Final
Conventional Explosives Safety Submission

Ordnance and Explosives (OE) Removal Action
Eastern Bypass

Fort McClellan, Alabama

Delivery Order 0010
Contract Number DACA87-99-D-0010

U.S. Army Corps of Engineers
Engineering and Support Center
Huntsville, Alabama

Geographical Corps District:
US Army Corps of Engineers, Mobile District

Prepared by
Foster Wheeler Environmental Corporation
Huntsville, Alabama

October 2001

Copy 2 of 25

TABLE OF CONTENTS

1.0 INTRODUCTION 1
2.0 REASON FOR OE 1
3.0 AMOUNT AND TYPE OF OE 3
4.0 START DATE 6
5.0 FROSTLINE 6
6.0 CLEARANCE TECHNIQUES 6
6.1 Detection Methods 6
6.2 Recovery and Disposal 8
6.3 Quality Assurance/Quality Control (QA/QC) Plan 9
6.4 OE Scrap Explosive Hazards 10
7.0 ALTERNATE TECHNIQUES 11
8.0 OFFSITE DESTRUCTION 11
9.0 TECHNICAL SUPPORT 11
10.0 LAND USE RESTRICTIONS 11
11.0 PUBLIC INVOLVEMENT 12
12.0 MAPS 12
12.1 Regional Map 12
12.2 Site Map 12
12.3 Q-D Map 12

TABLE OF CONTENTS
(Continued)

List of Tables

Table 1 Ordnance Types within OE Area 2 4

Table 2 Demolition Materials 14

List of Figures

Figure 1 Regional Map 2

Figure 2 Site Map 7

Figure 3 Q-D Map 13

List of Appendices

Appendix A CEHNC Memorandum-Minimum Separation Distances
Appendix B Ammunition Supply Point Explosive Storage Limits and License

LIST OF ACRONYMS

AEDA	Ammunition, Explosives, and Dangerous Articles
ALDOT	Alabama Department of Transportation
ANG	Army National Guard
ASP	Ammunition Supply Point
BCT	Base Realignment And Closure Cleanup Team
BIP	Blow In Place
BRAC	Base Realignment And Closure
CEHNC	Corps of Engineers, Huntsville Center
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CWM	Chemical Warfare Munition
DDESB	Department of Defense Explosives Safety Board
DGPS	Differential Global Positioning System
DID	Data Item Description
DOD / DoD	Department Of Defense
EBP	Eastern Bypass
EE/CA	Engineering Evaluation/Cost Analysis
EODT	EOD Technologies Inc.
ESS	Explosives Safety Submission
ft	Foot / Feet
FWENC	Foster Wheeler Environmental Corporation
IAW	In Accordance With
illum	Illumination
JPA	Joint Powers Authority
mm	Millimeter
MPH	Miles Per Hour
MPM	Most Probable Munition
MSD	Minimum Separation Distance
NEW	Net Explosive Weight
OE	Ordnance Explosives
OSHA	Occupational Safety and Health Administration / Act
QA	Quality Assurance
QC	Quality Control
QD	Quantity Distance
RTS	Robotic Total Station
SUXOS	Senior UXO Supervisor
U.S.	United States
USAESCH	U.S. Army Engineering Support Center, Huntsville
USRADS	Ultrasonic Ranging and Data System
UXO	Unexploded Ordnance
UXOQC	UXO Quality Control
UXOSO	UXO Safety Officer
VL	Verification Level

1.0 INTRODUCTION

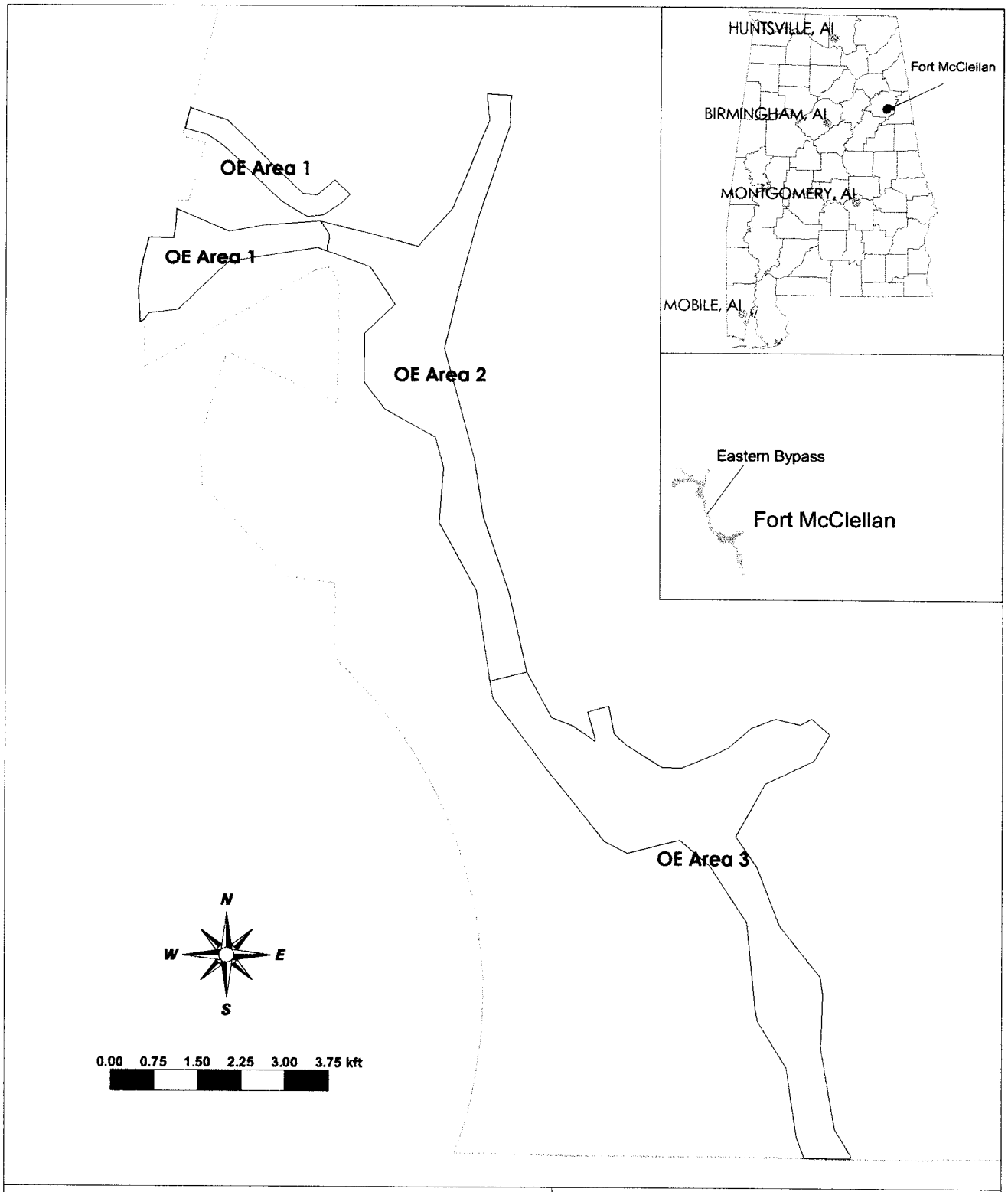
1.1 This Explosives Safety Submission (ESS) has been prepared for the Eastern Bypass OE Removal Action at Fort McClellan, Alabama. The purpose of this document is to present the Department of the Army selected remediation methodology to the Defense Department Explosives Safety Board (DDESB) for review and approval. The regulatory guidance under which this is prepared is DDESB Memorandum, Subject: Guidance for Clearance Plans dated 27 Jan 98.

1.2 This ESS addresses OE Areas 1, 2 and 3. The selected alternative for OE Area 1 is 'Clearance to 1 foot'. This clearance has been carried out over the entire OE Area 1 and based on the results and the contents of the associated Removal Report prepared by Explosive Ordnance Removal Technologies (EODT), further action is not considered necessary. The selected alternative for OE Area 2 is 'Clearance to Depth' with construction support and institutional controls. The site preparation and geophysical mapping for a clearance to depth is currently being carried out in OE Area 2 and the commencement of the removal phase is awaiting the approval of this document. In the Action Memorandum, 'No Further Action' is the chosen alternative for OE Area 3. This alternative was chosen after analyzing findings from both the EE/CA and the pre-construction support in the area that support the fact that there is no history of ordnance use and no ordnance was found there. These parcels will be transferred to the Alabama Department of Transportation for construction of the Eastern Bypass highway in accordance with the Joint Powers Authority (JPA) Land Reuse Plan. See Figure 1 – Regional Map for details of the areas.

1.3 This project is Delivery Order 0010, under contract DACA87-99-D-0010, Ordnance and Explosives Response at Fort McClellan, Alabama. Under the delivery order, a site-specific Eastern Bypass OE Removal Work Plan was prepared.

2.0 REASON FOR OE

2.1 Fort McClellan has been used for artillery training of troops and the National Guard as early as 1912 to present day. In 1941, McClellan became the site of the Chemical Corps Training Command. In 1962, the U.S. Army Combat Developments Command Chemical Biological-Radiological Agency moved to Fort McClellan. In 1973, the Chemical Corps School along with the U.S. Army Combat Developments Command Chemical Biological-Radiological Agency was moved to Edgewood Arsenal. In 1979, the U.S. Army Chemical Corps School re-established along with a training Brigade for Basic Training. In September of 1999 Fort McClellan was closed under the Base Realignment and Closure Act.



FOSTER WHEELER ENVIRONMENTAL CORPORATION

HU:DCR

Figure 1
Regional Map

Fort McClellan
Calhoun County
Alabama

3 July 2001

2.2 OE Area 2 has located within its boundaries, documented impact and training areas and based on previous investigations and studies conducted at Fort McClellan, OE and OE Scrap was found to be present in large quantities. Of note, was that in excess of 30,000 components of, or complete 2.36" rockets were located in the top 12 inches. OE Area 1 was found to contain small amounts of expended training items (OE Scrap) in the top 12 inches. Available documentary evidence and results of the one foot clearance by EODT indicate that OE Area 1 was never a designated impact area although it appears that infantry did use the area as a training area. There is evidence of small unit level weapons such as 60 mm practice mortars, 2.36" practice rockets, expended rifle smoke grenades, expended smoke grenades and projected flares. It appears that the non-designated training areas in OE Area 1 only had training / practice items fired in them and HE items were fired within the established range fans within OE Area 2. There is no documented history of ordnance use in OE Area 3. During an extensive ground reconnaissance there was no evidence of any subsurface OE; the only items found were OE scrap (one expended smoke grenade and one expended simulation charge).

3.0 AMOUNT AND TYPE OF OE

3.1 Several previous site investigations in and around the Eastern Bypass (EBP) OE Removal Area have indicated the presence of OE training items within the OE Area 2 area. The OE Area 2 area encompasses known impact areas. These activities as well as potential OE items that may be found within the EBP are described in the Final Engineering Evaluation/Cost Analysis prepared by Zapata Engineering dated April 2000 and Table 1 – Ordnance Types within OE Area 2.

3.2 EODT have demobilized operations after a clearance to 1 foot in support of pre-construction activities in the OE Area 2. The boundary of OE Area 2 has been adjusted since finalization of the EBP EE/CA to better reflect the nature of past use indicative of the types of ordnance found during the surface clearance. These boundaries as defined in the Action Memorandum indicate that OE Area 2 incorporates several range fans, including a 60mm mortar range, a 2.36" rocket range, and a tank range.

3.3 A clearance to 12 inches below grade was carried out over the entire OE Area 1. The OE Area 1 was identified in the EE/CA as a suspected training area. Data gathered in and around the OE Area 1 of the Eastern Bypass supports that finding. The documentary evidence so far, supports the assertion that practice items were used exclusively in OE Area 1. The OE Scrap items reported in this area such as inert hand grenades, practice 37mm projectiles and the 60mm M69 practice mortar are less penetrating and are likely to have been found during the previous 12" clearance. Again, the "Clearance to 1 foot" alternative was based on the data collected and the lack of live OE found in OE Area 1. The numerous activities completed in and around the OE Area 1 that support that historical use and have provided information leading to that recommendation are outlined below:

3.3.1 Eastern Bypass EE/CA Investigations. An EE/CA which included OE Areas 1, 2 and 3 was carried out. The objective of that investigation was to ascertain whether OE or OE Scrap was present in each of the areas. The type, depths and density of the OE or OE Scrap was not fully characterized as the objective of proving the presence of OE Scrap was achieved. Geophysical mapping of 8.56 acres and intrusive sampling of selected anomalies within 2.41 acres of OE Area 1 was performed. Further exploitation of this area was not required in the scope of the EE/CA as evidence of the presence of OE Scrap regardless of depth was achieved. OE Scrap discovered as a result of the sampling included 60mm practice mortars, 2.36-inch practice rockets, expended smoke grenades and one mine activator. All items recovered were found within 12 inches of the ground surface.

3.3.2 Eastern Bypass Construction Support. A surface and near surface removal of OE Scrap items over the entire OE Area 1 was performed to support pre-construction activities. The OE Scrap items recovered during this activity were training and practice items including, smoke and practice hand grenades, slap flares, training and practice mortars (60mm and 81mm), expended rifle grenades, one practice anti-vehicle mine, 2.36-inch practice rockets, and two expended 37mm APT rounds.

3.3.3 M2 Parcel Removal Action. A clearance to depth was performed on this parcel which is adjacent to the OE Area 1. Items recovered during this removal action included one white phosphorus grenade, one practice anti-tank mine, one practice grenade, and other OE Scrap debris consisting of portions of expended rifle grenades, slap and rifle flares, and hand grenades. All items except one expended rifle grenade was located within the top 12 inches of the ground surface.

3.4 There has been no unexploded ordnance items found within the OE Area 3 boundary and there is no evidence of past use. Two Ordnance and Explosive (OE) Scrap training items were found in the area consisting of an expended smoke grenade and an expended noise simulation device. Both of these items are consistent with small unit training in the area. The Action Memorandum recommends "No Further Action" in this area.

3.5 Based upon the type and use of OE and OE Scrap within OE Area 2, all are anticipated to be encountered at depths of less than four foot unless disposed of in a burial pit. The types of OE and OE Scrap associated with OE Area 2 are presented in Table 1.

Table 1
Ordnance Types within OE Area 2

Ordnance Item	Depth of Penetration (ft)	Maximum Detection Depth (ft)
3" Stokes Mortar, inert (Mk-1)	Not available	2.8
2.36" rocket motor, inert (M-7)	<0.8	1.3
2.36" rocket warhead, inert (M-7)	0.8	2.2

2.36" rocket warhead, heat (M-6)	0.8	2.2
2.36" rocket, heat (M-6)	0.8	2.2
2.36" rocket, inert (M-7)	0.8	2.2
2.36" rocket, fuze, live (M-6)	Not available	Not available
2.36" rocket, fuze, inert	Not available	Not available
60mm mortar, HE (M-49)	2.3	2.2
60mm mortar, illum, inert (M-83)	2.3	2.2
60mm mortar, inert (M-50)	2.3	2.2
60mm mortar, inert (M-69)	2.3	2.2
Flare, signal, expended	Surface	Not available
Flare, signal	Surface	Not available
Flare, trip, M-49, live	Surface	Not available
Fuze, grenade, smoke, inert	Surface	Not available
Fuze, grenade, smoke, live	Surface	Not available
Firing Device, live, (M-3)	Surface	Not available
Grenade, flare, rifle, live (M-23)	Surface	Not available
Grenade, hand, practice (Mk-2)	Surface	Not available
Grenade, hand, practice (Mk-2)	Surface	Not available
Grenade, hand, live, BP, (Mk-2)	Surface	Not available
Grenade, rifle, smoke, inert (Mk-22)	Surface	Not available
Grenade, rifle, practice (M-11)	0.2	2.0
Grenade, rifle, M-9A1, live	0.2	2.0
Grenade, smoke, inert (M-18)	Surface	Not available
Grenade, smoke, live (M-18)	Surface	Not available
Grenade, smoke, live (M8-HC)	Surface	Not available
Mine, bounding, inert (M-2)	Surface	Not available
Mine, practice, inert (M-12)	Surface	Not available
Projectile, 37mm, AP-T (M-51)	7.9	1.3
Projectile, 37mm, LE, live (Mk-1)	7.9	1.3
Projectile, 81mm, practice, (M-68)	5.4	2.9
Smoke, canister 105mm, inert (M-84)	Not Available	Not available
Booster, 3" stokes mortar	Not Available	Not available
Primer, cartridge case, (projo), live	Not Available	Not available

Note: The penetration depths are based on worst case theoretical assumptions, typical penetration depths are usually significantly less.

3.6 Most Probable Munition. The most probable munition (MPM) is the Projectile, 37mm HE, MK II. This item was selected as the most suitable by CEHNC after the discovery of fragmentation from this projectile in an adjacent area. Details of the Minimum Separation Distance for this item prepared by CEHNC are contained in Appendix B. Other items such as a Smoke, canister, 105 mm and Projectile, 81mm, practice, (M-68) were found although as only single items were discovered, these are not thought to be representative of items in the area. The item of ordnance selected as the MPM corresponds to an exclusion zone of 1181 feet. If during the course of the investigation, OE with a greater fragment range is discovered, the Q-D arc will be adjusted and an amendment to the MPM submitted for approval. In the interim period,

the figures from DoD 6055-9, Table C5.T1 or C5.T2 will be used for the item in question. See Figure 2 – Site Map and Figure 3 – Q-D Arcs for further details of the exclusion zone.

4.0 START DATE

4.1 The intrusive component of the Removal Action is scheduled to commence after the approval of this document estimated to be during October.

5.0 FROSTLINE

5.1 The depth of frostline is 6-inches. The planned clearance will be below the frostline.

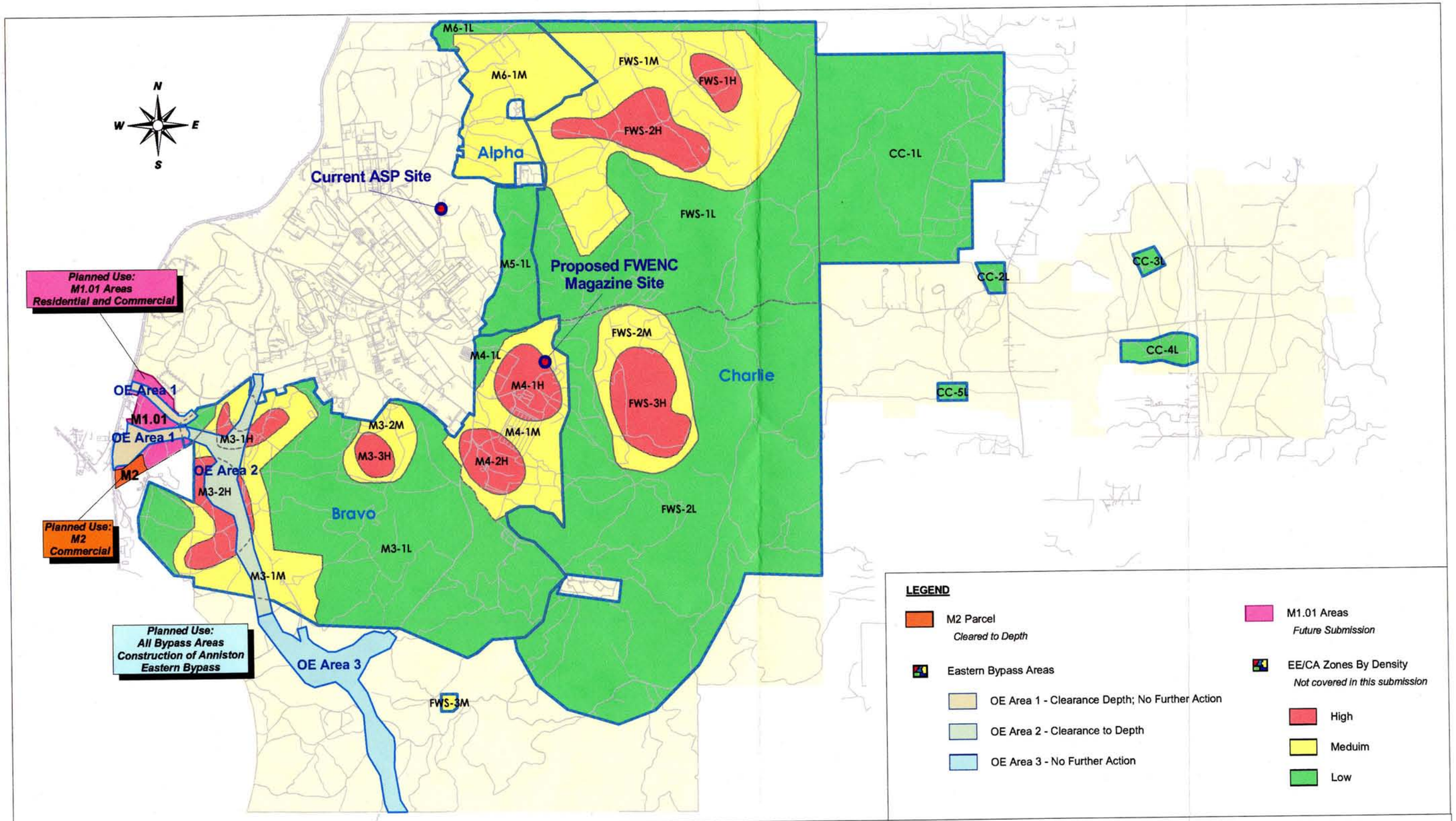
6.0 CLEARANCE TECHNIQUES

6.1 Detection Methods

6.1.1 The majority of grids within OE Area 2 were cleared of OE with magnetometers to 12 inches below grade prior to this removal action. All grids within OE Area 2 including the few not cleared to 12 inches by EODT will be cleared to depth within this removal action. Visual observance plus limited use of conventional magnetometers will be used as a further safeguard to detect surface OE during UXO escort for brush clearance and grid setout teams. This will also serve to confirm locations as safe for driving survey stakes into the ground.

6.1.2 Following brush clearance, the OE Area 2 area will be investigated with geophysics using several different positional data systems depending on the terrain. These include the Ultrasonic Ranging and Data System (USRADS), Differential Global Positioning System (DGPS), Vulcan Spatial Measurement System or Robotic Total Station (RTS). These positional systems will be coupled with the EM-61 sensor to perform the geophysical surveys. This equipment was selected as most suitable after on site prove-out in 1999 and is capable of detecting the smallest item to the detection depth specified in the next paragraph.

6.1.3 The planned OE removal depth selected in the Action Memorandum is "clearance to depth". In this scenario this is defined as, the excavation and removal of all sub-surface items geophysically detected which could potentially be OE. The contract performance line is defined IAW CEHNC DID OE-005-05. For example, this calculation corresponds to a minimum detection depth of 1.3 feet for 37mm projectiles, 2.2 feet for 2.36" rockets and 3.2 feet for 3.5" rockets. If an anomaly is detected and is located



FOSTER WHEELER ENVIRONMENTAL CORPORATION

HU:DCR

Approximate Scale 1:44,000

0.0 2.5 5.0 7.5 10.0 12.5 kft

Fort McClellan
Calhoun County
Alabama

3 July 2001

Figure 2
Site Map

below the four foot level and presents a credible target, consultation with CEHNC will be made and further investigation/exploitation of the anomaly will be carried out. Note that few if any anomalies are expected to be detected below the four foot level and these will require extensive shoring or benching works in order to comply with OSHA regulations.

6.1.4 The site will be sub-divided into grids (100 ft by 100 ft). Each grid corner will be setout using DGPS, RTS or other precise surveying technique to the accuracy set out in the Scope of Work (<1 foot). EM-61 sensor and navigation data will be collected, analyzed and mapped to depict anomaly locations suspected of being OE. The contractor is carrying out geophysical validation of 100% of 10 grids. This is the basis of the calibration of the geophysics and verification that the threshold and characteristics for selection of anomalies is accurate. Once this has been completed, the contractor will classify the anomalies into two categories, 'dig' and 'do not dig'. When the Reacquire Sheets are prepared and reacquisition of targets commences, 100% of the 'dig' anomalies and a percentage of the "Do Not Dig" anomalies will be marked. The extent of the "do not dig" anomalies to be excavated will be decided by the Delivery Order Manager, SUXOS and Project Geophysicist depending on the results of the previous grids. Target anomaly dig sheets will then be prepared and after approval of this ESS, UXO teams will dig each target anomaly. The geophysical data and target anomalies generated by Foster Wheeler will be truthed by comparison to the actual characteristics and locations of anomalies recovered. Some steep areas will preclude the use of geophysics and conventional methods (mag and dig) will be used.

6.1.5 The smallest item of interest expected at OE Area 2 is the 37 mm, HE MK 2 projectile. This projectile is 37 mm in diameter and 113.03 mm in length.

6.2 Recovery and Disposal

6.2.1 Demolition operations will begin when all personnel are out of the fragmentation zone of the ordnance being detonated. OE will be disposed of daily unless the on-site CEHNC Safety Specialist approves an exception. All items will be blown in place (BIP) to reduce the risk inherent in handling and movement. The Senior UXO Supervisor (SUXOS) and the UXO Safety Officer (UXOSO) will be on-site at all times during disposal operations. A reduced exclusion zone of 200 feet may be used if sandbags are used in accordance with HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions".

6.2.2 The operation will be performed under the direction and supervision of the Demolition Team Leader, who is charged with the responsibility to ensure that procedures contained in the work plan and referenced documents are followed. The UXOSO will monitor compliance with the safety measures contained in the work plan and associated documents, and in the event of noncompliance, is vested with the authority to stop or suspend operations.

6.2.3 Upon completion of disposal operations, the team's UXO Technician III and one UXO Technician II or I will inspect each disposal shot. One of these persons will perform a thorough search of the demolition area with a magnetometer. 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 SUXOS will authorize the resumption of site operations.

6.3 Quality Assurance/Quality Control (QA/QC) Plan

6.3.1 Quality Control is conducted using a three-phase control process; preparatory, initial, and follow-up inspection/audits to ensure processes are in control and opportunities for improving processes are captured and implemented. The UXO Quality Control Specialist (UXOQCS) has stop-work authority and is organizationally independent from the processes.

6.3.2 Dig sheet estimates (size, location, depth) vs. the excavation results will be compared. If any of the target anomalies are not recovered during excavation activities, the interpretation geophysicist will re-evaluate the data and the anomaly will be relocated with geophysical instrumentation. After sub-surface work is complete, an acceptance inspection will be conducted by FWENC using a statistically verifiable sampling plan. The sampling plans/procedures that will be used is MIL-STD 1916. MIL-STD 1916 will be applied using verification level (VL) III, inspection by attributes, inspection by lots, using switching procedures in the standard. The method of conducting the inspection will be to apply the sampling plan to areas completed, collect data in those areas using the same type equipment as the field teams, process the data, identify and classify anomalies, and excavate the anomalies to determine what the anomaly is.

6.3.3 Criteria for Contractor QC and Government QA acceptance of land parcels that have completed sub-surface clearance are no OE or OE look-alike found above the contract performance line IAW CEHNC DID OE-005-05. For example, this calculation corresponds to a minimum detection depth of 1.3 feet for 37mm projectiles, 2.2 feet for 2.36" rockets and 3.2 feet for 3.5" rockets. Items may be detected and removed by the contractor deeper than the contractually required detection depth. If any OE item presenting an explosive hazard is recovered that is outside the size/depth parameters defined for this project, the size and depth parameters for the project will be reassessed and corrective measures will be taken.

6.3.4 The government's geophysical quality assurance program for this project includes the following elements: 1) review and acceptance of the geophysical prove-out results; 2) government field oversight inspection of data acquisition and data processing operations; 3) government review of digital geophysical data; 4) comparison of excavation results with geophysical data results; 5) location of pre-seeded items within survey boundaries and detection capability of instrumentation selected for the project. In addition to the geophysical quality assurance program, the on-site CEHNC safety specialist will perform the following quality assurance functions: 1) ensures compliance with the approved project work plans; 2) verifies that contractor personnel meet the minimum work standards/qualifications established in the contract; and 3) performs an independent quality assurance search.

6.3.5 A failure of the detection process is defined to be any OE or other items within the project-defined size/depth parameters, that was not detected during the

geophysical mapping, but found during the QA process. If this occurs the entire grid will be failed and must be re-mapped and cleared. Upon completion of the re-work, an additional QA search will be conducted by the government safety specialist. If any OE item presenting an explosive hazard is recovered that is outside the size/depth parameters defined for this project, the size and depth parameters for the project will be reassessed and corrective measures will be taken.

6.3.6 The government's quality assurance plan provides a process that effectively monitors the contractor's performance in the areas of: initial digital geophysical data acquisition, processing, and interpretation; and target anomaly reacquisition and subsequent excavation. The plan is a multi-layered approach that verifies whether the contractor's team is performing the UXO detection and clearance operations to an acceptable standard. A quality assurance report will be included with the Final Removal Report. If any OE item presenting an explosive hazard is recovered that is outside the size/depth parameters defined for this project, the size and depth parameters for the project will be reassessed and corrective measures will be taken.

6.3.7 All conditions observed during the acceptance inspection will be documented. Conditions that are identified as questionable will be evaluated by project management and the UXO Quality Control Specialist (UXOQCS) to determine their acceptability. When a withhold condition is identified, a deficiency or nonconformance report will be issued and corrective action will be taken to correct the condition prior to offering the product to the client.

6.4 OE Scrap Explosive Hazards

6.4.1 UXO Removal Teams will locate, identify and mark ordnance related materials where they are located. Clearly identifiable inert materials will be consolidated in designated locations on each marked grid. The leader of the UXO Removal Team will re-inspect the clearly inert items and declare each item as inert. These items will be loaded into movable containers and transported to the on-site staging area. If an identified (specific type of munition) ordnance item cannot be determined to be free of explosive, it will be vented. If the item is not positively identified and may be a chemical munition no venting will be conducted and instructions in Section 9.0 Technical Support will be followed for suspect recovered Chemical Warfare Material (CWM).

6.4.2 In the staging area, the designated UXO Technician III will remove the items from the containers transported from the grids. He will re-inspect each item to assure that inert items are certifiably inert. The segregated items will be placed in lockable inert material containers. The designated UXO Technician III will maintain sole custody of the locked inert material containers. He/she will control access to the inspection and classification area to assure that no items other than those that are clearly inert will be added to these inert containers. Prior to signing the certification, the UXO Technician III in the presence of a Quality Control representative will re-inspect the containers. They will then close, seal and mark the containers, prepare a certification of inspection and sign this certification.

6.4.3 A Requisition and Turn-In Form, DD Form 1348-1A, will be completed for each

container of material proposed for sale or disposal. The form will be completed as a container is filled, and as items are individually inspected to assure that no danger of detonation or explosion remains. Copies of the form will be attached to the container, provided with the bill of lading for shipment, and in the project files. The forms will be used as the principal tool for maintaining accountability for materials and for inspection to assure that the items are in fact safe for unlimited release to the public.

6.4.4 The personnel certifying and verifying the inspection shall certify on the form, as follows:

> "This certifies and verifies that the AEDA residue, Range Residue and/or Explosive Contaminated property listed has been 100 percent properly inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related material."

6.4.5 OE Scrap or scrap metal will be maintained in a secure area until sale can be completed. Containers of materials will be locked and sealed to assure that no uninspected items are added to the containers. Offers for sale will include the "Dangerous Property" Clause stipulated by DoD Memorandum dated 15 May 1998.

7.0 ALTERNATE TECHNIQUES

7.1 There are no alternate techniques planned for destruction of OE onsite. The onsite method selected to destroy OE is detonation.

8.0 OFFSITE DESTRUCTION

8.1 Offsite disposal will not be used to destroy OE recovered.

9.0 TECHNICAL SUPPORT

9.1 Foster Wheeler Environmental and its sub-contractors will provide the technical support required during the removal action. If recovered OE is identified as Chemical Warfare Material (CWM) all intrusive activities will cease, the site will be evacuated in an upwind direction, and secured. The CEHNC Safety Representative and Fort McClellan Transition Force Operations will be notified and disposition instructions requested.

10.0 LAND USE RESTRICTIONS

10.1 For OE Area 2, Land Use Controls after OE Removal include an educational program for ALDOT workers and construction personnel of the potential hazards associated with the construction of the Eastern Bypass and posting signs along the bypass warning individuals not to dig unless designated officials are notified. A deed notice will be included in the transfer documents for OE Area 2. The clearance provided in OE Area 2 should remove all OE from this area. Because current technologies cannot assure a 100% clearance, construction support will be provided to address any

residual OE. The construction support envisioned is a response to any residual OE that may be found during construction. If numerous residual OE items are found during construction, the adequacy of the clearance performed will be reassessed and corrective measures recommended.

10.2 There are no Land Use Restrictions proposed for OE Area 1 and OE Area 3 although a deed notice will be included in the transfer documents as a means to manage any residual risk. Although deed notices are used as land use controls in some instances, the deed notice for OE Area 1 and OE Area 3 will serve only to provide information on notice requirements in the event an OE item is encountered after transfer.

11.0 PUBLIC INVOLVEMENT

11.1 There are no inhabited public buildings within the 1181 foot exclusion zone around the Eastern Bypass OE Removal area right-of-way. No planning documents are necessary for this Removal Action as no public involvement is necessary.

12.0 MAPS

12.1 Regional Map

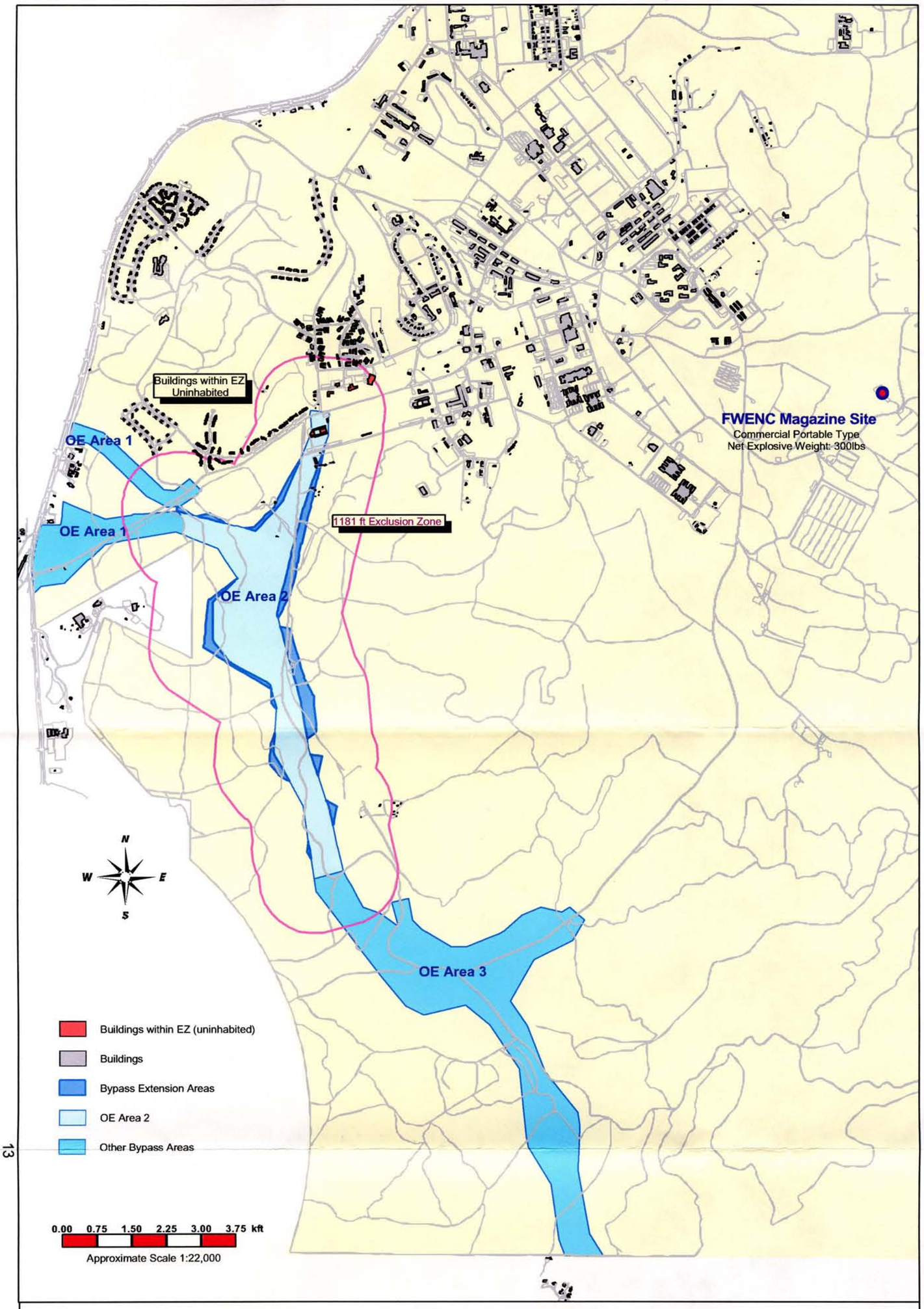
12.1.1 Figure 1 – Regional Map shows the regional location of the Eastern Bypass removal area within Fort McClellan, Anniston, Alabama.

12.2 Site Map

12.2.1 OE Areas. Figure 2 – Site Map shows the location of OE Area 1 (Completed clearance to 1 foot), OE Area 2 (Clearance to Depth), OE Area 3 (No Further Action), M2 Parcel (Cleared to Depth under previous submission), M1.01 Parcel (future submission) and the Alpha, Bravo and Charlie EE/CAs. The location of the current Fort McClellan Ammunition Supply Point (ASP) and the proposed FWENC magazines are shown. The FWENC demolition materials are currently stored in the ASP and will be transferred to the FWENC magazines upon closure of the ASP in November 2001. The planned use of each area is also shown. All demolitions will be accomplished within the Eastern Bypass OE Removal Area. There is no other planned or established demolition area.

12.3 Q-D Map

12.3.1 See Figure 3 – Q-D Map. Each OE Area covered under this submission is annotated on this map as well as the magazines for storage of demolition stores. The 1181 foot exclusion zone is marked and the uninhabited buildings within the exclusion zone are marked. Table 3 – Demolition Materials below lists the items that are stored in the ASP along with the corresponding Hazard Class.



FOSTER WHEELER ENVIRONMENTAL CORPORATION
FM:WWM
FTM_OOu2_NEW

Fort McClellan
Calhoun County
Alabama

25 February 2002
(Revised: 29 March 2002)

Figure 3
Q-D Map

Table 2
Demolition Materials

Demolition Materials	Hazard Class
Shaped Charge Commercial	1.4d
Detonator Assemblies, NE, SL-14	1.1d
Cord, Detonating	1.1d
Nonel (Shock Tube)	1.1s
Cap, Electric	1.4b
Detonator Assembly, EZTL 30	1.4b
Detonator Assembly EXEL 12	1.1b
Perforators, 19 grams	1.4s

12.3.2 Explosive Storage Limits and License certificates for the magazine including Q-D's are included in Appendix B. An earth-covered magazine (Building 4412) in the ASP will be used. The magazine is sited for 3,764 lbs HD 1.1. No recovered UXO will be stored in the magazine. All recovered UXO will be disposed of within the boundaries of the Eastern Bypass OE Removal Area.

12.3.3 Transportation of OE and donor explosives will comply with all federal, state, and local regulations. For transportation of explosives to the disposal site, FWENC and its sub-contractor will comply with regulatory requirements and the following:

a. Initiating explosives, such as blasting caps, will remain separated at all times. Blasting caps may be transported in the same vehicle as long as they are in a separate container (C770 Day Box) and secured away from other items;

b. Compatibility requirements including Category Z storage authorization requirements will be observed;

c. Only UXO Technicians III and above may be issued and transport explosive materials. The receiving party shall sign the receipt documents for accountability;

d. Operators transporting explosives will have a valid drivers license;

e. Drivers will comply with posted speed limits but will not exceed a safe and reasonable speed for the prevailing conditions. Vehicles transporting explosives off-road will not exceed 25 MPH; and

f. Personnel will not ride in the cargo compartment with explosives or OE.

g. Explosives will be transported in closed vehicles whenever possible. The load shall be well braced and, except when in closed vehicles, covered with a fire-resistant tarpaulin or in an appropriate shipping container.

h. Vehicles transporting donor explosives will be inspected daily, and will be properly placarded;

i. Vehicle engine will not be running when loading/unloading explosives;

j. Beds of vehicles will have either a wooden bed liner, dunnage, or sand bags to protect the explosives from contact with the metal bed and fittings; and

12.3.5 Vehicles transporting explosives will have a first aid kit, two 10 BC rated fire extinguishers, and communications capability.

12.3.6 Planned or Established Demolition Areas. OE will be disposed of in place where it is encountered.

APPENDIX A

CEHNC Memorandum-Minimum Separation Distances

Minimum Separation Distances
Ft. McClellan
37 mm MK II
7 February 2001

REQUESTED BY: Dan Copeland
PREPARED BY: Sherene Rizvi

This form shows calculated distances only. It does not constitute approval. Concurrence of CEHNC-OE-S is required to determine the applicable distance for a specific site.

In accordance with (IAW) OE Center of Expertise Interim Guidance Document 00-01, use of the range to no more than 1 hazardous fragment/600 sq ft as the minimum separation distance for accidental detonations requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S.

CALCULATIONS FOR UNINTENTIONAL DETONATIONS

Maximum Fragment Range = 1181 ft
Range to No More Than 1 Hazardous Fragment/600 sq ft = 200 ft
Range to 0.9 psi Overpressure = 43 ft

IAW OE Center of Expertise Interim Guidance Document 00-01, the minimum separation distance for intentional detonations may not be less than the default distance provided in DoD 6055.9-STD or the maximum fragment range or the K328 overpressure distance.

CALCULATIONS FOR INTENTIONAL DETONATIONS

Maximum Fragment Range = 1181 ft
K328 Overpressure Range = 282 ft

The primary fragmentation characteristics used in the calculation of the values listed above were computed IAW CEHNC-ED-CS-S-98-1. The maximum fragment range was calculated using the maximum weight fragment and the initial velocity from these characteristics in the computer software TRAJ. The range to no more than 1 hazardous fragment/600 sq ft was calculated IAW CEHNC-ED-CS-S-98-2.

SANDBAG ENCLOSURE FOR INTENTIONAL DETONATIONS

Required Sandbag Thickness = 20 in. with 6" standoff between munition and sandbags
Sandbag Throw Distance = 125 ft
Minimum Separation Distance = 200 ft

The required sandbag thickness and the sandbag throw distance were calculated IAW CEHNC-ED-CS-S-98-7. The minimum separation distance is based on the largest of the sandbag throw distance from test data based on the total NEW (munition plus donor charge) or 200 ft. A copy of HNC-ED-CS-S-98-7, "Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions" must be available on site. This report may be downloaded from the USAESCH homepage at http://www.hnd.usace.army.mil Select "Product Lines", "Ordnance and Explosives", "Innovative Technology", then "Analytical Tools". The first time you access the site you will have to register. You will be notified by e-mail when your login and password have been activated. You must have a login and password to download the report.

- MINIMUM SEPARATION DISTANCES WHILE USING MOFB DURING INTRUSIVE ACTIVITIES

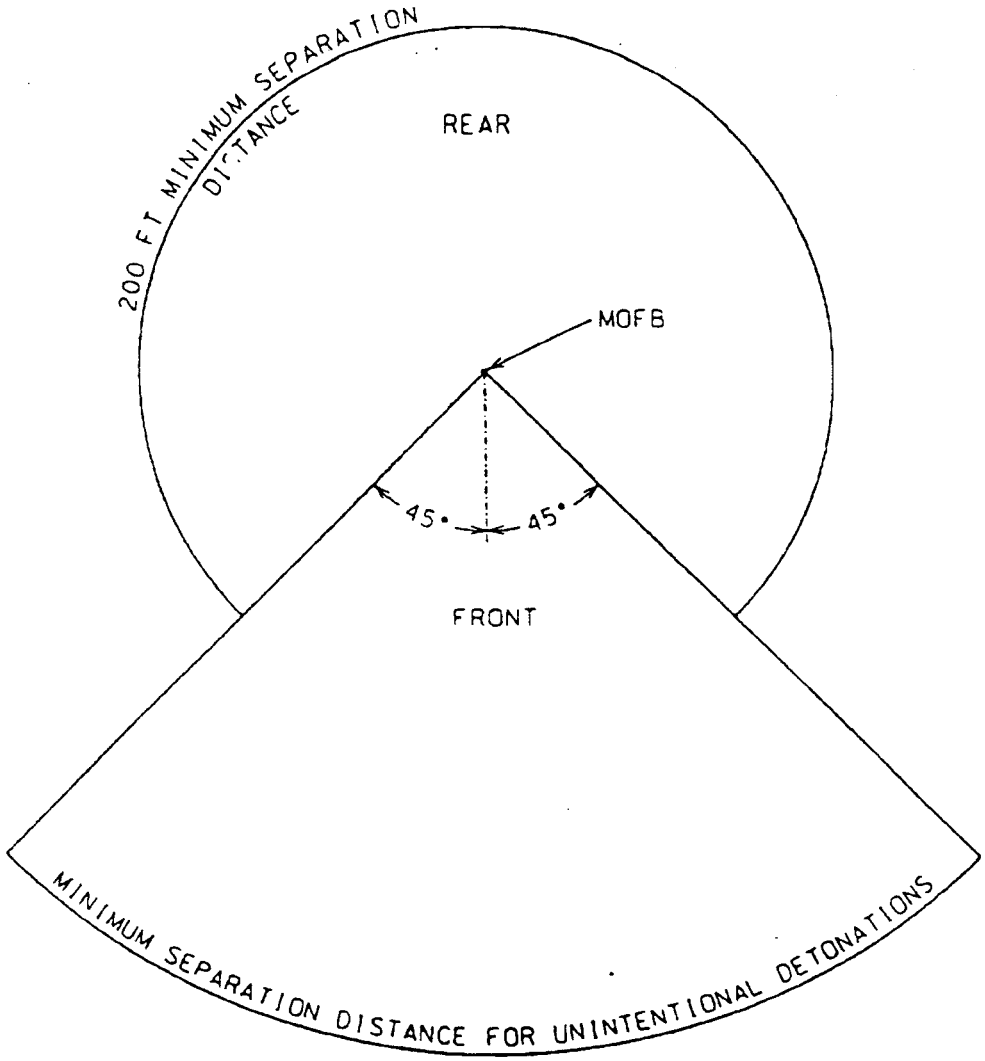
Design of the Miniature Open Front Barricade (MOFB) is in accordance with HNC-ED-CS-S-98-8, "Miniature Open Front Barricade". This document was approved by the DDESB. It may be found on HNC's website at www.hnd.usace.army.mil and select "Product Lines", "Ordnance & Explosives", "Innovative Technology", and "Analytical Tools". DDESB has placed certain restrictions on the approved usage of the MOFB. These are listed in the approval letter in the front of the report.

Thickness of Aluminum Required to Prevent Perforation = 1.45 in

The MOFB is designed to defeat fragments to the rear and sides of the MOFB in the case of an accidental/unintentional detonation during intrusive activities. The fragment distances to the front of the MOFB are the same as the fragment distances without the MOFB (see figure). The MOFB is not designed to reduce the effects of blast overpressure. The MOFB may not be used for intentional detonations. The minimum separation distances to the rear and sides of the MOFB must be maintained based on the expected throw distance of the MOFB itself.

Minimum Separation Distance to sides and rear = 200 ft
Minimum Separation Distance to front = 1181ft
K50 distance = 43 ft

Minimum Separation Distances
Ft. McClellan
37 mm MK II
7 February 2001



MINIMUM SEPARATION DISTANCE FOR UNINTENTIONAL DETONATIONS
USING MINIATURE OPEN FRONT BARRICADE DURING INTRUSIVE ACTIVITIES

SIGNATURES:

Shawne Rizzi 2/7/01
Subject Matter Expert
Michelle Cull 2/8/01

Wallace A. Watanabe 2/8/01
CEHNC-ED-CS-S Branch Chief

APPENDIX B

Ammunition Supply Point

Explosive Storage Limits and License

EXPLOSIVE STORAGE LIMITS & LICENSE

(For use of this form, see NGR 385-10, DA PAM 385-64)

1. EXPLOSIVES STORAGE LOCATION (Include Facility Name & State)
AMMUNITION SUPPLY POINT, FT MCCLELLAN, ALABAMA

2. DATE PREPARED
03/01/2000

3a. Structure type: NON STANDARD EARTH COVERED MAGAZINE #10 BLDG 4412

3b. Site type: AMMUNITION SUPPLY POINT

3c. Drawing & Revision #:

4. LICENSE #
(Issued by certifier)

5. HAZARD CLASS	6. TARGET ON WHICH REQD DISTANCE IS BASED	7. TYPE DISTANCE	8. QUANTITY DISTANCE SEPARATION		9. MAXIMUM ALLOWABLE NET EXPLOSIVE WEIGHT IN POUNDS
			ACTUAL FEET a.	REQUIRED FEET b.	
1.1	BLDG 4420	INTRALINE	280	280	3764
(18)1.2					NONE
(12)1.2					NONE
(08)1.2					NONE
(04)1.2	BLDG 4420	INTERMAGAZINE	280	200	CAPACITY
1.3	BLDG 4420	INTERMAGAZINE	280	100	CAPACITY
1.4	BLDG 4420	INTERMAGAZINE	280	50	CAPACITY

10a REMARKS
ANNUAL REVIEW OF EXISTING FACILITIES. NO CHANGES HAVE BEEN MADE.

10b DDESB APPROVAL DATE:

10c Inhabited Building & Public Traffic Route data (If not identified above)

	DESCRIBE EXPOSED SITE		DESCRIBE EXPOSED SITE
IBD:> 6560 FT	INSTALLATION BOUNDRY	PTR:> 5740 FT	U.S. HIGHWAY 21

11. PREPARED / REVIEWED BY
SIGNATURE: [signature] TITLE: QASAS
DATE: 4-4-2000
QUALITY ASSURANCE SPECIALIST AMMUNITION SURVEILLANCE

12. MAPS / DISTANCES / DESIGN VERIFIED & REVIEWED BY:
FACILITIES ENGINEER DATE:

13. APPROVED BY
SITE COMMANDER DATE: 4-4-2000

14. CERTIFIED BY:
STATE SAFETY MANAGER DATE: 4-14-2000

NGB Form 385-64-1 (T) 29 Oct 1999 8 1/2 X 11