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WORK PLAN FOR MUNITIONS RESPONSE FOR DISCARDED MILITARY MUNITIONS AT BUILDING 365 AND HANGAR 860 NAS CECIL FIELD FL

10/18/2011

CH2M HILL

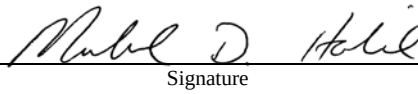
WORK PLAN REVISION

REVISION NO: 02

CONTRACT:	N62470-08-D-1006	TO NO:	JM07
PROJECT NAME:	Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas	PROJECT NUMBER:	378823
DOCUMENT NAME:	Work Plan, Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas	WORK PLAN DATE:	June 2010
REVISION PREPARED BY:	Jeffery Marks	DATE OF REVISION:	October 18, 2011

Modifications/Revisions:	
Item No.	Description of Modifications/Revisions
Purpose	The purpose of this Document Revision is to revise the Work Plan, Munitions Response for Discarded Military Munitions at Building 365 and Hangar 860 Munitions Response Areas (MRA) at the former Naval Air Station Cecil Field, Jacksonville, Florida based on administrative changes required for the project Explosives Safety Submissions (ESS). The technical approach specified in the Work Plan will be adhered to during the remainder of the munitions response scope of work.
001	Replace the Explosives Safety Submission, Amendment No. 04, Execution of a Selected Response for Discarded Military Munitions, Building 365 Munitions Response Area (dated April 2010) found in Appendix C of the Work Plan with the attached Explosives Safety Submission, Amendment No. 05, Execution of a Selected Response for Discarded Military Munitions, Building 365 Munitions Response Area (dated August 2011).
002	Replace the Explosives Safety Submission, Amendment No. 02, Execution of a Selected Response for Discarded Military Munitions, Hangar 860 Munitions Response Area (dated November 2010) found in Appendix C of the Work Plan with the attached Explosives Safety Submission, Correction No. 01, Execution of a Selected Response for Discarded Military Munitions, Hangar 860 Munitions Response Area (dated September 2011).

Reasons for the Modifications/Revisions:	
Item No.	Reasons for the Modifications/Revisions
001	Explosives Safety Submission, Amendment No. 05 reflects the adjustment in explosives safety quantity-distance (ESQD) arc for the M56A4 20-millimeter (mm) high explosive (HE) round resulting from the May 24, 2011 update of the Department of Defense Explosives Safety Board (DDESB) Fragmentation Data Review Forms. Per Naval Ordnance Safety and Security Activity (NOSSA) Instruction (NOSSAINST) 8020.15C (NOSSA, 2011), amendments are required when a change to an approved ESS increases explosives safety risks, identifies requirements for additional or increased explosives safety controls, or changes an ESQD arc.
002	Explosives Safety Submission, Correction No. 01 includes an update to Appendix B-1 to reflect the May 24, 2011 update of the DDESB Fragmentation Data Review Forms and a revised Appendix B-2 per the Appendix B-1 update for the 20-mm M56A4 HE round. Per NOSSAINST 8020.15C (NOSSA, 2011), corrections are required when a proposed change to an approved ESS does not increase explosives safety risks, identify requirements for additional or increased explosives safety controls, or changes an ESQD arc.

Jeffery Marks TO Project Manager	 Signature	10/28/2011 Date
Michael Halil Deputy Program Manager	 Signature	10/28/2011 Date
Client's Responsible Authority	Signature	Date

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Project File No. 378823		

Explosives Safety Submission, Amendment No. 05

Amendment No. 05 Final

Explosives Safety Submission

Execution of a Selected Response for Discarded Military Munitions Building 365 Munitions Response Area

Former Naval Air Station Cecil Field Jacksonville, Florida

Contract No. N62470-08-D-1006
Task Order No. JM07

Prepared for

U.S. Navy Facilities Engineering Command, Southeast

Prepared by

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August 2011

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Acronyms and Abbreviations

AGVIQ-CH2M HILL	AGVIQ-CH2M HILL Constructors, Inc. Joint Venture III
ARARs	Applicable or Relevant and Appropriate Requirements
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
BIP	blown-in-place
bgs	below ground surface
BRAC PMO SE	Base Realignment and Closure, Program Management Office, Southeast
CAD	Cartridge Actuated Device
CD	compact disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M HILL	CH2M HILL Constructors, Inc.
CFR	Code of Federal Regulations
CMC	closed metal container
DDESB	Department of Defense Explosives Safety Board
DGPS	Differential Global Positioning System
DMM	Discarded Military Munitions
DoD	Department of Defense
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
ECA	Equipment Check Area
EO	Executive Order
EOD	Explosive Ordnance Disposal
ESQD	Explosives Safety Quantity-Distance
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FDEP	Florida Department of Environmental Policy
FLANG	Florida Air National Guard
HAZWOPER	Hazardous Waste Operations and Emergency Response
HD	Hazard Division
HE	High Explosive
HERO	Hazards of Electromagnetic Radiation to Ordnance
HFD	Hazardous Fragment Distance
IBD	Inhabited Building Distance
ICA	Instrument Certification Area
JAA	Jacksonville Airport Authority
lbs	pounds
MCE	Maximum Credible Event
MD	Munitions Debris
MDAS	material documented as safe
MEC	Munitions and Explosives of Concern
MGFD	Munition with the Greatest Fragmentation Distance
mm	millimeter(s)

MMRP-CX	Military Munitions Response Program Center of Expertise
MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
NAS	Naval Air Station
NAVEODTECHDIV	Navy EOD Technology Division
NAVFAC SE	U.S. Naval Facilities Engineering Command, Southeast
NAVSEA	Naval Sea Systems Command
NEW	Net Explosives Weight
NOSSA	Naval Ordnance Safety and Security Activity
NOSSAINST	Naval Ordnance Safety and Security Activity Instruction
OSHA	Occupational Safety and Health Act
OFA	Obstacle Free Area
OP	Operational Procedure
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction
ORM	operational risk management
PES	Potential Explosion Sites
QA	Quality Assurance
QC	Quality Control
RPM	Remedial Project Manager
RSA	Runway Safety Area
RTK	Real Time Kinematic
RTS	Robotic Total Station
RPZ	Runway Protection Zone
SUXOS	Senior UXO Supervisor
TCRA	Time Critical Removal Action
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Corps of Engineers Support Center, Huntsville
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

1.0 Background

1.1 Project Manager

The responsible U.S. Naval Facilities Engineering Command, Southeast (NAVFAC SE)/ Base Realignment and Closure, Program Management Office Southeast (BRAC PMO SE) Project Manager for this project is:

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1.2 MRA Identifier and Description

Building 365 Munitions Response Area (MRA) is composed of the initial Munitions Response Site (MRS) (5-acre), Expansion No. 1 MRS (15-acre), Expansion No. 2 MRS (7-acre), Expansion No. 3 MRS (2-acre), and Expansion No. 4 MRS (3- to 18-acre). Expansions are outlined in detail within Section 1.6 and shown on Figures 1-2, C-1, and C-2.

The Building 365 MRA is 32 acres with an initial work area of 3 acres (Expansion No 4). If Munitions and Explosives of Concern (MEC) are recovered on a periphery grid, the "Selected Response" will continue into a 15-acre expansion region. "Selected Response" will be performed within grids until no MEC is recovered within one row of periphery grids in the 15-acre expansion region.

Building 365 MRA and Hangar 860 MRA (H860-MRA) are both located within the compounds of former Naval Air Station (NAS) Cecil Field (See Figure 1-3). This Explosive Safety Submission (ESS) Amendment is to update and clarify the Building 365 MRA.

Future use of the property is industrial. The property has already been transferred from Navy control to the Jacksonville Airport Authority (JAA).

1.3 Regional Map

A Regional Map of former NAS Cecil Field (Figure 1-1) shows the State of Florida and the location of the former station. Expansion Map for Building 365 MRA (Figure 1-2) shows the current Expansion No. 4 MRS work area along with previous "Selected Response" regions. The Activity Map of former NAS Cecil Field (Figure 1-3) shows the location of the MRA and corresponding Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Type II Hazard Division (HD) 1.1 Outdoor Storage Magazine covered by previous submissions.

1.4 Scope of Munitions Response

NAVFAC SE is responding to Building 365 MRA under ESS Revision No. 00, dated October 2004; Revision No. 01, dated January 2005; Revision No. 02, dated May 2005; Amendment No. 03, dated November 2005; and Amendment No. 04, dated April 2010. ESS activities are for a "Selected Response" on Building 365 MRA for NAVFAC SE, under Response Action Contracts No. N62467-01-D-0331, Contract Task Order No. 0029 and No. N62470-08-D-1006, Task Order No. JM07. Per Naval Ordnance Safety and Security Activity (NOSSA) Instruction (NOSSAINST) 8020.15C (NOSSA, 2011), amendments are required when a change to an approved ESS increases explosives safety risks, identifies requirements for additional or increased explosives safety controls, or changes an explosives safety quantity-distance (ESQD) arc. This ESS Amendment No. 05 is submitted to: 1) reflect the adjustment in ESQD arcs resulting from the May 24, 2011 update of the Department of Defense Explosives Safety Board (DDESB) Fragmentation Data Review Forms; and 2) present the ESS in accordance with NOSSAINST 8020.15C requirements.

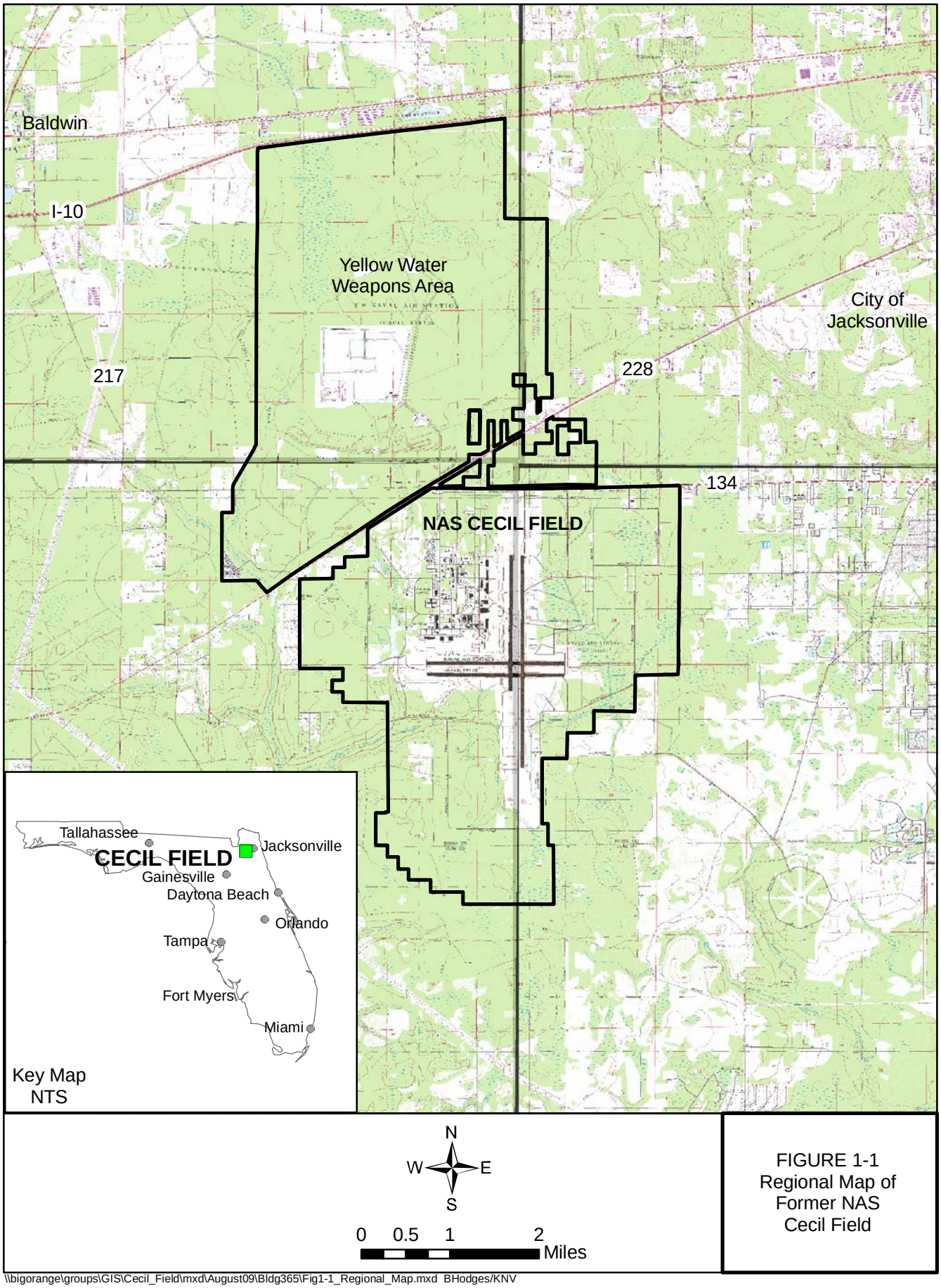

FIGURE 1-1
Regional Map of
Former NAS
Cecil Field

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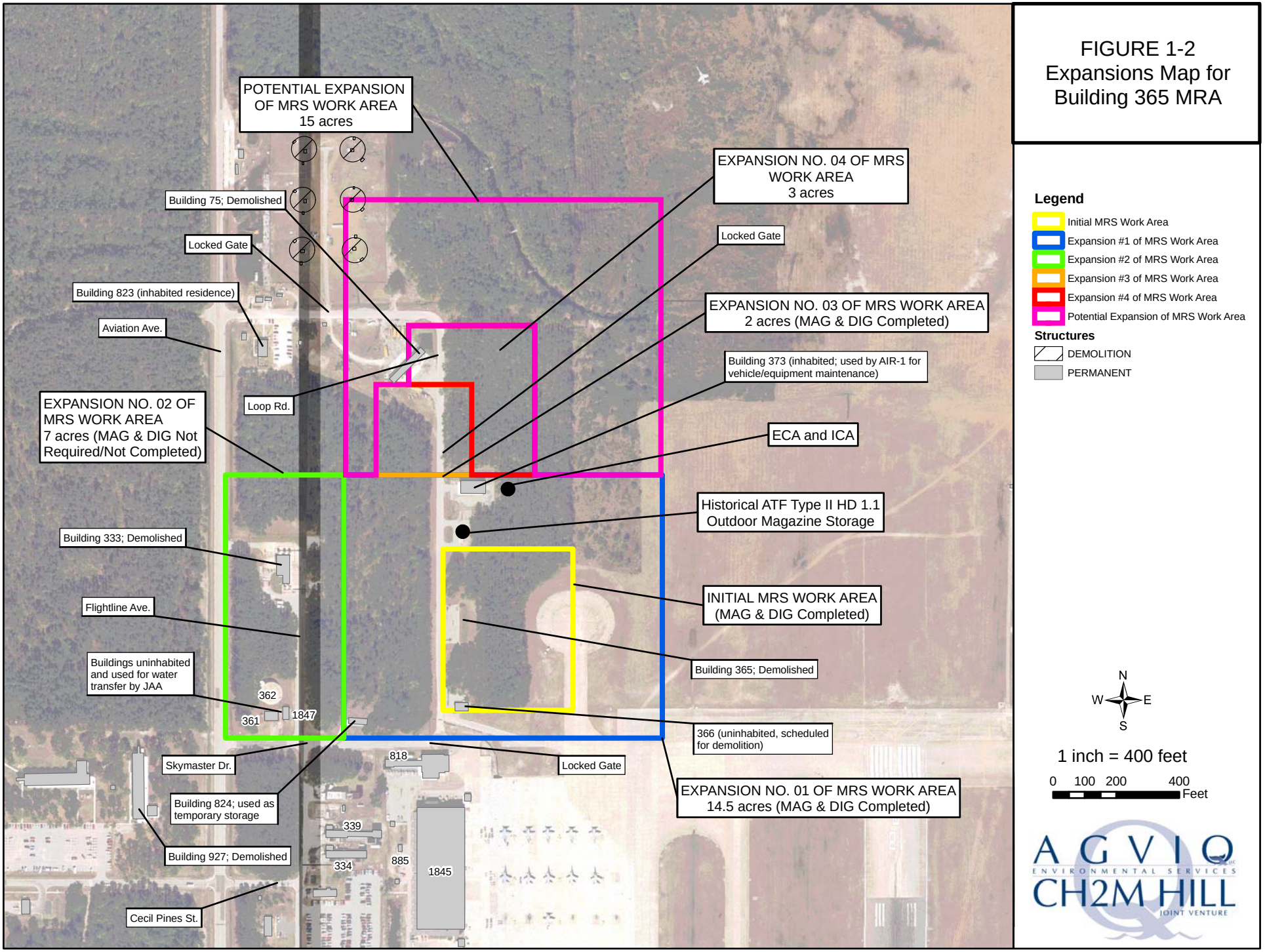

FIGURE 1-2
Expansions Map for Building 365 MRA

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CH2M HILL JOINT VENTURE

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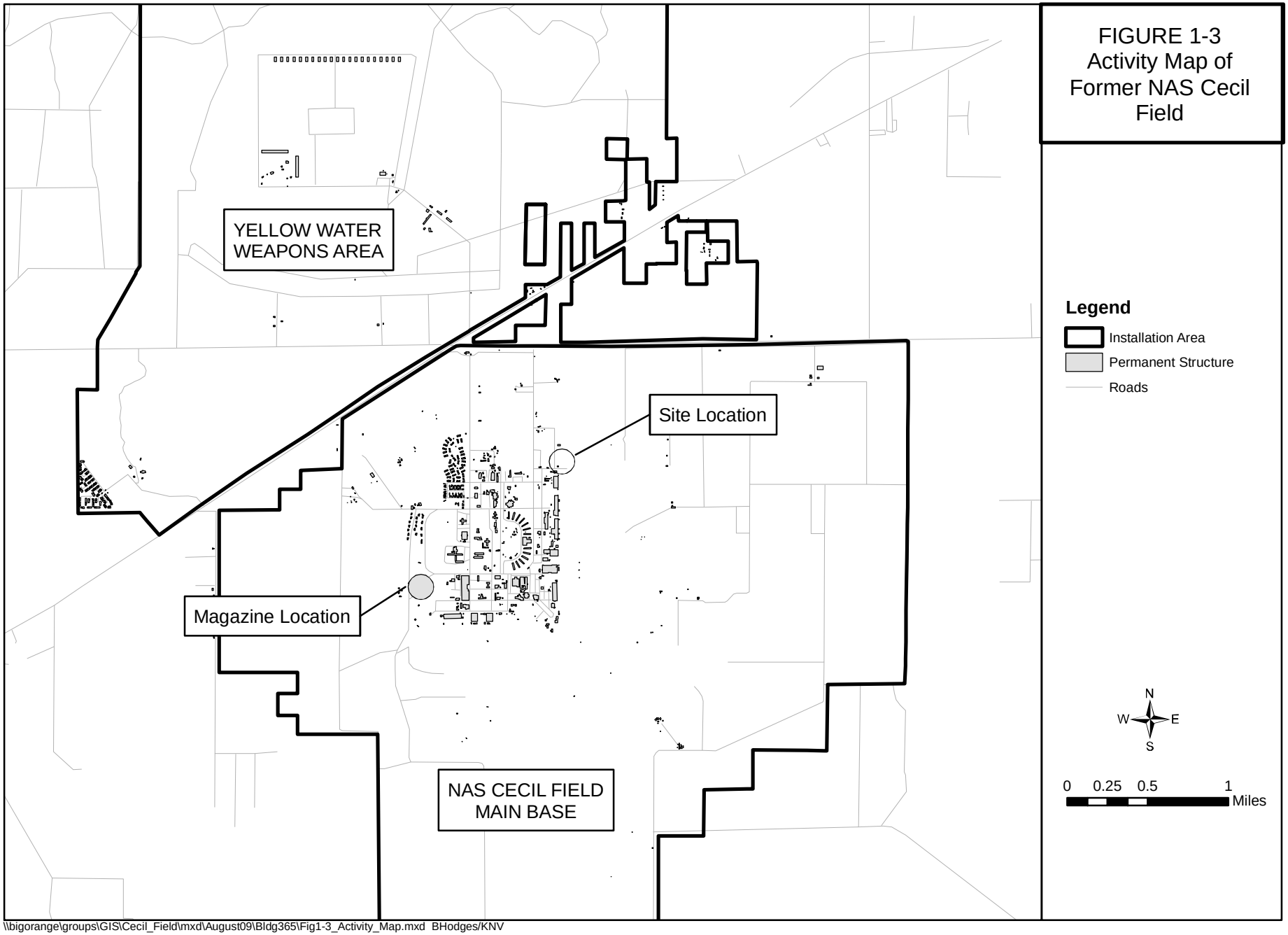


FIGURE 1-3
Activity Map of
Former NAS Cecil
Field

\\bigorange\groups\GIS\Cecil_Field\mxd\August09\Bldg365\Fig1-3_Activity_Map.mxd BHodges/KNV

1.5 History of MEC Use

According to the Environmental Baseline Survey (EBS) Report, Building 365 was a former earth covered weapons storage locker built in 1957 at the former NAS Cecil Field, Jacksonville, Florida. The building was a one-story cinderblock bunker that was divided into 10 individual storage areas. Building 365 was reported to store cartridge actuated devices (CAD) and was used as a ready service magazine to store munitions for flight operations. Building 365 was located west of Runway 18R, south of Buildings 373/104, and north of former Building 366 (Figure 1-2). An access road ran along the west side of the building and a wooded area was formerly located to the west. The building and adjacent property were classified in the EBS report as "1/White," an area where no release or disposal of hazardous substances or petroleum products occurred (including any migration of these substances from adjacent areas).

1.6 Previous Studies of Extent of MEC or Material Potentially Posing an Explosive Hazard (MPPEH) Contamination

The construction site was not a known or suspected MRA until the discovery of Discarded Military Munitions (DMM) on September 10, 2004. On Friday, September 10, 2004, one DMM and 10 expended CADs were found near Building 365. The items were discovered during clearing and grubbing operations of an approximate 5-acre area in support of an ongoing JAA construction project to expand the north apron aircraft taxiway. The DMM was two 20-millimeter (mm) rounds consisting of a cartridge case with a percussion primer, not impinged, and a High Explosive (HE) projectile, unfired with the point detonating fuze sheared off. On September 21, 2004, the CH2M HILL Constructors, Inc. (CH2M HILL) Munitions Response Team visited the site and talked with one of the responding Florida Air National Guard (FLANG) Explosive Ordnance Disposal EOD) Technicians. The EOD Technician stated that the recovered 20-mm round was in a safe condition and had been removed from the site for disposal.

The DMM discovery resulted in a work stoppage of the JAA construction project and prompted the need for additional MEC support. MEC support was deemed necessary as a cautionary action to ensure that the presence of the discovered DMM was unique to the area where it was found and to protect human health and safety during completion of the construction project.

The initial 5-acre work area was designated an MRA by NOSSA after receipt of an MRA Identification and Notification Report submitted by NAVFAC SE on September 16, 2004. An ESS Determination Request was submitted to NOSSA on September 27, 2004, and included a risk assessment that indicated the probability of encountering MEC as low. The ESS Determination Request was denied by NOSSA on September 28, 2004.

The ESS for Time Critical Removal Action (TCRA) operations from 0 to 1 foot below ground surface (bgs) at the initial 5-acre MRA work area was submitted on October 18, 2004, and was approved by DDESB on November 5, 2004. The munitions response operation on the initial 5-acre MRA work area was completed from December 6 to 17, 2004. Due to a large quantity of MEC items found near the buffer zone during the munitions response on the initial 5-acre site, the MRA was expanded (Expansion No. 1) by 15 acres to ensure that all

MEC/unexploded ordnance (UXO) and MPPEH were located and disposed. ESS Revision No. 1 was submitted on January 19, 2005, and approved by DDESB on March 3, 2005 and NOSSA on April 1, 2005. ESS Revision No. 1 covered the following topics: 1) "Selected Response" operations from 0 to 1 foot bgs in MRA Expansion No. 1 and a proposed Expansion No. 2 directly west of Expansion No. 1, 2) incorporation of temporary MEC storage in Building 365, an earth covered magazine located at the site, and 3) the use of engineering controls for MEC detonations.

The TCRA operation in Expansion No. 1 was completed from February 28, 2005 to March 18, 2005. The proposed Expansion No. 2, directly west of Expansion No. 1, was not implemented because no MEC was discovered within approximately 150 feet of the western boundary of Expansion No. 1.

The site was released back to JAA from NAVFAC SE on March 31, 2005, and construction of the north apron aircraft taxiway recommenced on April 8, 2005. Onsite construction support for the north apron expansion project was conducted April 8 to 29, 2005. No MEC were observed during the duration of onsite construction support.

ESS, Revision No. 02 was submitted on May 11, 2005, and approved by DDESB on August 11, 2005 and NOSSA on September 30, 2005. ESS Revision No. 2 addressed incorporation of temporary MEC storage in a portable outdoor ATF Type II HD 1.1 storage magazine due to the demolition of Building 365 in November 2007, making an alternate storage location necessary. See Expansion Map Figure 1-2 for the historical sited ATF Type II HD 1.1 outdoor magazine.

Based on the recovery of two MEC items (one 20-mm HE projectile, fuzed and unfired and one MK2 impulse cartridge, unfired) within a periphery grid along the northern boundary of Expansion No. 1, a 2-acre expansion to the north of the MRA work area became necessary to provide a "clean" boundary condition. ESS Amendment No. 03 was submitted on November 18, 2005, and was approved by DDESB on March 2, 2006, and NOSSA on March 13, 2006. ESS Amendment No. 03 covered "Selected Response" operations from 0 to 1-foot bgs in MRA Expansion No. 3. The "Selected Response" operation in Expansion No. 3 was completed May 15 to 18, 2006.

Based on the recovery of 19 MEC items (three 20-mm HE projectiles, unfired; ten MK2 impulse cartridges, unfired; two MK19 impulse cartridges, unfired; and three MK4, Mod 3 signal cartridges, unfired) and one MEC item (one MK1 Mod 3 signal cartridge, unfired) within the periphery grids of the 2-acre MRA Expansion No. 3, a 3-acre expansion to the north and east of MRA Expansion No. 3 was necessary to provide a "clean" boundary condition. ESS Amendment No. 04 encompassed a "Selected Response" operation from 0 to 1-foot bgs in Expansion No. 4 and a 15-acre expansion area around Expansion No. 4.

Based on the recovery of 7 MEC items (three Cartridge, Impulse, CCU-41/B; three 20-mm Target Practice Projectile; and one MK2 impulse cartridges, unfired) in 2010, the munitions response within Expansion No. 4 will be expanded to continue into the 15-acre MRA expansion area. The munitions response operations will continue into the 15-acre expansion area until a "clean" boundary can be established (Figure 1-2). The munitions response will not extend beyond the 15-acrea expansion area.

1.7 Justification for NDAI of NFA Decision

Not Applicable

2.0 Project Dates

2.1 Project Dates

Mobilization on the continued response on MRA Expansion No. 4 is anticipated to begin during the third quarter of 2011 with an estimated project duration of 6 to 8 weeks.

3.0 Types of MEC and MPPEH

3.1 Types and Quantities of MEC and MPPEH

No munitions disposal operations are known to have taken place in or near the construction site. The MRA has no history of having been used as a range and only DMM are expected to be encountered. No evidence has been discovered that suggests DMM may have been buried on this site. To date, the only DMM discovered has been on the surface. It is likely that the recovered DMM were discarded by person(s) unknown. Following is a summary of the items recovered during the TCRA and subsequent "Selected Response" operations:

- (230) each 20-mm unfired HE projectiles (combination of unfired/fuzed with cartridge intact and projectile only)
- (435) each unfired CADs/impulse cartridges (MK2, MK14, MK19, MK124, miscellaneous)
- (30) each CADs (expended/buried at location)
- (76) each small arms blanks (5.56-mm and 7.62-mm)
- (26) each MK1 and MK4 bomb dummy unit signal cartridges
- (3) each CXU-3A/B signal cartridges (2 unfired, 1 smoking)
- (1) MK23 unfired practice bomb
- Approximately 315 pounds (lbs) of munitions debris (MD)
- Approximately 2,900 lbs of non-MEC related scrap metal

3.2 Munition with the Greatest Fragmentation Distance (MGFD)

Based on the site history and findings of previous munitions response operations at this MRA, the primary MGFD selected for this operation is an M56A4 20-mm HE round.

TABLE 3-1
Primary MGFD

MGFD Type	Muntions Item	MFD-H (feet) [(1)]	MFD-V(feet) [(3)]
Primary	M56A4 20-mm HE round	535[(2)]	427[(2)]

[(1)] Maximum Fragmentation Distance- Horizontal
[(2)] DDESB Fragmentation Data Review Form, Dated 24 May 2011
[(3)] Maximum Fragmentation Distance- Vertical
Note: There is no Contingency MGFD.

If while executing the "Selected Response," an MEC item is encountered that has a greater fragment distance than the selected MGFD, the AGVIQ-CH2M HILL Constructors, Inc. Joint Venture III (AGVIQ-CH2M HILL) Project Manager will: 1) direct all munitions response personnel to immediately cease operations; and 2) submit an amended ESS to NOSSA (N53).

3.3 Maximum Credible Event (MCE)

Not Applicable

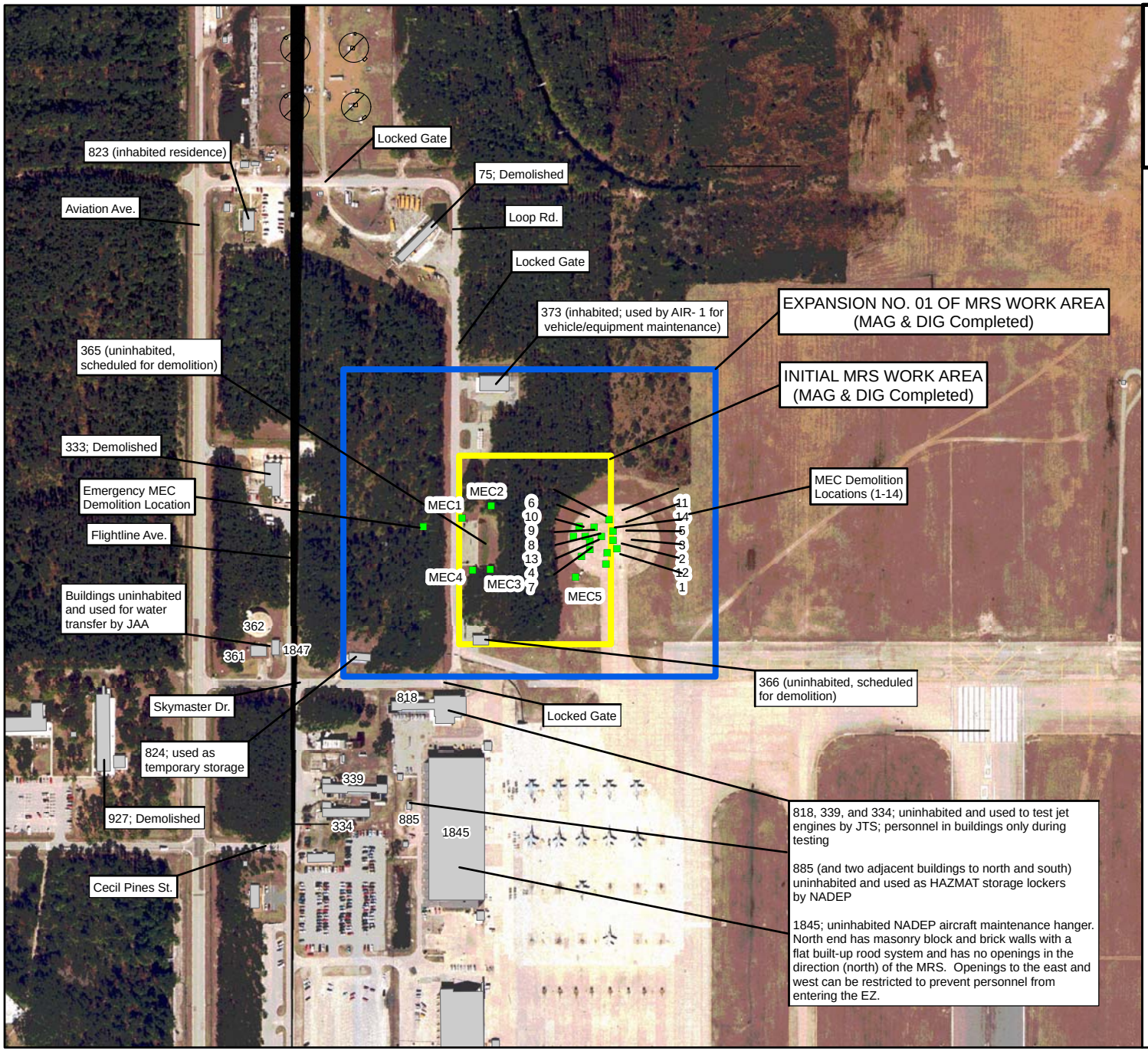
3.4 Explosive Soil and Contaminated Buildings

Soil samples were collected prior to and after open detonation of recovered MEC items. Figure 3-1 shows the MEC detonation location and soil sample collection points. Soil sampling and analytical requirements are provided in *Work Plan Addendum No. 01 for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the former NAS Cecil Field, Jacksonville, Florida, Revision No. 01* (CH2M HILL, 2005c).

A soil sample/analytical result summary letter report was prepared and submitted to NAVFAC SE, the Florida Department of Environmental Protection (FDEP), and the U.S. Environmental Protection Agency on March 31, 2005. The purpose of the summary letter report was to obtain FDEP approval that no further assessment of the MRA is necessary and impacted soil from the thermal treatment events had been sufficiently removed. FDEP concurrence was provided and the site was released back to JAA from NAVFAC SE on March 31, 2005. FDEP concurred in a letter dated March 31, 2005 that MEC discovered in soil and the MEC detonations have not caused an adverse environmental impact. FDEP also concurred that the elevated arsenic concentration reported from one of the detonation sites is apparently not caused by detonation activities.

Contaminated buildings are not applicable with this ESS submission.

FIGURE 3-1
SOIL SAMPLE LOCATION MAP



Legend

- MEC Soil Sample Location

Structures

- DEMOLITION
- PERMANENT

N
W E
S

1 inch = 400 feet

0 200 400 Feet

AGVIQ ENVIRONMENTAL SERVICES
CH2M HILL JOINT VENTURE

\\GALILEO\PROJ\CECIL_FIELD\MAPFILES\FIG3-1_SOIL_SAMPLE_20110716.MXD HHARDEST 7/19/2011 09:39:13

4.0 MEC and MPPEH Migration

4.1 MEC and MPPEH Migration

Due to the climatic conditions in Florida, the site does not have a frostline and has not experienced frost heave. MEC and MPPEH migration are not anticipated.

5.0 Detection Techniques

5.1 Detection Equipment, Method and Standards

Digital geophysical mapping survey of the site was not appropriate due to the presence of large piles of vegetation across the site (from grubbing activities prior to finding the DMM). A full-coverage survey impractical due to previous construction activity performed in the project area.

Only handheld analog geophysical metal detectors will be used at the site. CADs found at the site were historically constructed of both ferrous and non-ferrous metals; therefore, an all-metals detector, the White's XLT (or equivalent), will be utilized. The White's XLT metal detector is approved by the United States Army Engineering Support Center, Huntsville (USAESCH), Military Munitions Response Program Center of Expertise (MMRP-CX) for use on munitions response projects. The MMRP-CX has a program for testing geophysical instruments that meets the substantial requirements of the Navy Hazards of Electromagnetic Radiation to Ordnance (HERO) Program. Anomaly discrimination is not proposed.

All personnel who use the instrument for project operations will be required to demonstrate proficiency within the Instrument Certification Area (ICA) under observation by an Unexploded Ordnance Quality Control Specialist (UXOQCS). The ICA will contain 15 flagged and numbered locations. Each flag will be located within or adjacent to ground cover (grass or shrubs) or other forest litter (e.g., duff, debris) to mimic actual site conditions that an operator would experience during the intrusive investigation. The ICA will be located near the MRA Work Area (Figure 1-2). The ICA will be used to determine whether metallic items are present, either on the ground surface but not visible to the eye (e.g., tall grass or brush or beneath the mineral soil, can be detected by the operator. Twelve locations will have items buried below the mineral soil (so as to not be visible to the operator) to a depth no deeper than 1 foot bgs. The remaining three locations will not contain items. The items emplaced will be inert 20-mm projectiles (or surrogate) and CADs (or surrogate). Under observation by the UXOQCS, the instrument operator will sweep the ICA in the same manner that would be utilized for the MEC removal operations. The operator will signify to the UXOQCS whether or not an item is suspected to be present at each flagged location. The results will be recorded by the UXOQCS.

After the operator has checked each flagged location, the UXOQCS will evaluate the results. The operator will be considered certified to operate the instrument if:

- 100 percent of the locations with items were correctly identified, AND
- No more than two of the locations that did not have items were identified as having items present. (This will ensure that an operator does not pass by each location and identify it as having an item in order to pass automatically.)

In the event that an operator does not pass the certification, the UXOQCS will ensure the instrument is functioning properly (at the Equipment Check Area [ECA]). The operator will be required to train again in the use of the instrument by the UXO contractor's Senior UXO Supervisor (SUXOS) and to reattempt to certify. If an operator fails the test repeatedly, the UXOQCS will make a determination as to whether it is likely that the operator is not suited to perform the task required and will inform the SUXOS and Project Manager that the individual should be used for a different task or removed from the project.

The UXOQCS may change the locations of flags and item locations as needed to ensure that operators who have passed through the ICA are not able to share information regarding the locations of items or the numbers of flags where items are located. It will be left to the discretion of the UXOQCS to determine how often this is required to ensure a valid certification can be performed.

The UXOQCS will document when an operator is certified with a specific instrument. The operator will not be required to re-certify unless:

- He/she has left the project and did not return for at least 6 months,
- He/she has had to replace an instrument, for which the operator AND instrument had been certified previously, or
- The UXOQCS finds cause to re-certify the individual.

5.2 Navigational Equipment, Method and Standards

MRA boundary locations will be placed and certified by a Florida Registered Surveyor. Depending on the level of vegetation removal performed and the location within the site, positioning of grid identifying stakes will be accomplished through either Real Time Kinematic (RTK) Differential Global Positioning System (DGPS) or Robotic Total Station (RTS) methods. The most likely method will be RTK DGPS; however, under some conditions other methods may be required.

5.2.1 Real Time Kinematic Differential Global Positioning System

RTK DGPS is a differential global positioning system that utilizes satellites to determine the position of a rover antenna placed on the survey instrument and correction data from a base station setup on a control point to determine the system position. Corrections from the base station are sent via radio link to the rover receiver. Accuracy of the RTK DGPS system is sub-centimeter.

5.2.2 Robotic Total Station

RTS is a survey device that uses a survey "gun" setup over a known point that tracks a prism situated on the survey pole to record its position. The survey gun is initially set up at a known point and a prism is positioned over another known point so the gun, via laser, can back sight to locate itself in space. The level of accuracy of the system is similar to RTK DGPS.

5.3 Equipment Checkout

Geophysical instruments will be checked in an ECA prior to use each day and again following the day's work. Two items, one inert 20-mm projectile (or surrogate) and an empty CAD (or surrogate) will be buried at approximately 1-foot bgs to ensure that these items can be detected to that depth each day prior to beginning operations. See Figure 1-2 for ECA location Because the only MEC found or anticipated to be found at the site consist of DMM, it is not anticipated that individual MEC items will be found below 1 foot bgs.

Surveyor equipment will be validated on a known or derived benchmark prior to use. Equipment inspections will be performed on a daily basis to ensure they are in proper condition for the day's activities and are compliant with HERO requirements. The equipment inspection requires daily documentation on an inspection sheet. Radios and communications equipment will be tested prior to use for functionality.

5.4 Data Collection and Storage

Records of all data, field forms, maps, photographs, and related files are in AGVIQ-CH2M HILL's Jacksonville, FL Cecil Field office. Electronic files of final MEC data, maps, Quality Assurance/Quality Control (QA/QC) data, and other relevant data are archived on compact disk (CD). Paper and electronic copies of draft and final reports and submittals occur as specified in the project work plan.

6.0 Response Actions

6.1 Response Technique

Intrusive work will be completed in the initial 3 acres, and will be expanded only as needed based on MEC recovery in periphery grids.

The following general steps are included:

- Spraying of site for control of heavy mosquito population
- Emplacement of a 100-foot by 100-foot grid system tied to a permanent site monument by a Florida Registered Surveyor
- Removal of vegetation in wooded area of site

- Surface/subsurface removal operation to detect and investigate anomalies potentially related to MEC
- Disposal of MEC/material documented as explosive hazard
- Demilitarization of material documented as safe

Vegetation removal will be accomplished 6 inches above ground surface with gas-powered string trimmers with saw blade attachments and ditch axes or, where appropriate, using a tractor equipped with a bush hog mower. If required, tree removal will be performed in regions where the trees hinder the MEC removal operation. MEC avoidance will be performed during vegetation removal. Visual observation of the ground surface by UXO Technicians prior to and during vegetation removal will be instrument-assisted detection using a White's XLT all metals detector (or equivalent). The instrument will be used to check inside heavy vegetation (for example, a thick bush) where it is not possible for the UXO Technician to visually check the area. UXO Technicians will ensure vegetation reduction equipment operates a minimum of 6 inches above ground surface and with escort by qualified UXO personnel.

Following vegetation removal, the MRS will be divided into lanes 5 feet wide marked by string. A UXO Technician will use the White's XLT all metals detector (or equivalent) for searching within the survey lane. When a surface or subsurface anomaly is detected, a UXO Technician will mark and excavate the anomaly to determine if it presents a MEC hazard. Once the anomaly is investigated and a metallic item is removed, the anomaly location will be surveyed again with the White's XLT all metals detector (or equivalent) to determine if more metallic items remain.

6.2 Exclusion Zones

6.2.1 Exclusion Zones for MGFD

Table 6-1 provides the exclusion zones (EZ) for the MGFD. The EZs are illustrated in Figures C-1 and C-2 in Appendix C.

TABLE 6-1
Exclusion Zones

MGFDs		EZs (feet)				
		Fragmentation Effects		Blast Overpressure Effects		
Description	NEW[(1)] (lb)	HFD[(3)]	MFD	K328	K40	K24
M56A4 20-mm HE round	0.02640[(2)]	65[(2)]	535[(2)]	111[(2)]	14[(2)]	8[(2)]

(1) Net Explosive Weight (NEW)
(2) DDESB, Fragmentation Data Review Form, Dated 24 May 2011.
(3) Hazardous Fragment Distance

6.2.2 Operational EZ

EZ are established by each their respective operation. If non-essential personal enter the EZ, work will cease and the EZ will no longer be active. Table 6-2 provides the controlling EZs for the MGFD for this amendment. The ESQD maps are provided in Appendix C.

TABLE 6-2
Controlling Exclusion Zones for Building 365 MRA

Operation	Sited as	ES	Basis[1]	ESQD (feet)
Manual operations	Unintentional detonation	UXO Teams	K40 of the MGFD	14[2]
Manual operations	Unintentional detonation	Public and non-essential personnel	HFD of the MGFD	65[2]
MEC treatment up to 5.11 lb NEW equivalent	Intentional Detonation	Public and all personnel	Minimum Withdrawal Distance	200[3]
Portable magazine (up to 15 lbs NEW)	Above ground magazine	Non-essential personnel in structures	Inhabited building distance (IBD)	506[4]

(1) MGFD is the 20-mm M56A4 Projectile with 0.02640 lbs NEW.
(2) DDESB, Fragmentation Data Review Form, Dated 24 May 2011.
(3) Based on calculations from DDESB Technical Paper 16 and HNC-ED-CS-S-98-7 assuming a maximum of (10) 20-mm projectiles and the use of a 24-inch sandbag enclosure as described in Appendix B-2.
(4) Naval Sea Systems Command (NAVSEA) Operation Procedures (OP) - 5 Volume 1 Seventh Revision Table 7-9 (15lb NEW for Open).

Inhabited Buildings

Several buildings are located near Expansion No. 4 (Figures C-1 and C-2). Two inhabited buildings are located within the EZ for Expansion No. 4:

- Building 373, which is an industrial facility, will not be occupied when MEC removal in the MRA is occurring closer than 65 feet from Building 373.
- Building 823, which is an inhabited residence, is not encumbered by the MFR of 535 feet because high input mechanized operations for grounds vegetation clearance are performed in conjunction with anomaly avoidance and with the restriction that vegetation be cut no closer than 6 inches from grade. The HFD of 65 feet applies, but Building 823 is beyond that distance.

Building 365 was demolished in January of 2008.

6.2.3 Potential Explosion Sites (PESs)

The only PES is a Portable Outdoor ATF Type II HD 1.1 Storage Magazine, and it will be located within Hangar 860 MRA as seen on Figure C-3. The Portable Outdoor ATF Type II HD 1.1 Storage Magazine will be used to store recovered DMM and MEC. Table 6-3 outlines PES associated with the Building 365 MRA.

TABLE 6-3
PES Encumbering Building 365 MRA, MRS Expansion No. 4

PES Bldg/ Area	PES Type/ Operation	Closest Distance to MRS (Expansion No. 4) (feet)	IL/K18[1] from PES (feet)	PES explosive limits by class/division (C/D) (lb)					
				1.1	1.2.1 (MCE)[2]	1.2.2	1.2.3 (MEC)	1.3	1.4
H860-MRS-2-MAG	Portable Outdoor ATF Type II HD 1.1 Storage Magazine	7,728	66	15	0	0	0	0	0

(1) NAVSEA OP-5 Volume 1 Revision 7 Table 7-10 Inter Line distance C/D 1.1

(2) Maximum Creditable Event (MCE)

6.2.3.1 Physical Security

Magazine locks will meet the standards for ATF Type II HD 1.1 Storage Magazines, as specified in 27 CFR Section 55.208(a) (4). The magazine will have two locks. The SUXOS will hold a key to one of the locks, and the UXOSO will hold the key to the other. Access to the magazine will require both individuals.

6.2.3.2 Fire Protection

Fire extinguishers of 10 pounds and type BC will be located in the magazine area. Smoking, matches, open flames, spark-producing devices, and firearms will not be permitted within 50 feet of the magazine. The land surrounding the magazine will be kept clear of all volatile materials for a distance of at least 50 feet.

6.2.4 Access to EZ

Access to the MRA will be controlled by use of locked gates, barriers, and security guards (if necessary) to prevent entry of unauthorized personnel during munitions response operations. Signs signifying MEC removal operations will be posted around EZs with contact information.

While the EZs and ESQDs are in effect, access to these areas will be limited to personnel essential to the operation and authorized visitors. Unauthorized personnel are prohibited from entering established EZs while operation is being performed. Access to EZs will be determined on a case-by-case basis as specified in Naval Sea Systems Command (NAVSEA) OP-5 Chg 9 Rev 7 Chapter 14 Section 7.5. Non-UXO personnel and visitors authorized to enter the EZ will require intrusive work to be suspended and receive a site specific safety briefing by the UXO Safety Officer (UXOSO) and sign the signature page. The UXOSO will determine when visitors are authorized to enter the EZ.

The UXOSO is responsible for conducting an operational risk management (ORM) assessment in accordance with Office of the Chief of Naval Operations Instruction (OPNAVINST) 3500.39 (series) prior to initiating response actions involving MEC. In addition, the UXOSO will determine the maximum number of persons (essential personnel and authorized visitors) that can be in the EZ at one time. The ratio of UXO-qualified escorts to visitors will be determined by the UXOSO based on this site specific operational risk analysis.

Based on the risk posed by the munitions response operation underway, the UXOSO may determine that access to the EZ is unsafe for visitors. However, every effort will be made to accommodate the authorized visitor's needs. With concurrence of the responsible project manager, the UXOSO will grant EZ access to authorized visitors. Access to the site will be based upon the operational risk analysis of the scheduled MEC operations and availability of escorts, as well as a demonstrated visitor need and subsequent completion of visitor safety briefings.

Persons requiring access to the EZ must demonstrate a legitimate need for access and obtain authorization from the AGVIQ-CH2M HILL Project Manager and UXOSO. At a minimum, the request for authorization will include: names of the individual requesting access, the identification of emergency contacts for these individuals, purpose of visit; task(s) to be performed; and rationale to support EZ access. Persons requesting access must submit their

request to the AGVIQ-CH2M HILL Project Manager and UXOSO prior to the proposed date of the site visit. Advance notice will allow time for the UXOSO to support the visit request by assigning a qualified escort, conducting an operational risk analysis on the operations planned for the date of the site visit, and preparing a visitor site specific safety briefing for the planned operations.

Prior to entry, all authorized visitors must receive a site-specific safety briefing describing the specific hazards and safety procedures to be followed within the EZ for operations underway that work day. Each authorized visitor must acknowledge receipt of this briefing in writing.

Authorized visitors to the EZ must be escorted at all times by a UXO-qualified person assigned to the project.

Any authorized visitor that violates the established safety procedures will be immediately escorted out of the EZ and/or site for their own protection and to protect essential personnel working at the site.

Main access will be along Skymaster Drive.

6.3 MEC and MPPEH Hazard Classification, Storage and Transportation

6.3.1 Hazard Classification

MEC/MPPEH will be managed as Hazard Division (HD) C/D 1.1 per OP 5.

MEC/MPPEH deemed safe to move by a UXO Technician II and confirmed by a UXO Technician III will be consolidated and temporarily stored within an ATF Type II HD 1.1 storage magazine. The maximum NEW permitted within this magazine is 15 lb NEW.

Safe to move DMM and MEC items that may be moved to the temporary ATF Type II HD 1.1 storage magazine or to the demolition site will be moved by vehicle. All vehicle movements of DMM/MEC will comply with the requirements of SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar.

6.4 MEC and MPPEH Disposition Processes

MEC item(s) which have been moved for temporary storage in a portable ATF Type II HD 1.1 storage magazine will be disposed of by detonation at the MEC demolition location shown on Figure C-3.

Arrangements for delivery of explosives to countercharge discovered MEC have been made with a local explosives distributor and the explosives will be delivered within 24 hours of event. Donor charges will not be stored onsite.

To safely perform planned detonation of recovered DMM at the MEC demolition location shown on Figure C-3, it will be necessary to utilize engineering controls to reduce the blast effects to acceptable levels. The selected engineering control is sandbag mitigation, which will be implemented in accordance with TP 16 and HNC-ED-CS-S-98-7, *The Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions*. For

an intentional detonation, sandbag mitigation will be used with up to (10) 20-mm projectiles laid side by side and an ESQD of 200 feet will be implemented. Appendix B-2 provides the detailed risk assessment, engineering controls, and ESQD calculations.

MPPEH will be inspected by two UXO Technician IIIs. These inspectors will be independent of each other but the inspection may be done simultaneously. This inspection will be done in accordance with NAVSEA OP 5, Vol. 1, Paragraph 13-15. MPPEH will be stored in the ATF Type II magazine and will be destroyed with the MEC/DMM. Material Documented as Safe (MDAS) by the two UXO Technicians will be placed within a locked container pending disposition instructions from the Navy Defense Reutilization and Marketing Office (DRMO) located at NAS Jacksonville. MDAS material will be documented on DD Form 1348-1.

6.5 Explosive Soil

Not Applicable

6.6 Contaminated Buildings

Not Applicable

6.7 Operational Risk Management

An operational risk management analysis will be performed in accordance with the matrix provided in NOSSAINST 8020.15C, Explosive Safety Review (NOSSA, 2011), Section 6.7. Table 6-4 evaluates each individual process before and after hazard mitigation techniques.

TABLE 6-4
Hazard Analysis Matrix

Process Step	Hazard	Triggering Event	Initial Risk Index	Hazard Mitigation	Final Risk Index
1	MEC Avoidance	MEC to direct impact	D/III/4	UXO Tech escort and all non-UXO Tech personnel will have 3R Training	D/IV/5
2	Manual MEC removal operations	MEC reacts to impact or movement during soil removal	C/II/3	Initial mechanized excavation beside anomaly; final excavation with hand tools	D/IV/5
3	Transportation of MEC/DMM/MPPEH	MEC reacts to direct impact, or shock	C/II/2	Item determined safe to move. Item packed in sand in a wooden box. If item is electrical initiated or electrically fuzed it will be wrapped in tin foil and placed in a closed metal container (CMC)	D/III/4

TABLE 6-4
Hazard Analysis Matrix

Process Step	Hazard	Triggering Event	Initial Risk Index	Hazard Mitigation	Final Risk Index
4	MPPEH Processing	MPPEH reacts to impact during handling	C/II/4	MPPEH will be certified and verified as MDAS prior to Mechanical Operations for shredding by two UXO Tech III.	D/IV/5
5	DMM Storage	DMM reacts to shock, fire, and impact	C/I/2	ATF Type II HD 1.1 Portable Magazine with fire break	D/III/5
6	Recovered MEC treatment by Open Detonation	MEC and donor charges react to impact, heat, friction, electro-static discharge	C/II/3	All demo personnel trained; 200-feet ESQD EZ established; all personnel will wear non-static producing ; demo ops will not take place if electrical storm ≤ 5 miles	D/II/4

6.8 Contingencies

In the event that a situation is encountered that prevents the primary approach discussed in this ESS from working efficiently or effectively, that activity will be suspended until a plan of action has been prepared and approved. Any amendments or corrections to the ESS will be submitted to NOSSA and DDESB as required in NOSSAINST 8020.15C.

7.0 QC/QA

7.1 Quality Control (QC) Implementation

QC for the field activities on this project will include two primary elements: 1) field observation/audits of personnel and procedures and 2) checking equipment and instruments (for example, geophysical sensors, two-way radios) for functioning and appropriate response prior to use, during usage and after usage. As described in Section 5.3, geophysical instruments will be checked prior to and at the conclusion of daily work to verify that they were functioning properly, and verified at the ECA.

The UXOQCS will oversee the QC activities during the munitions response. The UXOQCS will report issues to the Munitions Response QC Program Manager and the Program QC Manager and will have the authority to stop non-compliant work. The UXOQCS will be qualified in accordance with DDESB TP18 as discussed in Section 8.2.

At least 15 QC seed items will be placed within regions were the "selected response" will be performed. All seeds will be in place prior to MEC Removal being performed. Each seed item

will be tagged with a label identifying the item as inert and providing a contract reference, a point of contact address, phone number, and a target identifier. AGVIQ-CH2M HILL personnel will perform seeding using hand or mechanical tools, depending on soil conditions. The seed locations will be checked using a hand-held analog geophysical instrument by the UXOQCS in MEC avoidance mode to confirm that no existing anomalies are present at the seed location. Once placed, the locations of all seeded items will be surveyed using hand held GPS equipment. Hand held GPS equipment will fall within 3-meter accuracy. QC seed items will either be inert 20-mm projectile (or surrogate) or an inert CAD (or surrogate) and will be buried at a depth no deeper than 1 foot bgs to ensure that these items can be detected. Detection of the QC seed items will be monitored by AGVIQ-CH2M HILL and should an item not be detected, a root-cause analysis will be performed and corrective actions determined.

The UXOQCS will be responsible for implementing the QC Plan, performing peer oversight, inspections, and audits in accordance with pass/fail criteria. Pass-fail criteria identified in Table 7-1 are the basis for conformance and non-conformance to accomplishment of scope objectives. The achievement of each pass criteria with zero failures enables the next phase of the process to progress.

Inspecting and certifying MPPEH-free of explosive hazards results in a determination of MDAS prior to shipment off site. The UXOQCS is one of the two UXO Technician IIIs who will verify 100% of all metal for recycling as MDAS. The UXOQCS will also confirm the proper treatment/disposal of all items and monitor the metal movement off site to a recycler via chain of custody with verified witness destruction.

TABLE 7-1
Quality Control Methods and Pass/Fail Criteria

Operation	Peer-oversight	Inspection	Audit	Pass/fail
Site Preparation DMM Holding Area, Soil Erosion Controls, Barricades, Entry Control Points	x	Conforms to Work Plan and or Standard Operating Procedures	Training Records IAW DDESB TP 18 Personnel Requirements	IAW with Work Plan criteria and ESS site plan
Instrument Check Area and Equipment Acceptance	x	Conforms to Work Plan and or Standard Operating Procedures	Geophysicists reviews detection, selection of seed items	100% detection & selection. Less than 100%; initiate Corrective Action Request
Land Survey	x	Conforms to Contractors Standard Operating Procedures	RLS License verification, Equipment Check-out against know control monument for vertical and horizontal accuracy	Site boundaries achieve centimeter tolerance for traverse closure
Vegetation Reduction	x	Conforms to Contractors Standard Operating Procedures	Training Records IAW DDESB TP 18 Personnel Requirements	Brush cut to no more than 6 inches above surface, trees greater than 3 inches in diameter remain.

TABLE 7-1
Quality Control Methods and Pass/Fail Criteria

Operation	Peer-oversight	Inspection	Audit	Pass/fail
Surface and Subsurface Removal	x	Surface Evaluation Program	100% recovery of "blind" seed	Pass = 0 MPPEH, 0 Missed Seeds, or 0 metal > 2 inches x 2 inches; Fail = 1 seed, or 1 MPPEH, or 1 MD; Fail = rework of 100-foot x 100-foot grid and repeat QC process
MPPEH Processing	x	Conforms to Contractors Standard Operating Procedures	100% verification of demilitarization methods to achieve a determination of releasable to a recycler	Visual Inspection of all surface areas, demilitarization IAW DODI 4140.62
MEC/MPPEH Disposal	x	Conforms to Contractors Standard Operating Procedures	100% verification of demilitarization	Item disposed of to remove all explosive hazard
DMM Storage	x	Conforms to Contractors Standard Operating Procedures	Storage conforms DoD 6055.09-STD Chapter 14 Special Storage Procedures for Waste Military Munitions	(1) storage of miss-compatible items and security devices not used as designed

7.2 Quality Assurance (QA) Implementation

The Navy RPM will arrange for independent QA oversight, which may be conducted by either Navy EOD Technology Division (NAVEODTECHDIV), a NAVFAC Atlantic Munitions Response Program (MRP) specialist, or the Navy Region Southeast Explosive Safety Officer.

The ESS, Site Work Plan, Site Safety and Health Plan, Standard Operating Procedures, Environmental Protection Plan, and Quality Assurance Project Plan will be reviewed for compliance.

8.0 Technical Support

8.1 EOD

The nearest EOD Team that is available for technical support and/or emergency response is the Navy EOD Mobile Unit 6, Platoon Mayport at Naval Station Mayport, Florida. The EOD platoon contact phone number is (904) 270-5412.

8.2 UXO Contractor

While performing contractual work for the Navy, all MEC operations personnel will have been trained, qualified, and certified by their contract employer to perform MEC project tasks. All UXO Technicians will also be qualified and certified in accordance with the terms outlined by U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel, and DDESB TP-18, Minimum Qualifications for UXO Technicians and Personnel.

All employees involved in hazardous waste site activities receive 40 hours of Occupational Safety and Health Act (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training. They must also have current HAZWOPER 8-Hour Refresher Training prior to working on the site. Any site worker entering the site will be required to have current HAZWOPER training.

All personnel who handle MEC/DMM will be certified in accordance with the Safe Explosive Act of 2003 and will be in process of or has received the Department of Justice /ATF Certification as a "Responsible Person" or Employee Possessor.

The UXO contractor shall be licensed in the State of Florida to perform demolitions. The UXO contactor will provide personnel with Florida Blasters license.

Documentation of the above will be available for review.

A SUXOS, UXOSO and UXOQCS will be on site during all munitions response activities. When permitted, the duties of the UXOSO and UXOQCS may be accomplished by one individual. Under no circumstances will the SUXOS also serve as either the UXOQCS or the UXOSO.

8.3 Physical Security

During munitions response activities, access restrictions apply by placing high visibility signs around the perimeter of the work area. This MRS is within the security area of the JAA and therefore access to the site is controlled by gates and guards. The usage of security forces from the JAA will be accomplished if more stringent physical security is required.

9.0 Environmental, Ecological, Cultural, and/or Other Considerations

9.1 Regulatory Statue, Phase, and Oversight

NAVFAC SE/BRAC PMO SE will conduct this MEC response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) framework, as is consistent with DoD policy. OPNAVINST 8020.14, *Department of the Navy Explosives Safety Policy* (Office of the Chief of Naval Operations [OPNAV], 1999), requires that all response actions involving real property known or suspected to contain military

munitions have approved plans and/or appropriate documentation in accordance with an established process.

In addition, the response action is taken under the delegated authority of the Office of the President of United States by Executive Order (EO) 12580. This EO authorizes the Navy to conduct and finance removal actions. This removal action is also appropriate based on several of the applicable factors under 40 Code of Federal Regulations (CFR) Part 300.415(b)(2). The Navy is the lead agency for this action, and NAVFAC SE is the contracting agency responsible for completing the response action.

- 29 CFR, Occupational Safety and Health Act (OSHA) Regulations: Construction (29 CFR 1926) and General Industry (29 CFR 1910), applicable sections
- U.S. Army Corps of Engineers (USACE), 2003, EM 385-1-1, *Safety – Safety and Health Requirements*

Section 121(d) of CERCLA requires that remedial actions implemented at CERCLA sites attain any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be Applicable or Relevant and Appropriate Requirements (ARARs). Potential ARARs for the MEC response action at the site have been developed as part of the planning process and are discussed in detail in the following work plans:

- *Work Plan Addendum No. 01 for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the former NAS Cecil Field, Jacksonville, Florida, Revisions No. 00* (CH2M HILL, 2004c), *No. 01* (CH2M HILL, 2005c), and *No. 02* (CH2M HILL, 2006).
- *Work Plan for Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas at the Former NAS Cecil Field, Jacksonville, Florida, Revisions No. 00* (AGVIQ-CH2M HILL, 2010) *and No. 01* (AGVIQ-CH2M HILL, 2011).

9.2 Environmental, Ecological, Cultural and/or Other Considerations

USACE Conceptual Permit No. 199801374 (IP-BL), June 2002, indicates that a protection plan is in place for the Eastern Indigo Snake.

No cultural sites are known or suspected to be on the MRA.

9.3 Non-Explosive Soil

Not Applicable (see Section 3.4)

10.0 Residual Risk Management

10.1 Residual Risk Management

A continued munitions response from the ground surface to a depth of 1 foot is proposed for the 3-acre MRA Expansion No. 4 and any potential future expansions, and will be completed in an approach consistent with work accomplished to date. Onsite construction support will be required for any future intrusive work beyond the 1-foot clearance depth in Expansion No. 4 and the potential 15-acre expansion area, as needed.

11.0 Safety Education Program

11.1 Safety Education Program

NAVFAC SE/BRAC PMO SE will brief the JAA on the site conditions, completed removal action, and any hazards and risks associated with MEC that may remain following the munitions response action. Onsite construction support will be required for any future intrusive work beyond the 1-foot clearance depth in Expansion No. 4 and the potential 15-acre expansion area, as needed.

12.0 Stakeholder Involvement

12.1 Stakeholder Involvement

The NAS Cecil Field Restoration Advisory Board, consisting of public citizens from the local community and impacted stakeholders, will be kept updated by the NAVFAC SE/BRAC PMO SE RPM of the site conditions, proposed removal plan, and progress of the removal action.

13.0 References

The following references were consulted during the preparation of this ESS Amendment. Not all are cited in the text.

AGVIQ-CH2M HILL. 2010. *Work Plan for Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas the Former Naval Air Station Cecil Field, Jacksonville, Florida, Revision No. 00*. Prepared for NAVFAC SE. June.

AGVIQ-CH2M HILL. 2011. *Work Plan for Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas the Former Naval Air Station Cecil Field, Jacksonville, Florida, Revision No. 01*. Prepared for NAVFAC SE. March.

CH2M HILL. 2004a. *Explosives Safety Submission for Munitions Response and On-Site Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC SE. October.

CH2M HILL. 2004b. *Explosives Siting Plan for Munitions Response and On-Site Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC SE. October.

CH2M HILL. 2004c. *Work Plan Addendum No. 01 for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida.* Revision No. 00. Prepared for NAVFAC SE. November.

CH2M HILL. 2005a. *Explosives Safety Submission for Munitions Response and On-Site Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Revision No. 01. Prepared for NAVFAC SE. January.

CH2M HILL. 2005b. *Explosives Siting Plan for Munitions Response and On-Site Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Revision No. 01. Prepared for NAVFAC SE. January.

CH2M HILL. 2005c. *Work Plan Addendum No. 01 for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida.* Revision No. 01. Prepared for NAVFAC SE. February.

CH2M HILL. 2005d. *Explosives Safety Submission for Munitions Response and On-Site Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Revision No. 02. Prepared for NAVFAC SE. May.

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CH2M HILL. 2005g. *Explosives Siting Plan for Munitions Response and On-Site Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Amendment No. 03. Prepared for NAVFAC SE. November.

CH2M HILL. 2006. *Work Plan Addendum No. 01 for Munitions Response and Onsite Construction Support for Discarded Military Munitions at the Former Naval Air Station Cecil Field, Jacksonville, Florida.* Revision No. 02. Prepared for NAVFAC SE. January.

CH2M HILL. 2010. *Explosives Safety Submission for Execution of a Selected Response for Discarded Military Munitions, Building 365, Munitions Response Area at the Former Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC SE. April.

DDESB. 2005. Technical Paper 16, Methodologies for Calculating Primary Fragment Distances. October 17.

DDESB TP-16 *Methods for Predicting Primary Fragmentation Characteristics.*

DDESB TP-18 *Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel.*

Department of Justice, Explosive Safety Act. 2003. July.

Florida Department of Environmental Protection. 2004. Letter to Commanding Officer of NAVFAC SE. *MEC Impact to Solid Determination and Pre- and Post-MEC Detonation Site Impact Determination – Soil Analytical Summary Letter Report, Building 365, MRS, Naval Air Station Cecil Field, Florida*. March 31.

NAVSEA 8020.7C. *Hazards of Electromagnetic Radio to Ordnance Safety Program*. 1999. July.

NAVSEA. 2001. SWO20-AG-WHM-010, *On-Station Movement of Ammunition and Explosives by Truck and Railcar.* January 15.

NAVSEA. 2010. Ordnance Publication 5 Volume 1, *Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Revision 7, Change 9*.

NAVSEAINST 8020.9B, *Ammunition and Explosives Personnel Qualification and Certification Program.*

NOSSA. 2011. Instruction 8020.15C, *Military Munitions Response Oversight Program*.

Office of the Chief of Naval Operations (OPNAV). 1999. OPNAVINST 8020.14, *Department of the Navy Explosives Safety Policy*.

Title 29 Code of Federal Regulations, Labor, Subtitle B, Regulations Relating to Labor, Chapter XVII, Occupation Safety and Health Administration, Department of Labor.

Title 29 Code of Federal Regulations, Labor, General Industry.

Title 40 Code of Federal Regulations, Protection of Environment, Part 300, National Oil and Hazardous Substance Pollution Contingency Plan. Subpart E—Hazardous Substance Response.

United States Executive Order 12580. 1987. 52 FR 2923, 3 CFR, 1987 Comp., p. 193. January 23.

U.S. Army Corps of Engineers. 2003. EM 385-1-1, *Safety – Safety and Health Requirement.*

U.S. Army Corps of Engineers. 2002. Conceptual Permit No. 199801374 (IP-BL). June.

APPENDIX A

Signature Page

NAVFAC Project		BRAC PMO Project	
Project name:		Project name: Discarded Military Munitions Building 365, Former NAS Cecil Field Jacksonville, Florida	
Explosive Safety Officer or UXO Contractor Safety Officer		**Explosive Safety Officer or UXO Contractor Safety Officer**	
Signature		George DeMetropolis Signature	9/11/11
Printed name	Date	CH2M HILL NR Safety/QC Mgr. Printed name	Date
Public Works Office Planning Department		**Program Management Office Planning Department**	
Signature		Signature	9/15/2011
Printed name	Date	MARK E. DAVIDSON Printed name	Date
Remedial Project Manager		**Remedial Project Manager**	
Signature		Signature	
Printed name	Date	ARTHUR SANFORD Printed name	9/15/11 Date

APPENDIX B-1

Fragmentation Data Review Form

Fragmentation Data Review Form

Database Revision Date 5/24/2011

Category:	Surface-Launched HE Rounds	DODIC:	A890
Munition:	20 mm M56A4		
Case Material:	Steel, Mild	Date Record Created:	11/9/2006
		Record Created By:	MC
Fragmentation Method:	Naturally Fragmenting	Last Date Record Updated:	1/11/2009
Secondary Database Category:	Projectile	Individual Last Updated Record:	SDH
Munition Case Classification:	Robust	Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	H-764 (RDX)
Explosive Weight (lb):	0.0264
Diameter (in):	0.7874
Cylindrical Case Weight (lb):	0.10516
Maximum Fragment Weight (Intentional) (lb):	0.0034
Design Fragment Weight (95%) (Unintentional) (lb):	0.0017
Critical Fragment Velocity (fps):	3064

Overpressure Distances

TNT Equivalent (Pressure):	1.46
TNT Equivalent Weight - Pressure (lbs):	0.039
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	6
Public Traffic Route Distance (2.3 psi); K24 Distance:	8
Inhabited Building Distance (1.2 psi), K40 Distance:	14
Intentional MSD (0.0655 psi), K328 Distance:	111

Required Sandbag Thickness

TNT Equivalent (Impulse):	1.3
TNT Equivalent Weight - Impulse (lbs):	0.034
Kinetic Energy 10^6 (lb-ft²/s²):	0.0160
Required Wall & Roof Sandbag Thickness (in)	12
Expected Maximum Sandbag Throw Distance (ft):	25
Minimum Separation Distance (ft):	200

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	65
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	535
MFD-V [Maximum Fragment Distance, Vertical] (ft):	427

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	1.86	1.00
Mild Steel:	0.36	0.20
Hard Steel:	0.30	0.16
Aluminum:	0.80	0.45
LEXAN:	3.04	2.11
Plexi-glass:	1.77	1.10
Bullet Resist Glass:	1.33	0.80

Water Containment System and Minimum Separation Distance:

TNT Equivalent (Impulse):	1.3
TNT Equivalent Weight - Impulse (lbs):	0.034
Kinetic Energy 106 (lb-ft²/s²):	0.0160
Water Containment System:	5 gal carboys/ inflatable pool
Minimum Separation Distance (ft):	200/200

Item Notes

APPENDIX B-2

Risk Assessment and Engineering Controls and Calculations

Risk Assessment and Calculation of Engineering Controls and Explosives Safety Quantity Distance
for
Detonation of Multiple Munitions with Engineering Controls
Hangar 860 and Building 365 MRA
Cecil Field, Florida

Risk Assessment

1.0 Background

Recovery of multiple discarded military munitions (DMM) has generated a need for their safe disposal. To safely detonate recovered DMM within the work area for Cecil Field it is necessary to utilize engineering controls to reduce the blast effects to acceptable levels. To develop the appropriate level of engineering controls the fragment velocity and mass must be determine for comparison with tested engineering controls that effectively reduce the blast effects to an acceptable distance. Reference (a) has the current approved explosive safety quantity distance (ESQD) arcs for Cecil Field is 535-ft for an intentional detonation based on the munition with the greatest fragment distance (MGFD), a M56A4, 20mm HE projectile (refer to Attachment B-1).

Based on an evaluation of the hazards on site, a Risk Assessment was conducted in accordance with OPNAVINST 3500.39A, Operational Risk Management and Management Guidance for the Defense Environmental Restoration Program dated September 28, 2001. The ***recommended Risk Assessment Code (RAC) for this site is RAC 4 – Minor Risk***. A review of the risk evaluation process is provided in the following paragraphs.

2.0 Hazard Severity assessment of the worst credible consequence which can result as a result of the hazard posed by a 20mm High Explosive projectile was judged to be a "***Category II***" - hazard may cause severe injury or property damage.

While a 20mm High Explosive projectile, if detonated in close proximity to an individual, could cause death or severe injury, the 20mm rounds recovered have not been fired and are not armed. For these reasons the "Hazard Severity" recommended is "Category II" – hazard may cause severe injury or property damage.

3.0 Mishap Probability that a hazard will result in a mishap or loss for this site is judged to be "***Sub-category D***" - unlikely to occur.

The following calculation of engineering controls/ESQD and Operational Hazard Analysis, in addition to the application of standard operating procedures, and use of highly experienced and trained UXO Technicians provide controls that reduce the hazard to an acceptable risk. If items with a explosive risk greater than the 20mm HE projectile are encountered this risk analysis and attached documents will be updated and submitted for further review by NOSSA and DDESB if necessary.

Calculations for Engineering Controls and ESQD

1.0 References

a. Fragmentation Data Review Form (refer to Attachment B-1)

b. Department of Defense Explosive Safety Board (DDESB) Technical Publication 16, Revision 2, Methodologies for Calculating Primary Fragment Characteristics, dated October 17, 2005

c. Department of the Army Technical Manual 43-0001-27, Army Ammunition Data Sheets – Small Caliber Ammunition, dated April 29, 1994

d. U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Use of Sandbags for Mitigation of Fragment and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7 dated August 1998 and approved by DDESB February 23, 1999

2.0 Background

Recovery of multiple discarded military munitions (DMM) has generated a need for their safe disposal. To safely detonate recovered DMM within the work area for Cecil Field it is necessary to utilize engineering controls to reduce the blast effects to acceptable levels. To develop the appropriate level of engineering controls the fragment velocity and mass must be determine for comparison with tested engineering controls that effectively reduce the blast effects to an acceptable distance. Reference (a) has the current approved explosive safety quantity distance (ESQD) arc for Cecil Field is 535-ft for an intentional detonation based on the munition with the greatest fragment distance (MGFD), a M56A4, 20mm HE projectile.

3.0 Calculation of Engineering Controls

To determine the specifications for engineering controls for planned detonation activities, the munitions specific information from reference (a) and the calculation from Chapter 5, reference (b) were utilized to determine the expected maximum fragmentation weight and velocity from a detonation of (10) each, 20mm projectiles laid side by side.

The following is an excerpt from Chapter 5, of reference (b) for calculating maximum fragment ranges for multiple round detonations:

> "**Maximum Fragment Ranges**
> As indicated above, the effect of detonating stacks of munitions is to increase the fragment initial velocity by as much as a factor of 2 and to increase the fragment mass by as much as 50%."

Reference (a) provides the following data for a M56A4, 20mm HE projectile:

- Explosive Weight: 0.02640 lb
- Max Fragment Weight: 0.0034 lb
- Critical Fragment Velocity: 3,064 feet/second

Reference (a) identifies the explosive filler for the M56A4, 20mm projectile as H764 explosives. H764 explosive has an explosives equivalent of 1.3 of the TNT standard of 1.00 as listed in reference (a).

The donor charge will consist of .75-lb PETN boosters with a total explosive weight 3.75 lbs. PETN has an explosive equivalent of 1.27 of the TNT standard of 1.00 as listed in Table A-2 of reference (b).

Therefore the calculations for maximum fragment weight, expected initial velocity, and NEW are:

- The **maximum fragment weight** = 1.5 x weight from reference (a) (1.5 x 0.0034 lbs.) = **0.0051 lbs.**
- The **expected initial velocity** = 2.0 x velocity from reference (a) (2.0 x 3,064 feet/second) = **6,128 feet/second**
- **NEW** = NEW Donor (TNT Eq) + NEW Projectiles (TNT Eq.) = 3.75 (1.27) + 10(0.02640)(1.3) = **5.11 lbs. of TNT Eq**

Reference (d) has the following directions for determining the thickness of sand bags for protection:

> "To determine the minimum wall and roof thickness for a particular shell other than those found in Table 5, the approach is as follows:
>
> (1) Determine the initial fragment velocity (V_F) in ft/s, the maximum fragment weight (W_F) in pounds, and the kinetic energy ($W_F V_F^2/2$) in lb-ft^2/s^2 for the particular munition.
> (2) Identify the munition with the next largest kinetic energy, from Table 6.
> (3) Use the sandbag wall and roof thickness from Table 5 for the munition with the next largest kinetic energy shown in Table 6."

Therefore the calculations for a M56A4, 20mm HE projectile are:

Kinetic Energy ($W_F V_F^2/2$) = (0.0051 x **6,128**^{2} / 2) = 95,758 or 0.095758 x 10^6 lb-ft^2/s^2

Take into account for the total NEW of the planned detonation (**5.11 lbs. of TNT Eq**) and use Table 7 of reference (d) for the NEW and the closest Kinetic Energy to determine the wall and roof thickness for sand bags, sandbag throw, and withdrawal distances. This would be either the 105mm M1 or the 4.2 inch M39A2.

A withdrawal zone is necessary for any detonation. This withdrawal zone applies to everyone, both public and operational personnel. The **withdrawal zone is the maximum sandbag throw distance, distance to a sound level of 140 decibels, or 200 feet**. For all munitions tested, the sound level at 100 feet was substantially less than 140 decibels. At 200 feet, the sound level will be even less. The withdrawal zones are also listed in Table 7 of reference (d).

According to Table 7, reference (d), an enclosure which has **24 inches of sandbags on the roof and walls**, would have a **maximum sandbag throw of 135 feet**, and would require a **ESQD arc of 200 feet**.

APPENDIX C

ESQD Maps

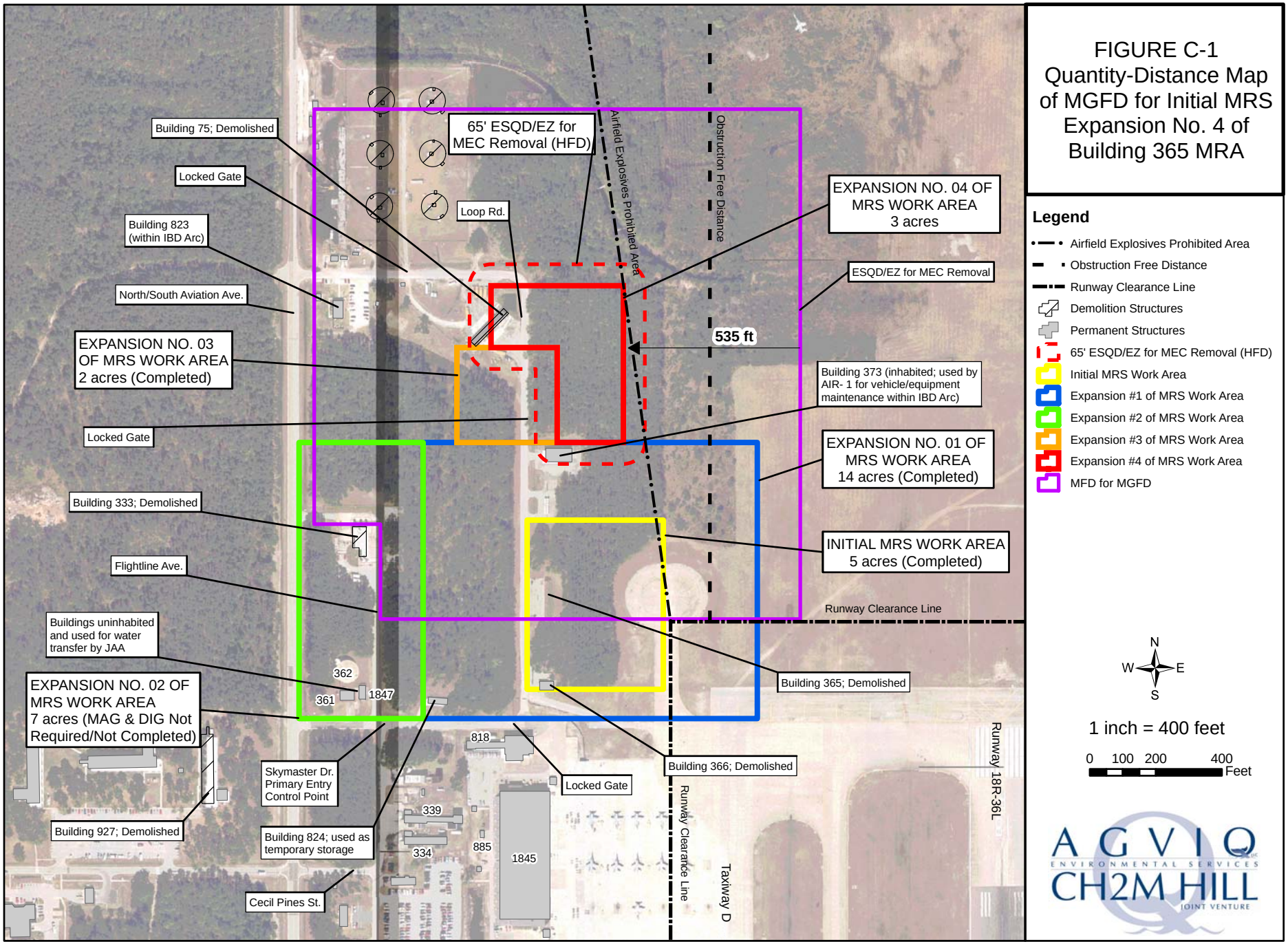

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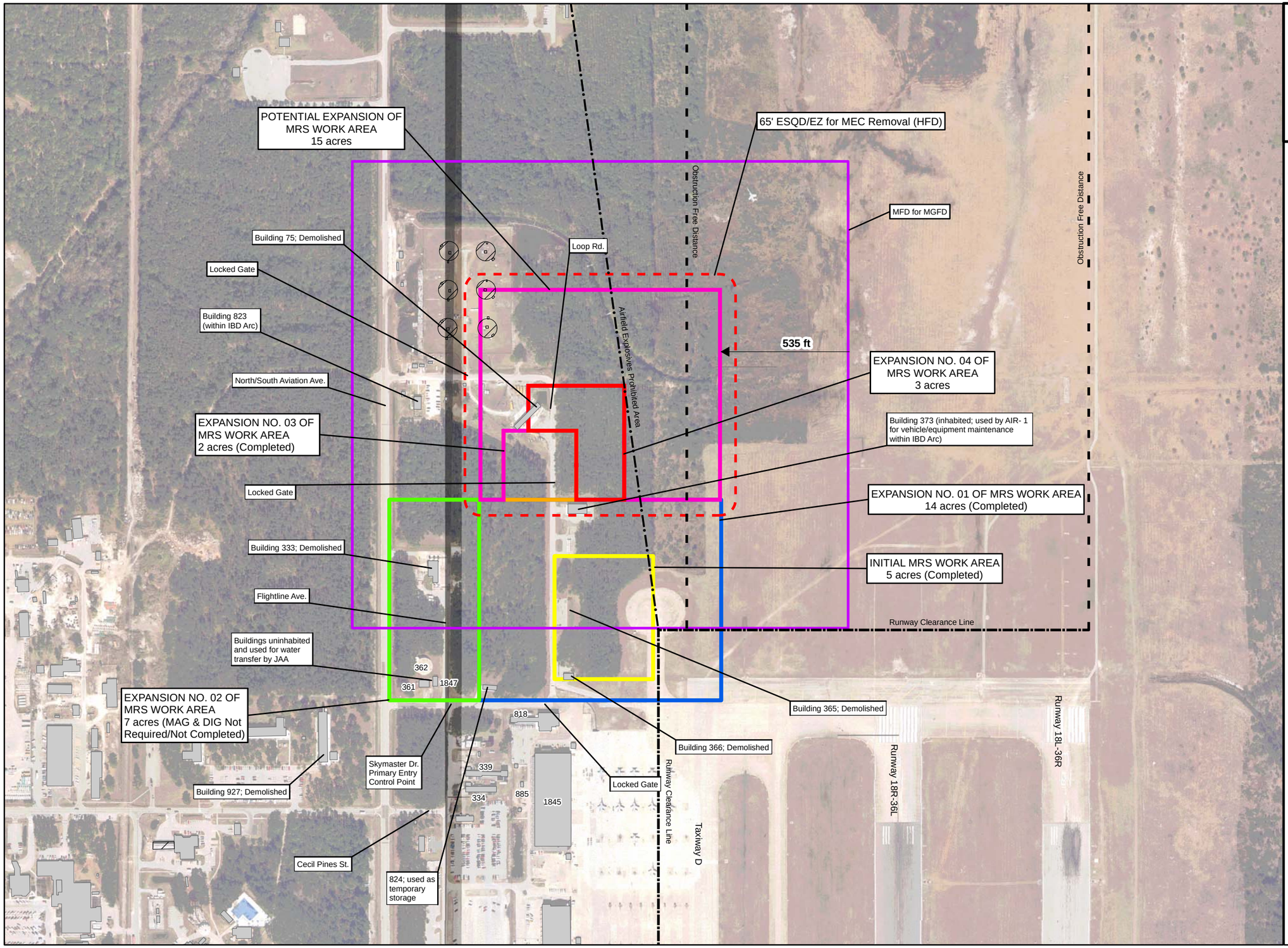
FIGURE C-2
Quantity-Distance Map of the MGFD for the Entire Potential MRS Expansion No. 4 of Building 365 MRA



Legend

- Airfield Explosives Prohibited Area
- Obstruction Free Distance
- Runway Clearance Line
- Demolition Structures
- Permanent Structures
- 65' ESQD/EZ for MEC Removal (HFD)
- Potential Expansion of MRS Work Area
- Initial MRS Work Area
- Expansion #1 of MRS Work Area
- Expansion #2 of MRS Work Area
- Expansion #3 of MRS Work Area
- Expansion #4 of MRS Work Area
- MFD for MGFD

N
W E
S

1 inch = 400 feet

0 100 200 400 Feet

AGVIQ ENVIRONMENTAL SERVICES
CH2M HILL JOINT VENTURE

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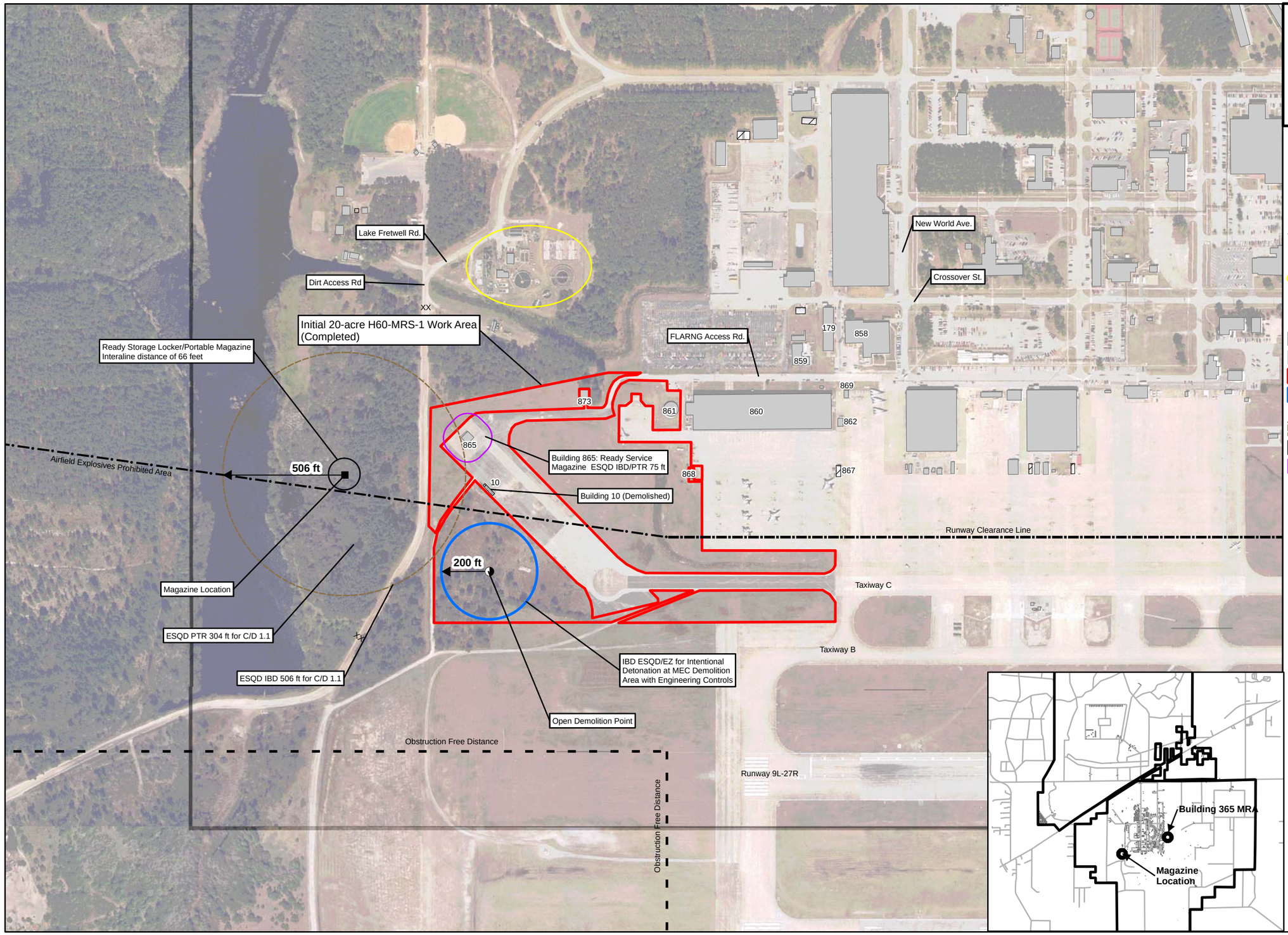
FIGURE C-3
ATF Type II C/D 1.1 Portable Outdoor Storage Magazine and DMM Disposal for Building 365 MRA and Hanger 860 MRA with ESQD Arcs



LEGEND

- Magazine Location
- Open Demolition Point
- XX Barricaded Road Way when applicable EZ in affect
- Airfield Explosives Prohibited Area
- Obstruction Free Distance
- Runway Clearance Line
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

Structures

- Demolition
- Permanent
- Initial MRS Work Area
- Detonation Area

Explosive Storage Areas

- ESQD IBD 506 ft for C/D 1.1
- Ready Storage Locker/Portable Magazine Interaline distance of 66 ft
- Building 865: Ready Service Magazine ESQD IBD 75 ft

Note: The EZs for Intentional detonation are reduced through the use of engineering controls

N
W E
S

1 inch = 400 feet

0 100 200 400 Feet

AGVIQ ENVIRONMENTAL SERVICES
CH2M HILL JOINT VENTURE

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Explosives Safety Submission, Correction No. 01

Correction No. 01 Final

Explosives Safety Submission

Execution of a Selected Response for Discarded Military Munitions Hangar 860 Munitions Response Area

Former Naval Air Station Cecil Field Jacksonville, Florida

Contract No. N62470-08-D-1006
Task Order No. JM07

Prepared for

U.S. Navy Facilities Engineering Command, Southeast

Prepared by

Northpark 400
1000 Abernathy Road
Suite 1600
Atlanta, GA 30328

September 2011

Contents

Tables

Figures

Appendices

Acronyms and Abbreviations

AGVIQ-CH2M HILL	AGVIQ-CH2M HILL Constructors, Inc. Joint Venture III
ARARs	Applicable or Relevant and Appropriate Requirements
ATF	Bureau of Alcohol, Tobacco, Firearms and Explosives
BEM	Buried Explosion Module
BIP	blown-in-place
bgs	below ground surface
BRAC PMO SE	Base Realignment and Closure, Program Management Office, Southeast
C/D	Class/Division
CAI	cartridge actuated initiator
CD	compact disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CH2M HILL	CH2M HILL Constructors, Inc.
CFR	Code of Federal Regulations
CMC	closed metal container
DDESB	Department of Defense Explosives Safety Board
DGPS	Differential Global Positioning System
DMM	Discarded Military Munitions
DoD	Department of Defense
DODI	Department of Defense Instruction
DRMO	Defense Reutilization and Marketing Office
EBS	Environmental Baseline Survey
ECA	Equipment Check Area
EO	Executive Order
EOD	Explosive Ordnance Disposal
EODB	EOD Bulletin
ESQD	Explosives Safety Quantity-Distance
ESS	Explosives Safety Submission
EZ	Exclusion Zone
FAA	Federal Aviation Administration
FANG	Florida Air National Guard
FE\AD	Facilities Engineering & Acquisition Division
FLARNG	Florida Army Reserve National Guard
GPS	Global Positioning System
HAZWOPER	Hazardous Waste Operations and Emergency Response
HD	Hazard Division
HE	High Explosive
HERO	Hazards of Electromagnetic Radiation to Ordnance
HFD	Hazardous Fragment Distance
IBD	Inhabited Building Distance
IAW	in accordance with
ICA	Instrument Certification Area

JAA	Jacksonville Airport Authority
lb	pounds
MCE	Maximum Credible Event
MD	munitions debris
MDAS	Material Documented as Safe
MEC	Munitions and Explosives of Concern
MFD-H	Maximum Fragmentation Distance- Horizontal
MFD-V	Maximum Fragmentation Distance- Vertical
MGFD	Munition with the Greatest Fragmentation Distance
mm	millimeter(s)
MMRP-CX	Military Munitions Response Program Center of Expertise
MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
NAS	Naval Air Station
NAVEODTECHDIV	Navy EOD Technology Division
NAVFAC SE	U.S. Naval Facilities Engineering Command, Southeast
NAVSEA	Naval Sea Systems Command
NAVSEAINST	Naval Sea Systems Command Instruction
NEW	Net Explosive Weight
NOSSA	Naval Ordnance Safety and Security Activity
NOSSAINST	Naval Ordnance Safety and Security Activity Instruction
OP	Operational Procedures
OPNAV	Office of the Chief of Naval Operations
OPNAVINST	Office of the Chief of Naval Operations Instruction
ORM	Operational Risk Management
OSHA	Occupational Safety and Health Act
PES	Potential Explosion Site
QA	Quality Assurance
QC	Quality Control
RLS	Registered Land Survey
RPM	Remedial Project Manager
RTK	Real Time Kinematic
RTS	Robotic Total Station
SUXOS	Senior UXO Supervisor
TNT	Trinitrotoluene
TP	Technical Paper
TtNUS	Tetra Tech NUS, Inc.
USACE	U.S. Army Corps of Engineers
USAE	USA Environmental, Inc.
USAESCH	U.S. Army Engineering Support Center, Huntsville
UXO	unexploded ordnance
UXOQCS	UXO Quality Control Specialist
UXOSO	UXO Safety Officer

1.0 Background

1.1 Project Manager

The responsible U.S. Naval Facilities Engineering Command, Southeast (NAVFAC SE)/ Base Realignment and Closure, Program Management Office, Southeast (BRAC PMO SE) Project Manager for this project is:

Art Sanford
Remedial Project Manager (RPM)
BRAC PMO SE
(843) 743-2135
(843) 743-2142
Art.sanford@navy.mil

1.2 Munitions Response Site (MRS) Identifier and Description

The 74-acre Hangar 860 Munitions Response Area (H860-MRA) contains both the 20-acre Hangar 860 MRS -1 (H860-MRS-1) and 54-acre Hangar 860 MRS-2 (H860-MRS-2). H860-MRS-2 is located west of Hangar 860. Hangar 860 is located on Aerospace Way and north of Runway 9L-27R on the former Naval Air Station (NAS) Cecil Field, Jacksonville, Florida. Figures 1-2 and 1-3 show the MRS location within NAS Cecil Field and Jacksonville, Florida.

H860-MRS-2 is comprised of an initial 12-acre region and a potential 42-acre expansion. If Munitions or Explosive of Concern (MEC) is recovered on a periphery grid of the initial 12-acre region, the "Selected Response" will continue into a 42-acre expansion region. "Selected Response" will be performed until no MEC is recovered within one row of periphery grids in the 42-acre expansion region.

Hangar 860 MRA and Building 365 MRA are located within the compounds of the former NAS Cecil Field (see Figure 1-3). The purpose of this Explosive Safety Submission (ESS) Correction is to update and clarify the Hangar 860 MRA ESS.

The initial 20-acre H860-MRS-1 was released back to Jacksonville Airport Authority (JAA) from the Navy in a letter dated January 31, 2007 (BRAC PMO SE, 2007).

1.3 Regional Map

A Regional Map of former NAS Cecil Field (Figure 1-1) shows the State of Florida and the location of the former NAS Cecil Field. Expansions Map for H860-MRA (Figure 1-2) displays the current H860-MRS-2 along with previous "Selected Response" operation regions.

1.4 Scope of Munitions Response

NAVFAC SE is responding to Hangar 860 MRA under ESS, dated February 2006; ESS Amendment No. 01, dated April 2010; and ESS Amendment No. 02, dated November 2010.

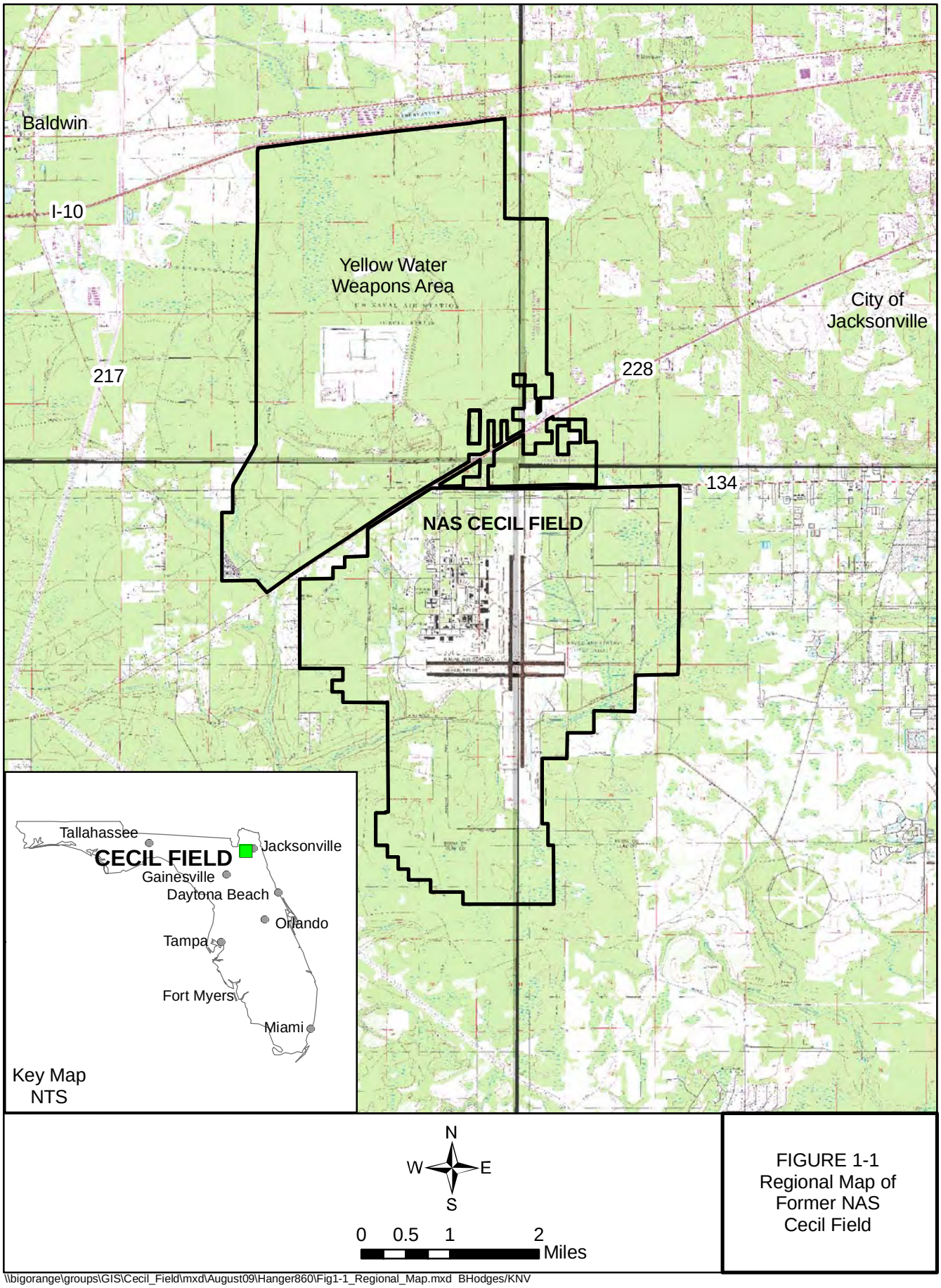
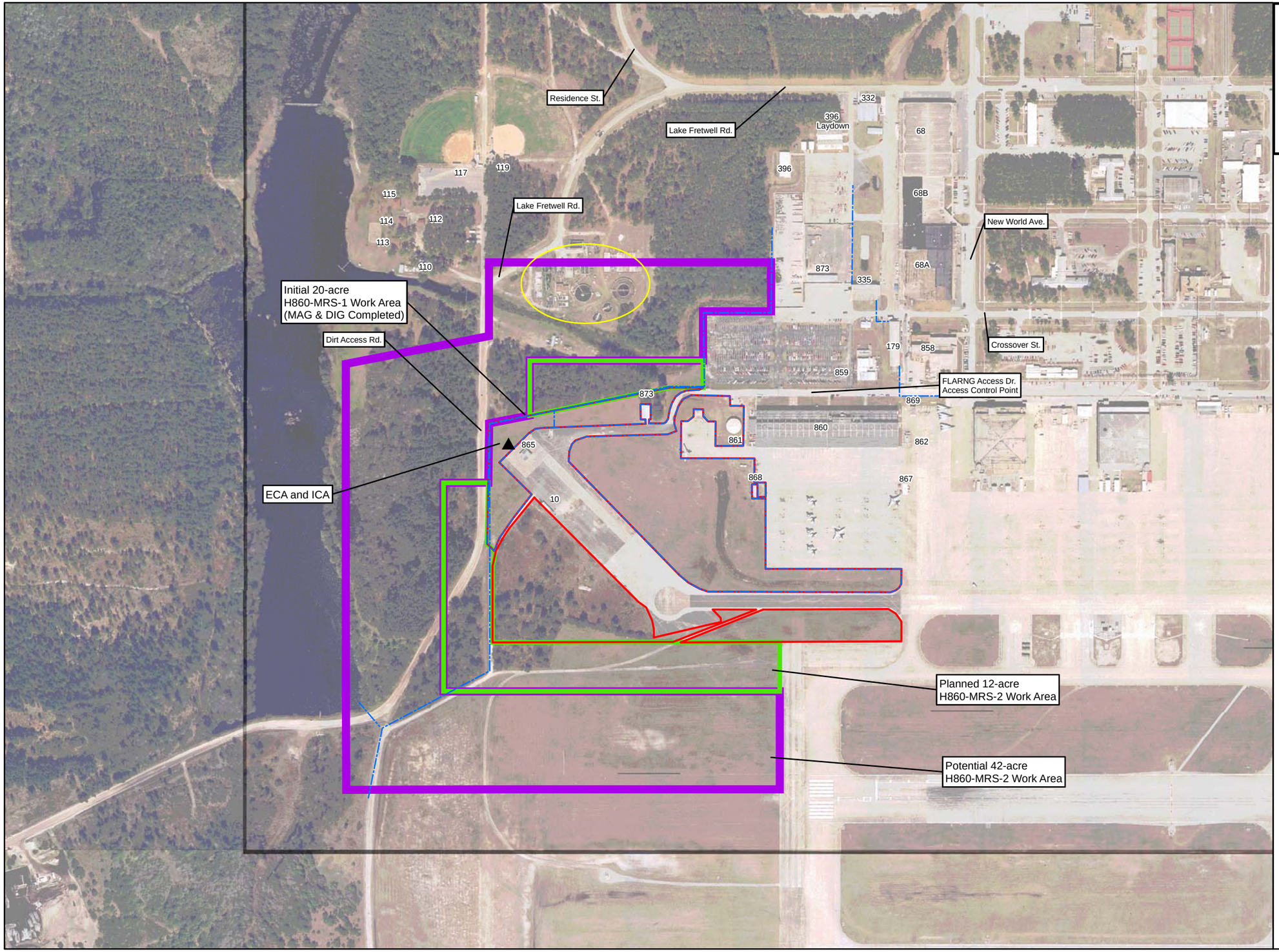


FIGURE 1-1
Regional Map of
Former NAS
Cecil Field

\\bigorange\groups\GIS\Cecil_Field\mxd\August09\Hanger860\Fig1-1_Regional_Map.mxd BHodges/KNV

Figure 1-2
Expansions Map for Hanger 860 MRA



Legend

- JAA and FLARNG Fence Line
- Initial MRS Work Area (H860-MRS-1)
- Planned 12-acre Expansion Area (H860-MRS-2)
- Potential 42-acre Expansion Area (H860-MRS-2)
- ECA and ICA

Structures

- DEMOLITION
- PERMANENT
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority

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0 100 200 400
Feet

AGVIQ ENVIRONMENTAL SERVICES
CH2M HILL JOINT VENTURE

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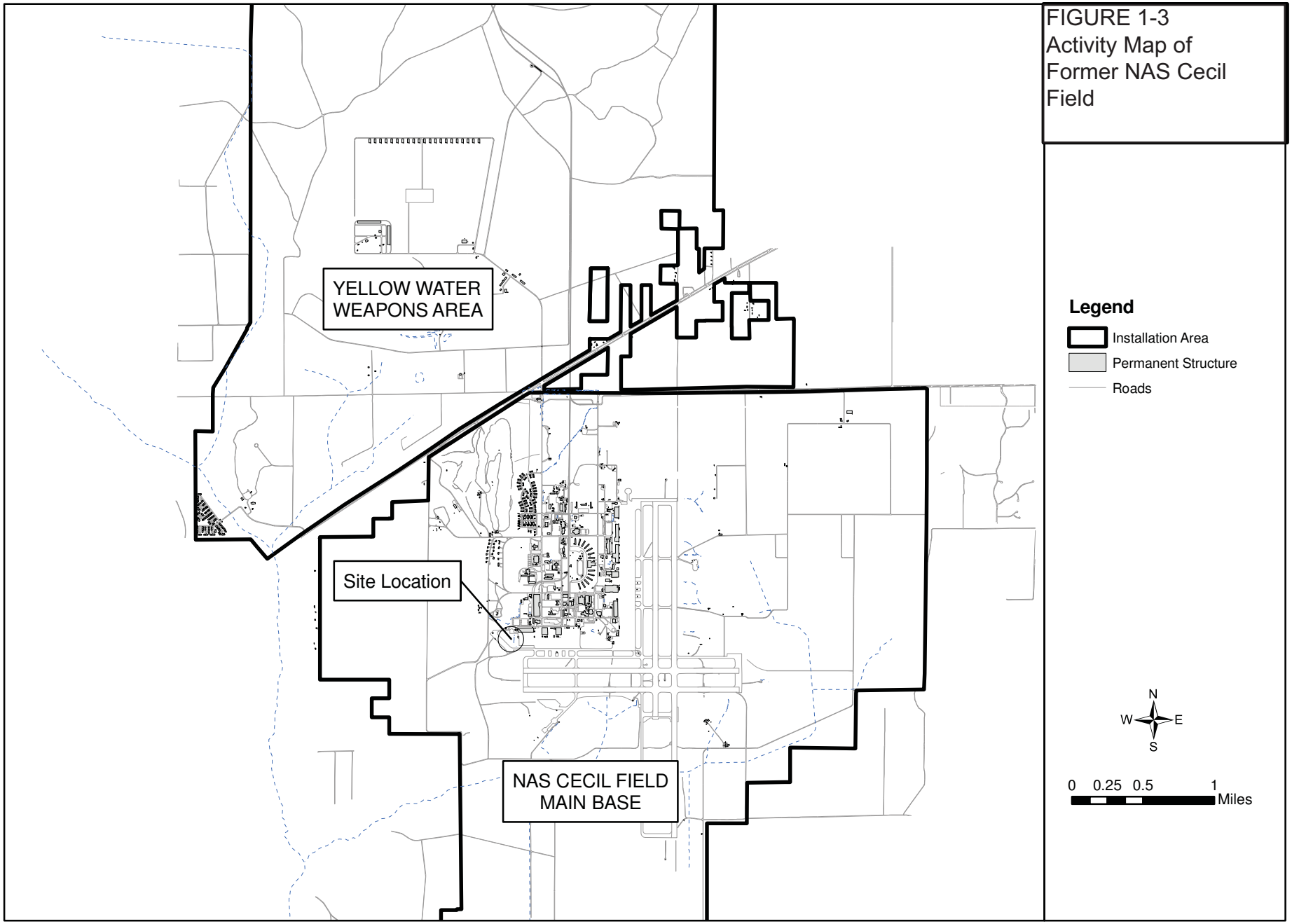

FIGURE 1-3
Activity Map of
Former NAS Cecil
Field

\\volunteer\public\Cecil_Field\mxd\Initial_MRS_Work_Area\Fig2-2_Vicinity_Map.mxd
4/16/2007

ESS activities are for a "Selected Response" on Hangar 860 MRA for NAVFAC SE, under Response Action Contracts No. N62467-01-D-0331, Contract Task Order No. 0029 and No. N62470-08-D-1006, Task Order No. JM07. Per Naval Ordnance Safety Security Activity (NOSSA) Instruction (NOSSAINST) 8020.15C (NOSSA, 2011), corrections are required when a proposed change to an approved ESS does not increase explosives safety risks, identify requirements for additional or increased explosives safety controls, or changes an explosives safety quantity-distance (ESQD) arc. ESS Correction No. 01 is submitted to: 1) update Appendix B-1 to reflect the May 24, 2011 update of the Department of Defense Explosives Safety Board (DDESB) Fragmentation Data Review Forms; 2) revise Appendix B-2 per Appendix B-1 update for the 20-mm M56A4 High Explosive (HE) round; and 3) present the ESS in accordance with NOSSAINST 8020.15C requirements.. Scope areas affected by this scope of work are depicted on Figure 1-2.

1.5 History of MEC Use

Building 865 was constructed in 1976 and used as a ready munitions magazine for S3 squadrons. The building is a one-story cinderblock magazine that is divided into 12 individual storage bays. Temporary storage of munitions is reported to have occurred at this facility. Building 873 was reported as sonobuoy storage (Tetra Tech NUS, Inc. [TtNUS], 1999). Buildings 873 and 865 are located south and east of H860-MRS-2 within the Hangar 860 MRA.

1.6 Previous Studies of Extent of MEC or MPPEH Contamination

During a visual site survey for a future construction project design on February 4, 2005, members of the Florida Army Reserve National Guard (FLARNG), the tenant occupying Hangar 860, observed multiple possible MEC items in an open stormwater drainage ditch located to the southwest of Hangar 860 at the former NAS Cecil Field. The stormwater ditch had been cleared approximately 1 month earlier. A Florida Air National Guard (FANG) Explosive Ordnance Disposal (EOD) team responded on February 4, 2005, recovered one of the possible MEC items, and provided an e-mail summary of the FANG EOD response to FLARNG. FANG EOD identified the recovered item as a JAU-22/B cartridge actuated initiator (CAI) with a Net Explosive Weight (NEW) of 0.0116 lb and rated as 1.4C hazard division (HD) explosives. It was estimated that approximately one dozen of the CAIs remained in-place at the site following the FANG EOD response.

FLARNG notified the JAA of the discovery by e-mail on February 4, 2005; and on Tuesday, February 8, 2005, JAA notified NAVFAC SE. Based on a request from NAVFAC SE, CH2M HILL Constructors, Inc. (CH2M HILL) visited the site with JAA and FLARNG. Approximately 12 to 15 CAIs were observed during the site visit. One CAI was located along the slope of the ditch and the others were located at the bottom of the ditch, visible through standing water. At the request of NAVFAC SE, EOD Mayport responded on February 22, 2005, to remove the CAIs remaining onsite. EOD Mayport removed 22 CAIs and identified the CAIs as expended.

Applicable site studies and reports include the Environmental Baseline Survey (EBS) for Transfer report, dated August 1999, prepared by TtNUS; Draft Site Specific After-Action

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Applicable site studies and reports include the Environmental Baseline Survey (EBS) for Transfer report, dated August 1999, prepared by TtNUS; Draft Site Specific After-Action

Report, dated July 2006, prepared by USA Environmental, Inc. (USAE); and Project Completion Letter Report, dated December 2006, prepared by CH2M HILL.

The Draft Site Specific After-Action Report prepared by USAE and the Project Completion Letter Report (CH2M HILL, 2006e) document the "Selected Response" activities completed on the original H860-MRS-1. A "Selected Response" for H860-MRS-1 work area was completed during the period of May 22, 2006 to June 29, 2006. The "Selected Response" recovered 482 MEC/Material Potentially Presenting an Explosive Hazard (MPPEH) items, including 76 MEC/MPPEH items within periphery grids. Based on the results of the completed munitions response, the Project Completion Letter Report (CH2M HILL, 2006e) included the following recommendations:

1. Re-designate the site as an MRA (H860-MRA), comprised of H860-MRS-1 and H860-MRS-2.
2. Expand the munitions response to include H860-MRS-2 (12 acres) due to the recovery of 76 MEC items within north, west, and south periphery grids of H860-MRS-1.
3. The H860-MRS-1 (20 acres) has received a "Selected Response" for MEC/MPPEH to a depth of 1-foot below ground surface (bgs).

During the completed "Selected Response" operations on the initial 20-acre H860-MRS-1 work area, 6,013 anomalies were investigated with 482 anomalies identified as MEC/ MPPEH, and 15 pounds (lb) of Material Documented As Safe (MDAS) and 5,113 lb of non-MEC related debris recovered.

H860-MRS-2 regions directly correspond to the MEC items recovered in H860-MRS-1. If MEC items are recovered within H860-MRS-2 initial 12-acre area, "Selected Response" will be conducted within the additional 42-acre expansion area.

A "Selected Response" for H860-MRS-2 work area was completed during the period of August 2, 2010 to March 15, 2011. During the completed "Selected Response" operations, 8,473 anomalies were investigated with 36 anomalies identified as MEC/MPPEH, and 6 lb of MDAS and approximately 16,000 lb of non-MEC related debris recovered. The "Selected Response" will continue within H860-MRS-2 until no MEC is recovered within one row of periphery grids.

1.7 Justification for NDAI of NFA Decision

Not Applicable

2.0 Project Dates

2.1 Project Dates

Mobilization on the continued response on H860-MRS-2 is anticipated to begin during the third quarter of 2011, with an estimated project duration of 6 to 8 weeks.

3.0 Types of MEC and MPPEH

3.1 Types and Quantities of MEC and MPPEH

The type and amount of MEC anticipated to be encountered within the H860-MRS-2 expansion is assumed similar to that recovered within H860-MRS-1 and completed H860-MRS-2. Specific types of MEC suspected are the 2.75-inch rocket Mk5 HEAT warhead, MK19 Impulse Cartridge, JAU-22/B CAI, M56A4 20-mm Projectile, and MK23 Practice Bomb.

3.2 MGFD

Based on the site history and findings of previous munitions response operations at this MRA, the primary MGFD selected for this operation would have been the 2.75-inch rocket Mk5 HEAT warhead. However, a DDESB fragmentation data review form is not available for the 2.75-inch rocket Mk5 HEAT warhead. The Mk5 HEAT has a NEW of 0.88 lb (Composition B). Consequently, the munition featured in the DDESB database which most closely compares to the Mk5 HEAT has been selected as the MGFD. The primary MGFD will be the M151 and Mk64 2.75-inch rocket. The NEW for the 2.75-inch M151 and Mk64 rocket is 2.3 lb (Composition B). There will be no contingency MGFD.

TABLE 3-1
Primary MGFD

MGFD Type	Muntions Item	MFD-H[(1)] (feet)	MFD-V[(3)] (feet)
Primary	M151 and Mk64 2.75-inch Rocket	1,348[(2)]	1,067[(1)]

(1) Maximum Fragmentation Distance - Horizontal
(2) DDESB, Fragmentation Data Review Form, Updated 24 May 2011
(3) Maximum Fragmentation Distance - Vertical
NOTE: No Contingency MGFD selected

If while executing a "selected" munitions response, a MEC item is encountered that has a greater fragment distance than the selected MGFD, the AGVIQ-CH2M HILL Constructors, Inc. Joint Venture III (AGVIQ-CH2M HILL) project manager will: 1) direct all munitions response personnel to immediately cease operations; and 2) submit an amended ESS to NOSSA (N53).

3.3 Maximum Credible Event (MCE)

Not Applicable

3.4 Explosive Soil and Contaminated Buildings

The MRA proposes no explosive soil or contaminated building hazards.

4.0 MEC and MPPEH Migration

Due to the climatic conditions in Florida, the site does not have a frostline and has not experienced frost heave. MEC and MPPEH migration are not anticipated.

5.0 Detection Techniques

5.1 Detection Equipment, Method and Standards

Only handheld analog geophysical metal detectors will be used at the site. The CAIs found at the site were historically constructed of both ferrous and non-ferrous metals; therefore, an all-metals detector, the White's XLT (or equivalent), will be utilized. The White's XLT metal detector is approved by the U.S. Army Engineering Support Center, Huntsville (USAESCH), Military Munitions Response Program Center of Expertise (MMRP-CX) for use on munitions response projects. The MMRP-CX program for testing geophysical instruments meets the substantial requirements of the Navy Hazards of Electromagnetic Radiation to Ordnance (HERO) Program. A Schonstedt GA-52Cx (or equivalent) may be used to identify metallic items but will not be used to determine if no metallic items are present. Anomaly discrimination is not proposed.

All personnel who use the instrument for project operations will be required to demonstrate proficiency within the Instrument Certification Area (ICA) under observation by an Unexploded Ordnance Quality Control Specialist (UXOQCS). The ICA will contain 15 flagged and numbered locations. Each flag will be located within or adjacent to ground cover (grass or shrubs) or other forest litter (e.g., duff, debris) to mimic actual site conditions that an operator would experience during the intrusive investigation. The ICA will be located near the Hangar 860 MRA Work Area (Figure 1-2). The ICA at Former Naval Air Station Cecil Field, Building 365 MRA, Jacksonville, Florida, may be used to validate employing UXO Technicians to perform intrusive investigation at Hangar 860 MRA. The ICA will be used to determine whether metallic items are present, 1) on the ground surface but not visible to the eye (e.g., tall grass or brush) or 2) beneath the mineral soil, can be detected by the operator. Twelve locations will have items buried below the mineral soil (so as to not be visible to the operator) to a depth no deeper than 1 foot bgs. The remaining three locations will not contain items. The items emplaced will be inert 20-mm projectiles (or surrogate) and CAIs (or surrogate). Under observation by the UXOQCS, the instrument operator will sweep the ICA in the same manner that would be utilized for the MEC removal operations. The operator will signify to the UXOQCS whether or not an item is suspected to be present at each flagged location. The results will be recorded by the UXOQCS.

After the operator has checked each flagged location, the UXOQCS will evaluate the results. The operator will be considered certified to operate the instrument if:

- 100 percent of the locations with items were correctly identified, AND
- No more than two of the locations that did not have items were identified as having items present. (This will ensure that an operator does not pass by each location and identify it as having an item in order to pass automatically.)

In the event that an operator does not pass the certification, the UXOQCS will ensure the instrument is functioning properly (at the Equipment Check Area [ECA]). The operator will be required to train again in the use of the instrument by the unexploded ordnance (UXO) contractor's Senior UXO Supervisor (SUXOS) and to reattempt to certify. If an operator fails the test repeatedly, the UXOQCS will make a determination as to whether it is likely that the operator is not suited to perform the task required and will inform the SUXOS and Project Manager that the individual should be used for a different task or removed from the project.

The UXOQCS may change the locations of flags and item locations as needed to ensure that operators who have passed through the ICA are not able to share information regarding the locations of items or the numbers of flags where items are located. It will be left to the discretion of the UXOQCS to determine how often this is required to ensure a valid certification can be performed.

The UXOQCS will document when an operator is certified with a specific instrument. The operator will not be required to re-certify unless:

- He/she has left the project and did not return for at least 6 months,
- He/she has had to replace an instrument, for which the operator AND instrument had been certified previously, or
- The UXOQCS finds cause to re-certify the individual.

5.2 Navigational Equipment, Method and Standards

Final MRA boundary locations will be placed and certified by a Florida Registered Surveyor. Depending on the level of vegetation removal performed and the location within the site, positioning of grid identifying stakes will be accomplished through either Real Time Kinematic (RTK) Differential Global Positioning System (DGPS) or Robotic Total Station (RTS) methods. The most likely method will be RTK DGPS; however, under some conditions other methods may be required.

5.2.1 Real Time Kinematic Differential Global Positioning System

RTK DGPS is a differential global positioning system that utilizes satellites to determine the position of rover antenna placed on the survey instrument and correction data from a base station set up on a control point to determine the system position. Corrections from the base station are sent via radio link to the rover receiver. Accuracy of the RTK DGPS system is sub-centimeter.

5.2.2 Robotic Total Station

RTS is a survey device that uses a survey "gun" setup over a known point that tracks a prism situated on the survey pole to record its position. The survey gun is initially set up at a known point and a prism is positioned over another known point so the gun, via laser, can

back sight to locate itself in space. The level of accuracy of the system is similar to RTK DGPS.

5.3 Equipment Checkout

Geophysical instruments will be checked in an ECA prior to and at the end of each day. Two items, one inert 20-mm projectile (or surrogate) and an empty CAI (or surrogate) will be buried at approximately 1 foot bgs to ensure that these items can be detected to that depth. See Figure 1-2 for ECA location. Because the only MEC found or anticipated to be found at the site consists of Discarded Military Munitions (DMM), it is not anticipated that individual MEC items will be found 1 foot bgs.

Surveyor equipment will be validated on a known or derived benchmark prior to use. Equipment inspections will be performed on a daily basis to ensure they are in proper condition for the day's activities and are compliant with HERO requirements. The equipment inspection requires daily documentation on an inspection sheet. Radios and communications equipment will be tested prior to use for functionality.

5.4 Data Collection and Storage

Records of all data, field forms, maps, photographs, and related files are in AGVIQ-CH2M HILL's Jacksonville, Florida Cecil Field office. Electronic files of final MEC data, maps, Quality Assurance/Quality Control (QA/QC) data, and other relevant data are archived on compact disk (CD). Paper and electronic copies of draft and final reports and submittals occur as specified in the project work plan.

6.0 Response Actions

6.1 Response Technique

The following general steps are included:

- Spraying of site for control of heavy mosquito population
- Emplacement of a 100-foot by 100-foot grid system tied to a permanent site monument by a Florida Registered Surveyor
- Removal of vegetation in wooded area of site
- Surface/subsurface removal operation to detect and investigate anomalies potentially related to MEC
- Disposal of MEC/Material Documented as Explosive Hazard (MDEH)
- Demilitarization of MDAS

Vegetation removal will be accomplished 6 inches above ground surface with gas-powered string trimmers with saw blade attachments and ditch axes or, where appropriate, using a

tractor equipped with a bush hog mower. If required, tree removal will be performed in regions where the trees hinder the MEC removal operation. MEC avoidance will be performed during vegetation removal. Visual observation of the ground surface by UXO Technicians prior to and during vegetation removal will be instrument-assisted detection using a White's XLT all metals detector (or equivalent). The instrument will be used to check inside heavy vegetation (for example, a thick bush) where it is not possible for the UXO Technician to visually check the area. UXO Technicians will ensure vegetation reduction equipment operates a minimum of 6 inches above ground surface and with escort by qualified UXO personnel.

Following vegetation removal, the MRS will be divided into lanes 5 feet wide marked by string. A UXO Technician will use the White's XLT all metals detector (or equivalent) for searching within the survey lane. When a surface or subsurface anomaly is detected, a UXO Technician will mark and excavate the anomaly to determine if it presents an MEC hazard. Once the anomaly is investigated and a metallic item is removed, the anomaly location will be surveyed again with the White's XLT all metals detector (or equivalent) to determine if more metallic items remain. Initial and maximum ESQD maps for Hangar 860 are presented in Figures C-1 and C-2, respectively.

6.2 Exclusion Zones

6.2.1 Exclusion Zone

Table 6-1 provides the exclusion zone (EZ) details.

TABLE 6-1
Exclusion Zones

MGFDs		EZs (feet)				
		Fragmentation Effects		Blast Overpressure Effects		
Description	NEW[(1)] (lb)	HFD[(3)]	MFD[(4)]	K328	K40	K24
M151 and Mk64 2.75-inch Rocket	2.3[(2)]	258[(2)]	1,348[(2)]	455[(2)]	55[(2)]	33[(2)]

(1) Net Explosive Weight (NEW)
(2) DDESB, Fragmentation Data Review Form, Updated 24 May 2011
(3) Hazardous Fragment Distance
(4) Maximum Fragment Distance

6.2.2 Operational EZ

EZ are established by their respective operation. If non-essential personal enter the EZ, work will cease and the EZ will no longer be active. Table 6-2 provides the controlling for the MGFD for this correction. The ESQD maps are provided in Appendix C.

TABLE 6-2
Controlling Exclusion Zones

Operation	Sited as	ES	Basis	ESQD (feet)
Manual operations	Unintentional detonation	UXO Teams	K40 of the MGFD	55[(1)]
Manual operations	Unintentional detonation	Public and non-essential personnel	HFD of the MGFD	258[(1)]
Treatment of MGFD	Intentional detonation	Public and all personnel	MFD of MGFD	1,348[(1)(2)]
Sandbagged MGFD and Non-MGFD treatment up to 5.11 lb TNT equivalent NEW	Intentional detonation	Public and all personnel	Withdrawal distance using engineering controls	200[(3)(4)]
Portable magazine (up to 15 lb NEW)	Above ground magazine	Non-essential personnel in structures	Inhabited building distance (IBD)	506[(5)]
		Non-essential personnel in open	Public traffic route	304[(6)]

(1) DDESB, Fragmentation Data Review Form, Updated 24 May 2011
(2) This distance can be reduced by employing engineering controls authorized by DDESB TP-16
(3) For only one round of M151 or Mk64, with 24 inches of sandbags for roof and walls, in accordance with DDESB TP-16, and the Fragmentation Data Review Form for the M151 or Mk64 round.
(4) For multiple 20 mm rounds, based on calculations from DDESB TP-16 and HNC-ED-CS-S-98-7 assuming a maximum of (10) 20-mm projectiles, with up to 5.11 lb TNT equivalent NEW (including donor charge), and the use of a 24-inch sandbag enclosure as described in Appendix B-2.
(5) Naval Sea Systems Command (NAVSEA) Operation Procedures (OP) - 5 Volume 1 Seventh Revision Table 7-9 (15 lb NEW for Open)
(6) The PTR is 60% of the IBD.

Inhabited Buildings

There are several inhabited buildings located near H860-MRS-2 (see Figures C-1 and C-2), as described below. A competent person will observe all EZ impacted buildings and will halt work if non-essential personal enter active EZ and execute a resume work order when non-essential personal exit the EZ.

Nine inhabited buildings are located within the MFD EZ (1,348 feet) of Hangar 860 MRA. For each of these buildings, high input mechanized operations for vegetation clearance will be performed using anomaly avoidance techniques. Vegetation clearance will not occur within 6 inches from the ground. During vegetation removal, the 258-foot HFD EZ will be enforced. All of these buildings are located outside of the 258-foot HFD EZ. However, the occupants of these building will be notified of the munitions response activities, and if necessary, will be evacuated if the MFD EZ is active.

- Building 335 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 335 is located directly west of Building 68A. Building 335 is the FLARNG motor pool building and is only occupied during weekend drill activities. This building is constructed of standard concrete block.

- Building 331 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 331 is located north of Building 68. Building 331 is occupied by approximately 50 business workers. This building is constructed of standard concrete block.
- Building 332 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 332 is located east of Building 68. Building 332 is occupied by approximately 12 business workers on Monday through Friday 9:30 a.m. until 4:30 p.m. This building is constructed of standard concrete block.
- Building 547 is located within the EZ for the 12- and 42-acre H860-MRS-2 expansion. Building 547 is located in between Hangar 13 and Hangar 14. Building 547 is occupied by no more than 30 workers.
- Building 858 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 858 is occupied by FLARNG and used as general office space. At any given time, there are approximately 10 to 15 employees located in the building. Building 858 is constructed of standard concrete block.
- Building 859 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 859 is occupied by FLARNG and used as general office space. Approximately three employees are located in the building. Building 859 is a collection of temporary metal buildings adjoined to create one building.
- Building 860 is located within the EZ for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 860 is an inhabited FLARNG aircraft maintenance hangar. The west end of the hangar has masonry block and brick walls with a flat built-up roof system and has no openings in the direction (west) of the MRS. Openings to the south (hangar/personnel access doors) and north (personnel access) can be restricted to prevent personnel from entering the EZ.
- Building 68B is located within the EZ for the 12 and 42-acre potential H860-MRS-2 expansion. Building 68B is occupied by U.S. Customs. This building is constructed of standard concrete block. At any given time, approximately 100 employees are located in the building.
- Hangar 13 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Hangar 13 is located at the southern end of New World Avenue and north of Taxiway C. Hangar 13 is used by the U.S. Coast Guard and contains approximately 30 workers at any given time.

In the event MEC item(s) are identified at the site at a location where the IBD ESQD/EZ includes a structure, the following procedures will be implemented:

- If the SUXOS and UXO Safety Officer (UXOSO) determine the item(s) are safe to move, it will be placed in the portable Type II HE storage magazine and secured for disposal by detonation at the end of the Time-Critical Removal Action.
- If the SUXOS determines the MEC/MDEH item(s) are not safe to move, the item(s) will be flagged and security personnel posted at the end of the operating day. The site will be monitored by security personnel until disposal operations can be performed.

- An attempt will be made to conduct disposal operation within 24 hours. Prior to initiating the disposal, the SUXOS and a UXO Technician III will evaluate the recovered MEC and existing ESQD arcs to ensure that disposal by detonation can be safely effected through the use of appropriate engineering controls, as described in this document. If it is determined that insufficient ESQD arcs exist, due to a contingency not having been addressed in this ESS (e.g., previously unplanned equipment such as a fuel tank present in the EZ), a plan using alternate engineering controls will be developed and expeditiously submitted via e-mail to NOSSA for review and approval prior to executing disposal by detonation operations. Disposal will be conducted in accordance with EOD Bulletin (EODB) 60A 1-1-31, OP 5 Volume I, and NAVSEA SW060-AA-MMA-010 Volumes I and II. Engineering controls will conform with DDESB TP-16 Revision 1 and USAESCH, Use of Sandbags for Mitigation of Fragment and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7 dated August 1998 and approved by DDESB February 23, 1999.
- All nonessential personnel will be evacuated from within the IBD ESQD/EZ for detonation operations.

Uninhabited Buildings

Several buildings that fall within the EZ are classified as "uninhabited" (see Figures C-1 and C-2) and are listed below. These uninhabited buildings are not utilized by employees as a permanent workplace, but may contain potential visitors. Surveillance of uninhabited buildings within the EZ will be conducted during working hours. No work will be conducted in the MRS if an uninhabited building becomes occupied.

- Building 68 is located within the established EZ for the 42-acre potential H860-MRS-2 expansion. Building 68 is being utilized as a storage area by Boeing. This building is constructed of standard concrete block.
- Building 68A is located within the established EZ for the 42-acre potential H860-MRS-2 expansion. Building 68A is being utilized as a storage area by Northrop Grumman. This building is constructed of standard concrete block.
- Building 110 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 110 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is used for the storage of maintenance equipment.
- Building 112 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 112 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public restroom facility.
- Building 113 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 113 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public picnic pavilion.
- Building 114 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 114 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public picnic pavilion.

- Building 115 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 115 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a public picnic pavilion.
- Building 117 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 117 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a softball field and concession stand.
- Building 119 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 119 is located at Lake Fretwell Park and is a City of Jacksonville-owned property that is a softball field and scorekeepers building.
- Building 179 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 179 is used as general storage by the FLARNG.
- Building 396 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 396 is used as a storage and laydown area for grass cutting equipment by J&D Maintenance.
- Building 861 is located within the EZ for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 861 is uninhabited and used as a concrete fire protection water reservoir for Hangar 860.
- Building 862 is located within the EZ for the 42-acre potential H860-MRS-2 expansion. Building 862 is an out-building located on the east side of Building 860 and is used for general storage of maintenance equipment and emergency equipment.
- Building 865 is located within the EZ for the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 865 is an uninhabited cinderblock ready service magazine used by the USCG and FLARNG.
- Building 869 is located within the EZ for the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 869 is a concrete structure that stores equipment for Hangar 860.
- Building 873 is located within the established EZs for both the 12-acre planned and 42-acre potential H860-MRS-2 expansions. Building 873 is uninhabited and used by the FLARNG for storage of nonhazardous aircraft parts.
- The Former Water Treatment Plant is located within the bounds of the 42-acre potential H860-MRS-2 expansion and the EZ for the 12-acre planned H860-MRS-2 expansion. The Former Water Treatment Plant is uninhabited, closed, and secured by the Jacksonville Electric Authority.

6.2.3 Potential Explosive Sites (PESs)

The only PES is a Portable Outdoor Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) Type II Hazard Division (HD) 1.1 Storage Magazine, and it will be located within H860 MRA as seen on Figures C-1 and C-2. The Portable Outdoor ATF Type II HD 1.1 Storage Magazine will be used to store recovered DMM. Table 6-3 outlines PES associated with H860-MRA.

TABLE 6-3
PES Encumbering H860-MRS-2

PES Bldg/Area	PES Type/ Operation	Closest Distance to MRS (feet)	IL/K18[1] from PES (feet)	PES explosive limits by class/division (C/D) (lb)					
				1.1	1.2.1 (MEC) [2]	1.2.2	1.2.3 (MEC)	1.3	1.4
H860-MRS-2-MAG	Portable Outdoor ATF Type II HD 1.1 Storage Magazine	213	66	15	0	0	0	0	0

(1) NAVSEA OP-5 Volume 1 Revision 7, Change 9 Table 7-10 intraline distance C/D 1.1
(2) Maximum Credible Event

6.2.4 Access to EZ

Access to the MRA will be controlled by use of locked gates, barriers, and security guards (if necessary) to prevent entry of unauthorized personnel during munitions response operations. Signs signifying MEC removal operations will be posted around EZs with contact information.

While the EZs and ESQDs are in effect, access to these areas will be limited to personnel essential to the operation and authorized visitors. Unauthorized non-essential personnel and the public are prohibited from entering established EZs while operation is being performed. Access to EZs will be determined on a case-by-case basis as specified in NAVSEA OP-5 Chg 9 Rev 7 Chapter 14 Section 7.5. Non-UXO personnel and visitors authorized to enter the EZ will require intrusive work to be suspended and receive a site specific safety briefing by the UXOSO and sign the signature page. The UXOSO will determine when visitors are authorized to enter the EZ.

The UXOSO is responsible for conducting an operational risk management (ORM) assessment in accordance with OPNAVINST 3500.39 (series) prior to initiating response actions involving MEC. In addition, the UXOSO will determine the maximum number of persons (essential personnel and authorized visitors) that can be in the EZ at one time. The ratio of UXO-qualified escorts to visitors will be determined by the UXOSO based on this site specific operational risk analysis.

Based on the risk posed by the munitions response operation underway, the UXOSO may determine that access to the EZ is unsafe for visitors. However, every effort will be made to accommodate the authorized visitor's needs. With concurrence of the responsible project manager, the UXOSO will grant EZ access to authorized visitors. Access to the site will be based upon the operational risk analysis of the scheduled MEC operations and availability of escorts, as well as a demonstrated visitor need and subsequent completion of visitor safety briefings.

Persons requiring access to the EZ must demonstrate a legitimate need for access and obtain authorization from the AGVIQ-CH2M HILL Project Manager and UXOSO. At a minimum, the request for authorization will include: names of the individual requesting access, the

identification of emergency contacts for these individuals, purpose of visit; task(s) to be performed; and rationale to support EZ access. Persons requesting access must submit their request to the AGVIQ-CH2M HILL Project Manager and UXOSO prior to the proposed date of the site visit. Advance notice will allow time for the UXOSO to support the visit request by assigning a qualified escort, conducting an operational risk analysis on the operations planned for the date of the site visit, and preparing a visitor site specific safety briefing for the planned operations.

Prior to entry, all authorized visitors must receive a site-specific safety briefing describing the specific hazards and safety procedures to be followed within the EZ for operations underway that work day. Each authorized visitor must acknowledge receipt of this briefing in writing.

Authorized visitors to the EZ must be escorted at all times by a UXO-qualified person assigned to the project.

Any authorized visitor that violates the established safety procedures will be immediately escorted out of the EZ and/or site for their own protection and to protect essential personnel working at the site.

Main access will be along Lake Fretwell Road (see Figures C-1 and C-2).

6.3 MEC and MPPEH Hazard Classification, Storage and Transportation

6.3.1 Hazard Classification

MEC/MPPEH will be managed as Hazard/Class Division 1.1 per NAVSEA OP 5.

MEC/MPPEH deemed safe to move by a UXO Technician II and confirmed by the UXO Technician III will be consolidated and temporarily stored within an ATF Type II HD 1.1 storage magazine. The maximum NEW permitted within this magazine is 15 lb NEW.

6.3.2 Portable Outdoor ATF Type II HD 1.1 Storage Magazine

A Portable Outdoor ATF Type II HD 1.1 Storage Magazine will be used for temporary MEC storage during this response. The Portable Outdoor ATF Type II HD 1.1 Storage Magazine will be a skid-mounted 5.5-foot by 5-foot by 5-foot box Type II magazine as specified in 27 Code of Federal Regulations (CFR) Section 55.208(a) (4). The maximum NEW to be stored in the magazine is 15 lb. This explosives storage area will meet the requirements of:

- Title 27 CFR, ATF, Part 55, Commerce in Explosives
- DoD, 2010, 6055.09-M – DoD Ammunition and Explosives Safety Standards
- NAVSEA, 2010, OP 5, - Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Seventh Revision, Change 9

The magazine will be located near H860-MRA-2 Work Area, as shown on Figures C-1 and C-2, and secured within a fence.

6.3.3 Onsite Transportation Procedures

Safe to move DMM and MEC items that may be moved to the temporary ATF Type II HD 1.1 storage magazine or to the demolition site may be hand carried in the position found or will be moved by vehicle. All vehicle movements of DMM/MEC will comply with the requirements of SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Railcar.

Explosive donor charges will be delivered by a commercial explosives vendor properly licensed in accordance with NAVSEA SW020-AF-HBK-010, Motor Vehicle Driver and Shipping Inspector's Manual for Ammunition, Explosives, and Related Hazardous Materials. Explosives will be delivered directly to the MRA work area as needed and immediately will be prepared and used to perform detonation of recovered MEC. Donor charges will not be stored onsite.

6.3.4 Vehicle Requirements

Vehicles transporting DMM and MEC on the project site must comply with NAVSEA SW023-AG-WHM-010, On-Station Movement of Ammunition and Explosives by Truck and Rail, and the following requirements:

- Vehicles transporting explosives must be marked with appropriate placards when carrying all Class 1 explosives.
- All vehicles transporting explosives must be equipped with reliable communications, a first-aid kit, and two 10-lb type-BC fire extinguishers.
- Vehicles transporting explosives must be inspected daily when in use, and the inspections must be documented using a Motor Vehicle Inspection Form.
- Vehicles transporting explosives must be operated by a qualified driver with a Commercial Drivers License that includes a Hazardous Materials Endorsement.

6.4 MEC and MPPEH Disposition Processes

Arrangements for delivery of explosives to countercharge discovered MEC have been made with a local explosives distributor and the explosives will be delivered within 24 hours of event. Commercial explosives will not be stored onsite.

In accordance with NAVSEA SW020-AF-HBK-010, Third Edition, the vendor will be required to comply with the licensing requirements of state and local motor vehicle laws. Explosives will be accounted for in writing, from date of receipt to final disposition. An inventory will be maintained that demonstrates the initial receipt of explosives, any discovery of a discrepancy in the quantities on hand versus quantities on inventory, and final disposition (for example, return to distributor or destruction).

6.4.1 Detonation of MEC at MRS

When MEC and/or MPPEH are discovered and are not safe to transport, and the area can withstand a high-order detonation, these materials will be disposed of by detonation where found, or by blow-in-place (BIP). Engineering controls for blast/fragment mitigation may be required, including the evacuation of personnel and protection of property; construction of protective works such as trenching, barricades, or buttresses to protect fixed facilities;

and/or tamping the shot with earth and sand to reduce fragmentation. UXO personnel will follow the protection procedures for personnel and property, and determine the best methods to be used, and will advise the SUXOS of any coordination or assistance required to effect final disposal. Only pre-approved DDESB-approved engineering controls will be used.

The danger area will be marked off and evacuated. Individuals temporarily occupying facilities (i.e., Buildings 335, 331, 332, 547, 858, 859, 860, 68B and Hangar 13) will be notified of all MEC-related activity and will be vacated when necessary based on the established EZ.

6.4.2 Detonation of MEC at Planned Demolition Area

MEC item(s) determined by the SUXOS and UXOSO as safe to move but not safe to transport for offsite disposal and have been moved for temporary staging in an ATF Type II HD 1.1 Outdoor Storage Magazine will be disposed of by detonation at the MEC demolition location shown on Figures C-1 and C-2.

To safely perform planned detonation of recovered DMM at the MEC demolition location as shown on Figures C-1 and C-2, it will be necessary to utilize engineering controls to reduce the blast effects to acceptable levels. The selected engineering control is sandbag mitigation, which will be implemented in accordance with DDESB TP 16 and HNC-ED-CS-S-98-7, *The Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions*. For the intentional detonation with sandbag mitigation of up to ten 20-mm projectiles laid side by side, an ESQD of 200 feet, will be implemented. Appendix B-2 provides the detailed risk assessment and engineering controls and ESQD calculations.

MPPEH will be inspected by two UXO Technician IIIs. These inspectors will be independent of each other but the inspection may be done simultaneously. This inspection will be done in accordance with NAVSEA OP 5, Vol. 1, Paragraph 13-15. MPPEH will be stored in the ATF Type II magazine and will be destroyed with the MEC/DMM.

6.4.2.1 Treatment of 2.75-inch Rocket

Acceptable to move 2.75-inch rocket warheads may be treated by utilizing the Buried Explosion Module (BEM). The munition-specific values provided in DDESB TP 16 Revision 3 do not agree with the May 24, 2011 Fragmentation Database. The fragment weight, fragment velocity, and single TNT equivalent weight for the M151 and Mk 64 rocket warhead from the May 24, 2011 Fragmentation Database may be entered in the User Defined mode.

The BEM (Appendix B-3) dictates that the MEC item will be buried no shallower than 3.51 feet in order to achieve a MFD of 0 feet. Nevertheless, a 200-foot ESQD will be maintained when treating 2.75-inch rockets.

6.4.2.2 Treatment of MEC other than 2.75-inch Rocket

Based on the engineering controls calculations and referencing Table 7, HNC-ED-CS-S-98-7, an enclosure with 24 inches of sandbags on the roof and walls would have a maximum sandbag throw of 135 feet and would require an ESQD arc of 200 feet. The IBD ESQD arc is shown on Figures C-1 and C-2.

6.4.3 MPPEH

A systematic approach will be used for collecting, inspecting, and segregating site debris. The approach is designed so that materials undergo a continual evaluation/inspection process from the time they are acquired until the time they are removed from the site. Site debris will be classified and segregated into one of two categories: 1) MEC/ MDEH or 2) MDAS.

Segregation procedures begin at the time the item is discovered by the UXO Technician. At this point, the UXO Technician makes a preliminary determination as to the classification of the item. If the item is identified as MDAS, it is placed at a temporary MDAS accumulation point located within the current operating grid. MDAS that is characterized by two UXO III Technicians will be processed in accordance with NAVSEA, 2010 OP 5. If the item is identified as MEC/MPPEH, it is handled as described in Sections 6.4.1 and 6.4.2.

MDAS will be inspected, demilitarized as necessary, certified, and verified as free of explosive hazards pending disposition instructions from the Navy DRMO located at NAS Jacksonville. MDAS material will be documented on DD Form 1348-1.

6.5 Explosive Soil

Not Applicable

6.6 Contaminated Buildings

Not Applicable

6.7 Operational Risk Management

An operational risk management analysis will be performed in accordance with the matrix provided in NOSSAINST 8020.15C, Explosive Safety Review (NOSSA, 2011), Section 6.7. Table 6-4 evaluates each individual process before and after hazard mitigation techniques.

TABLE 6-4
Hazard Analysis Matrix

Process Step	Hazard	Triggering Event	Initial Risk Index[1]	Hazard Mitigation	Final Risk Index
1	MEC Avoidance	MEC to direct impact	D/III/4	UXO Tech escort all non-UXO tech personnel and all non-UXO Tech personnel will have 3R Training	D/IV/5
2	Manual MEC removal operations	MEC reacts to impact or movement during soil removal	C/II/3	Initial mechanized excavation beside anomaly; final excavation with hand tools	D/IV/5
3	Transportation of MEC/DMM/MPPEH	MEC reacts to direct impact, or shock	C/II/2	Item determined acceptable to move. Item packed in sand in a wooden box. If item is electrical initiated or electrically fuzed it will be wrapped in tin foil and placed in a closed metal container (CMC)	D/III/4
4	MPPEH Processing	MPPEH reacts to impact during handling	C/II/4	MPPEH will be certified and verified as MDAS prior to Mechanical Operations for shredding by two UXO Tech III	D/IV/5
5	DMM Storage	DMM reacts to shock, fire, and impact	C/I/2	ATF Type II HD 1.1 Portable Magazine with fire break site IAW NASEA OP5	D/III/5
6	Recovered MEC treatment by Open Detonation	MEC and donor charges react to impact, heat, friction, electro-static discharge	C/II/3	All demo personnel trained; 200-ft ESQD EZ established; all personnel will wear non-static producing ; demo ops will not take place if electrical storm ≤ 5 miles	D/II/4

1. NOSSAINST 8020.15B Table 6-4 Operational risk management codes

6.8 Contingencies

In the event a situation is encountered that prevents the primary approach discussed in this ESS from working efficiently or effectively, that activity will be suspended until a plan of action has been prepared and approved. Any amendments or corrections to the ESS will be submitted to NOSSA and DDESB as required in NOSSAINST 8020.15C.

7.0 QC/QA

7.1 QC Implementation

QC for the field activities on this project will include two primary elements: 1) field observation/audits of personnel and procedures and 2) checking equipment and instruments (e.g., geophysical sensors, two-way radios) for functioning and appropriate response prior to use, during usage and after usage. As described in Section 5.3, geophysical instruments will be checked prior to and at the conclusion of daily work to verify that they were functioning properly, and verified at the ECA.

The UXOQCS will oversee the QC activities during the munitions response. The UXOQCS will report issues to the Munitions Response QC Program Manager and the Program QC Manager, and will have the authority to stop non-compliant work. The UXOQCS will be qualified in accordance with DDESB TP18 as discussed in Section 8.2.

At least 20 QC seed items will be placed within regions where the "selected response" will be performed. All seeds will be in place prior to MEC removal operations being performed. Each seed item will be tagged with a label identifying the item as inert and providing a contract reference, a point of contact address, phone number, and a target identifier. AGVIQ-CH2M HILL personnel will perform seeding using hand or mechanical tools, depending on soil conditions. The seed locations will be checked using a hand-held analog geophysical instrument by the UXOQCS in MEC avoidance mode to confirm that no existing anomalies are present at the seed location. Once placed, the locations of all seeded items will be surveyed using hand held global positioning system (GPS) equipment. Hand held GPS equipment will fall within 3-meter accuracy. QC seed items will either be inert 20-mm projectile (or surrogate) or an inert CAI (or surrogate) and will be buried at a depth no deeper than 1 foot bgs to ensure that these items can be detected. Detection of the QC seed items will be monitored by AGVIQ-CH2M HILL and should an item not be detected, a root-cause analysis will be performed and corrective actions determined.

The UXOQCS will be responsible for implementing the QC Plan, performing peer oversight, inspections, and audits in accordance with pass/fail criteria. Pass-fail criteria identified in Table 7-1 are the basis for conformance and non-conformance to accomplishment of scope objectives. The achievement of each pass criteria with zero failures enables the next phase of the process to progress.

Inspecting and certifying MPPEH-free of explosive hazards results in a determination of MDAS prior to shipment offsite. The UXOQCS is one of the two UXO Technician IIIs who will verify 100 percent of all metal for recycling as MDAS. The UXOQCS will also confirm the proper treatment/disposal of all items and monitor the metal movement offsite to a recycler via chain-of-custody with verified witness destruction.

TABLE 7-1
QC Methods and Pass/Fail Criteria

Operation	Peer Oversight	Inspection	Audit	Pass/Fail
Site Preparation DMM/MDEH/MPPEH Holding Area, Soil Erosion Controls, Barricades, Entry Control Points	x	Conforms to Work Plan and or Standard Operating Procedures	Training Records IAW DDESB TP 18 Personnel Requirements	IAW with Work Plan criteria and ESS site plan
ICA placement and Equipment Acceptance	x	Conforms to Work Plan and or Standard Operating Procedures	Geophysicists reviews detection, selection of seed items	100% detection and selection Less than 100%; initiate Corrective Action Request
Land Survey	x	Conforms to Contractor's Standard Operating Procedures	Registered Land Survey (RLS) License verification, Equipment Check-out against know control monument for vertical and horizontal accuracy	Site boundaries achieve centimeter tolerance for traverse closure
Vegetation Reduction	x	Conforms to Contractor's Standard Operating Procedures	Training Records IAW DDESB TP 18 Personnel Requirements	Brush cut to no more than 6 inches above surface, trees greater than 6 inches in diameter remain
Surface and Subsurface Removal	x	Surface Evaluation Program	100% recovery of "blind" seed	Pass = 0 MPPEH, 0 Missed Seeds, or 0 metal > 2 inches x 2 inches; Fail = 1 missed seed, 1 MPPEH, or 1 MEC; Fail = rework of 100-foot by 100-foot grid and repeat QC process
MPPEH Processing	x	Conforms to Contractor's Standard Operating Procedures	100% verification of demilitarization methods to achieve a determination of releasable to a recycler	Visual Inspection of all surface areas, demilitarization IAW DODI 4140.62
MEC/MDEH Disposal	x	Conforms to Contractor's Standard Operating Procedures	100% verification of demilitarization	Item disposed of to remove all explosive hazard

IAW in accordance with
DODI Department of Defense Instruction

7.2 QA Implementation

The Navy RPM will arrange for independent QA oversight, which may be conducted by either Navy EOD Technology Division (NAVEODTECHDIV), a NAVFAC Atlantic Munitions Response Program (MRP) specialist, or the Navy Region Southeast Explosive Safety Officer.

The ESS, Site Work Plan, Site Safety and Health Plan, Standard Operating Procedures, Environmental Protection Plan, and Quality Assurance Project Plan will be reviewed for compliance.

8.0 Technical Support

8.1 EOD

The nearest EOD Team that is available for technical support and/or emergency response is the Navy EOD Mobile Unit 6, Platoon Mayport at Naval Station Mayport, Florida. The EOD platoon contact phone number is (904) 270-5412.

8.2 UXO Contractor

While performing contractual work for the Navy, all MEC operations personnel will have been trained, qualified, and certified by their contract employer to perform MEC project tasks. All UXO Technicians will also be qualified and certified in accordance with the terms outlined by U.S. Department of Labor Employment Standards Administration Wage Hour Division for UXO Personnel, and DDESB TP-18, Minimum Qualifications for UXO Technicians and Personnel.

All employees involved in hazardous waste site activities receive 40 hours of Occupational Safety and Health Act (OSHA) Hazardous Waste Operations and Emergency Response (HAZWOPER) training. They must also have current HAZWOPER 8-Hour Refresher Training prior to working on the site. Any site worker entering the site will be required to have current HAZWOPER training.

All personnel who handle MEC/DMM will be certified in accordance with the Safe Explosive Act of 2003 and will be in process of or has received the Department of Justice /ATF Certification as a "Responsible Person" or Employee Possessor.

The UXO contractor will be licensed in the State of Florida to perform demolitions. UXO contactor will provide personnel with a Florida Blasters license.

Documentation of the above will be available for review.

A SUXOS, UXOSO and UXOQCS will be onsite during all munitions response activities. When permitted, the duties of the UXOSO and UXOQCS may be accomplished by one individual. Under no circumstances will the SUXOS also serve as either the UXOQCS or the UXOSO.

8.3 Physical Security

During munitions response activities, access restrictions apply by placing high visibility signs and or fences around the perimeter of the work area.

9.0 Environmental, Ecological, Cultural, and/or Other Considerations

9.1 Regulatory Statue, Phase, and Oversight

NAVFAC SE/ BRAC PMO SE will conduct this MEC response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) framework, as is consistent with DoD policy. OPNAVINST 8020.14, Department of the Navy Explosives Safety Policy (OPNAV, 1999), requires that all response actions involving real property known or suspected to contain military munitions have approved plans and/or appropriate documentation in accordance with an established process.

In addition, the response action is taken under the delegated authority of the Office of the President of United States by Executive Order (EO) 12580. This EO authorizes the Navy to conduct and finance removal actions. This removal action is also appropriate based on several of the applicable factors under 40 CFR Part 300.415(b)(2). The Navy is the lead agency for this action, and NAVFAC SE is the contracting agency responsible for completing the response action.

The response action will be conducted in accordance with the following health and safety regulations and requirements, in addition to the MEC-specific regulations and requirements provided in

- *Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida, Revisions No. 00* (CH2M HILL, 2006c), *No. 01* (CH2M HILL, 2006d), and *No. 02* (CH2M HILL, 2007)
- *Work Plan for Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas at the Former NAS Cecil Field, Jacksonville, Florida, Revisions No. 00* (AGVIQ-CH2M HILL, 2010) and *No. 01* (AGVIQ-CH2M HILL, 2011)
- 29 CFR, Occupational Safety and Health Act (OSHA) Regulations: Construction (29 CFR 1926) and General Industry (29 CFR 1910), applicable sections
- U.S. Corps of Engineers (USACE), 2003, EM 385-1-1, *Safety – Safety and Health Requirements*

Section 121(d) of CERCLA requires that remedial actions implemented at CERCLA sites attain any federal or more stringent state environmental standards, requirements, criteria, or limitations that are determined to be Applicable or Relevant and Appropriate Requirements (ARARs). Potential ARARs for the MEC response action at the site have been developed as part of the planning process and are discussed in detail in

- *Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida, Revisions No. 00* (CH2M HILL, 2006c), *No. 01* (CH2M HILL, 2006d), and *No. 02* (CH2M HILL, 2007)

- *Work Plan for Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas at the Former NAS Cecil Field, Jacksonville, Florida, Revisions No. 00* (AGVIQ-CH2M HILL, 2010) and *No. 01* (AGVIQ-CH2M HILL, 2011)

9.2 Environmental, Ecological, Cultural and/or Other Considerations

USACE Conceptual Permit No. 199801374 (IP-BL), June 2002, indicates that a protection plan is in place for the Eastern Indigo snake.

No cultural sites are known or suspected to be on the MRS.

9.3 Non-Explosive Soil

Non Applicable (see Section 3.4)

10.0 Residual Risk Management

10.1 Residual Risk Management

A continued munitions response from the ground surface to a depth of 1 foot is proposed for the 12-acre H860-MRS-2 and any potential future expansions, and will be completed in an approach consistent with work accomplished to date. Onsite construction support will be recommended for any future intrusive work beyond the 1-foot clearance depth in H860-MRS-2 and the potential expansion area, as needed.

11.0 Safety Education Program

11.1 Safety Education Program

NAVFAC SE/BRAC PMO SE will brief the JAA and City of Jacksonville on the site conditions, completed removal action, and any hazards and risks associated with MEC that may remain following the munitions response action. Onsite construction support will be required for any future intrusive work beyond the 1-foot clearance depth in H860-MRS-2 and the potential 42-acre expansion area, as needed.

12.0 Stakeholder Involvement

12.1 Stakeholder Involvement

The NAS Cecil Field Restoration Advisory Board, consisting of public citizens from the local community and impacted stakeholders, will be kept updated by the NAVFAC SE/ BRAC PMO SE RPM of the site conditions, proposed removal plan, and progress of the removal action.

13.0 References

The following references were consulted during the preparation of this ESS Correction. Not all are cited in the text.

AGVIQ-CH2M HILL. 2010. *Work Plan for Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas, the Former Naval Air Station Cecil Field, Jacksonville, Florida, Revision No. 00*. Prepared for NAVFAC SE. June.

AGVIQ-CH2M HILL. 2011. *Work Plan for Munitions Response for Discarded Military Munitions at Building 365 and Hanger 860 Munitions Response Areas, the Former Naval Air Station Cecil Field, Jacksonville, Florida, Revision No. 01*. Prepared for NAVFAC SE. March.

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CH2M HILL. 2006a. *Explosives Safety Submission for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida*. February.

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CH2M HILL. 2006c. *Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. Revision No. 00*. April.

CH2M HILL. 2006d. *Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. Revision No. 01*. June.

CH2M HILL. 2006e. *Project Completion Letter Report, Munitions Response for Discarded Military Munitions at Munitions Response Site 1, Hangar 860 Munitions Response Area, Former Naval Air Station Cecil Field, Jacksonville, Florida*. December.

CH2M HILL. 2007. *Work Plan Addendum No. 23 for Munitions Response for Discarded Military Munitions at Hangar 860, Former Naval Air Station Cecil Field, Jacksonville, Florida. Revision No. 02*. May.

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CH2M HILL 2010b. *Notification of MEC Find with Fragmentation Distance Larger than Currently Approved by ESS - Hangar 860 MRS, Former NAS Cecil Field, Jacksonville, FL*. August 27, 2010.

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DDESB. 2005. Technical Paper 16, Methodologies for Calculating Primary Fragment Distances. October 17.

DDESB TP-16 *Methods for Predicting Primary Fragmentation Characteristics*.

DDESB TP-18 *Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel*.

Department of Justice, Explosive Safety Act. 2003. July.

NAVSEA 8020.7C. *Hazards of Electromagnetic Radio to Ordnance Safety Program*. 1999. July.

NAVSEA. 2001. SWO20-AG-WHM-010, *On-Station Movement of Ammunition and Explosives by Truck and Railcar*. January 15.

NAVSEA. 2010. Ordnance Publication 5 Volume 1, *Ammunition and Explosives Ashore: Safety Regulations for Handling, Storing, Production, Renovation, and Shipping of Ammunition and Explosives Ashore, Revision 7, Change 9*.

NAVSEAINST 8020.9B, *Ammunition and Explosives Personnel Qualification and Certification Program*.

NOSSA. 2011. Instruction 8020.15C, *Military Munitions Response Oversight Program*.

Office of the Chief of Naval Operations (OPNAV). 1999. Office of the Chief of Naval Operations Instruction (OPNAVINST) 8020.14, *Department of the Navy Explosives Safety Policy*.

TtNUS. 1999. *Environmental Baseline Survey for Transfer, Jacksonville Port Authority Parcel, Naval Air Station Cecil Field, Jacksonville, Florida*. Prepared for NAVFAC EFD SOUTH. August.

Title 29 Code of Federal Regulations, Labor, Subtitle B, Regulations Relating to Labor, Chapter XVII, Occupation Safety and Health Administration, Department of Labor.

Title 29 Code of Federal Regulations, Labor, General Industry.

Title 40 Code of Federal Regulations, Protection of Environment, Part 300, National Oil and Hazardous Substance Pollution Contingency Plan. Subpart E—Hazardous Substance Response.

United States Executive Order 12580. 1987. 52 FR 2923, 3 CFR, 1987 Comp., p. 193. January 23.

U.S. Army Corps of Engineers, 2003, EM 385-1-1, *Safety – Safety and Health Requirement.*

U.S. Army Corps of Engineers, June 2002. Conceptual Permit No. 199801374 (IP-BL).

APPENDIX A

Signature Page

NAVFAC Project		BRAC PMO Project	
Project name:		Project name: Execution of a Selected Response for DMM, Hanger 860 MRA Former NAS Cecil Field Jacksonville, Florida	
Explosive Safety Officer or UXO Contractor Safety Officer		**Explosive Safety Officer or UXO Contractor Safety Officer**	
Signature		George DeMetropolis Digitally signed by George DeMetropolis DN: cn=George DeMetropolis, o=CH2M HILL, ou, email=George.DeMetropolis@ch2m.com, c=US Date: 2011.09.14 04:06:46 -10'00' Signature	
Printed name	Date	Printed name	Date
Public Works Office Planning Department		**Program Management Office Planning Department**	
Signature		Signature MARK E. DAVIDSON	9/15/2011
Printed name	Date	Printed name	Date
Remedial Project Manager		**Remedial Project Manager**	
Signature		Signature ARTHUR SANFORD	9/15/11
Printed name	Date	Printed name	Date

APPENDIX B-1

Fragmentation Data Review Forms

Fragmentation Data Review Form

Database Revision Date 5/24/2011

Category:	Surface-Launched HE Rounds	DODIC:	H841
Munition:	2.75 in M151 & Mk 64		
Case Material:	Iron, Pure	Date Record Created:	3/4/2008
		Record Created By:	HH
Fragmentation Method:	Naturally Fragmenting	Last Date Record Updated:	2/18/2010
Secondary Database Category:	Rocket	Individual Last Updated Record:	SDH
Munition Case Classification:	Robust	Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	Composition B
Explosive Weight (lb):	2.3
Diameter (in):	2.7500
Cylindrical Case Weight (lb):	6.05350
Maximum Fragment Weight (Intentional) (lb):	0.0463
Design Fragment Weight (95%) (Unintentional) (lb):	0.0086
Critical Fragment Velocity (fps):	5677

Overpressure Distances

TNT Equivalent (Pressure):	1.16
TNT Equivalent Weight - Pressure (lbs):	2.668
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	25
Public Traffic Route Distance (2.3 psi); K24 Distance:	33
Inhabited Building Distance (1.2 psi), K40 Distance:	55
Intentional MSD (0.0655 psi), K328 Distance:	455

Required Sandbag Thickness

TNT Equivalent (Impulse):	1.14
TNT Equivalent Weight - Impulse (lbs):	2.622
Kinetic Energy 10^6 (lb-ft²/s²):	0.7461
Required Wall & Roof Sandbag Thickness (in)	24
Expected Maximum Sandbag Throw Distance (ft):	125
Minimum Separation Distance (ft):	200

Distribution authorized to the Department of Defense and U.S. DoD contractors only for Administrative-Operational Use (17 October 2002). Other requests shall be referred to the Chairman, Department of Defense Explosives Safety Board, Room 856C, Hoffman Building I, 2461 Eisenhower Avenue, Alexandria, VA 22331-0600.

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	258
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	1348
MFD-V [Maximum Fragment Distance, Vertical] (ft):	1067

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	7.14	3.24
Mild Steel:	1.34	0.62
Hard Steel:	1.10	0.51
Aluminum:	2.76	1.34
LEXAN:	6.79	4.23
Plexi-glass:	5.12	2.73
Bullet Resist Glass:	4.30	2.14

Water Containment System and Minimum Separation Distance:

TNT Equivalent (Impulse):	1.14
TNT Equivalent Weight - Impulse (lbs):	2.622
Kinetic Energy 106 (lb-ft²/s²):	0.7461
Water Containment System:	1100 gal tank
Minimum Separation Distance (ft):	200

Item Notes

Fragmentation Data Review Form

Database Revision Date 5/24/2011

Category:	Surface-Launched HE Rounds	DODIC:	A890
Munition:	20 mm M56A4		
Case Material:	Steel, Mild	Date Record Created:	11/9/2006
		Record Created By:	MC
Fragmentation Method:	Naturally Fragmenting	Last Date Record Updated:	1/11/2009
Secondary Database Category:	Projectile	Individual Last Updated Record:	SDH
Munition Case Classification:	Robust	Date Record Retired:	

Munition Information and Fragmentation Characteristics

Explosive Type:	H-764 (RDX)
Explosive Weight (lb):	0.0264
Diameter (in):	0.7874
Cylindrical Case Weight (lb):	0.10516
Maximum Fragment Weight (Intentional) (lb):	0.0034
Design Fragment Weight (95%) (Unintentional) (lb):	0.0017
Critical Fragment Velocity (fps):	3064

Overpressure Distances

TNT Equivalent (Pressure):	1.46
TNT Equivalent Weight - Pressure (lbs):	0.039
Unbarricaded Intraline Distance (3.5 psi), K18 Distance:	6
Public Traffic Route Distance (2.3 psi); K24 Distance:	8
Inhabited Building Distance (1.2 psi), K40 Distance:	14
Intentional MSD (0.0655 psi), K328 Distance:	111

Required Sandbag Thickness

TNT Equivalent (Impulse):	1.3
TNT Equivalent Weight - Impulse (lbs):	0.034
Kinetic Energy 10^6 (lb-ft²/s²):	0.0160
Required Wall & Roof Sandbag Thickness (in)	12
Expected Maximum Sandbag Throw Distance (ft):	25
Minimum Separation Distance (ft):	200

Theoretical Calculated Fragment Distances

HFD [Hazardous Fragment Distance: distance to no more than 1 hazardous fragment per 600 square feet] (ft):	65
MFD-H [Maximum Fragment Distance, Horizontal] (ft):	535
MFD-V [Maximum Fragment Distance, Vertical] (ft):	427

Minimum Thickness to Prevent Perforation

	Intentional	Unintentional
4000 psi Concrete (Prevent Spall):	1.86	1.00
Mild Steel:	0.36	0.20
Hard Steel:	0.30	0.16
Aluminum:	0.80	0.45
LEXAN:	3.04	2.11
Plexi-glass:	1.77	1.10
Bullet Resist Glass:	1.33	0.80

Water Containment System and Minimum Separation Distance:

TNT Equivalent (Impulse):	1.3
TNT Equivalent Weight - Impulse (lbs):	0.034
Kinetic Energy 106 (lb-ft²/s²):	0.0160
Water Containment System:	5 gal carboys/ inflatable pool
Minimum Separation Distance (ft):	200/200

Item Notes

APPENDIX B-2

Risk Assessment and Engineering Controls and Calculations

Risk Assessment and Calculation of Engineering Controls and Explosives Safety Quantity Distance
for
Detonation of Multiple Munitions with Engineering Controls
Hangar 860 and Building 365 MRA
Cecil Field, Florida

Risk Assessment

1.0 Background

Recovery of multiple discarded military munitions (DMM) has generated a need for their safe disposal. To safely detonate recovered DMM within the work area for Cecil Field it is necessary to utilize engineering controls to reduce the blast effects to acceptable levels. To develop the appropriate level of engineering controls the fragment velocity and mass must be determine for comparison with tested engineering controls that effectively reduce the blast effects to an acceptable distance. Reference (a) has the current approved explosive safety quantity distance (ESQD) arc for Cecil Field is 535-ft for an intentional detonation based on the M56A4, 20mm HE projectile (refer to Attachment B-1).

Based on an evaluation of the hazards on site, a Risk Assessment was conducted in accordance with OPNAVINST 3500.39A, Operational Risk Management and Management Guidance for the Defense Environmental Restoration Program dated September 28, 2001. The ***recommended Risk Assessment Code (RAC) for this site is RAC 4 – Minor Risk***. A review of the risk evaluation process is provided in the following paragraphs.

2.0 Hazard Severity assessment of the worst credible consequence which can result as a result of the hazard posed by a 20mm High Explosive projectile was judged to be a "***Category II***" - hazard may cause severe injury or property damage.

While a 20mm High Explosive projectile, if detonated in close proximity to an individual, could cause death or severe injury, the 20mm rounds recovered have not been fired and are not armed. For these reasons the "Hazard Severity" recommended is "Category II" – hazard may cause severe injury or property damage.

3.0 Mishap Probability that a hazard will result in a mishap or loss for this site is judged to be "***Sub-category D***" - unlikely to occur.

The following calculation of engineering controls/ESQD and Operational Hazard Analysis, in addition to the application of standard operating procedures, and use of highly experienced and trained UXO Technicians provide controls that reduce the hazard to an acceptable risk. If items with a explosive risk greater than the 20mm HE projectile are encountered this risk analysis and attached documents will be updated and submitted for further review by NOSSA and DDESB if necessary.

Calculations for Engineering Controls and ESQD

1.0 References

a. Fragmentation Data Review Form (refer to Attachment B-1)

b. Department of Defense Explosive Safety Board (DDESB) Technical Publication 16, Revision 2, Methodologies for Calculating Primary Fragment Characteristics, dated October 17, 2005

c. Department of the Army Technical Manual 43-0001-27, Army Ammunition Data Sheets – Small Caliber Ammunition, dated April 29, 1994

d. U.S. Army Corps of Engineers, Engineering and Support Center, Huntsville, Use of Sandbags for Mitigation of Fragment and Blast Effects Due to Intentional Detonation of Munitions, HNC-ED-CS-S-98-7 dated August 1998 and approved by DDESB February 23, 1999

2.0 Background

Recovery of multiple discarded military munitions (DMM) has generated a need for their safe disposal. To safely detonate recovered DMM within the work area for Cecil Field it is necessary to utilize engineering controls to reduce the blast effects to acceptable levels. To develop the appropriate level of engineering controls the fragment velocity and mass must be determine for comparison with tested engineering controls that effectively reduce the blast effects to an acceptable distance. Reference (a) has the current approved explosive safety quantity distance (ESQD) arcs for Cecil Field is 535-ft for an intentional detonation based on the M56A4, 20mm HE projectile.

3.0 Calculation of Engineering Controls

To determine the specifications for engineering controls for planned detonation activities, the munitions specific information from reference (a) and the calculation from Chapter 5, reference (b) were utilized to determine the expected maximum fragmentation weight and velocity from a detonation of (10) each, 20mm projectiles laid side by side.

The following is an excerpt from Chapter 5, of reference (b) for calculating maximum fragment ranges for multiple round detonations:

> "**Maximum Fragment Ranges**
> As indicated above, the effect of detonating stacks of munitions is to increase the fragment initial velocity by as much as a factor of 2 and to increase the fragment mass by as much as 50%."

Reference (a) provides the following data for a M56A4, 20mm HE projectile:

- Explosive Weight: 0.02640 lb
- Max Fragment Weight: 0.0034 lb
- Critical Fragment Velocity: 3,064 feet/second

Reference (a) identifies the explosive filler for the M56A4, 20mm projectile as H764 explosives. H764 explosive has an explosives equivalent of 1.3 of the TNT standard of 1.00 as listed in reference (a).

The donor charge will consist of .75-lb PETN boosters with a total explosive weight 3.75 lbs. PETN has an explosive equivalent of 1.27 of the TNT standard of 1.00 as listed in Table A-2 of reference (b).

Therefore the calculations for maximum fragment weight, expected initial velocity, and NEW are:

- The **maximum fragment weight** = 1.5 x weight from reference (a) (1.5 x 0.0034 lbs.) = **0.0051 lbs.**
- The **expected initial velocity** = 2.0 x velocity from reference (a) (2.0 x 3,064 feet/second) = **6,128 feet/second**
- **NEW** = NEW Donor (TNT Eq) + NEW Projectiles (TNT Eq.) = 3.75 (1.27) + 10(0.02640)(1.3) = **5.11 lbs. of TNT Eq**

Reference (d) has the following directions for determining the thickness of sand bags for protection:

> "To determine the minimum wall and roof thickness for a particular shell other than those found in Table 5, the approach is as follows:
>
> (1) Determine the initial fragment velocity (V_F) in ft/s, the maximum fragment weight (W_F) in pounds, and the kinetic energy ($W_F V_F^2/2$) in lb-ft^2/s^2 for the particular munition.
> (2) Identify the munition with the next largest kinetic energy, from Table 6.
> (3) Use the sandbag wall and roof thickness from Table 5 for the munition with the next largest kinetic energy shown in Table 6."

Therefore the calculations for a M56A4, 20mm HE projectile are:

Kinetic Energy ($W_F V_F^2/2$) = (0.0051 x **6,128**^{2} / 2) = 95,758 or 0.095758 x 10^6 lb-ft^2/s^2

Take into account for the total NEW of the planned detonation (**5.11 lbs. of TNT Eq**) and use Table 7 of reference (d) for the NEW and the closest Kinetic Energy to determine the wall and roof thickness for sand bags, sandbag throw, and withdrawal distances. This would be either the 105mm M1 or the 4.2 inch M39A2.

A withdrawal zone is necessary for any detonation. This withdrawal zone applies to everyone, both public and operational personnel. The **withdrawal zone is the maximum sandbag throw distance, distance to a sound level of 140 decibels, or 200 feet**. For all munitions tested, the sound level at 100 feet was substantially less than 140 decibels. At 200 feet, the sound level will be even less. The withdrawal zones are also listed in Table 7 of reference (d).

According to Table 7, reference (d), an enclosure which has **24 inches of sandbags on the roof and walls**, would have a **maximum sandbag throw of 135 feet**, and would require a **ESQD arc of 200 feet**.

APPENDIX B-3

Buried Explosion Module

BURIED EXPLOSION MODULE

(Version 6.2)

Based on DDESB Technical Paper 16 Revision 3, EARTHEX software, and NSWCDD/TR-92/196

(ENGLISH UNITS)

SELECT BURIAL MEDIUM	Soil	**SELECT ITEM DESCRIPTION**	
SELECT SOIL TYPE *(See TP 16, Revision 3 for soil details)*	Dry Sand	OTHER (User Defined)	

USER DEFINED FRAGMENT CHARACTERISTICS

	FRAGMENT WEIGHT (lbs)	0.046
ENTER	FRAGMENT VELOCITY (ft/s)	5,677.00
	SINGLE ITEM TNT EQUIVALENT WEIGHT (lbs)	2.67
	ENTER TOTAL NUMBER OF ITEMS	1
	ENTER TOTAL WEIGHT OF ALL DONOR CHARGES (lbs)	1.00
	SINGLE ITEM NEW (lbs)	2.67
	SINGLE ITEM MAXIMUM FRAGMENT WEIGHT (lbs)	0.0463
	FRAGMENT WEIGHT USED IN CALCULATIONS (lbs)	0.0463
	SINGLE ITEM MAXIMUM FRAGMENT VELOCITY (ft/s)	5,677
	FRAGMENT VELOCITY USED IN CALCULATIONS (ft/s)	5,677
	TOTAL TNT WEIGHT USED (lbs)	3.97
	ENTER DEPTH OF BURIAL (ft)	3.51
	ENTER HORIZONTAL RANGE (for pressure calculation) (ft)	200

CRATER OR CAMOUFLET? ***CAMOUFLET***

CAMOUFLET CAVITY RADIUS (ft)	1.85

FRAGMENT EXIT VELOCITY (ft/s)	0.0	FRAGMENT LAUNCH ANGLE (°)	0.0

MAXIMUM FRAGMENT DISTANCE (ft)	0.0

*Distance at which pressure is 0.066 psi=	Blast Withdrawal Distance (buried/undex) (ft)*	N/A*
Open Air Withdrawal Distance, K328 (ft) = 519.4	Fragment Hazard Distance (ft) **	0.0
	Pressure at Fragment Hazard Distance (psi)	N/A*
	Pressure at Fragment Hazard Distance (dB)	N/A*
	Pressure at Range Entered (psi)	N/A*
	Pressure at Range Entered (dB)	N/A*

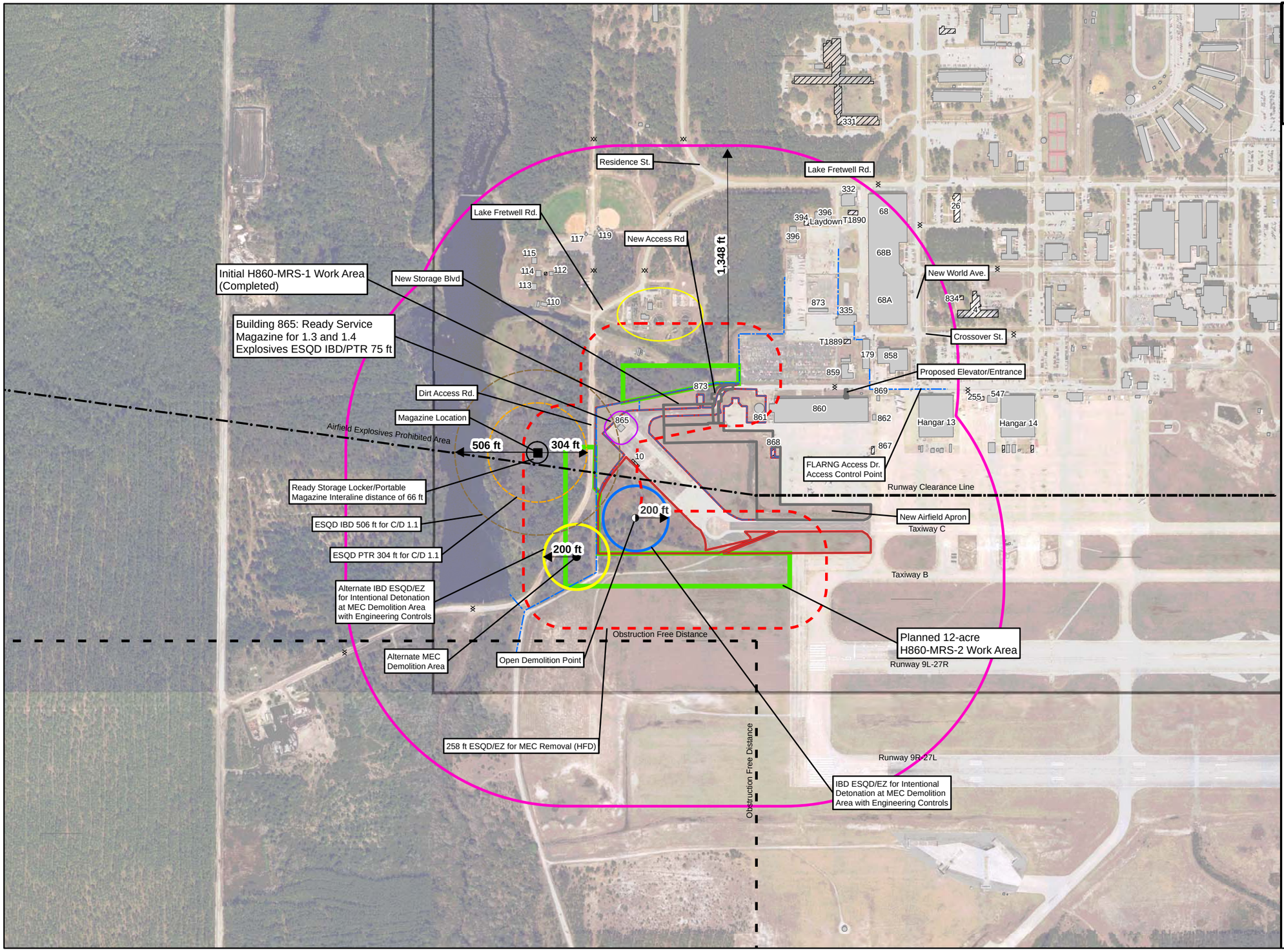
***Airblast methodology not applicable (N/A) for Camouflet conditions!**

****Depth too great--no fragments expected**

APPENDIX C

ESQD Maps

FIGURE C-1
Quantity-Distance Map for H860-MRS-2 (Initial)



Legend

- Magazine Location
- Open Demolition Point
- XX Barricaded Road Way (When Applicable EZ in Effect)
- Airfield Explosives Prohibited Area
- Obstruction Free Distance
- Runway Clearance Line
- JAA and FLARNG Fence Line
- Hanger Area Grids
- Initial MRS Work Area
- MFD for MGFD
- Existing Demolition Area
- Alternate Demolition Area
- Planned 12-acre H860-MRS-2 Work Area
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority
- 258 ft ESQD/EZ for MEC Removal (HFD)
- Demolition Structure
- Permanent Structure
- ESQD IBD 506 ft for C/D 1.1
- ESQD PTR 304 ft for C/D 1.1
- Ready Storage Locker/Portable Magazine Interaline distance of 66 ft
- Building 865: Ready Service Magazine ESQD IBD/PTR 75 ft

N
W E
S

0 300 600
Feet

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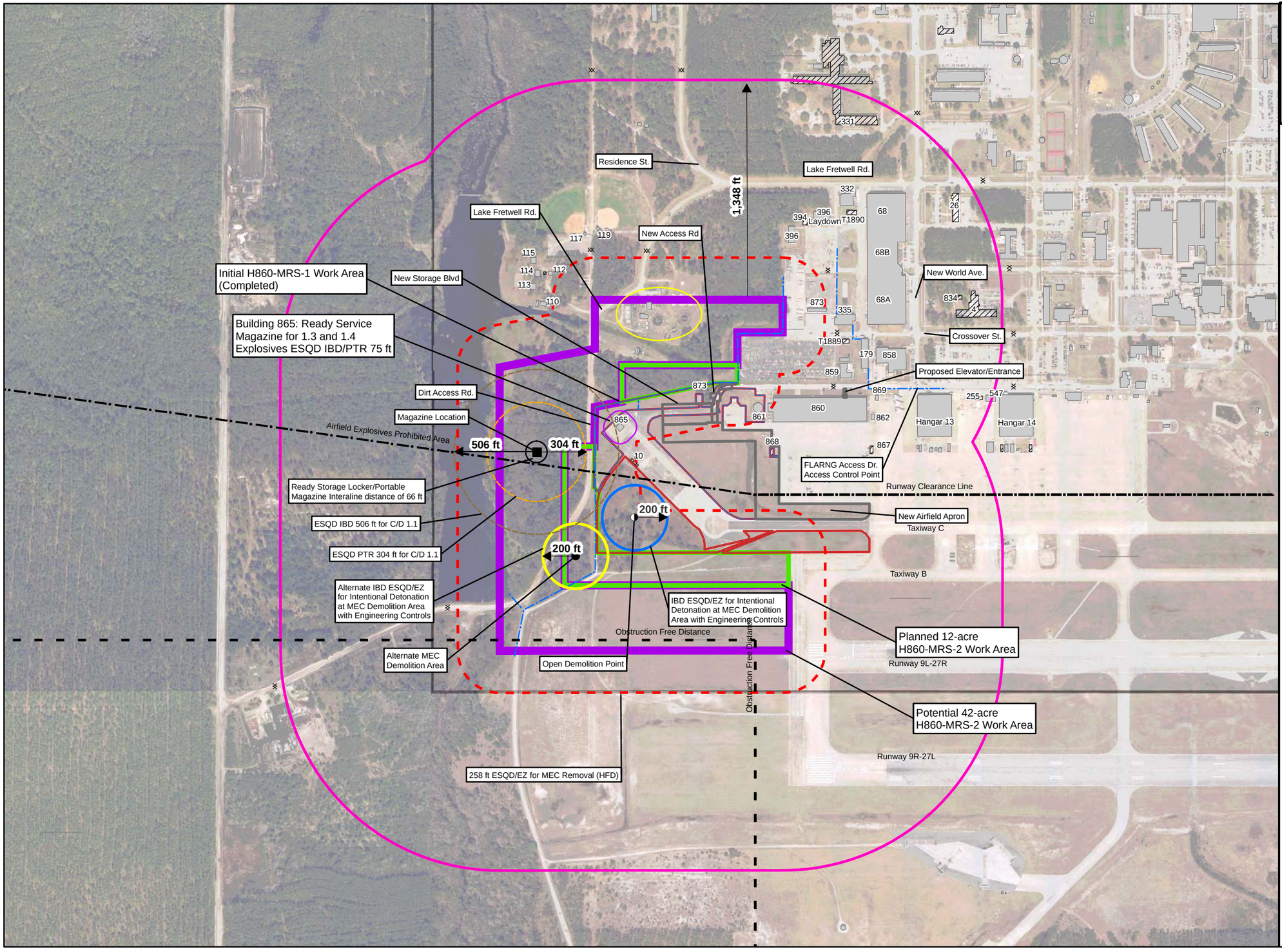
FIGURE C-2
Quantity-Distance Map for H860-MRS-2 (Maximum)



Legend

- Magazine Location
- Open Demolition Point
- XX Barricaded Road Way (When Applicable EZ in Effect)
- Airfield Explosives Prohibited Area
- Obstruction Free Distance
- Runway Clearance Line
- JAA and FLARNG Fence Line
- Hanger Area Grids
- Initial MRS Work Area
- MFD for MGFD
- Existing Demolition Area
- Alternate Demolition Area
- Planned 12-acre H860-MRS-2 Work Area
- Potential 42-acre H860-MRS-2 Work Area
- Former Water Treatment Plant: Uninhabited; Closed and Secured by the Jacksonville Electric Authority
- 258 ft ESQD/EZ for MEC Removal (HFD)
- Demolition Structure
- Permanent Structure
- ESQD IBD 506 ft for C/D 1.1
- ESQD PTR 304 ft for C/D 1.1
- Ready Storage Locker/Portable Magazine Interaline distance of 66 ft
- Building 865: Ready Service Magazine ESQD IBD/PTR 75 ft

N
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0 300 600
Feet

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