assigned personnel.

2.3.8.11 Quality Control Specialist. USA Environmental's Quality Control Specialist (QCS) monitors the project's performance in accordance with safety protocols and technical compliance. The QCS is responsible for the oversight and implementation of USA Environmental's QC Program and coordinates with the ZAPATAENGINEERING Project Manager and UXO PM. The QCS provides guidance, as required, and performs scheduled reviews of documentation (QC reports, field progress reports, and technical findings).

2.3.8.12 UXO Specialist. Under the direct supervision of the UXO Supervisor, the UXO Specialist is responsible for the safe and efficient performance of OE field operations, including the location, identification, removal, and disposal of OE in accordance with the approved work plan and SSHP. The UXO Specialist is authorized to temporarily stop the performance of work and immediately alert the UXO Supervisor of an unsafe condition. Internally, the UXO Specialist reports to the UXO Supervisor. The UXO Specialist will be a graduate of the US Naval Explosive Ordnance Disposal School and a 40-hour Hazardous Waste Site Worker course in accordance with 29 CFR 1910.120. The UXO Specialist will have more than three years of active duty military EOD experience, or was a UXO Assistant with at least five years documented military EOD and contractor OE experience.

## 2.4 Quality Control

Quality will be integrated into all aspects of the operations being conducted at Fort McClellan. Procedures have been designed for:

- Testing and calibrating equipment;
- determining the effectiveness of work performed;
- inspecting the maintenance and accuracy of site records; and
- determining compliance with site safety and operational plans.

2.4.1 Each employee shall be qualified, with appropriate training and experience to support placement in their respective position. Site specific training will be provided to all site personnel prior to commencing field activities. The SSHP will be reviewed with specific emphasis in the hazards known to exist on-site. Daily tail-gate briefings will outline the day's activities, unique hazards, and safety precautions. Personnel records and certificates of qualifications will be received prior to job assignments or change in duty position. QC audits will be conducted to ensure proper implementation/execution of the operational plans.

2.4.2 Daily QC Audits. All instruments and equipment that require maintenance and/or calibration will be checked prior to the start of each work day. Batteries will be replaced as needed and the instruments will be checked against a known source. The QC Specialist is responsible for insuring that personnel accomplish all QC checks and that the appropriate log entries are made. The QC Specialist will perform random, unscheduled checks of the various sites to ensure that personnel accomplish all work

specified in the Work Plan and submit a report of findings to the USA Senior UXO Supervisor.

2.4.3 Periodic QC Audits. The first three grids of each of the respective sample areas will be completely excavated of all anomalies. The QC Specialist will conduct a quality audit of each excavated grid within each survey area within a reasonable time after the completion of the work. This audit will be performed by USA's QC Specialist and will encompass a magnetometer inspection (using a Schonstedt Model GA-52 magnetometer) of at least 10% of each grid. The QC Specialist will inspect the survey grid using a zig-zag pattern that covers at least 10% of the entire grid and will submit a written report of his findings to the UXO Project Manager. The Pass/Fail criterion for these audits is zero UXO items encountered. If the QC Specialist does not pass the grid, the UXO Project Manager will schedule the area for re-working. In addition to the physical inspection of the site, the QC Specialist will conduct an audit of all logs being maintained by contract personnel to ensure proper entries are being made.

2.4.4 Equipment Calibration and Tests. Measurement equipment utilized on-site, i.e. magnetometers, monitors, geophysical mapping equipment, etc., will be checked for operational reliability and calibration.

2.4.4.1 All equipment used at Fort McClellan will be dedicated solely to the project until the project is completed. Equipment, such as vehicles, backhoe, chipping/grubbing equipment, will have before, during, and after operation maintenance performed in accordance with the equipment's operating manual. The QC Specialist is specifically responsible for inspecting that equipment is maintained calibrated and checked. Records of these checks will be maintained in the UXO Supervisor's journals. If equipment field checks indicate that any piece of equipment is not operating correctly, and field repair cannot be made, the equipment will be tagged and removed from service. USA's Project Manager will be notified and a request for replacement equipment will be placed immediately. Replacement equipment will meet same specifications for accuracy and precision of the equipment removed from service.

2.4.5 Logs and Records. For all site work, bound log books with consecutively numbered pages will be used by field personnel. The field log books will be used to record the daily activities of the field team, provide sketch maps and locations of UXOs and other pertinent items, and to note any observations which may affect the quality of data.

2.4.5.1 Logs, records, and reports will be periodically inspected by the QC Specialist. These inspections will focus on the completeness, accuracy, and legibility of entries and records. Results of these inspections will be forwarded to the UXO Project Manager.

2.4.6 Nonconformance/Corrective Action. Any nonconformance to contractual requirements must be documented and reported. Nonconformance includes:

- Delivery of items or services by USA and/or any of its subcontractors, that do not meet the contractual requirements;
- errors made in following work instructions or improper work instructions;
- unforeseeable or unplanned circumstances that result in items or services that do not meet quality/contractual/technical requirements;
- technical modifications to the project by individuals that do not have the responsibility and authority; and
- errors in craftsmanship and trade skills.

Immediately upon receipt of a notice of nonconformance, the Project Manager and/or the Senior UXO Supervisor will take the following corrective actions:

- Identify the impact, if any, the nonconformance has on other project activities;
- identify and implement the actions required to bring the project/activity back into compliance; and
- identify and implement procedures to preclude recurrence of the nonconformance.

2.4.7 The Quality Control procedures outlined in this plan ensure that all critical site activities are inspected, that the results of these inspections are recorded and reported, and that the overall objectives of this project are achieved.

## **2.5 Document Organization**

This work plan is a compendium of specific plans that are required to implement the EE/CA project at Fort McClellan. Each plan is primarily a stand-alone document within the umbrella of this introduction and site description. This is intentional so that each member of the field team can focus on a detailed plan for their area of responsibility, yet be knowledgeable of how their area of responsibility is integrated into the overall field effort. Table 2-1 provides a summary of the sections of the work plan and reference to how they are mentioned in the SOW.

**Table 2-1 Content of the Eastern Bypass EE/CA Work Plan for Fort McClellan**

<u>WORK PLAN</u>	<u>LOCATION IN WORK PLAN</u>	<u>SOW REFERENCE</u>
Executive Summary	Section 1	
Project Overview	Section 2	
Site Mobilization / Demobilization Plan	Section 3	3.3.3
Geophysical Investigations Plan	Section 4	3.3.6
Intrusive Excavation Plan	Section 5	3.3.5
Conventional Safe Holding Area Plan	Section 6	3.3.4
Site Safety and Health Plan	Section 7	7.0.2
References	Section 8	

## 2.6 Schedule

As presented in the Project Schedule, Figure 2-6, brush clearing and surveying of the prove-out area and sampling area(s) will commence upon approval of the work plans prior to initiating geophysical prove-out and data collection efforts. Sampling activities are scheduled for late winter, 1999, with submittal of the draft EE/CA in April, 1999. The estimated date for project completion is November 23, 1999.

## 2.7 Submittal Matrix

Table 2-2 identifies specific deliverables under this Task Order.

## 2.8 Document Distribution

Table 2-3 identifies the recipient and number of copies to be distributed to each individual/agency.

## 2.9 Format and Content of Engineering Reports

All drawings will be of engineering quality with sufficient details. The report will consist of 8-1/2"x11" paper with drawings folded to this size if necessary. The reports will be 3-ring bound and appropriately titled. Each page of draft submittals will be stamped with "DRAFT". Review comments approved by ZAPATAENGINEERING will be incorporated into all subsequent submittals. Each submittal will identify the specific members and title of the ZAPATAENGINEERING staff and subcontractors with significant

input into the report. All final submittals will be sealed by the registered Professional Engineer-In-Charge.

### **2.10 Data Presentation**

Project data will be arranged and presented in a clear and logical format in accordance with scientifically accepted standards. Figures, charts, tables, and other visual displays (e.g., maps and geophysical data) will be used for organizing, evaluating, and presenting data and for highlighting relationships of data. Graphical methods of data presentation may be used when appropriate to illustrate data trends and patterns as a supplement to information presented in data tables.

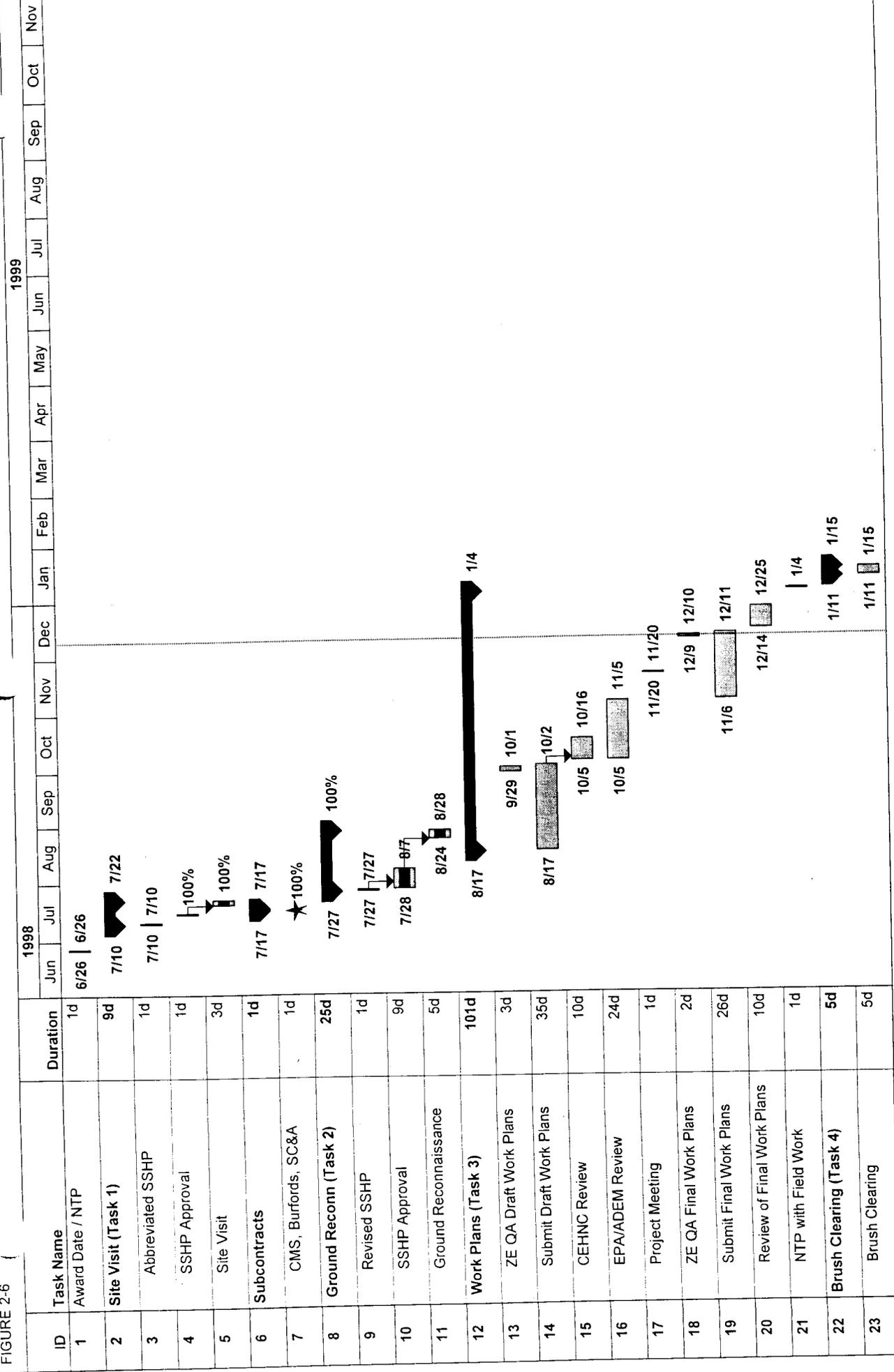
### **2.11 Communications**

A record of all telephone conversations and written correspondence affecting decisions relating to the performance of this task order will be documented and sequentially numbered. A summary of the telephone conversations and copies of written correspondence will be submitted to the Contracting Officer with the monthly progress report.

### **2.12 Project File Management**

Project documentation will be maintained in project-specific files by ZAPATAENGINEERING. The files will provide a record of all background information, previous investigation reports, and all data and information generated during the project. Requirements for hard copy files are provided below.

PROJECT SCHEDULE

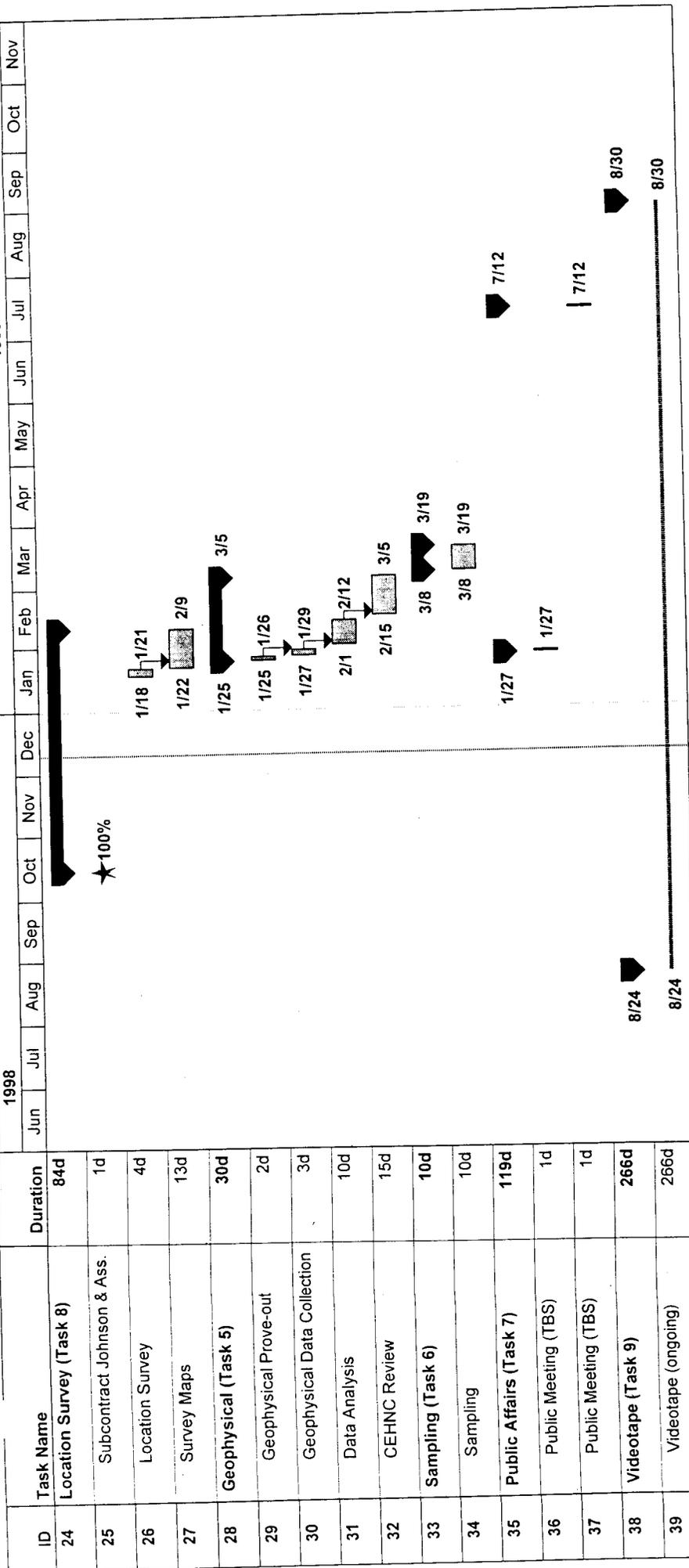


Date: 12/10/98

Legend:

- Task: [Solid Bar]
- Progress: [Hatched Bar]
- Milestone: [Diamond]
- Summary: [Thick Solid Bar]
- Rolled Up Task: [Hatched Bar]
- Rolled Up Milestone: [Diamond]
- Rolled Up Progress: [Thick Hatched Bar]

FIGURE 2-6 PROJECT SCHEDULE



**Legend:**

- Task: [Solid black bar]
- Progress: [Hatched bar]
- Milestone: [Diamond symbol]
- Summary: [Thick black bar]
- Rolled Up Task: [Hatched bar with arrow]
- Rolled Up Milestone: [Diamond symbol with arrow]
- Rolled Up Progress: [Thick black bar with arrow]

Date: 12/10/98

Ft. McClellan EE/CA

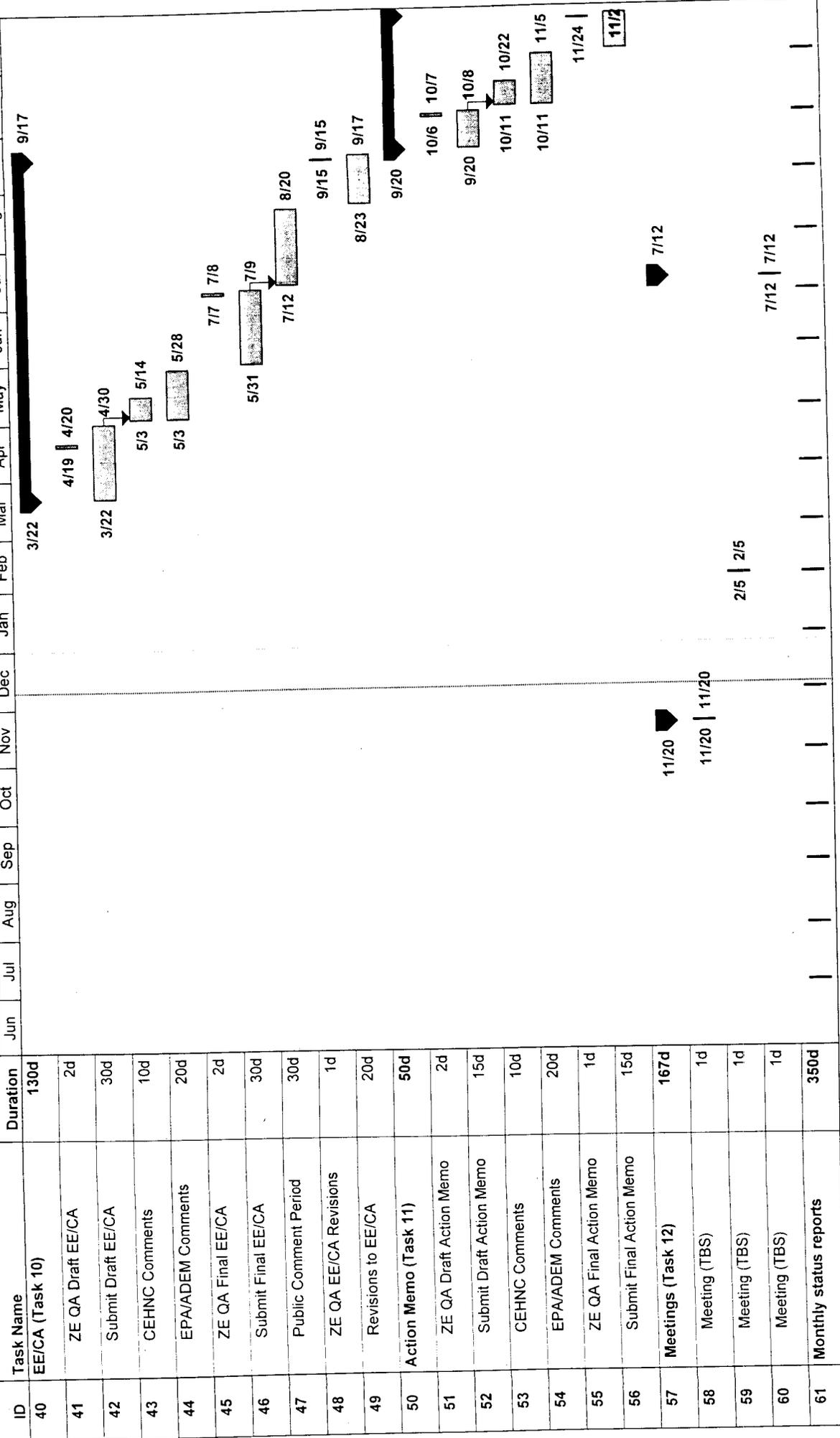
Page 2-20

PROJECT SCHEDULE

1999

1998

Jun Jul Aug Sep Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov



Task	Summary	Rolled Up Progress
Task		
Progress		
Milestone		

Date: 12/10/98

**Table 2-2 Submittal Matrix**

SUBMITTAL	SUBMITTED TO:		
	CONTRACTING OFFICER	PROJECT MANAGER	DISTRIBUTION LIST (TABLE 2-3)
Draft Work Plans and SSHP	✓ (w/out attachment)	✓	✓
Final Work Plan and SSHP	✓ (w/out attachment)	✓	✓
Draft EE/CA	✓ (w/out attachment)	✓	✓
Final EE/CA	✓ (w/out attachment)	✓	✓
Draft Action Memorandum	✓ (w/out attachment)	✓	✓
Final Action Memorandum	✓ (w/out attachment)	✓	✓
Geophysical Prove-out Letter Report		✓	
Digital copy of documents, maps, drawings, data		✓	
Geophysical Data Files		✓	
Geophysical Archive Files		✓	
Final Survey Report and Drawings		✓	
Description Cards		✓	
List of Control Points		✓	
Field Survey Log Books		✓	
Monthly Reports	✓	✓	
Minutes of Meetings	✓	✓	
Videotape		✓	
Correspondence	✓	✓	
Digital copies of drawings, maps, data, documents		✓	
Computer Files		✓	

### **2.12.1 Hard Copy Files**

For this project, a hard copy file must be established as a permanent record of project plans, activities, and results. Each of these files will be tracked using a unique project number (i.e., task number). Minimum documentation to be included in the project files includes:

- Work Authorization
- Project Statement of Work
- Deliverables
- Quality Assurance Records
- Background Material
- Correspondence
- Contact Reports
- Subcontracting Documentation
- Invoice Transmittal Letters
- Project Management Forms
- Field Activity Logbooks
- Field Data Sheets
- Chain-of-Custody Sheets
- Analytical Results
- Photographs, Maps, and Site Drawings

### **2.12.2 Document Control**

The fundamental goal of document control is to ensure that documents are accurate, current, representative of ongoing project operations, and in the possession of the individuals responsible for implementing, reviewing, and approving the prescribed procedures/work results. To accomplish these goals, the following document control techniques/procedures will be used:

- document control numbers;
- internal review and formal approval procedures; and
- storage/retrieval procedures.

2.12.2.1 Document control, in general, is required for all documents that specify quality requirements, prescribe activities affecting quality, or describe results of work performed under documents that prescribe quality protocol. Document types subject to document control under this project include work plans, project reports, and progress reports.

### **2.12.3 Document Control Numbers**

Document control numbers provide a mechanism through which documents can be traced and maintained from initiation through revision and archiving. This is particularly advantageous when it becomes necessary to reconstruct, review, submit, or archive associated documentation.

2.12.3.1 Document control numbers will be assigned to each deliverable document produced under the program. The document control number is a unique alphanumeric code corresponding to ZAPATAENGINEERING's internal project number.

**2.12.4 Document Distribution**

In order to serve the function for which they are intended, documents must be distributed to the appropriate ZAPATAENGINEERING and subcontractor personnel. At a minimum, the personnel whose signatures represent approval of the document and the project file will be supplied with a copy of the final document. In addition, all key project personnel will receive a copy of all planning documents (e.g., Geophysical Investigations Plan, Intrusive Excavation Plan, and the Site Safety and Health Plan). The external distribution of all documents is outlined in Table 2-3.

**2.12.5 Storage Procedures**

All documents of a confidential nature will be stored in locked filing cabinets that can be accessed only by designated personnel.

**Table 2-3 Distribution List**

ADDRESSEE	DRAFT SUBMITTALS	DRAFT-FINAL & FINAL SUBMITTALS
Contracting Officer US Army Engineering and Support Center, Huntsville ATTN: CEHNC-CT, Lynda Bonds 4820 University Square Huntsville, Alabama 35816-1822	1 (without attachments)	1 (without attachments)
Commander US Army Engineering and Support Center, Huntsville ATTN: CEHNC-PM-ED, Mr. David Skridulis 4820 University Square Huntsville, Alabama 35816-1822	6	6
Commander US Army Engineer District, Mobile ATTN: CESAM-EN-GH (Mr. Ellis Pope) 109 St. Joseph Street Mobile, Alabama 36602-3630	2	2
US Environmental Protection Agency Atlanta Federal Center ATTN: Mr. Bart Reedy 100 Alabama Street, SW Atlanta, Georgia 30303	2	2
Alabama Department of Environmental Management Government Facilities Section, Hazardous Waste Branch,	2	2

ADDRESSEE	DRAFT SUBMITTALS	DRAFT-FINAL & FINAL SUBMITTALS
Land Division ATTN: Mr. Chris Johnson P.O. Box 301463 Montgomery, Alabama 36130-1463		
US Army Chemical and Military Police Centers & Fort McClellan Directorate of Environment Bldg. 141A 13 <sup>th</sup> Ave. ATTN: ATZN-EM Fort McClellan, Alabama 36205	2	5
Ms. Sharon Delchamps US Fish and Wildlife Service Ecological Services 1208-B Main Street Daphne, Alabama 36526	1	2
Commander USACML: MPCEN & FM Attn: ATZN-CSF (Don Byars) Bldg. 143A Fort McClellan, Alabama 36205	1	1
USAMCL: MPCEN & FM Range Control P.O. Box 5280 (ATTN: Major Case) Fort McClellan, Alabama 36205-5000		1

## 2.13 Project Management and Reporting

### 2.13.1 Monthly Progress Reporting

The Project Manager will be responsible for preparing a monthly progress report that will be submitted to CEHNC by the 10<sup>th</sup> of each month.

2.13.1.1 Monthly progress reports will summarize the following:

- Period covered by report;
- work accomplished during the reporting period;
- problems encountered and solutions to these problems;
- summary of any findings; and
- work to be accomplished in next reporting period.

2.13.1.2 The monthly report will include a report of budgeted costs versus expenditure to date. Cost data will be displayed in tabular format and presented on a project task basis, to include the following information:

- 1) budgeted value of the task,
- 2) cumulative task expenditure through the previous month,
- 3) actual expenditure during the current reporting month,
- 4) cumulative expenditure to date, and
- 5) percentage of work complete of each task.

### **2.13.2 Minutes of Meetings**

Minutes of all project meetings will be documented by ZAPATAENGINEERING. Comments made during the conference, or decisions affecting criteria changes will be recorded. Written comments presented by attendees will be attached to each report with the conference action noted. Conference action will be noted by “A” for an approved comment, “D” for a disapproved comment, “W” for a comment that has been withdrawn, and “E” for a comment that has an exception noted. The Project Manager will be responsible for preparing and submitting the project meeting minutes to the contracting officer within 10 working days after each meeting.

### **2.14 Contact List**

The following list identifies key points of contact for this delivery order.

Lynda Bonds Contracting Officer  
US Army Engineering and Support Center, Huntsville  
ATTN: CEHNC-CT,  
4820 University Square  
Huntsville, Alabama 35816-1822  
Telephone: (256) 895-1384

US Army Engineering and Support Center, Huntsville  
ATTN: CEHNC-PM-ED, David Skridulis  
4820 University Square  
Huntsville, Alabama 35816-1822  
Telephone: (256) 895-1468  
Fax: (256) 895-1469

Ms. Suzy Cantor-McKinney  
Project Manager  
ZAPATAENGINEERING, P.A.

1100 Kenilworth Avenue  
Charlotte, NC 28204  
Telephone: (704) 358-8240  
Fax: (704) 358-8342

Ms. Mary F. Richards  
Contract Administrator  
ZAPATAENGINEERING, P.A.  
1100 Kenilworth Avenue  
Charlotte, NC 28204  
Telephone: (704) 358-8240  
Fax: (704) 358-8342

Mr. George Spencer  
USA Environmental, Inc.  
4904 Eisenhower Boulevard, Suite 310  
Tampa, FL 33634  
Telephone: (813) 884-5722  
Fax: (813) 884-1876

Dr. David Lieblich  
Sanford Cohen & Associates, Inc.  
97 Central Street, Suite 302  
Lowell, MA 01852  
Telephone: (978) 459-4411  
Fax: (978) 459-4488

SITE MOBILIZATION/DEMOBILIZATION  
AND SUPPORT PLAN

FOR

EASTERN BYPASS EE/CA  
AT  
FORT MCCLELLAN, ALABAMA

September 1998

Prepared for:

US ARMY ENGINEERING AND SUPPORT CENTER  
HUNTSVILLE

Prepared by:

ZAPATAENGINEERING, PA

1100 KENILWORTH AVENUE  
CHARLOTTE, NORTH CAROLINA 28204  
PHONE (704) 358-8240

### 3.0 SITE MOBILIZATION/DEMOBILIZATION AND SUPPORT PLAN

#### 3.1 Introduction

This plan details the field work flow and requisite mobilization and demobilization activities for conducting the geophysical prove-out, data collection, and sampling activities at Fort McClellan. Field work will be conducted in two separate efforts; site preparation and geophysical activities, and sampling.

##### 3.1.1 Site Mobilization

Site mobilization/demobilization efforts involve mobilizing personnel and equipment, establishing a field office at the site, and moving personnel off the site at the conclusion of the field investigations. ZAPATAENGINEERING will begin mobilization following approval of the work plans. During field activities, personnel will be temporarily lodged in nearby accommodations and provided with rental vehicles to access the site. Mobilization efforts will include, but not be limited to, a variety of activities as outlined below:

- establishing an on-site office at the Directorate of the Environment, Building 141A;
- identifying, procuring, packaging, shipping, and inventorying project equipment;
- performing maintenance and quality checks of the equipment to ensure they are operationally ready;
- establishing an on-site communication system;
- coordinating with Range Control and the Military Police; and
- arrangement for local emergency services to include medical, medical evacuation, fire and police.

3.1.1.1 Coordination with the US Army Engineering and Support Center and Fort McClellan will be initiated 15 days prior to arrival on-site to secure office facilities. The temporary office will be located in Building 141A. As this building is currently occupied, all utilities (water, electricity) are in service. Anticipated office needs include a desk, telephone, and dedicated telephone outlet for connection of a computer modem. ZAPATAENGINEERING will provide a computer, modem, printer and fax machine. On-site personnel utilizing the temporary office will be instructed to minimize disruption of existing office staff. ZAPATAENGINEERING will establish a work schedule, either four (4) 10-hour days or five (5) 8-hour days per week. The schedule will be provided to the Directorate of the Environment to coordinate access to the building during normal work hours, as well as early morning and evening hours.

3.1.1.2 In consultation with personnel of the Directorate of the Environment's Office, portable equipment will be housed on the premises in an unobtrusive location. At the

termination of the field work, all equipment will be transferred off the premises, and the storage location returned to its original condition.

3.1.1.3 Due to the proximity of the proposed geophysical prove-out area and sample locations to Summerall Gate Road and the Environmental Office, the need for an on-site office trailer has been negated. However, on-site sanitary facilities will be provided. Containerized potable water will be available in vehicles parked in proximity to the areas of investigation.

3.1.1.4 In addition to securing office space, Range Control will be notified of the exact location(s) of field investigations and the schedule to be on-site. They will be provided with a list of all site personnel and methods for contacting individuals during the site activities. The Military Police will also be informed of scheduled field activities.

3.1.1.5 As described in the Site Safety and Health Plan, the primary emergency contacts while conducting the field investigations will be the Fort McClellan Fire Department and Military Police. In addition, the nearest hospital for treatment is the Stringfellow Memorial Hospital, located at 301 E. 18<sup>th</sup> Street, Anniston. Hospital authorities will be notified prior to conducting field activities.

### ***3.1.2 Site Preparation***

Preparation of the site will include brush removal in the designated prove-out area(s) and sampling area(s). Burford's Tree Surgeons, subcontractor to ZAPATAENGINEERING, is a local company and will not require temporary lodging or office space at Fort McClellan. They will mobilize to the site through the designated gate each morning, and leave the site to their home office at the conclusion of work each day. Daily site clearing activities will not commence until the ZAPATAENGINEERING Site Manager and USA Environmental Senior UXO Supervisor have arrived on-site and the safety briefing is conducted.

3.1.2.1 Site surveying will be performed by Johnson & Associates, subcontractor to ZAPATAENGINEERING. The surveyors will require temporary lodging while performing site activities. As described above, daily survey activities will not commence until the ZAPATAENGINEERING Site Manager and USA Environmental Senior UXO Supervisor have arrived on-site and the safety briefing is presented. Any need for telephone or computer access will be accommodated by ZAPATAENGINEERING at the Environmental Office.

3.1.2.2 Subsequent to clearing and surveying, USA Environmental, Inc., subcontractor to ZAPATAENGINEERING, will conduct the geophysical prove-out, as described in the Geophysical Investigations Plan. Prior to personnel arriving to the site, requisite equipment will be shipped directly to the Environmental Office for storage until geophysical activities begin. USA Environmental personnel will be accompanied by Sanford Cohen & Associates (SC&A) during the prove-out and data collection efforts. Individuals from USA Environmental and SC&A will be lodged temporarily in the vicinity of Fort McClellan, and be provided a vehicle for daily access to the site. Any required computer support will be available at the temporary office established in

Building 141A. Upon completion of the geophysical activities, personnel and equipment will be demobilized to their home office for data interpretation and mapping.

### **3.2 Sampling**

Sampling will be performed by USA Environmental, under the direction of ZAPATAENGINEERING. Descriptions of sample locations and detailed procedures for conducting the intrusive investigation are included in the Intrusive Excavation Plan. Ordnance unearthed during sampling activities will be managed in accordance with the Conventional Safe Holding Area Plan.

#### **3.2.1 Site Demobilization**

At the conclusion of all site work, ZAPATAENGINEERING will remove all equipment and supplies from the post facilities. All utilized space will be inspected and returned to its original condition. Range Control will be notified of our departure from the post, and all borrowed equipment will be returned, in working condition, to the appropriate offices.

GEOPHYSICAL INVESTIGATIONS PLAN

FOR

EASTERN BYPASS EE/CA  
AT  
FORT MCCLELLAN, ALABAMA

September 1998

Prepared for:

US ARMY ENGINEERING AND SUPPORT CENTER  
HUNTSVILLE

Prepared by:

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## **4.0 GEOPHYSICAL INVESTIGATIONS PLAN**

### **4.1 Introduction**

A geophysical investigation will be performed on approximately 10 acres in four distinct areas located within the proposed eastern bypass of Fort McClellan in Anniston, Alabama. As the known impact areas have been previously characterized by the US Army Engineering and Support Center (CEHNC), sample grids will be located in areas that reveal evidence of ground training outside the known impact areas. Refer to Figures 4-1 and 4-2. A Geonics EM-61 Time Domain Metal Detector (TDMD) and/or a Geometrics G-858 magnetometer are the geophysical survey instruments that will be tested for performance at Fort McClellan. The better performing instrument will be used to detect ordnance and explosives (OE). The selection of these specific instruments is based upon direct relevant experience on similar OE detection, location and characterization operations. These sensors represent the best performing devices for OE as determined by the US Army Jefferson Proving Ground (JPG) tests conducted over the last three years to determine the relative effectiveness of OE-related technologies.

4.1.1 The selection of the deployment instrument will depend upon the results of the Geophysical Prove-out (GPO) performed prior to the site survey, as described in Section 4.2. The selected geophysical instrument will be utilized to collect digital geophysical data on pre-defined grids. SC&A and USA Environmental, subcontractors to ZAPATAENGINEERING, will provide all necessary equipment and personnel to perform the geophysical investigation. SC&A will provide geophysical oversight and data analysis equipment and services. USA Environmental will provide all data collection personnel and equipment, under supervision of a SC&A geophysicist.

4.1.2 SC&A will establish a geographical information system (GIS) on-site to facilitate the following activities: organization of geophysical survey activities; collection and review of data; processing and interpretation of data; display and mapping of results; and archiving of all recorded and processed data. This will involve the set-up and operation of a Windows NT computer on-site for data analysis and information management.

### **4.2 Geophysical Prove-out Plan**

#### **4.2.1 Overview**

The purpose of the geophysical prove-out (GPO) is to select the best instrument for use at the site, determine the depth range of target detectability for each instrument, and allow for CEHNC to evaluate the quality of the geophysical methods and contractor performance. The effectiveness of geophysical techniques to detect, locate, and characterize OE is dependent upon several site-specific factors including soil and bedrock type, soil moisture content, vegetation conditions, proximity to man-made structures, and presence of near surface debris. The success of a geophysical survey is also dependent upon selecting the most appropriate technology for the specific detection task. For example, the detection of small shallow ordnance items requires utilization of different instruments than for large deep targets. Success of the OE survey is also

dependent upon the effectiveness of the navigational technology used to position-stamp the digital geophysical data. If high quality sensor readings are made, but the positional accuracy is inadequate, the survey will not succeed. For these reasons, an on-site GPO of different survey technologies will be executed at Fort McClellan prior to deployment on the sampling grids. During the GPO, seeded items will be surveyed to determine the effectiveness of the identified technologies under the actual site conditions at Fort McClellan.

#### **4.2.2 Site Selection**

One of the objectives of the initial site visit of July 21, 1998 and the Ground Reconnaissance of August 24 - 28, 1998 was to identify possible locations for a geophysical prove-out. In order to be adequate for a GPO, the site must be large enough for the burial of seed items used to evaluate the performance of the survey technologies. The site must be representative of the soil, vegetation, and cultural conditions expected on the sampling grids. The following documents were consulted to obtain information on soils at the site and to determine representative sites:

- Historical Aerial Photography Investigation of the Fort McClellan East By-Pass Study Area, prepared by the Oak Ridge National Laboratory
- Archive Search Report
- Ground Reconnaissance Report

4.2.2.1 One site has been identified for the GPO, adjacent to the firebreak, south of Summerall Gate Road, as depicted on Figure 4-2. Other possible site locations have been tentatively identified if the primary location proves unusable. The prove-out grid will be cleared of man-made objects to a depth not less than 10 feet.

#### **4.2.3 Seed Items**

The objective of the prove-out is to evaluate the effectiveness of geophysical technologies to detect specific OE targets under site-specific conditions. As such, a set of inert OE and/or OE simulants will be buried within the GPO plot to represent the type of possible OE expected on the site. Items identified in the known impact area in the vicinity of the proposed bypass area include 60mm mortars, rifle grenades, 37mm projectiles, and 57mm projectiles. An attempt will be made to procure inert OE to match these targets. If unavailable, items will be manufactured to simulate the size, shape, and metallic weight of these items. At least three (3) items of each type will be buried in the test plot. Depths of each item will be determined by the following relationships provided by CEHNC:

$$\text{Magnetics} - \log(\text{depth}) = 1.354 * \log(\text{diameter}) - 2.655$$

$$\text{Electromagnetics} - \log(\text{depth}) = 1.002 * \log(\text{diameter}) - 1.961$$

“Depth” refers to the top of the buried munition (in meters) and “diameter” defines the minor axis diameter of the munition (in millimeters). No targets will be buried greater

than 1.2 meters (4 feet), as the clearance objective is to one meter (3 feet). The maximum depth sensors will perform accurately on small items, without excavation, is approximately one meter. Large items and disturbed areas such as disposal pits will be detectable at depths greater than 1.2 meters. The accuracy of GPS and non-GPS navigation will be compared by surveying one geophysical prove-out grid using fiducial marks, hip chains, and/or tick wheel positioning methods, in addition to GPS.

#### **4.2.4 Sensor Selection**

After the GPO grids have been established, two geophysical methods will be tested; time domain electromagnetics (EM) and total field magnetics. Both methods are suited for environments such as Fort McClellan. The EM technique will utilize the Geonics EM-61 TDMD instrument, a device that generates electromagnetic pulses that trigger eddy currents in the subsurface. The eddy current decay produces a secondary magnetic field that is monitored by two receiving coils and recorded by an attached data logger. If a magnetometer is selected in the GPO, or it is determined that a magnetometer is required due to vegetation issues, a Geometrics G-858 magnetometer will be used for the surveys. The G-858 instrument is a cesium magnetometer sensor comprised of a miniature atomic absorption unit from which a signal proportional to the intensity of the ambient magnetic field is derived. The sensitivity of the instrument is 0.05 nanoTesla (nT) and can collect data at a frequency of up to ten times per second. A hand-held flux-gate gradiometer will also be included in the test. Different instruments will be considered if performance during the GPO is poorer than expected.

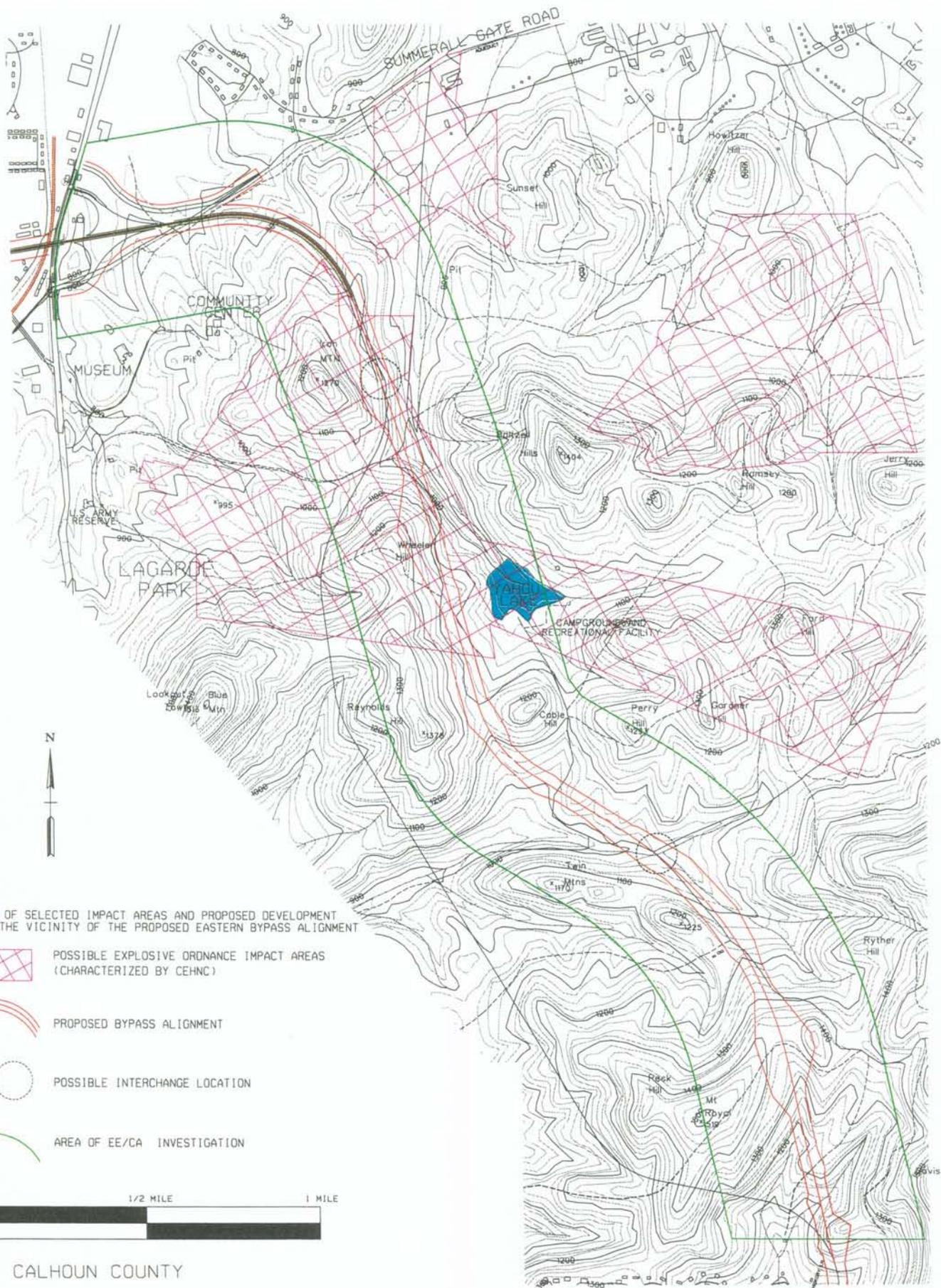
4.2.4.1 A diurnal magnetometer will be established in an area determined to be relatively free of subsurface metallic debris to track the natural, time varying changes in the background magnetic field of the earth. This background level of the magnetic field is subtracted from the magnetometer data collected over the survey site to “level” the data; i.e., bring the data down to background level of zero. This screening is performed using an audio metal detector to find a “clean” area suitable for the base station. Once established, the diurnal magnetometer measures the natural variation in Earth’s magnetic field by measuring the field strength at five-second intervals, or less.

#### **4.2.5 Prove-out Procedures**

Data will be collected from the GPO site in the same manner that it will be collected from the sampling grids. Three-foot lanes will be walked to provide complete coverage of the site. Both the TDMD and the magnetometers will be integrated with GPS to provide positional information during the survey. USA Environmental will establish a differential GPS base station to track the satellite information required to generate differential GPS corrections. These corrections will be broadcast in real-time via radio link to the roving GPS unit integrated with the geophysical sensors. After data are collected, they will be immediately downloaded to SC&A’s home office for QC, archiving, processing, analysis, and interpretation. SC&A will receive the data from USA Environmental, and load the data into the on-site GIS analysis system. Data will be processed and analyzed by in-house geophysicists to yield quantitative detection capability results for each buried target, for both deployed technologies. Anomaly signatures will be discerned at this point for identification of anomalies to be excavated.

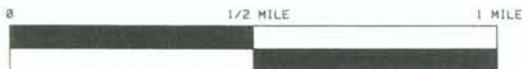
4.2.5.1 As part of the GPO, the capability of the GPS system to achieve the required positioning accuracy will be tested and documented. Sky maps of satellite coverage and elevations will be consulted to identify time windows that are inappropriate for surveying. As many of the area sampling grids are in (or adjacent to) wooded areas, the effectiveness of the GPS to provide accurate positional data will be evaluated under these conditions. This will be accomplished by plotting the tracks of the GPS receiver as it traverses throughout the grid. Deviations from known paths will be evident by correlating the positional data from the GPS receiver with the log notes that describe the pattern and location of sensor deployments.

4.2.5.2 Upon completion of data collection, field data will be checked and basic corrections, such as for navigation, instrument bias, and diurnal variation will be applied. No filtering or normalization will be applied to the data. All corrections will be documented in a Microsoft Word file to accompany each digital data file. Data files will be delivered via the Internet, in the ASCII Data File (ADF) format, within 12 hours of the geophysical mapping. In addition, SC&A will produce a planimetric CADD map, in Intergraph.dgn format, of the area containing the geophysical data with seeded targets annotated and numbered. The map will be located in the Alabama State Grid Plane coordinate system. Geophysical mapping will be exactly coincident with the grid and will use exactly the same coordinate system. The geophysical data will be presented in delineated fields as x, y, and z, where x and y are the local state grid plane coordinates in East and North, and z is the instrument reading. Where there are multiple instrument values such as with EM instruments, the channels will be provided in separate ADF files. Each of the three data fields will be separated by a space (not a comma). TDEM data will consist of two separate files of three columns in the same format, with the z component for the top and bottom coils in separate files. There will be no header or other information included in the file. No individual file may be more than four megabytes in size and no more than 60,000 lines long. Each grid of data will be logically and sequentially named so that the file name can be easily correlated with the grid name used by other project personnel. A Dig Sheet containing the easting and northing of each identified target, as well as the target identification number will accompany this map.



LOCATION OF SELECTED IMPACT AREAS AND PROPOSED DEVELOPMENT AREAS IN THE VICINITY OF THE PROPOSED EASTERN BYPASS ALIGNMENT

-  POSSIBLE EXPLOSIVE ORDNANCE IMPACT AREAS (CHARACTERIZED BY CEHNC)
-  PROPOSED BYPASS ALIGNMENT
-  POSSIBLE INTERCHANGE LOCATION
-  AREA OF EE/CA INVESTIGATION



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HUNTSVILLE, ALABAMA

PROJECT TITLE: FORT McCLELLAN  
EASTERN BYPASS

DRAWING TITLE: AREA OF EE/CA INVESTIGATION

PROJECT #: 982503

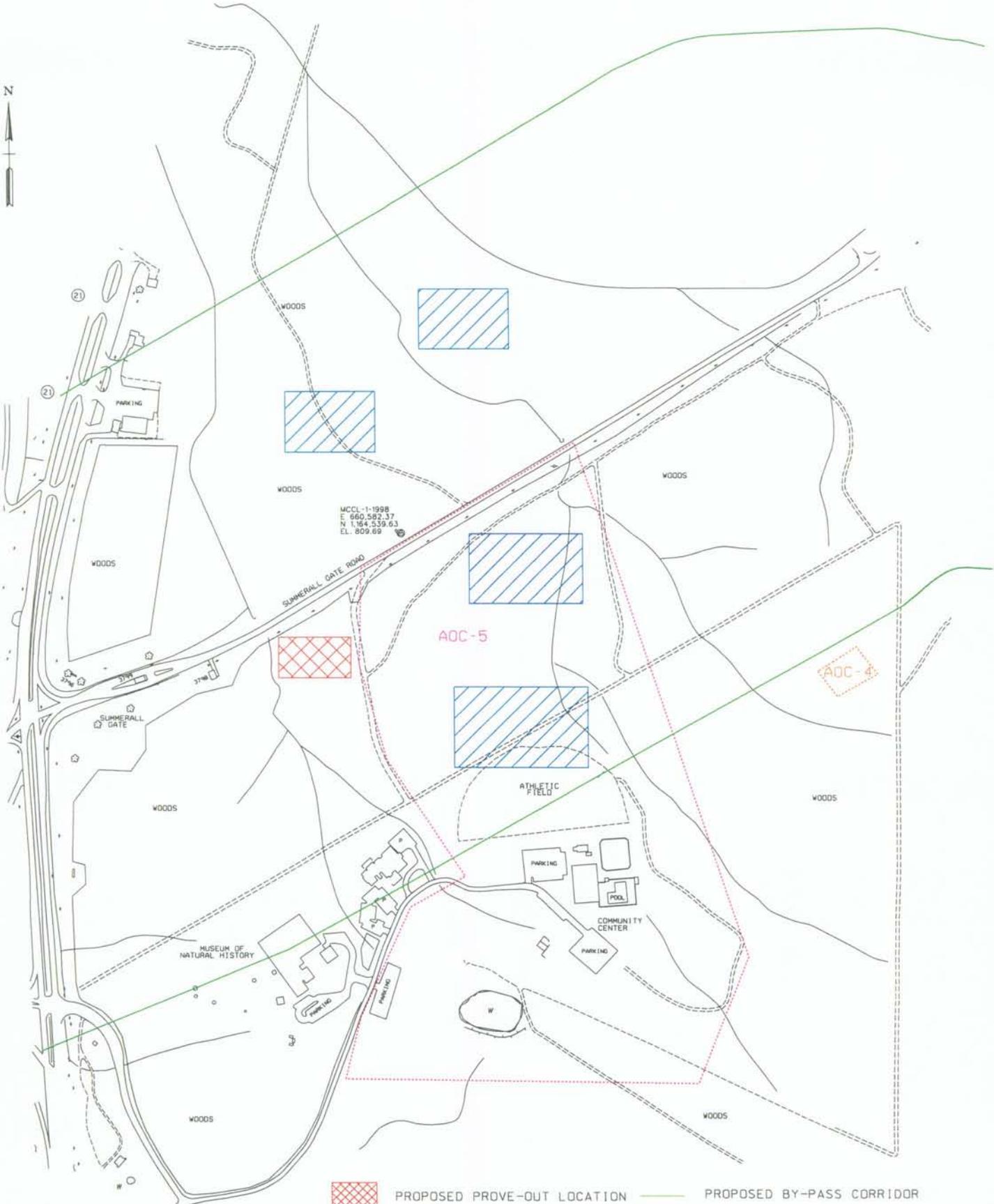
PAGE #: 4-5

DATE: 09 DEC 98

DRAWN BY: MSA

SCALE: AS SHOWN

FIGURE 4-1



- PROPOSED PROVE-OUT LOCATION
- PROPOSED SURVEY LOCATION
- PROPOSED BY-PASS CORRIDOR
- OLD CHEMICAL WEAPONS DEMONSTRATION AREA (AOC-5)
- BIOLOGICAL WARFARE AREA (AOC-4)

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PROJECT TITLE: FORT McCLELLAN  
 EASTERN BYPASS  
 DRAWING TITLE: INTRUSIVE SAMPLE AREAS

PROJECT #:	PAGE #:	DATE:	DRAWN BY:	SCALE:	FIGURE
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4.2.5.3 After initial corrections to the data, SC&A will perform data analysis. To accomplish this, ASCII data files (ADF files) will be gridded to produce Intergraph “GRD” files. Initial target detection lists will be obtained using a standard threshold analysis method. Advanced data processing algorithms may also be considered.

#### **4.2.6 Prove-out Reporting**

Upon completion of the data analysis, SC&A will prepare a brief report describing GPO activities, procedures, and conclusions. The prove-out report will document the performance of each instrument at the site. Measures of sensor performance include: probability of detection, false-alarm rate (false positives), missed objects (false negatives), production rates (acres/day), and cost (per acre). These measures will be tabulated in the prove-out report for inspection by the government. The critical radius for evaluating a detection is one foot: target identification within one foot of an actual target is considered a detection and identification outside this radius is a missed target. Target identification within a two-foot radius of an actual target will not be considered a false alarm. Determination of target errors for acquired targets as well as missed targets will be based upon the computed distance between the picked target location and the given target location as well as relocation of the given target coordinate picks on the physical prove-out grid and determination of the distance of the flagged location from the center of the actual target location. Plots of representative data will be provided to support the conclusion of the GPO Report. The geophysical instrumentation that performs better at the GPO will be adopted as the method to be used during the site survey. The experience gained from the GPO and the resulting recommendations will be incorporated into the Geophysical Work Plan.

### **4.3 Geophysical Survey**

The US Army Engineering and Support Center has provided to the contracting team existing information describing the eastern bypass area of Fort McClellan, including GIS-Computer-Aided Drafting and Design (CADD) maps for the site, Environmental Assessment reports and Historical Aerial Photography reports in both electronic and paper formats. These data, in addition to the findings of the site walkover and ground reconnaissance, were used to develop the investigation plans for this site and to define locations of investigation grids.

4.3.1 Once a grid is defined and confirmed in the field, the coordinates of the corners of each sampling grid will be plotted at their appropriate locations on the site map(s). Coordinates of the corners of each sampling grid will be located to the closest one foot, and will be based on the North American Datum of 1983 (NAD 83) referenced to the Alabama State Plane Grid System.

4.3.2 The corners of the grids will be used to define the extent of the geophysical surveys. Global positioning system (GPS) technology will be used to facilitate geophysical survey activities. During the analysis phase of the operation, the location of ordnance scrap, ordnance fragments, shrapnel, small arms ammunition and metallic debris identified during the grid survey will be recorded on a “per grid” basis and

provided to SC&A by USA Environmental for incorporation into the GIS. This information will be correlated with geophysical data. Specific-site features such as topography, buildings, and roads will be depicted on the site map upon completion of site survey and mapping effort. All sketches, computation sheets and all field logbooks used during this effort will be kept by the SC&A Site Manager and provided to the ZAPATAENGINEERING Project Manager at the completion of the fieldwork.

4.3.3 SC&A will utilize the Ordnance and Explosive Knowledge Base (OE-KB) software system to process, detect, locate and characterize all anomalies in the geophysical data. This analysis will culminate in target excavation sheets that will be provided to ZAPATAENGINEERING for subsequent statistical analysis and intrusive actions.

#### **4.4 Geophysical Field Management**

This section describes standard practices and procedures used for collection, processing, and controlling data associated with OE geophysical surveys at Fort McClellan. The geophysical survey techniques to be applied will utilize either a Geonics EM-61 TDMD or a Geometrics G-858 magnetometer. Section 4.2 summarizes the testing of these instruments at an initial geophysical prove-out test site within proposed bypass area prior to the survey of sampling grids. During the geophysical prove-out, if it is determined that the use of either piece of equipment is not appropriate, alternate techniques may be warranted, which may require modifications to the project budget and schedule.

4.4.1 The objective of the geophysical investigation is to accurately locate and record the locations of geophysical anomalies possibly associated with potential OE items. The geophysical investigation areas and identified anomalies will be mapped for subsequent evaluation and provided to ZAPATAENGINEERING by SC&A.

4.4.2 The field investigation activities for this project will include the grid layout and survey, clearing of vegetation, mapping, OE geophysical sensor surveys, OE excavation and removal as necessary, and OE disposal procedures. The methods and procedures to be used during the on-site geophysical phase of the EE/CA investigation are described in the following subsections. The work performed during this field effort will be in accordance with the Intrusive Excavation Plan, the Conventional Safe Holding Area Plan, and the Site Safety and Health Plan, unless the procedures are modified and approved in writing by the CEHNC on-site representative.

4.4.3 As described in the Site Mobilization/Demobilization and Support Plan, a field office will be established in Building 141A on the post. The office will have adequate capacity to support the geophysical operation requirements of SC&A. SC&A will arrange for provision of necessary data processing and analysis utilities and facilities. USA Environmental will provide all survey equipment required to execute the geophysical data collection.

4.4.4 SC&A will have a geophysicist on site to provide expertise in the collection, analysis, and interpretation of geophysical data for OE detection, location and characterization. SC&A will work closely with USA Environmental field personnel in

the calibration of sensors, collection of field data, and the QC of geophysical and navigational information.

#### **4.5 Geophysical Survey Procedures**

As described in the Intrusive Excavation Plan, four distinct areas of the proposed bypass through Fort McClellan have been identified for surveying based on the current land use, past ordnance activities, and terrain. Each area will be divided into rectangular grids with dimensions dependent upon prevailing site conditions. The number of grids proposed at each sector is based on the review of the total acreage, site accessibility, and topographic features. Larger areas are allotted more grids than smaller areas. In general, sites with high accessibility to the field crews are allocated more grids than sites that are difficult to access. Surface conditions may influence the number of grids for a given area because of slopes or wetlands. Tree coverage also influences the size and location of sampling grids, as the effectiveness of GPS technology is adversely affected by limited view of the sky. It is anticipated that a standard grid size of 100 x 100 feet will be adequate to obtain the data for this project.

4.5.1 Prior to geophysical investigation of a grid, USA Environmental will conduct a surface sweep of the grid and associated grid access routes. Brush clearing will be conducted by Burford's Tree Surgeons. If any surface unexploded ordnance is found during the initial survey, the Senior UXO Supervisor will be immediately contacted and the item will be disposed of as described in the Intrusive Excavation Plan. The location will be recorded on the Individual Grid Status Sheets.

4.5.2 After the grids have been laid out, the geophysical survey will be conducted using electromagnetic or magnetic techniques. One of two (2) geophysical methods, time domain electromagnetics (EM) or magnetics, will be applied at the survey grids, as described in Section 4.2.4.

4.5.3 Geophysical investigation teams will subdivide each sampling grid into parallel one-meter wide survey lanes running east-west or north-south for EM-61 and/or G-858 surveys. Survey lane spacing of one meter (about three feet) is appropriate to provide full coverage with some overlap. Data will be collected by traversing these lanes with the instruments and recording the data on a data logger. The EM-61 and/or G-858 surveys will be conducted by USA Environmental personnel. From the geophysical investigation of each grid, Anomaly Dig Sheets will be developed. An individual sheet will be created for each grid showing the location of specific anomalies detected within the grid.

4.5.4 Data collected during the EM-61 and/or G-858 surveys will be formatted by USA Environmental so that they can be readily analyzed for the evaluation of anomalies. Within 72-hours of completion of a grid, the data will be analyzed and an Anomaly Dig Sheet provided to the SC&A Site Manager. The total number of anomalies within the grid will be recorded and used for statistical down-sampling. The first three grids will be completely excavated of every metallic anomaly after geophysical mapping. The geophysicist will evaluate this data prior to determining which anomalies to sample in subsequent grids. The 4<sup>th</sup> grid will be due 144 hours after collection to account for the

additional analysis required during processing of the first three grids. Subsequent grids will be processed during the 72 hour period and due at times that account for the additional lag incurred from processing the first three grids. Additional time lags may be incurred during later updates of the signature database, depending upon the number of signatures to be updated: if this occurs, the additional delay will be communicated to ZAPATAENGINEERING. This will also allow for CEHNC to QA the validity of the data analysis. A spreadsheet containing all field information pertaining to each excavated target will be transferred daily from the site to SC&A for continued updating of the signature database.

4.5.5 The geophysical data collected in the field will be reviewed at several stages. The first quality check will be during data collection. The field crews will be able to check the data logger to ensure that data are being collected and examine the data during data logger “dumps” when the information is downloaded to the hard drive of a portable computer. A second quality check will be performed when the data are initially evaluated. If the coordinates of the data do not fall within the boundaries of the investigated grid, SC&A will become aware of this when reviewing the data within the GIS. A final quality check will occur when USA Environmental excavates a limited number of anomalies. These intrusive investigations will validate the interpretation of the geophysical data. If data quality is deemed unacceptable during field operations, the crew chief will stop data collection until such time that acceptable data quality can be achieved. Gridded and positioned data will be checked for missed areas, coordinate accuracy in reference to grid boundaries, and data quality. Unacceptable data will require rework. In some instances it may be possible to correct coordinate errors such as grid shifts in processing without requiring rework. These instances will be evaluated on a case by case basis to afford the government the most appropriate solution.

4.5.6 Reacquisition of targets and data collection activities will occur using Real Time Differentially Corrected Global Positioning System (RT-DGPS) equipment and the following procedures. USA Environmental will collect the data and provide it to SC&A, including GPS positioning data at known locations. SC&A will then provide USA Environmental target data that include GPS locations. These data are electronically uploaded, as waypoints, into GPS (Trimble Model: Professional (XL)) receivers. Once the ground locations are uploaded into the GPS receivers, the actual ground locations are reoccupied by navigating to the selected point and marking the ground location with a pin flag. Excavation will be carried out on the location of the pin flag: the size of the hole shall account for the expected relocation error. This relocation and excavation methodology will yield a 1:1 relation between identified targets and excavated anomalies.

4.5.7 Each anomaly identified on the Anomaly Dig Sheets will be assigned a unique number based on its location. For example, anomaly S02-G03-A08 represents the eighth anomaly in Grid 3, Sector 2.

#### **4.6 Data Analysis and Mapping Procedures**

SC&A will analyze all geophysical data for detection, location and characterization of anomalies. These activities will be performed to meet performance requirements

specified by ZAPATAENGINEERING. SC&A will execute all work within a geographical information system (GIS); i.e., the Intergraph MGE GIS which utilizes Microstation as the CAD platform. This system will be compatible with the CEHNC and BCT platform, and all data generated will conform to these data format requirements. All digital data will be transferred to the CEHNC OE server, via Internet, within 48 hours of completion of mapping.

4.6.1 The GIS-based data analysis effort will involve preparation, analysis, processing, and interpretation of data acquired from the field. All files contributing to the GIS data sets will be backed up prior to editing or manipulating. The GIS operator will be responsible for registering and processing all survey and intrusive data collected in the field into the GIS.

4.6.2 The GIS will be established using design files provided by CEHNC. If these are not available, SC&A will create a design file based on coordinate system information provided by CEHNC. SC&A will incorporate into the GIS all survey information defining grid locations. Registered CADD files, if available, will be imported into the GIS as graphical elements for display and data interpretation.

4.6.3 SC&A will use a variety of methods to detect, locate, and characterize targets including threshold analysis, Ordnance and Explosive Knowledge Base (OE-KB), model matching, and expert evaluation. Excavation information from the first 3 to 5 grids will aid in obtaining more accurate estimates of target characteristics on the remaining data. As further excavations are completed, information will be fed back to SC&A for updating the site-specific signature database and improving subsequent target estimates. This analysis will culminate in target excavation sheets that will be provided to ZAPATAENGINEERING for subsequent statistical analysis and intrusive actions. Upon completion of a given excavation, ZAPATAENGINEERING will provide the exact location, identification, and attributes of the excavated specific OE object to SC&A. The data will be compiled and sent to the project office for processing. The results will be entered into the GIS and provided to ZAPATAENGINEERING.

#### **4.7 Data Reporting**

SC&A's GIS system will be utilized for all data review, manipulation, analysis, interpretation, and reporting. As a part of the data evaluation process, the GIS operator will confirm that its documentation is complete, paginated, and legible; that qualitative identifications are accurate; that calculations are accurate; and that the results are expressed in the appropriate units. A copy of the geophysical data displayed on the GIS anomaly maps will be provided to ZAPATAENGINEERING to be checked for completeness and compliance with existing geophysical data format requirements. Data will be validated and results not in compliance with established QA/QC criteria will be identified.

4.7.1 SC&A will create data packages for each analysis grid and check them for completeness. The data will then be provided to ZAPATAENGINEERING for confirmation. SC&A's evaluation process will include consideration of:

- the anomaly location with respect to defined grid coordinates;
- the detection instrument readings (e.g., the electronic signature);
- subsurface conditions and proximity to sources of interference that affect the sensitivity and reliability of the detection instrument; and
- field observations and comments by the geophysical and intrusive investigation personnel.

4.7.2 Field activity logbooks will be maintained daily, and all entries will be recorded in ink. Field logbooks will be bound with consecutively numbered pages. Working maps or sketches of the sampling sites will be used to document ordnance locations during excavation and removal activities.

4.7.3 Upon completion of data collection, SC&A staff will review the geophysical survey data for quality, evaluate any potential problems, and decide to accept or reject the data. If rejected, a rework schedule will be defined. All decisions will be logged. Visualizing data will constitute an important component of the QC effort. All data will be checked through visual inspection of the data within the GIS to ensure the preprocessed and gridded data fall within the bounds of a grid boundary. Statistical analysis of anomaly signatures will be conducted to validate the accuracy of the data. Failure to meet visual or statistical specifications will initiate a data quality warning. Data quality warnings must be followed by a logged action on the data; i.e., acceptance or rejection with a rework schedule.

4.7.4 After the data from each grid have been evaluated, a tabular listing of parameters for each target will be produced. This table will contain fields describing:

- the location of each target in State Plane Coordinates;
- the estimated depth of the target;
- the estimated mass of the target; and
- a ranking of each target in terms of its likelihood of being OE.

4.7.5 These tabular characterization results will be provided to ZAPATAENGINEERING as Excel spreadsheets. SC&A will provide ZAPATAENGINEERING a geophysical survey map of each grid annotated to include the target locations and target identification numbers.

4.7.6 All data will be archived daily onto a separate archiving device, such as a Zip disc, Jaz disc, or CD-ROM, to ensure that no information is lost during the project. Upon

completion of the project, a CD-ROM will be created and delivered to ZAPATAENGINEERING containing all:

- Raw field data
- Processed data
- GIS design files
- Target detection and characterization results
- Data analysis log sheets
- Report documentation.

A complete description of all data processing, data analysis, target characterization activities, and results will be provided as a Geophysical Investigation Report. An archived copy of all geophysical mapping will be provided to CEHNC on CD ROM format within seven (7) days from completion of the survey.

#### **4.8 Quality Control**

The EM-61 units and/or magnetometers will be field tested and adjusted daily to ensure that they are operating properly. This will be accomplished by utilizing a “seeded” test grid containing inert ordnance items, or similar magnetic inert items, representative of those known to have been used at the site or that have previously been recovered. These items will be buried at various depths up to 1.2 meters (four feet) and used to determine standard indication/signatures. An instrument reading differing more than 25 percent from the baseline reading of one or more seeded calibration target may suggest equipment failure or procedural error. If an instrument does not meet the standard, it will be re-calibrated, repaired or replaced. After the test grid has served its purpose, the test items will be removed and disposed of.

4.8.1 EM techniques are affected by various environmental conditions, such as shallow groundwater or electrical storms. These conditions will be taken into consideration when field-testing the EM-61 equipment as well as during data collection.

4.8.2 Magnetometer data may be affected by electrical storms, solar flares, and magnetic storms as well as local sources of ferrous materials (i.e. fences, metallic debris) or magnetic noise (i.e. cellular phones, walkie talkies). Diurnal or daily changes in the earth’s magnetic field also occur and must be compensated for. This will be accomplished at the site by establishing a base station where measurements are made hourly throughout the survey. The survey data will later be adjusted based on the variations at the base station. The GPS receiver radio will be positioned at sufficient distance from the sensors (magnetometer or EM units) so that radio communication has no affect on the sensor recordings.

4.8.3 The operational and test procedures will conform to manufacturer’s standard instructions. All geophysical instruments and equipment used to gather and generate

field data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturer's specifications. Field instruments and equipment will be tested daily to ensure that they are operating properly. Calibration, repair, or replacement records will be filed and maintained by the Geophysical Survey Team Leader and may be subject to audit by the QA manager. Testing records of the field instrumentation will be filed with the Project Manager after the field work is completed. This field test will ensure that the equipment is functioning within the allowable tolerances established by this project.

4.8.4 The accuracy of the geographic analysis is only as good as the underlying data being analyzed. Certain guidelines are necessary to ensure data quality after it has been entered into the GIS system. Potential data problems include source data errors, data entry errors that can be corrected, data corruption errors that can be prevented, and user errors that can be minimized through utilization of experienced personnel.

4.8.4.1 Data Loss and File Corruption. Several programs manipulate the various files used by the GIS. Due to hard disk limitations, Random Access Memory (RAM) limitations, or human error these programs occasionally crash, and the files being manipulated by these programs may be corrupted. To prevent data loss, these files will be backed up daily.

4.8.4.2 Data Reduction. All raw data from field measurements (including geophysical and intrusive data collection activities) will be appropriately recorded and noted in the field notebooks. If the data are to be used in the project reports, they will be reduced and summarized, and the reduction method will be documented in the report. Data reduction and analysis methodologies will depend upon those geophysical methods selected.

4.8.4.3 Data Validation and QC. Final validation of geophysical data will be performed by actually excavating geophysical anomalies. Post-excavation data review will be performed by reexamining a limited number of surveyed areas and rechecking the excavated location. Data review will be performed on both the geophysical surveys and the intrusive investigations.

4.8.4.4 Data Analysis Quality Control Checks. GIS-based data analysis will be conducted in accordance with accepted and appropriate methods. To ensure that all data analysis results are reproducible and objective, 20 percent of all data will be independently analyzed by a second data analyst to validate the accuracy of all data manipulation procedures.

INTRUSIVE EXCAVATION PLAN

FOR

EASTERN BYPASS EE/CA  
AT  
FORT MCCLELLAN, ALABAMA

September 1998

Prepared for:

US ARMY ENGINEERING AND SUPPORT CENTER  
HUNTSVILLE

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## 5.0 INTRUSIVE EXCAVATION PLAN

### 5.1 Introduction

This plan outlines the procedures ZAPATAENGINEERING, P.A. and USA Environmental, Inc. will use to perform ordnance and explosives operations at Fort McClellan, Alabama. Intrusive operations will be performed in a systematic manner using proven techniques and methods. This plan describes the activities and methodology that will be implemented to accomplish the project objectives.

#### 5.1.1 Personnel

USA Environmental will deploy a Senior UXO Supervisor and UXO Specialists during various portions of the project. All UXO personnel working at this site have completed Naval Explosive Ordnance Disposal or US Army Bomb Disposal training, which details procedures for evaluation and disposal of OE. All employees at this job site will have completed a training program, prior to beginning work on site, which complies with OSHA Regulations 29 CFR 1910.120e(9). In addition, all employees who work on hazardous sites receive training, which includes an equivalent of 40 hours of off-site training and three days of actual field experience under the direct supervision of a trained, experienced Supervisor. Management and Supervisors receive an additional eight hours training on program supervision. Each employee receives eight hours of OSHA refresher training annually.

### 5.2 Site-Specific Training

USA Environmental will perform site-specific training for all personnel assigned to this project. The purpose of this training is to ensure that all personnel fully understand the procedures and methods USA Environmental will use to perform operations at Fort McClellan, their individual duties and responsibilities, and any and all safety and environmental practices/procedures associated with field operations. All personnel will be trained upon arrival at the site. Training topics and training responsibilities are as follows:

- The UXO Specialists and support personnel will receive operational briefings and training on their duties and responsibilities. *All* on-site personnel will receive training on ordnance recognition and unexploded ordnance (UXO) safety precautions. This training will be performed by the Senior UXO Supervisor.
- All personnel will receive training on the individual equipment they will operate while on-site.
- All site personnel will receive detailed training on the Site-Specific Safety and Health Plan (SSHP).

### **5.3 Field Operations**

Upon completion of the site preparatory activities, as described in the Site Mobilization/Demobilization and Support Plan, field operations will commence. The following sections describe the general work practices that will be followed during all operations, and the specific procedures and methods to be used during this ordnance investigation project.

#### **5.3.1 General Site Practices**

All operational activities at Fort McClellan will be performed under the supervision and direction of qualified UXO personnel. Non-UXO qualified personnel will be prohibited from entering the OE operations area or performing operations unless they are accompanied and supervised by a UXO Specialist. Throughout field operations, USA Environmental and all site personnel will strictly adhere to the following general practices.

5.3.1.1 Work Hours. Field work will be conducted during daylight hours only. The work schedule will be determined as either four (4) 10-hour days or five (5) 8-hour days, as required. In no case will UXO personnel work more than 10 hours in any one day, or more than 40 hours in any one week.

5.3.1.2 Site Access. USA Environmental, in conjunction with Fort McClellan Range Control, will control access into operating areas and will limit access to only those personnel necessary to accomplish the specific operations or who have a specific purpose and authorization to be on the site. Hazardous OE operations will not be conducted when unauthorized persons are in the vicinity.

5.3.1.3 Handling of OE. If identified and required to be maneuvered, OE items will be handled by qualified UXO personnel only. Non-UXO site personnel will be emphatically instructed and closely supervised to ensure they do not handle OE items. OE-related scrap will not be handled or touched unless it has first been checked and cleared by a UXO Specialist.

#### ***--THIS POLICY WILL BE STRICTLY ENFORCED--***

5.3.1.4 Meetings and briefings. A daily general briefing and a daily tailgate safety briefing. In addition, the Senior UXO Supervisor may hold a safety stand-down at any time he notes any degradation of safety or a safety issue that warrants a review.

5.3.1.5 Daily General Briefing. The daily general briefing will be conducted for all personnel at the designated command post (CP) prior to beginning work. The briefing will cover general hazards for the project and any new safety issues or hazards that were identified since the previous briefing.

5.3.1.6 Daily Tailgate Briefing. Tailgate safety briefings will be conducted at operating sites on a daily basis. A written record of this training and the signatures of personnel attending the training will be maintained. The training will focus on the specific hazards

anticipated at each work site during that day's operations and the safety measures that will be used to eliminate or mitigate those hazards. The training discussion will also refer to other operations within the area whose proximity may have safety ramifications. As work progresses and the team's location changes within a site, or from site-to-site, any corresponding changes in ingress/egress routes and emergency evacuation routes will also be reviewed during this tailgate briefing.

5.3.1.7 Visitor Safety Briefing. Site visitors must receive a safety briefing prior to entering the operating area and must be escorted at all times by a UXO Specialist or the Site Manager. All visitors entering the project site must sign in at the temporary field office. Hazardous OE operations (intrusive, demolition) will cease when visitors, other than the USACE Safety Specialist, are present.

5.3.1.8 Environmental Awareness. The promotion of environmental awareness will be ongoing as part of safety and operational briefs.

5.3.1.9 Safety and Environmental Violations. Safety violations or unsafe acts will be immediately reported to the Senior UXO Supervisor. Failure to comply with safety rules/regulations or failure to report violations may result in immediate removal from the project site. Reckless interference with sensitive species or blatant disregard for environmental issues will likewise not be tolerated and may lead to removal from the site.

5.3.1.10 Work Clothing and Field Sanitation. Work clothing will be appropriate for the conditions encountered. In most cases this will be Level D PPE. During operations, the appropriate level of PPE will be in accordance with the Site Safety and Health Plan.

- Footwear will be sturdy work boots (steel toe when using weeders and chainsaws).
- Hand protection will consist of leather or canvas work gloves. Rubber inner or outer gloves may be required where increased protection is needed.
- Safety glasses with side shields, hearing protection, and hard hats will be available and worn when engaged in activities where their use is required.
- In no case will tennis/running shoes or abbreviated attire such as tank tops or shorts be permitted.

5.3.1.11 The team will be outfitted with field decontamination equipment, which will consist of portable eye-wash kits, containers of wash water, paper towels and soap. Prior to commencing operations each day, these facilities will be in place and ready for use in the vicinity of the team's work area, as needed. Good housekeeping measures will be practiced.

5.3.1.12 Field operations at Fort McClellan will be conducted in a systematic manner using proven operating methods and techniques. All activities will be conducted under

the direction, supervision, and observation of the Senior UXO Supervisor. All personnel will strictly adhere to approved plans and established procedures. When operational parameters change and there is a corresponding requirement to change procedures or routines, careful evaluation of such changes will be conducted by on-site supervisory personnel in close liaison with the ZAPATAENGINEERING Site Manager and Project Manager. Any new course of action or desired change in procedures will be submitted with justification for approval, as required. Approved changes will be implemented in a manner that will ensure uniformity in procedures and end-product quality on the part of the UXO team.

### **5.3.2 Preparation of Work Areas**

Procedures for preparation of the work areas will vary from site to site. Prior to initiating work, the site will be reviewed by the Senior UXO Supervisor who will determine what preparatory measures are needed. Clear access routes will be searched and marked prior to the commencement of site activities to ensure safe ingress/egress routes for fire department or other emergency vehicles that may be needed on the site. The boundaries of all areas cleared will be marked with tape (yellow/black striped). All survey crews will be accompanied by a UXO Specialist. Locations for survey markers will be checked with a magnetometer to ensure there are no subsurface anomalies prior to placement of the markers.

## **5.4 OE Operations**

USA Environmental will provide OE safety support during the intrusive excavation activities for the Engineering Evaluation/Cost Analysis (EE/CA) at Fort McClellan. UXO personnel and equipment will vary depending on specific site operations. Some of the tasks may occur simultaneously at different locations, while other tasks will be dependent on other operations.

5.4.1 Based on the findings of the site visit, ground reconnaissance, and available documentation, the probability of encountering OE is small. However, USA Environmental will provide OE disposal on an as-needed basis. During the site mobilization phase, the Senior UXO Supervisor will coordinate with Range Control for the location of an appropriate disposal site. The selected site will be in a remote area of the impact area with ready and limited access. USA Environmental will have procedures in place for explosives delivery on-call and as needed. USA Environmental will arrange for an explosives supplier to deliver the necessary explosives for demolitions to the site when required. Depending on the time of day and delivery time, it may be necessary to delay demolition operations to the next day. Items moved to the impact area will not require security to remain overnight as the area is posted as "Off Limits". If OE is encountered that must be destroyed in place, ZAPATAENGINEERING will coordinate overnight security if required.

### **5.4.2 Brush Clearing and Surface Debris Removal**

A UXO Specialist will accompany the brush clearance subcontractor during brush clearing and surface debris removal activities to conduct a visual survey for surface ordnance prior to the clearing crew entering a suspect area. Brush clearing activities will

be conducted to provide access to the prove-out and sample grids, as necessary. In addition, brush and vegetation up to a size of three (3) inches in diameter will be removed from the geophysical prove-out area and sample areas, and disposed of on-site. Brush will be cut to a height of no greater than six (6) inches above ground surface to eliminate interference with OE sampling operations. Scrap metal and debris will be collected and disposed of at either a scrap metal dealer or local landfill.

#### **5.4.3 Location Survey and Mapping**

A UXO Specialist will accompany the land surveyor during site surveying activities to conduct a visual survey for surface ordnance prior to the survey crew entering a site. Prior to driving stakes or establishing monuments, the UXO Specialist will check the areas with a magnetometer to ensure that they are free of subsurface anomalies. The boundary corners and grid corners within the areas being investigated will be established using precision surveying methods and will be conducted by a Land Surveyor registered in the State of Alabama. Each boundary corner and sample grid corner will be referenced to the Alabama State Plane Coordinate System and North American Datum of 1983. Boundary corners will be located to the closest one-hundredth of a foot (0.01 foot), while sample grid corners will be located to the closest one (1.0) foot.

#### **5.4.4 Geophysical Mapping**

USA will conduct the geophysical prove-out, as described in the Geophysical Investigations Plan. Prior to seeding the test grid with seed items, a UXO Technician will perform a sweep of the grid area using a Schonstedt magnetometer to ensure no OE items are on the surface and no anomalies are present at the seed locations. At the completion of data collection, USA will remove all seeded items and backfill all excavations.

### **5.5 Proposed Sample Locations**

Based on findings of the initial site visit and ground reconnaissance conducted by ZAPATAENGINEERING, and the review of available documentation, the probability of encountering live conventional ordnance in the non-impact areas of the proposed eastern bypass is relatively small. Several items were identified during the ground reconnaissance indicative of ground training in the area, and included:

- unknown smoke dispenser spheres,
- expended signal, illumination round, parachute White Star M127A1 and aluminum launching tube,
- mine, anti-tank practice, heavy M20 with smoke charge, M45 primer in the M604 fuse,
- M1 practice activator in the secondary fuse well, and
- unexpended cartridge 5.56 caliber blanks.

5.5.1 As a result of these findings, four proposed sample grid locations have been identified north and south of Summerall Gate Road, due east of the entrance gate. Refer to Figure 5-1. These areas exhibited the most concentrated evidence of training activities. Areas 1, 2 and 3 each encompass approximately two (2) acres. Area 4, is

approximately four (4) acres in size. Areas 3 and 4 are located within the former Chemical Demonstration Area. The location of these sample areas should not impact previously identified archaeological sites.

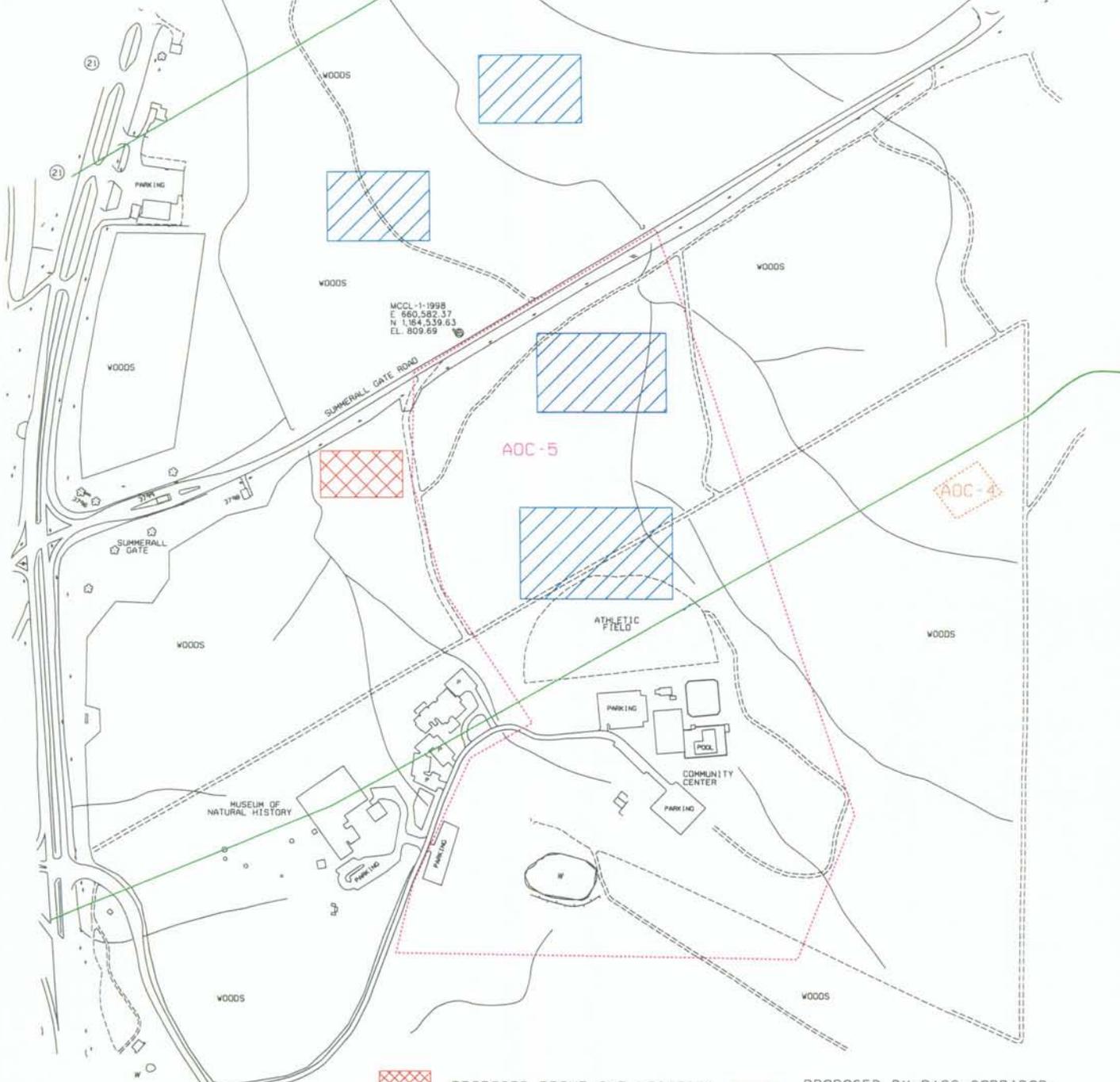
5.5.2 It is anticipated that a standard grid size of 100 by 100 feet will be adequate to obtain the geophysical data. Site topography and terrain conditions, such as steep grades and excessively thick brush may dictated the actual size and location of the sample grids, once the sample area has been clearly defined and surveyed.

### **5.5.3 *Sampling***

Once the sample area boundaries and grid corners are established, sample grids will be screened using equipment identified during the geophysical prove-out. USA Environmental will then excavate and identify anomalies within the sample grids which have been designated by the ZAPATAENGINEERING Site Manager. The decision to excavate will be made jointly with CEHNC, and be based on the signature of the anomaly. Chemical and toxic hazards are not anticipated to be encountered during this phase of work at Fort McClellan. If, during site operations, USA Environmental personnel encounter a suspected toxic chemical munition or chemical warfare material (CWM), they will immediately withdraw upwind to a safe location outside the fragmentation zone of the type of ordnance, and contact the Fort McClellan Range Control and the US Army Engineering and Support Center (CEHNC) for notification of appropriate agencies.

5.5.3.1 USA Environmental will secure the site with two (2) UXO Specialists until the arrival of the Technical Escort Unit (TEU) or military EOD. If directed, USA Environmental will assist the TEU, as well as establish and operate a personnel and equipment decontamination station (PDS).

5.5.3.2 In the event that hazardous or toxic materials are encountered during excavation of anomalies, ZAPATAENGINEERING will provide for the removal, packaging, transport, and disposal of the material removed from individual anomaly excavations, in accordance with all applicable Federal, state, and local regulations. US Army Corps of Engineers Mobile District will be responsible for requisite environmental remediation.



- PROPOSED PROVE-OUT LOCATION
- PROPOSED SURVEY LOCATION
- PROPOSED BY-PASS CORRIDOR
- OLD CHEMICAL WEAPONS DEMONSTRATION AREA (AOC-5)
- BIOLOGICAL WARFARE AREA (AOC-4)

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**US ARMY ENGINEERING  
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 HUNTSVILLE, ALABAMA

**PROJECT TITLE: FORT McCLELLAN  
EASTERN BYPASS**  
**DRAWING TITLE: INTRUSIVE SAMPLE AREAS**

PROJECT #:	PAGE #:	DATE:	DRAWN BY:	SCALE:	FIGURE
982503	5-7	09 DEC 98	MSA	AS SHOWN	5-1

#### 5.5.4 Equipment

The equipment requirements for this activity include:

- Schonstedt magnetometers to detect and locate sub-surface metallic anomalies;
- Pin flags, as listed below;
- Miscellaneous common hand tools (e.g. screwdrivers, etc.); and
- Excavation tools (shovels, picks, hand trowels, etc.).

<u>COLOR</u>	<u>USED TO MARK</u>
<i>Red Pin Flag</i>	Danger, identified OE or subsurface anomaly, special precaution required.
<i>White Pin Flag</i>	Boundary or temporary marker.

#### 5.5.5 Anomaly Investigation

Once anomalies have been marked by the geophysical team, the Senior UXO Supervisor will direct the UXO Technicians to begin excavating and investigating the subsurface anomalies. During this operation, the Senior UXO Supervisor will disperse the UXO Technicians across the operating grid in a manner that maximizes the separation distance between individual technicians.

5.5.5.1 Anomalies will be investigated to a depth of three (3) feet. OE encountered that is safe to move will be consolidated in the sampling area for detonation. Locations that have anomalies deeper than three (3) feet will be marked and reported to the CEHNC Site Safety Representative who will determine if further excavation is required. During all anomaly excavation operations, only UXO personnel will be allowed in the exclusion area (EZ). The EZ will include an area large enough to prevent injury to other personnel or operations from fragmentation and blast. The minimum exclusion area during anomaly excavation will be a fragmentation radius of 1,250 feet based on the requirements of the CEHNC Safety Concepts and Considerations for UXO Operations, unless reduced by the SSHO and CEHNC Safety Specialist, based on the specific ordnance item.

#### 5.5.6 Disposal

If required, OE and OE-related material containing explosives or hazardous material will be disposed of by detonation utilizing standard electric firing procedures, as outlined in USA Environmental's Demolition Standard Operating Procedures (SOP), included in Appendix E of this plan. Items determined safe to move may be consolidated within a site or grid to reduce the number of detonation shots necessary to destroy any UXO. The following paragraphs describe the procedures to be used to detonate OE items at Fort McClellan.

5.5.6.1 USA Environmental will dispose of OE and suspect live OE-related material by detonation. Demolition shots will be limited to 20 pounds net explosive weight (NEW), including priming charges. Demolition operations will begin in a work site when all non-

essential and non-UXO personnel are beyond the fragmentation zone of the ordnance being detonated. Ordnance that is safe to move may be consolidated to reduce the number of shots.

5.5.6.2 All roads and trails that provide access to the disposal site will have roadblocks established during disposal operations. The Senior UXO Supervisor will be on site at all times during disposal operations. The operation will be performed under the direction and supervision of the Senior UXO Supervisor who is charged with the responsibility to ensure that procedures contained in this work plan and referenced documents are followed. The Senior UXO Supervisor will monitor compliance with the safety measures contained in the work plan and associated documents, and in the event of non-compliance will stop or suspend operations.

**NOTE**

*Disposal activities are inherently hazardous and require strict adherence to approved safety and operational procedures. Violations of procedures may result in immediate removal from this project.*

5.5.6.3 Prior to the start of disposal activities, the Senior UXO Supervisor will verify that the area around the operating site is clear of all non-UXO personnel and verify with the command post and Range Control that all required notifications have been made. A minimum distance of 1,250 feet (non-fragmenting), 2,500 feet (fragmenting) and 4,000 feet (bombs and projectiles greater than 5 inches in diameter) will be established and maintained around the operating site. Depending upon the type of munition(s) being destroyed, the fragmentation distance may be increased or decreased based on ordnance data. Personnel remaining on-site will be limited to those needed to safely and efficiently prepare the item(s) for destruction.

5.5.6.4 Standard electric demolition equipment utilized by the US Military will be used for demolition. Procedures will follow the guidelines dictated by USA Environmental's SOP (Appendix E) and applicable Federal, state, and local guidelines.

5.5.6.5 Prior to initiation of demolition operations, all non-essential personnel will be evacuated from the area. Prior to priming of demolition charges, all avenues of ingress will be physically blocked by guard personnel. Radio communications will be maintained between all concerned parties at all times. Avenues of ingress will not be opened without the express permission of the Senior UXO Supervisor. A constant state of vigilance will be maintained by all personnel to detect any intrusion into the fragmentation zone and overflights of any aircraft.

5.5.6.6 Hazardous and toxic materials will be disposed of at a permitted RCRA facility, in accordance with all applicable Federal, state, and local regulations.

### **5.5.7 Explosives Accountability and Transportation**

Detailed procedures for the issue, turn-in, and transportation of explosives are contained in USA Environmental's SOP in Appendix E. In addition to these procedures, USA Environmental will strictly enforce the following:

- Issues of explosives will be limited to those quantities needed to perform a specific operation;
- strict accountability of explosives will be maintained at all times;
- only UXO Technicians will be issued and/or transport explosive materials;
- all vehicles transporting ammunition and explosives will be properly inspected and placarded in accordance with DOD Form 626, vehicle inspection, and DOD 6055.9 STD, Ammunition and Explosives Safety Standards, prior to loading explosives or UXO onto the vehicle;
- vehicle engines will not be running when loading or unloading explosives;
- beds of vehicles will have either a plastic bed liner, dunnage, or sandbags to protect the explosives from contact with the metal bed and fittings;
- vehicles transporting explosives will have a first aid kit, two (2) 10 BC fire extinguishers and communications capability;
- compatibility requirements when transporting explosives and OE will be observed;
- vehicle operator will have a valid operators permit;
- maximum speed for explosive vehicles will be 25 MPH or less if the situation so dictates; and
- personnel will not ride in the cargo compartment with explosives or OE.

### **5.5.8 Disposal Shots**

While preparing UXO for detonation, the Senior UXO Supervisor will ensure that the number of personnel on-site is kept to a minimum required to safely accomplish the disposal mission. Authority to initiate demolition operations will rest solely on the Senior UXO Supervisor. This individual is responsible for ensuring that all personnel have been evacuated from the area, that all personnel have been accounted for, that all pertinent parties have been notified of an impending demolition shot. He will also ensure that the area is secure prior to authorizing the detonation of explosive charges. Prior to priming demolition shots, the Senior UXO Supervisor will direct all non-essential personnel to leave the area.

5.5.8.1 Upon completion of disposal operations, the Senior UXO Supervisor and one UXO Specialist will visually inspect each disposal shot. One of these personnel will perform a visual inspection of the disposal site(s). The second person will stand by at a safe distance and be prepared to render assistance in the event of an emergency. Upon

completion of this inspection and providing that there are no residual hazards, the Senior UXO Supervisor will authorize the resumption of site operations and all detonation holes will be back-filled.

#### **5.5.9 Records**

The Senior UXO Supervisor will prepare and maintain a detailed accounting of OE destroyed and non-hazardous OE-related scrap recovered. The inventory will include information pertaining to the following:

- The number, type, and description of OE items recovered and destroyed;
- The type(s) and amounts of explosives used;
- The number, type, and description of non-hazardous items recovered and stockpiled, and an estimated weight, in pounds, of the scrap remaining for disposal.

5.5.9.1 All data obtained during the intrusive excavation efforts will be incorporated in to the digital design files and plotted on site maps. The findings of the field activities will be included in the Engineering Evaluation/Cost Analysis for presentation of the available and recommended removal alternatives.

CONVENTIONAL SAFE HOLDING AREA PLAN

FOR

EASTERN BYPASS EE/CA  
AT  
FORT MCCLELLAN, ALABAMA

September 1998

Prepared for:

US ARMY ENGINEERING AND SUPPORT CENTER  
HUNTSVILLE

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## **6.0 CONVENTIONAL SAFE HOLDING AREA PLAN**

Based on the site visit, ground reconnaissance of the non-impact area, and available documentation, the probability of encountering live conventional ordnance in the non-impact area is small. In the event of a discovery of OE and OE-related material, USA Environmental, subcontractor to ZAPATAENGINEERING, will provide conventional ordnance disposal on site.

Explosives will be stored in the Fort McClellan Ammunition Supply Point (ASP) in a government-supplied magazine. Initial stock of explosives will include the following;

1. Composition C-4, 10 lbs. NEW,
2. Detonation cord, 50 grains/foot, 2-100 ft. rolls, 0.325 kg NEW, and
3. Electric instant blasting caps, 12 ft. wires, 1 box of 50, 0.05 kg NEW.

Additional explosives will be purchased, if required. The explosives supplier, Omni Distribution, Inc., Memphis, TN will provide Material Safety Data Sheets (MSDS) with the shipment. Copies of all MSDS will be provided to the Fort McClellan ASP personnel. This plan outlines the procedures ZAPATAENGINEERING will use to perform conventional ordnance removal and disposal operations, in the event that such items are found at Fort McClellan, Alabama. USA Environmental will dispose of conventional ordnance located on site by detonation.

### **6.1 Disposal Operations**

All conventional ordnance material containing explosives will be disposed of by detonation utilizing standard electric firing procedures as outlined in Technical Manual (TM) 60A-1-1-31. USA Environmental has the option to utilize non-electric firing procedures if the particular situation dictates. If these methods of disposal are determined to be impractical, USA Environmental will notify the on-site CEHNC Safety Specialist. The proposed disposal site will be located in the sampling grids and will be coordinated with Fort McClellan Range Control and the CEHNC Safety Specialist.

6.1.1 Conventional ordnance-related materials will be disposed of by demolition (see 5.5.5 Intrusive Excavation Plan). Demolition operations will begin when all non-essential and non-UXO personnel are beyond the fragmentation zone of the ordnance being detonated. Conventional ordnance will be consolidated to reduce the number of detonation shots necessary to destroy any UXO material. Storage of explosives will be in strict compliance with DOD 6055.9 STD Ammunition and Explosives Safety Standards. Detailed procedures for the storage, issue, turn-in, and transportation of explosives are contained in Attachment I to this plan. Any remaining UXO detonation explosive not used during this project will be either released to personnel at the Fort McClellan ASP or returned to the explosives supplier.

*Attachment I*  
STANDARD OPERATING PROCEDURES (SOP)  
EXPLOSIVES STORAGE AND ACCOUNTABILITY

1-1 General

The following USA Environmental policies are not all inclusive nor are they applicable in all situations. This SOP is not a stand-alone document and is to be used together with the Project Work Plan, SSHP, applicable Federal, state, local regulations, and contract restrictions and guidance.

1-2 References

Procedures and information contained in this document were obtained from the below listed references:

- CEHNC Safety Considerations for UXOs;
- ZAPATAENGINEERING Fort McClellan SSHP;
- OSHA, 29 CFR 1910, Occupational Safety and Health Standards;
- OSHA, 29 CFR 1926, Construction Standards;
- Applicable sections of EPA, 40 CFR Parts 260 to 299, Protection of Environment;
- Applicable sections of DOT, 49 CFR Parts 100 to 199, Transportation;
- ATF P 5400.7, ATF-Explosives Law and Regulations;
- CEHNC EM 385-1-1, Safety and Health Requirements Manual;
- CEHNC ER 385-1-92, Safety and Occupational Health Document Requirements for Hazardous Waste Remedial Actions;
- DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards;
- DOD 4160.21-M, Defense Reutilization and Marketing Manual;
- DA PAM 385-64, Ammunition and Explosives Safety Standards;
- AR 385-64, Ammunition and Explosives Safety Standards;
- AR 200-1, Environmental Protection and Enhancement;
- AR 385-10, The Army Safety Program;
- AR 385-16, System Safety Engineering and Management;
- AR 385-40 w/USACE supplement, Accident Reporting and Records;
- TM 9-1300-200, Ammunition General;
- TM 9-1300-214, Military Explosives;
- TM 60 Series Publications.

1-2 Storage and Accountability

Demolition operations require the availability and storage of explosive materials. To the maximum extent possible, local government facilities will be used.

1-2.1 USA Environmental will comply with local storage criteria and procedures when using Government facilities. When required to provide explosive storage, USA Environmental will:

- Use portable approved Bureau of Alcohol, Tobacco, and Firearms (ATF) Type 2 structures or existing government furnished magazines;
- Locate, install, and maintain the magazines to comply with the magazine criteria and quantity distance requirements established in DOD 6055.9-STD, DOD Ammunition and Explosives Safety Standards;
- Install sufficient magazines to comply with explosive compatibility requirements, (i.e., bulk explosives, initiating explosives, OE; and,
- Establish security, such as fencing and/or guards, to prevent unauthorized access and/or theft.

#### 1-2.1.1 Type 2 Outdoor Magazines

A type 2 magazine is a box, trailer, semi-trailer, or other mobile facility.

1-2.1.1.1 Outdoor magazines will be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated. They will be supported to prevent direct contact with the ground and, if less than one cubic yard in size, will be securely fastened to a fixed object. The ground around outdoor magazines must slope away for drainage or provide for adequate drainage. When unattended, vehicular magazines must have wheels removed or otherwise effectively immobilized by kingpin locking devices or other methods.

1-2.1.1.2 The exterior and doors are to be of not less than 1/4-inch steel and lined with at least two inches of hardwood. Magazines with top openings will have lids with water-resistant seals or which overlap the sides by at least one inch when in a closed position.

1-2.1.1.3 Hinges and hasps will be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps will be installed so they cannot be removed when the doors are closed and locked. Each door will be equipped with two padlocks fastened in separate hasps and staples. Padlocks must have at least five tumblers and a case-hardened shackle of at least 3/8-inch diameter. Padlocks will be protected with not less than 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples.

### 1-3 Accountability

USA Environmental will employ the following procedures to account for explosive materials:

- Control of and access to explosive magazines will be strictly controlled by the Senior UXO Supervisor. All issues and turn-ins of explosives will be properly documented and verified, through physical count, by a quality control specialist.
- On receipt, the type, quantity, and lot number of each explosive item is recorded in the magazine data card and the original receipt documents will be maintained on file by the Senior UXO Supervisor.
- All requests for explosives from the individual operating sites will be reviewed by the Senior UXO Supervisor. Only sufficient explosives for the day's operations will be issued.
- Issues of explosives are recorded on explosive usage records and deducted from the magazine data card(s). This procedure will ensure that the quantities of explosives on-the-floor in the magazine reflect the quantities listed on the magazine data card, and that issued explosives are accounted for while they are in the possession of individual users.
- Entries made on the explosive usage records and magazine data cards will be verified through physical count by the UXO Supervisor with drawing or turning-in the explosives, and the QC Specialist.
- All unused explosives are turned-in at the end of each day, re-entered on the magazine data card and recorded on the explosive usage record.
- At the end of each day, the Senior UXO Supervisor and the UXO supervisor reconcile the entries on each explosive usage record, and will turn these records over to the Project Manager.
- Weekly, the QC specialist will direct a 100% inventory of all explosives on hand. These inspections will include a physical count of the explosives and a comparison of this amount with the amount listed on the individual magazine data cards. Discrepancies and the results of these inventories will be recorded and reported to the Senior UXO Supervisor.

1-4 Transportation of OE and explosives will comply with all Federal, state, and local regulations. Permits are not required under CERCLA for transportation of explosives or conventional OE on-site or on Federal installations. Off-site shipment of conventional ordnance will be made using commercial carriers approved to transport ammunition and explosives, Class A and B, for the Department of Defense. For off-site shipment:

- Conventional ordnance will be packaged IAW 49 CFR part 173;
- drivers will be provided DD Form 836 (Special Instructions for Motor Vehicle Drivers);
- vehicles will be inspected using DD form 626, (Motor Vehicle Inspection), and be properly placarded;

- compatibility requirements will be observed; and,
- the load shall be well braced and, except when in closed vans, covered with a fire-resistant tarpaulin.

#### 1-4 Federal Installations/On-Site

Transportation of explosives and conventional ordnance on-site and on Federal installations will comply with the following:

- Vehicles will be inspected daily using DD form 626, Motor Vehicle Inspection, and will be properly placarded;
- explosives will be transported in closed vehicles whenever possible;
- when using an open vehicle explosives will be covered with a flame resistant tarpaulin (except when loading/unloading);
- vehicle engine will not be running when loading/unloading explosives;
- beds of vehicles will have either a wooden or plastic bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings;
- vehicles transporting explosives will have a first aid kit, two 10 BC rated fire extinguishers, and communications capability;
- initiating explosives, such as blasting caps, will remain separated at all times;
- compatibility requirements will be observed;
- operators transporting explosives will have a valid drivers license; and
- drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for conditions. Vehicles transporting explosives off-road will not exceed 25 MPH.