Final

RCRA Facility Investigation Report for Four Munitions Response Sites:

Anti-Aircraft Range – 4A (FTSW-009-R-01)
Anti-Aircraft Range – 4B (FTSW-009-R-02)
Anti-Tank Range 90-MM-2 (FTSW-010-R-01)
Grenade Launcher Range (FTSW-011-R-01)
at Fort Stewart, Hinesville, Georgia

Prepared for USACE, Baltimore District
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Contract No. W912DR-09-D-0005, Task Order No. 0005
Project No. 500064
Revision 0
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LIST OF ACRONYMS AND ABBREVIATIONS

3ID.....3rd Infantry Division
AP.....Armor-Piercing
ASCII.....American Standard Code for Information Interchange
BSEn.....Bering Sea Environmental
CB&I.....CB&I Federal Services LLC
CENAB.....USACE, Baltimore District
CERCLA.....Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR.....Code of Federal Regulations
CHE.....Chemical Warfare Material Hazard Evaluation
cm.....centimeters
CMS.....Corrective Measures Study
CMUA.....Concentrated Munitions Use Area
CS.....Confirmatory Sampling
CSM.....Conceptual Site Model
CWM.....Chemical Warfare Materiel
DERP.....Defense Environmental Restoration Program
DGM.....Digital Geophysical Mapping
DMM.....Discarded Military Munitions
DoD.....U.S. Department of Defense
DQO.....Data Quality Objective
EHE.....Explosive Hazard Evaluation
EM.....Electromagnetic
EM.....Engineer Manual
EOD.....Explosive Ordnance Disposal
ESQD.....Explosive Safety-Quantity Distance
ESV.....Ecological Screening Value
EZ.....Exclusion Zone
FTSW.....Fort Stewart
GA.....Georgia
GA EPD.....Georgia Environmental Protection Division
GPS.....Global Positioning System
HA.....Hazard Assessment
HE.....High Explosives
HHE.....Health Hazard Evaluation
HRR.....Historical Records Review
HFD.....Hazardous Fragment Distance
IBCT.....Infantry Brigade Combat Team
ISO.....Industry Standard Object
IVS.....Instrument Verification Strip
lb.....pounds
MAMMS.....Multiple Award Military Munitions Services
MC.....Munitions Constituents
MD.....Munitions Debris
MEC.....Munitions and Explosives of Concern
mg/kg.....milligrams per kilogram
MGFD.....Munition with Greatest Fragmentation Distance
mm.....millimeters
MMRP.....Military Munitions Response Program
MPPEH.....Material Potentially Presenting an Explosive Hazard
MRA.....Munitions Response Area
MRS.....Munitions Response Site
MRSPP.....Munitions Response Site Prioritization Protocol
msl.....mean sea level

mV .....millivolts
NCP .....National Oil and Hazardous Substances Pollution Contingency Plan
NFA .....No Further Action
NRL .....Naval Research Laboratory
OB/OD .....Open Burn/Open Detonation
QA .....Quality Assurance
QC .....Quality Control
RCRA .....Resource Conservation and Recovery Act
RDX .....Research Department Formula X
RFI .....RCRA Facility Investigation
RSL .....Regional Screening Level
RTS .....Robotic Total Station
RTK .....Real-Time Kinematic
SUXOS .....Senior Unexploded Ordnance Supervisor
TCRA .....Time Critical Removal Action
TNT .....Trinitrotoluene
USACE .....U.S. Army Corps of Engineers
USEPA .....U.S. Environmental Protection Agency
UXO .....Unexploded Ordnance
VSP .....Visual Sample Plan

EXECUTIVE SUMMARY

This report presents the results of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) performed at four Munitions Response Sites (MRSs) located at Fort Stewart (FTSW) in Hinesville, Georgia (GA):

- Anti-Aircraft Range – 4A (FTSW-009-R-01)
- Anti-Aircraft Range – 4B (FTSW-009-R-02)
- Anti-Tank Range 90-MM-2 (FTSW-010-R-01)
- Grenade Launcher Range (FTSW-011-R-01)

This RFI was conducted to determine the nature and extent of Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC), to determine the hazard and risk posed to human health and the environment by MEC and MC, and to collect or develop additional data for the Corrective Measures Study (CMS) if needed. CB&I Federal Services LLC (CB&I) prepared this report under contract to the U.S. Army Corps of Engineers (USACE), Baltimore District (CENAB), Multiple Award Military Munitions Services (MAMMS), Contract W912DR-09-D-0005, Task Order 0005. This work was performed in accordance with the RFI Work Plan (CB&I, 2015; 2016).

Anti-Aircraft – 4A and Anti-Aircraft – 4B are part of one former range, but were split into two MRSs due to extensive previous MEC removal actions at Anti-Aircraft – 4A. It was determined that there was no additional data needed to evaluate the nature and extent of MEC at Anti-Aircraft – 4A. Analog and digital geophysical investigations were conducted at Anti-Aircraft – 4B, Anti-Tank Range 90-MM-2, and Grenade Launcher Range to evaluate the extent of MEC.

The only potential MC source identified during the RFI was a disposal pit for munitions at the Grenade Launcher Range that was too large to remove under the scope of this RFI. Adequate characterization of the soil in this disposal pit is not possible without accessing the soil below the munitions. For this reason and because no other potential sources of MC were found, no MC samples were collected for the RFI.

The need for additional environmental sampling, as outlined in the approved work plan, was not identified during the course of RFI activities. Since environmental sampling for MC was not conducted at any of the four MRS sites, neither a comparison to screening levels nor an MC risk assessment was conducted. Therefore, comments previously received from the Georgia Environmental Protection Division (GA EPD) regarding screening levels and risk assessment procedures are not applicable to this RFI Report.

The information collected was reviewed and used to develop and refine the conceptual site models (CSMs) for potential exposures to MEC and MC. The CSMs relate the indicated sources of explosive items to potential human health and ecological receptors at the MRSs in consideration of both the current and projected future land use. These land-use scenarios were evaluated with respect to how people would interact with the land at the MRSs. The compiled information was then used to conduct an assessment of the potential explosive and environmental hazards for the site. The following summarizes the MEC findings for each MRS:

- Anti-Aircraft – 4A. This MRS has undergone development and a significant portion of the site has already been evaluated during previous investigations. Since two MEC items were found during previous investigations, exposure pathways to MEC in the subsurface are considered complete. Since no MEC was found on the ground surface and the MRS is heavily developed and maintained, exposure pathways to MEC on the surface are considered incomplete. Based on results from previous investigations, there is a 95 percent confidence that there are less than 0.026 MEC items per acre in the MRS.
- Anti-Aircraft – 4B. No MEC was found, and 12 items of munitions debris (MD) were found during the intrusive subsurface anomaly investigation. The MD was in the form of inert, practice M2 Rockets, consistent with historical training records. A sampling of digital

geophysical mapping (DGM) anomalies did not uncover burial pits near the former firing points. Since no MEC were found, exposure pathways to MEC on the surface and in the subsurface are considered incomplete.

- Anti-Tank Range 90-MM-2. No MEC was found, and 11 MD items were identified during the RFI investigation, which included 2.36-inch practice rockets, 40 millimeter (mm) and 90mm projectiles, a flare, a 25-mm TP-T cartridge, and a practice/training submunition. An unfired 25mm projectile was found on the ground surface and classified as Material Potentially Presenting an Explosive Hazard (MPPEH). Due to its recent age and condition, the 25mm projectile is not considered to be associated with historical range activities. A sampling of large DGM anomalies did not uncover burial pits near the former firing points. Due to the 25mm projectile, exposure pathways to MPPEH on the surface are considered complete. Since no MEC/MPPEH was found in the subsurface, exposure pathways to MEC/MPPEH in the subsurface are considered incomplete.
- Grenade Launcher Range. There was no evidence of MEC associated with the small arms ranges also used for grenade launchers. However, six unfired 25mm projectiles were found on the surface and classified as MPPEH. Due to their recent age and condition, they are not considered to be associated with historical range activities. The DGM investigation uncovered a subsurface disposal pit near the 120mm projectile firing point. This area can be seen as disturbed on a 1957 aerial photograph. Three MEC items were recovered, including a 250-pound General Purpose Bomb, an 8-inch M106 high explosives (HE) projectile, and a 90mm M348 HE anti-tank projectile. The pit was large enough that it could not be fully removed under the scope of this investigation, so there is potential for additional MEC to remain. Due to the 25mm projectile, exposure pathways to MPPEH on the surface are considered complete. Due to the MEC in the disposal pit, exposure pathways to MEC in the subsurface are considered complete. There are potentially complete pathways to MC in soil underneath the disposal pit if munitions casings were breached and MC released.

CONCLUSIONS

For the MRSs with complete MEC exposure pathways, it is recommended that a CMS be performed to evaluate remedial options to address MEC. For the Grenade Launcher Range, the CMS should also address potential MC releases to soil underneath the disposal pit. The conclusions and recommendations are summarized in **Table ES-1**.

Table ES-1
RFI Summary and Recommendations

MRS	MEC	MC	Recommendations
Anti-Aircraft Range – 4A (FTSW-009-R-01)	Used existing data to evaluate MEC extent. Exposure pathways to MEC in the subsurface are complete. MEC Hazard Assessment (HA) score of 545 indicating a Hazard Level of 3 (moderate potential explosive hazard condition).	No evidence of MC releases.	Conduct CMS to evaluate alternatives to address MEC in the subsurface.
Anti-Aircraft Range – 4B (FTSW-009-R-02)	No MEC found. Exposure pathways to MEC are incomplete so no MEC HA scoring performed.	No evidence of MC releases.	No Further Action
Anti-Tank Range 90-MM-2 (FTSW-010-R-01)	No MEC found, but MPPEH from recent discarding of items found. Exposure pathways to MPPEH on the ground surface are complete. Exposure pathways to MEC are incomplete so no MEC HA scoring performed.	No evidence of MC releases.	Conduct CMS to evaluate alternatives to address MPPEH on the surface from recent discarding of munitions.
Grenade Launcher Range (FTSW-011-R-01)	MEC was found in a disposal pit and MPPEH was found on the surface from recent discarding of items. Exposure pathways to MPPEH on the ground surface and MEC in the subsurface are complete. MEC HA score 665, which results in a Hazard Level of 3 (moderate potential explosive hazard condition).	No evidence of MC releases associated with the small arms and grenade launcher ranges. MC releases may be associated with the subsurface disposal pit which could not be assessed without removing the disposal pit.	Conduct CMS to evaluate alternatives to address MPPEH on the surface from recent discarding of munitions and MEC and MC in the disposal pit near the 120mm firing point.

1.0 INTRODUCTION

This report describes the findings and conclusions of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) to characterize the nature and extent of Munitions and Explosives of Concern (MEC) and Munitions Constituents (MC) at the following four Munitions Response Sites (MRSs) located at Fort Stewart (FTSW) in Hinesville, Georgia (GA):

- Anti-Aircraft Range – 4A (FTSW-009-R-01)
- Anti-Aircraft Range – 4B (FTSW-009-R-02)
- Anti-Tank Range 90-MM-2 (FTSW-010-R-01)
- Grenade Launcher Range (FTSW-011-R-01)

This work was performed on behalf of the U.S. Army Corps of Engineers (USACE), Baltimore District (CENAB), Multiple Award Military Munitions Services (MAMMS) Contract W912DR-09-D-0005, Task Order No. 0005. This work was performed in accordance with the RFI Work Plan (CB&I Federal Services LLC [CB&I], 2015; 2016).

The U.S. Department of Defense (DoD) has established the Military Munitions Response Program (MMRP) to address DoD sites suspected of containing MEC or MC. Pursuant to the DoD Manual for Defense Environmental Restoration Program (DERP) Management (DoD, 2012), DoD primarily conducts MMRP response activities in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 U.S. Code §9620), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] Part 300). At FTSW, this work is performed under RCRA (42 U.S. Code §6901 et seq [1976]) rather than CERCLA. While not all MEC or MC constitutes RCRA or CERCLA hazardous substances, pollutants, or contaminants, the DERP statute provides the DoD with the authority to respond to releases of MEC and MC. DoD policy states that such responses shall be conducted in accordance with RCRA, CERCLA, and the NCP.

The RFI was developed and performed in accordance with FTSW's RCRA Part B Permit No. HW-045 (S) issued by the Georgia Environmental Protection Division on August 14, 2007. This permit will be in force until the renewal and/or permit modification on August 14, 2017. The U.S. Environmental Protection Agency (USEPA) Region 4 has deferred its involvement on this project and empowered the state with regulatory authority.

1.1 PURPOSE AND SCOPE

The overall purpose of this work is to conduct an RFI due to the potential presence of MEC and MC at four FTSW MRSs: Anti-Aircraft Range – 4A (FTSW-009-R-01), Anti-Aircraft Range – 4B (FTSW-009-R-02), Anti-Tank Range 90-MM-2 (FTSW-010-R-01), and Grenade Launcher Range (FTSW-011-R-01). More specifically, the objective of the RFI is to:

- Determine the nature and extent of MEC
- Determine the nature and extent of MC
- Determine the hazards and risk posed to human health and the environment by MEC and MC

Additionally, the data collected for this RFI will be used to support site-specific recommendations of no further action (NFA) or the preparation of a Corrective Measures Study (CMS), where applicable.

1.2 PROBLEM IDENTIFICATION

A variety of ground-based training has reportedly occurred at the four FTSW MRSs included in this RFI. Therefore, MEC in the form of unexploded ordnance (UXO) or discarded military munitions (DMM) could potentially be present, as well as MC in concentrations posing a risk to human health or the environment.

1.3 PHYSICAL SETTING

1.3.1 Location

FTSW is located in Hinesville, GA, approximately 40 miles southwest of Savannah, GA (**Figure 1-1**). FTSW is 279,081 acres in size and covers portions of Bryan, Evans, Liberty, Long, and Tattnall counties (**Figure 1-2**). The Installation, which is the largest Army installation east of the Mississippi River, is bisected by Georgia Highway 119 and Georgia Highway 144.

- Anti-Aircraft Ranges – 4A (FTSW-009-R-01) and 4B (FTSW-009-R-02). The Anti-Aircraft Range – 4A consists of 465 acres where MEC investigations and removals were previously performed by CENAB. The Anti-Aircraft Range – 4B represents the 663 acres that remain undeveloped. These MRSs are shown on **Figure 1-3**.
- Anti-Tank Range 90-MM-2 (FTSW-010-R-01). The Anti-Tank Range 90-MM-2 is a 546-acre MRS as shown on **Figure 1-4**. Anti-Tank Range 90-MM-2 is a separate MRS surrounding a RCRA permitted landfill known as Anti-Tank Range 90-MM (FTSW-003-R-01) MRS. Both Anti-Tank Range 90-MM and Anti-Tank Range 90-MM-2 were the same historical ranges. It was decided that Anti-Tank Range 90-MM will continue to be monitored as part of the landfill under the RCRA program and NFA be taken under the MMRP. Therefore, the Anti-Tank Range 90-MM-2 represents a new MRS that excludes the landfill.
- Grenade Launcher Range (FTSW-011-R-01). The Grenade Launcher Range is a 143-acre MRS as shown on **Figure 1-5** that was used for anti-aircraft, anti-tank, grenade launcher, and small arms training during the 1940s.

1.3.2 Topography

The majority of FTSW consists of flat land, with surface elevations varying from approximately 2–30 meters above mean sea level (msl). In the northwestern portion of the FTSW, the topography consists of gently rolling hills with elevations ranging from 30 to 55 meters above msl (Arcadis/Malcolm Pirnie, 2011). The MRSs included in this RFI consist of relatively flat terrain (**Figure 1-6**).

1.3.3 Climate

The climate at FTSW is classified as humid subtropical, and the region is characterized by well-defined seasons with hot, humid, summers, and mild winters. The National Oceanic and Atmospheric Administration identified the average annual precipitation for Fort Stewart, GA, as 48.32 inches, with November as the driest month and July as the wettest month.

1.3.4 Geology and Soils

FTSW lies within the Southern Coastal Plain physiographic province. The province is characterized by a wedge of gentle, southeast-dipping, clastic sediments approximately 2,300 meters thick, which cover crystalline basement rock. The unconsolidated clastic sediments, consisting of sand, silt, and clay, thicken in an easterly direction. Metamorphic basement rocks are located underneath the clastic sediments. This basement complex consists of metamorphic and igneous rocks ranging in age from Precambrian to Triassic. The basement complex dips coastward at about 5.7 meters per kilometer from the Fall Line, which is located near Macon and Augusta, GA, to near the surface in the Savannah, GA, area (Arcadis/Malcolm Pirnie, 2011).

The most common soil series at FTSW are Ellabelle loamy sand, Ogeechee, Pelham, Stilson, Rutlege, Leefield, and Mascotte (**Figure 1-7** and **Figure 1-7a**). All soils identified on FTSW are described as being poorly drained. The majority of the soils present contain a sandy surface layer overlying subsurface soil that may consist of sand, clay, loam, or a combination thereof. There is a general lack of cohesive clays in the surface soils. As such, these soils are prone to erosion. However, the MRSs are not highly eroded because the terrain is relatively flat and well vegetated.

1.3.5 Vegetation

Within FTSW, four types of ecosystems are present: sand hills, pine flatwoods, upland forests, and wetlands. The breakdown of ecosystems at FTSW is as follows: 57 percent upland forest, 29 percent forested wetlands, and 14 percent cleared areas. The MRSs included in this RFI contain forests, wetlands, and developed areas.

Major tree species located within FTSW include longleaf pine (Pinus palustris), slash pine (Pinus elliottii), loblolly pine (Pinus taeda), tupelo (Nyssa sylvatica), other gums (Nyssa spp.), water oak (Quercus nigra), and bald cypress (Taxodium distichum) (Arcadis/Malcolm Pirnie, 2011).

Approximately 82,148 acres of wetlands have been identified on FTSW, which represent approximately 30 percent of the total area. Wetland types identified at FTSW include black water swamps, bay forests, stream head pocosins, wet pine flat woods, and cypress-gum swamps. Wetlands and water features are shown on **Figure 1-8**.

1.3.6 Hydrogeology

The FTSW area is underlain by Coastal Plain strata that constitute the following three major aquifer systems in order of descending depth: the surficial aquifer system, the Brunswick aquifer system, and the Floridan aquifer system (USGS, 2011).

The surficial aquifer system consists of interlayered sand, clay, and thin limestone beds. At FTSW, the surficial aquifer consists of an unconfined zone extending to depths between 20 and 40 feet, and a confined zone between depths of 50 and 90 feet. The surficial aquifer system is separated from the underlying Brunswick aquifer system by a confining unit consisting of silty clay and dense, phosphatic limestone (USGS, 2011).

The Brunswick aquifer system consists of upper and lower water-bearing zones of sand and limestone, separated by a 70-foot-thick confining unit consisting of clay and sand. The Brunswick aquifer system is separated from the underlying Floridan aquifer system by a confining unit consisting of layers of silty clay and dense phosphatic dolomite (USGS, 2011).

The Floridan aquifer system is composed of carbonate rocks of varying permeability that are separated into several water-bearing zones by layers of relatively dense limestone that act as semi-confining units. The Floridan aquifer system is the principal source of water at FTSW, with 20 wells completed in the Upper Floridan Aquifer (USGS, 2011). These wells range in depth from 500 to 800 feet and are cased to depths of 400 to 470 feet (Arcadis/Malcolm Pirnie, 2011).

1.3.7 Beneficial Resources

Specific beneficial resources include various aquatic habitats that provide fish and crustaceans for human consumption, wetland habitats, and water recreational areas. FTSW has a number of natural or man-made ponds and lakes, the Canoochee River, Canoochee Creek and tributaries, and a number of bottomland swamps and pools. Dense growth of aquatic vegetation is typical, especially during the summer months. FTSW contains approximately 82,148 acres of wetlands, covering approximately 30 percent of the installation. Forested areas also serve as a habitat to game, which are hunted for recreation and human consumption. FTSW contains more than 158,869 acres of forested land. It also contains a large amount of grassland, which serves as a habitat to many species. FTSW acts as a home to many threatened, endangered, or special concern plants and animals. However, other than the forested areas that act as habitat, there are no known site-specific, sensitive ecological or cultural resources at any of the four MRSs included in this RFI (Arcadis/Malcolm Pirnie, 2011).

1.4 SITE HISTORY

On September 10, 1940, construction of a reservation began on the former Camp Savannah Anti-Aircraft Firing Center. The name of the reservation was changed from Camp Savannah to Camp Stewart on November 18, 1940. The reservation served as an anti-aircraft center that prepared artillery troops for deployment. During the spring of 1944, the reservation was home to 55,000 soldiers.

On November 20, 1944, the mission of training anti-aircraft units ended, and in December 1944, all training was terminated. Army ground forces units departed by April 30, 1945, and a prisoner-of-war camp was also closed. From August 6, 1945 until September 2, 1945, the reservation served as a separation center for redeployed troops. Camp Stewart was inactivated on September 30, 1945, and the reservation became the training location for the Georgia National Guard. By the fall of 1945, 2 officers, 10 enlisted men, and 50 civilian employees remained at the reservation in order to maintain the facilities.

Camp Stewart was reactivated on August 9, 1950, to support the Korean war effort. The reservation was designated as the 3rd Army Anti-Aircraft Artillery Training Center. In 1953, the mission of the reservation was expanded to include armor and tank training. On March 21, 1956, Camp Stewart was re-designated as Fort Stewart and designated a permanent Army Installation. In 1959, FTSW became an armor and artillery firing center. During the Cuban Crisis of 1962, the 1st Armored Division was relocated to FTSW. Training at FTSW peaked during this time.

Due to the need for more helicopter and light fixed wing aircraft during the Vietnam Conflict, a portion of the U.S. Army Aviation School at Fort Rucker, Alabama, was transferred to FTSW in 1966. The new mission for FTSW included helicopter pilot and helicopter gunnery training.

In 1967, the main mission for FTSW was to train Army aviators. Active duty, Reserve, and National Guard personnel were also stationed at FTSW to maintain readiness. Vietnamese helicopter pilots began training at FTSW in 1970. In 1973, all aviation training was consolidated at Fort Rucker. By 1974, FTSW became a training and maneuver area for Army and National Guard Units. Training activities included: tank, field artillery, helicopter gunnery, and small arms. In 1974, the 1st Battalion, 75th Infantry Regiment (Ranger), and the 24th Infantry Division were activated at FTSW.

Currently, FTSW, along with Hunter Army Airfield, is home of the 3rd Infantry Division (3ID). Major units located at FTSW include: 1st Brigade, 3ID; 2nd Brigade, 3ID; 3ID Artillery; 3ID Support Command; 3ID Engineer Brigade; 3/7 Cavalry; 1/3 Air Defense Artillery; 103d Military Intelligence Battalion; 123d Signal Battalion; 3d Military Police Battalion (Provisional); and 24th Corps Support Groups. The 3d Brigade, 3ID operates out of Fort Benning, GA, but often trains at FTSW. The mission of FTSW is to sustain a quality of life and reservation support at the level necessary for divisions and non-divisional, tenant, and Reserve Component units to accomplish their training missions (Arcadis/Malcolm Pirnie, 2011).

The following subsections include brief site descriptions for the FTSW MRSs addressed in this RFI report.

1.4.1 Anti-Aircraft Range – 4A (FTSW-009-R-01) and 4B (FTSW-009-R-02)

The Anti-Aircraft Range – 4A and 4B together represent the firing points and vicinity of three overlapping 40 millimeter (mm) and 90mm anti-aircraft ranges that fired to the north, with range fans extending well beyond the MRSs into the Operational Range of FTSW (**Figure 1-3**). The ranges were used for training from 1941 to 1964. The 40mm and 90mm anti-aircraft guns were fired at M2 target rockets and/or towed aerial targets. Armor-Piercing (AP) projectiles would be solid steel, while fillers used may have included Trinitrotoluene (TNT) or Comp B (TNT/Research Department Formula X [RDX] mixtures) according to technical data sheets. Use of the range for other types of munitions was not identified in historical reports.

Based on the numerous investigations performed to date, the Confirmatory Sampling (CS) (Arcadis/Malcolm Pirnie, 2011) recommended the site be divided into two MRSs. The boundaries of these two MRS are shown on **Figure 1-9** and consist of:

- Anti-Aircraft Range – 4A consisting of 465 acres where MEC investigations and removals were performed by CENAB
- Anti-Aircraft Range – 4B which includes the remainder of the MRS and represents 663 acres that are mostly undeveloped where removal actions have not occurred

1.4.2 Anti-Tank Range 90-MM-2 (FTSW-010-R-01)

The Anti-Tank Range 90-MM-2 is a 546-acre MRS (**Figure 1-10**). The eastern portion of the MRS was historically used for firing 40mm anti-aircraft and 90mm anti-tank rounds from an area that is now a motor pool and fueling station. The range was operational during the 1940s, with aerial photos of the time showing two ground scars spaced approximately 1,500 feet apart, assumed to represent the 90mm and 40mm firing positions. There was a figure-eight shaped track observed in historical photos which was part of a mounted target system used for anti-aircraft training. This area is now covered by the landfill. AP projectiles fired would be solid steel, while fillers used may have included TNT or Comp B (TNT/RDX mixtures) according to technical data sheets. Use of the range for other types of munitions was not identified in historical reports. The range fans extended well beyond the MRS and into the Operational Range of FTSW (**Figure 1-4**). The western portion of the MRS partially overlaps small arms, grenade launcher, and 120mm anti-aircraft range fans that fired from slightly south of the MRS.

As depicted on **Figure 1-10**, Anti-Tank Range 90-MM-2 surrounds a RCRA permitted landfill that is also a separate MRS known as Anti-Tank Range 90-MM (FTSW-003-R-01). Both Anti-Tank Range 90-MM and Anti-Tank Range 90-MM-2 were the same historical ranges. It was decided that Anti-Tank Range 90-MM will continue to be monitored as part of the landfill under the RCRA program and NFA be taken under the MMRP (Malcolm Pirnie, Inc., 2007). Therefore, Anti-Tank Range 90-MM-2 represents a new MRS that does not include the landfill.

1.4.3 Grenade Launcher Range (FTSW-011-R-01)

The Grenade Launcher Range is a 143-acre MRS that was used for anti-aircraft, anti-tank, grenade launcher and small arms training during the 1940s (**Figure 1-11**). Three small arms ranges (H, B, and A) consisting of numerous firing mounds are located within the MRS. Range B was also used to fire 40mm practice grenades with grenade launchers into the Range B berm, located within the MRS. A 9.2-acre infiltration course is located within Range H, which included .30-cal machine gun firing and detonations of 1-pound (lb) blocks of TNT to simulate battle conditions. A firing point for 120mm anti-aircraft projectiles was also located on the western portion of the MRS.

1.5 PREVIOUS INVESTIGATIONS AND ACTIONS

1.5.1 Historical Records Review

The Phase 2 Historical Records Review (HRR) was completed in June 2010. The HRR compiled a wide variety of documentation on known MMRP sites at FTSW into a cohesive whole. The Phase 2 HRR is a continuation of the initial HRR completed in September 2006 and covers the area recently removed from the operational footprint and no longer excluded from the MMRP. During the HRR, the MRSs included in this RFI were identified: Anti-Tank Range 90-MM-2, Anti-Aircraft Range – 4 (later to become Anti-Aircraft Range – 4A and Anti-Aircraft Range – 4B), and Grenade Launcher Range.

1.5.2 Infantry Brigade Combat Team Construction Site – MEC Quality Assurance Investigation to Depth of Detection

During construction of the Infantry Brigade Combat Team (IBCT) site in 2009 within the Anti-Aircraft Range 4A, MEC and Material Potentially Presenting an Explosive Hazard (MPPEH) were observed. A MEC quality assurance (QA) Investigation to Depth of Detection was performed by CENAB to provide guidance on a path forward for the site. From February 14–26, 2011, CENAB conducted a mag and dig investigation at areas of interest within the construction site. During the investigation, over 2000 anomalies were investigated. Items identified during this investigation are summarized in **Table 1-1**, below.

Table 1-1
Items Recovered During IBCT Construction Site QA Investigation

Item Recovered	Quantity	Classification
Point Detonating Fuze	1	MEC
M2 Target Rocket	15	MD
3.5-inch Rocket Motor	1	MD

Small arms (.50 caliber cartridges) were also found during this investigation. Based on the findings during the MEC QA investigation, it was recommended that construction continue with "low probability" construction support protocols based on the guidelines established in the DoD Explosive Safety Manual 6055.9M. In addition, further investigation was recommended at the remaining areas within the construction site (USACE, 2011a).

1.5.3 Phase 2 Confirmatory Sampling Report

The CS Report evaluated the potential presence of historical munitions at each of the four MRSs included in this RFI. MEC and MC investigations were performed in August 2010 (Arcadis/Malcolm Pirnie, 2011). The following text summarizes the findings of the Phase 2 CS at the four MRSs included in this RFI and provides the CS conclusions and recommendations.

Anti-Aircraft Range – 4 – As part of the Phase 2 CS, a magnetometer-assisted visual survey was conducted in accessible, undeveloped areas of the MRS (approximately 20 acres). During the visual survey, no MEC or MPPEH was observed. Based on the extensive work previously performed, the CS recommended the Anti-Aircraft Range – 4 be divided into two MRSs. Anti-Aircraft Range – 4A includes the areas where a majority of the investigations and removal activities were performed. Anti-Aircraft Range – 4B includes the remainder of the MRS, which is mostly undeveloped and removal actions had not occurred. Although no MEC was observed during the surveys completed during the CS, the CS Report summarized Explosive Ordnance Disposal (EOD) team responses as presented in **Table 1-2**.

Table 1-2
Items Reported During Historical EOD Reponses (Anti-Aircraft Range – 4A and 4B)

Item Recovered	Quantity	Classification
Anti-Aircraft Range – 4A		
40mm projectile	1	MD
Mortar (no type specified)	1	MD
2.75-inch rocket	1	MD
Anti-Aircraft Range – 4B		
M67 hand grenade	1	MD

In order to assess MC, four discrete surface soil samples were collected from randomly distributed locations (three on Anti-Aircraft Range 4A and one on Anti-Aircraft Range 4B). Surface soil samples were collected at depths of 0–6 inches and analyzed for aluminum, antimony, copper, lead, and zinc by USEPA Method 6010B and explosives by USEPA Method 8330B modified. All metals were detected below the Regional Screening Levels (RSLs) and the Region 4 Ecological Screening Values (ESVs). All samples were non-detect for explosives. Based on the numerous investigations performed at the Munitions Response Area (MRA) to date, the CS recommended the MRA be divided into two MRSs. The Phase 2 CS recommended both MRSs receive an RFI/CMS for MEC.

Anti-Tank Range 90-MM-2 – As part of the Phase 2 CS, a magnetometer-assisted visual survey was conducted in approximately 10 percent of the undeveloped areas within the MRS (approximately 33 acres). As presented in **Table 1-3**, one munitions debris (MD) item was recovered during the visual survey.

Table 1-3
Items Recovered During the CS at Anti-Tank Range 90-MM-2

Item Recovered	Quantity	Classification
M16A1 Anti-Personnel Mine	1	MD

In addition, several concrete pads and a concrete structure were observed within the MRS. In order to assess MC, four discrete surface soil samples were collected from randomly distributed locations. Surface soil samples were collected at depths of 0–6 inches and analyzed for aluminum, antimony, copper, lead, and zinc by USEPA Method 6010B and explosives by USEPA Method 8330B modified. Two samples were collected near the suspected firing lines; the other two samples were randomly placed. All samples were non-detect for explosives. Zinc was detected above the FTSW background level and the ESV in one sample. However, the zinc concentration is not believed to be associated with former munitions activities. All other metals were detected below the RSLs and ESVs. The Phase 2 CS recommended an RFI/CMS for MEC.

Grenade Launcher Range – As part of the Phase 2 CS, a magnetometer-assisted visual survey was conducted in approximately 10 percent of the undeveloped areas within the MRS (approximately 4 acres). During the visual survey, pop flares, empty ammo cans, and expended small arms cartridges were observed. In addition, concrete backstops were observed in the MRS. An earthen berm was present in front of portions of the backstop. Wooden target frames were also observed behind the backstop. In order to assess MC, 14 discrete surface soil samples were collected and analyzed for select metals and explosives. Of the 14 samples, 6 samples were biased to berms and firing points. The remaining eight samples were randomly located throughout the MRS. Soil samples were collected at depths of 0–6 inches and analyzed for aluminum, antimony, copper, lead, and zinc by USEPA Method 6010B and explosives by USEPA Method 8330B modified. All samples were non-detect for explosives. Lead was detected above the ESV in three samples. However, the Phase 2 CS Report concluded that since the concentrations of lead were less than an order of magnitude above the established background levels, they were likely indicative of naturally occurring conditions and not evidence of an impact of the former land use. The maximum lead concentration detected was 61.4 milligrams per kilogram (mg/kg), which is below the USEPA RSL for residential soil of 400 mg/kg.

1.5.4 Infantry Brigade Combat Team Construction Site – MEC Quality Assurance Follow-On Investigation to Depth of Detection

In April 2011, CENAB performed a Follow-On MEC investigation at the remaining areas within the construction site, which is located in Anti-Aircraft Range – 4A. From April 11–29, 2011, a mag and dig investigation was performed in areas within the construction footprint that were not covered by soil piles, buildings, pavement, etc. or areas that were not investigated during the initial MEC QA investigation (February 2011). During the investigation, over 3,300 anomalies were investigated. No MEC items were observed. Items identified during this investigation are summarized in **Table 1-4**.

Table 1-4
Items Recovered During IBCT Construction Site – MEC QA Follow-On Investigation

Item Recovered	Quantity	Classification
M2 Target Rocket	54	MD
M2 Target Rocket Motors	19	MD
81mm Practice Mortar	2	MD

Based on the findings during the MEC QA investigation, it was recommended that construction continue with “low probability” construction support protocols based on the guidelines established in the DoD Explosive Safety Manual 6055.9M (USACE, 2011b).

1.5.5 Army and Air Force Exchange Service Shoppette Highway 144 Construction Site MEC Investigation to Depth of Detection

Prior to construction of the Army and Air Force Exchange Service Mini Mart, CENAB performed a mag and dig investigation to verify that the site was safe for construction activities. From April 13–21, 2011, the MEC investigation was performed on the 5-acre construction site, which is located in Anti-Aircraft Range – 4A. During the investigation, over 350 anomalies were investigated. A small pit (1.5 feet by 2 feet by 2 feet) that contained rusted out bodies of fuze shipping containers was observed. No additional MEC/MPPEH was observed within the construction site. Based on the findings during the MEC

investigation, it was recommended that construction site continue with "low probability" construction support protocols based on the guidelines established in the DoD Explosive Safety Manual 6055.9M (USACE, 2011c).

1.5.6 Time Critical Removal Action 10th Engineer Battalion Site & Dog Kennel Site

From April through June 2011, Bering Sea Environmental (BSEn), under contract to the USACE, Baltimore District, completed a Time Critical Removal Action (TCRA) at the 10th Engineer Battalion, Dog Kennel Site, HHQ Site, and South Pond Site. All of these locations are located within the Anti-Aircraft Range – 4A. During the TCRA, one MEC item, a T91 90mm HE-T projectile, was observed. Additionally, numerous MD items were found, mostly M2 target rockets (BSEn, 2011). Items identified during this investigation are summarized on **Table 1-5**.

Table 1-5
Items Recovered During TCRA, 10th Engineer Battalion Site & Dog Kennel Site

Item Recovered	Quantity	Classification
T91 90mm HE-T Projectile	1	MEC
M2 Target Rocket Motors	Not specified	MD

1.6 CURRENT AND PROJECTED LAND USE

A large portion of FTSW consists of undeveloped, forested land and wetlands. The majority of FTSW is considered an operational area. **Figure 1-2** shows the location and current status of each of the four MRSs included in this work plan. The current and projected future land use for each MRS is discussed below.

The Anti-Aircraft Range – 4A consists of recently developed residential and industrial areas. In June 2009, the USACE Savannah District began construction on the 4th IBCT across approximately 457 acres of land within this MRS (Arcadis/Malcolm Pirnie, 2011). Facilities associated with the IBCT Site and located within the MRS include: barracks, operations facilities, tactical equipment maintenance facilities, Brigade/Battalion Headquarters facility, a dog kennel, dining facility, a physical fitness center, and family care clinic. No changes in the land use are anticipated or planned.

The Anti-Aircraft Range – 4B is mostly undeveloped, forested land. Forested areas are habitat for game which are hunted for recreation (Arcadis/Malcolm Pirnie, 2011). The wetlands (**Figure 1-8**) within Anti-Aircraft Range – 4B are fenced and restricted by signage due to the potential for MEC. The southern portion of the MRS is a non-residential portion of the cantonment area with a maintenance facility, an administration building, an EOD facility, garden plots utilized by FTSW residents, and a private equestrian club that leases from FTSW. No changes in the land use are anticipated or planned within the Anti-Aircraft Range – 4B.

The majority of the Anti-Tank Range 90-MM-2 consists of forested areas and grasslands used as wildlife habitat. The MRS is also partially comprised of the non-residential cantonment area, including a motor pool and a borrow area. The borrow area is still being used as such based on a 2014 site visit. The borrow area is expected to remain in use for the near future. The motor pool area within Anti-Tank Range 90-MM-2 site is fenced, and the cantonment area has 24-hour security (Arcadis/Malcolm Pirnie, 2011). No changes in the land use are anticipated or planned within the Anti-Tank Range 90-MM-2.

The majority of the Grenade Launcher Range consists of the recently developed, non-residential portion of the cantonment area, which includes office buildings and warehouses. There are no fences restricting access to the Grenade Launcher Range. The western portion of the MRS consists of undeveloped, forested land used as wildlife habitat. No changes in the land use are anticipated or planned within the Grenade Launcher Range.

2.0 PROJECT OBJECTIVES

The overall purpose of the work was to conduct an RFI for four MRSs at FTSW based on historical use of the MRSs and the potential presence of MEC or MC. The RFI included the following objectives:

- Determine nature and extent of MEC and MC where present
- Determine the hazard and risk posed to human health and the environment by MEC and MC
- Collect or develop additional data for the CMS, as appropriate, to determine corrective measure alternatives for mitigation, including no action

It should be noted that the Phase 2 CS did not recommend further investigation of MC. The project team (including FTSW, U.S. Army Environmental Command, and USACE) agreed that MC would be investigated only if breached munitions or munitions caches were identified during the RFI field investigations.

2.1 PRELIMINARY CONCEPTUAL SITE MODEL

The Conceptual Site Model (CSM) is intended to assist in planning, interpreting data, and communicating. The CSM is used as a planning tool to integrate information from a variety of resources, to evaluate the information with respect to project objectives and data needs, and to evolve through an iterative process of further data collection or action.

The preliminary CSMs were developed during the CS (Arcadis/Malcolm Pirnie, 2011) and modified based on guidance from USACE Engineer Manual (EM) 200-1-12 (USACE, 2012), site-specific data, and general historical information including literature reviews, aerial photographs, maps, training manuals, technical manuals, and field observations.

The CSM is broken out into three sections: Sources, Interaction, and Receptors for MEC and/or MC, with complete and incomplete exposure pathways identified for each receptor. Each section is discussed below:

- Sources. Sources are those areas where MEC or MC has entered (or may enter) the physical system. An objective of this investigation is to verify and refine these locations.
- Interactions. The hazard from MEC and/or MC arises from direct contact as a result of some human activity. Interactions describe ways that receptors come into contact with a source. For MC, this can include physical transportation of the contaminant and transfer from one media to another through various processes such that media other than the source area can become contaminated. Interactions also include exposure routes (ingestion, inhalation, and dermal contact) for each receptor. For MEC, movement is not typically significant and interaction will occur only at the source area, limited by access and activity. However, there can be some movement of MEC through natural processes such as frost heave and erosion.
- Receptors. A receptor is an organism (human or ecological) that contacts a chemical or physical agent. The pathway evaluation must consider both current and reasonably anticipated future land use, as receptors are determined on that basis. Human receptor subcategories can include authorized installation personnel, residents, contractors/visitors, recreational users, trespassers, and biota.

2.1.1 Source

A MEC source area is the location where MEC are expected to be found in the environment. A preliminary assessment of potential MEC source areas was based on information from the HRR, CENAB investigations, TCRA, and the Phase 2 CS.

Anti-Aircraft Range – 4A (FTSW-009-R-01)

The Anti-Aircraft Range – 4A consists of 465 acres where MEC investigations and removals were performed by CENAB in 2011 (USACE, 2011a,b,c; BSEn, 2011).

The Anti-Aircraft Range – 4A, together with the Anti-Aircraft – 4B MRS, represent the firing points and vicinity for three overlapping 40mm and 90mm anti-aircraft ranges that fired to the north, extending well beyond the MRSs into the Operational Range of FTSW. Activities associated with the anti-aircraft range training took place from 1941 to 1964. During range activities, M2 target rockets served as aerial targets for anti-aircraft gunners. The M2 target rocket, which simulated low-flying high-speed aircraft, was fired from a mobile launcher with a solid propellant. These rockets did not contain explosives and had a maximum range of approximately 1 mile. In addition to range activities, troops disposing of DMM (M2 target rockets, 90mm projectiles, and 40mm projectiles) close to the firing points during training exercises represented a potential source in the preliminary CSM. This is less of a concern for Anti-Aircraft Range – 4A because the majority of firing points are located within Anti-Aircraft Range – 4B.

In 2011, several MEC investigations/removal actions were performed within the Anti-Aircraft Range – 4A. During these investigations, mag and dig activities were performed within the MRS. Two MEC items were recovered (a point detonating fuze and a T91 90mm HE-T projectile). Additional MD was found, including numerous M2 target rockets, occasional 40mm and 90mm projectiles which are associated with site use, as well as isolated finds of munitions not associated with the reported range history (2.75-inch rockets, 3.5-inch rockets, and 81mm practice mortars).

With no evidence of stationary land-based targets in the site history and during previous investigations, an overall homogenous MEC distribution was confirmed. This MRS is expected to contain additional 40mm and 90mm projectiles that fell short of their targets. After investigating a high percentage of area, CENAB concluded a low probability for future exposure to MEC.

Anti-Aircraft Range – 4B (FTSW-009-R-02)

The Anti-Aircraft Range – 4B represents the 663 acres of the historical Anti-Aircraft Range – 4 that remain largely undeveloped and uninvestigated. Since both the 4A and 4B MRSs are geographically intertwined parts of the same historical range, the source of MEC and MC for the Anti-Aircraft Range – 4B MRS was primarily the same as the Anti-Aircraft Range – 4A MRS with two exceptions.

Anti-Aircraft Range – 4B contains the majority of firing points compared to 4A. Troops burying DMM (40mm anti-aircraft and 90mm anti-tank rounds) close to the firing points during training exercises was a potential source of MEC in the preliminary CSM.

A previous EOD response for a single M-67 hand grenade, found on the surface in the wooded southeast lobe of the MRS, represented a potential MEC source for additional grenades in the preliminary CSM.

Anti-Tank Range 90-MM-2 (FTSW-010-R-01)

The Anti-Tank Range 90-MM-2 is a 546-acre MRS. The eastern portion of the MRS was historically used for firing 40mm anti-aircraft and 90mm anti-tank rounds from what is now covered with a motor pool and fueling station. These 40mm and 90mm range fans extended well beyond the MRS into the Operational Range of FTSW. The western portion of the MRS partially overlaps small arms, grenade launcher, and 120mm anti-aircraft range fans that fired from slightly south of the MRS. The large areal extent and layout of the range fans and the relatively small size of the MRS near the firing points suggested that most items fired did not land within the MRS, and consequently clusters of MEC were not anticipated. Troops burying DMM (40mm anti-aircraft and 90mm anti-tank rounds) close to the firing points during training exercises was also a potential source in the CSM.

During the Phase 2 CS, an inert M16A1 anti-personnel mine was observed which did not match the historical use of the site. Due to the extensive use of FTSW, isolated finds of items not associated with the site history are occasionally observed. With no evidence of stationary land-based targets in the site history or previous investigation, overall homogenous MEC distribution was anticipated on the surface and in the subsurface. This MRS was expected to potentially contain 40mm Anti-Aircraft, 90mm Anti-Tank rounds, and potentially 120mm projectiles that fell short of their targets. Additionally, DMM in the subsurface near the firing points was also a potential source in the preliminary CSM.

Grenade Launcher Range (FTSW-011-R-01)

The Grenade Launcher Range MRS was used for anti-aircraft, anti-tank, grenade launcher, and small arms training during the 1940s. Three small arms ranges (H, B, and A) are located within the MRS, which consisted of numerous firing mounds. Range B was also used to fire 40mm practice grenades with grenade launchers. A 9.2-acre infiltration course was located within Range H, which included .30-cal machine gun firing and detonations of 1-lb blocks of TNT to simulate battle conditions. A firing point for 120mm anti-aircraft projectiles was also located on the western portion of the MRS. Due to the use of 40mm grenades at targets, the area around the target berms had the highest potential to contain MEC on the surface or in the subsurface. The remainder of the MRS, including the Infiltration Course, was used for small arms training. As such, MEC was not anticipated in those areas. DMM (120mm anti-aircraft projectiles) buried in/around the 120mm firing point was also a potential source in the preliminary CSM.

2.1.2 Activity

The hazard from MEC arises from direct contact as a result of some human activity. This human activity could be moving or somehow disturbing MEC that could cause it to detonate. This could occur during construction activities as well as maintenance and training activities at the installation. Receptors in the area could all deliberately or inadvertently disturb MEC on the surface while walking. The current and future land use of the FTSW MRSs is presented in Section 1.6.

2.1.3 Access

FTSW is readily accessible via multiple roads and access to most portions of the MRSs is controlled but not restricted. Some portions of the MRS have higher security restrictions associated with facility missions, but authorized receptors can access all portions of the MRSs.

2.1.4 Receptors

Receptors at FTSW were preliminarily identified to include residents, authorized installation personnel (including construction workers, maintenance workers, and trainees), visitors, and trespassers. The current and reasonably anticipated receptors for each MRS have been re-evaluated as part of this RFI. The revised list of receptors is provided in Section 4 as part of the revised CSM.

2.2 DATA QUALITY OBJECTIVES

Data quality objectives (DQOs) were developed for MEC in accordance with the DQO Process for Hazardous Waste Site Investigations, EPA QA/G-4HW (USEPA, 2000). **Tables 2-1** through **2-4** identify the DQO process for the four MRSs.

Table 2-1
MEC DQO Process at the Anti-Aircraft Range – 4A (FTSW-009-R-01)

Step	Data Quality Objective
1. State the problem	There is the potential for MEC in the subsurface as UXO (items that were fired on the range), although CENAB investigations determined this probability to be low (MEC QA Follow-On Investigation, 2011). Significant data are available for this MRS to describe the nature and extent of MEC. In searching approximately 200 of the 465 acres, 2 MEC items were found. Only a small portion of the firing points are located within Anti-Aircraft Range – 4A (now covered by the Shoppette); the rest of the firing points are within Anti-Aircraft Range – 4B).
2. Identify the decision	The information evaluated during the RFI will be used to assess the MEC hazards posed to human health and the environment and determine whether further action is needed.
3. Identify inputs to decision	• Historical Information • Previous Investigations • Evaluation of potential hazards associated with MEC to human health using MEC Hazard Assessment (HA)
4. Define study boundaries	The Anti-Aircraft Range – 4A consists of 465 acres where MEC investigations and removals were performed by CENAB. The MRS is bounded by the operational range to the north. The MRS boundary is as defined in the Phase 2 CS.
5. Develop a decision rule	If there is an area where an increased density of MEC/MD is evident, consider the area a Concentrated Munitions Use Area (CMUA) and determine the boundary based on a thorough analysis of historical and current aerial photography and previous investigations. If there are no CMUAs (as anticipated for the Anti-Aircraft Range – 4A based on previous investigations and because rounds fired on the range would have landed outside the MRS), then run UXO Estimator software "Analyze Field Data" module to determine whether adequate coverage was obtained at the MRS. If adequate coverage was obtained (as anticipated because 200 of 465 acres has been searched for MEC), then no further data are needed. If MEC hazards are identified, then proceed to CMS.
6. Specify limits on decisions	UXO Estimator will be used to statistically analyze previously collected data with a 95% confidence limit and a target MEC density of 0.5 MEC/acre.
7. Optimize design for obtaining data	For the Anti-Aircraft Range – 4A, there are no known CMUAs and no firing points that have not already been investigated. UXO Estimator software "Analyze Field Data" module was run to determine whether adequate coverage was obtained at the MRS, using the following inputs: 465-acre MRS, 200 acres investigated, 2 MEC found, 0.5 MEC/acre target density, and 95% confidence level. UXO Estimator calculated with 95% probability that there is less than 0.026 MEC per acre in the MRS. We can be 95% confident that there are less than 12 MEC in the 465-acre MRS. Since two were already found, we are 95% confident that there are less than 10 MEC in the remaining 265 acres that were unsearched. Based on this analysis, sufficient coverage was obtained to characterize the MRS and no additional field investigation is warranted. The RFI will include a MEC HA and will determine whether corrective measures should be evaluated in a CMS.

Table 2-2
MEC DQO Process at the Anti-Aircraft Range – 4B (FTSW-009-R-02)

Step	Data Quality Objective
1. State the problem	There is the potential for MEC on the surface or in the subsurface as UXO (items that were fired on the range) or DMM (items that were intentionally buried near the firing points).
2. Identify the decision	The information obtained during the RFI will be used to assess the MEC hazards posed to human health and determine whether further action is needed.
3. Identify inputs to decision	• Historical Information • Previous Investigations • Geophysical Investigation using analog geophysics (mag and dig) or digital geophysical mapping (DGM) (EM61-MK2) • Intrusive Investigation of anomalies • Evaluation of potential hazards associated with MEC to human health
4. Define study boundaries	The Anti-Aircraft Range – 4B represents the 663 acres that remain largely undeveloped and uninvestigated. The MRS is bounded by the operational range to the north. The RFI will be performed in the MRS boundary as defined from the Phase 2 CS.
5. Develop a decision rule	If there is an area where an increased density of MEC/MD is evident, consider the area a CMUA and determine the boundary based on a thorough analysis of historical and current aerial photography, previous investigations, and transect/geophysical data. If CMUAs are not encountered (as anticipated for the Anti-Aircraft Range – 4B because rounds fired on the range would have landed beyond the MRS in the operational ranges), then use UXO Estimator to determine sampling acreage and investigate all anomalies. If there are firing points, then collect DGM data from the firing point locations and excavate anomalies that have the potential to represent pits of buried DMM. If MEC is found, then determine the nature and extent of MEC in the area and perform a MEC HA at the MRS. If MEC hazards are identified, then proceed to CMS.
6. Specify limits on decisions	UXO Estimator will be used to statistically determine sampling area with a 95% confidence limit and a target MEC density of 0.5 MEC/acre. Geophysicists will select anomalies at firing points that represent potential DMM burial pits. Anomalies greater than 3 feet across will be the primary selection criteria. All potential pits will be evaluated. In the case where a large number of potential pits are identified, a statistical percentage of these will be investigated using the Visual Sample Plan (VSP) module.
7. Optimize design for obtaining data	For the Anti-Aircraft Range – 4B, a minimum of 5.95 acres will be investigated based on the following UXO Estimator inputs: 663 acre MRS, 0.5 MEC/acre target density, and 95% confidence level. The data will consist of analog geophysical transects distributed throughout the MRS. In areas where transects are less feasible due to buildings and roads, DGM grids will be utilized. All anomalies will be investigated. Additionally, approximately 4.6 acres of DGM is proposed to identify potential DMM burial pits. Locations that have the potential to contain pits of buried DMM will be investigated.

Table 2-3
MEC DQO Process at the Anti-Tank Range 90-MM-2 (FTSW-010-R-01)

Step	Data Quality Objective
1. State the problem	There is the potential for MEC on the surface or in the subsurface as UXO (items that were fired on the range) or DMM (items that were intentionally buried near the firing points).
2. Identify the decision	The information obtained during the RFI will be used to assess the MEC hazards posed to human health and determine whether further action is needed.
3. Identify inputs to decision	• Historical Information • Previous Investigations • Geophysical Investigation using analog geophysics (mag and dig) or DGM (EM61-MK2) • Intrusive Investigation of anomalies • Evaluation of potential risk associated with MEC to human health
4. Define study boundaries	The Anti-Tank Range 90-MM-2 is a 546-acre MRS. The MRS is bound by the operational range to the north. The Anti-Tank Range 90-MM MRS, which contains the active landfill, is not part of the MRS. The RFI will be performed in the MRS boundaries as defined from the Phase 2 CS.
5. Develop a decision rule	If there is an area where an increased density of MEC/MD is evident, consider the area a CMUA and determine the boundary based on a thorough analysis of historical and current aerial photography, previous investigations, and transect data. If CMUAs are not encountered, (as anticipated for the Anti-Tank Range 90-MM-2 because rounds fired on the range would have landed beyond the MRS in the operational ranges), then use UXO Estimator to calculate sampling acreage and investigate all anomalies. If there are firing points, then collect DGM data from the firing point locations and excavate anomalies that have the potential to represent pits of buried DMM. If MEC is found, then determine the nature and extent of MEC in the area and perform a MEC HA at the MRS. If MEC hazards are identified, then proceed to CMS.
6. Specify limits on decisions	UXO Estimator will be used to statistically determine sampling area with a 95% confidence limit and a target MEC density of 0.5 MEC/acre. Geophysicists will select anomalies at firing points that represent potential DMM burial pits. Anomalies greater than 3 feet across will be the primary selection criteria. All potential pits will be evaluated. In the case where a large number of potential pits are identified, a statistical percentage of these will be investigated using the VSP module.
7. Optimize design for obtaining data	At the Anti-Tank Range 90-MM-2, a minimum of 5.94 acres will be investigated based on the following UXO Estimator inputs: 546-acre MRS, 0.5 MEC/acre target density, and 95% confidence level. Analog geophysical transects will be placed throughout the MRS and all anomalies will be investigated. Additionally, approximately 2.3 acres of DGM is proposed to identify potential DMM burial pits. Locations that have the potential to contain pits of buried DMM will be investigated.

Table 2-4
MEC DQO Process at the Grenade Launcher Range (FTSW-011-R-01)

Step	Data Quality Objective
1. State the problem	The Grenade Launcher Range fan and area around the target berms have the potential to contain UXO on the surface or in the subsurface in the form of 40mm grenades. Burial pits near the 120mm firing point, if present, have the potential to contain DMM in the subsurface. The remainder of the MRS, including the Infiltration Course, was used for small arms training. As such, MEC is not anticipated in those areas.
2. Identify the decision	The information obtained during the RFI will be used to assess the MEC hazards posed to human health and the environment and determine whether further action is needed.
3. Identify inputs to decision	• Historical Information • Previous Investigations • Geophysical Investigation using analog geophysics (mag and dig) or DGM (EM61 MK2) • Intrusive Investigation of anomalies • Evaluation of potential risk associated with MEC to human health and the environment
4. Define study boundaries	The Grenade Launcher Range is a 143-acre MRS. The MRS is bound by the operational range to the north. The RFI will be performed in the MRS boundaries as defined from the Phase 2 CS.
5. Develop a decision rule	If CMUAs are expected (as anticipated since grenades were fired at the berm within the MRS), then use the VSP "Transect Sampling for UXO Target Traversal" module to develop the sampling plan for this portion of the MRS. If there are firing points, then collect DGM data from the firing point locations and excavate anomalies that have the potential to represent pits of buried DMM. If MEC is found, then determine the nature and extent of MEC in the area and perform a MEC HA at the MRS. If MEC hazards are identified, then proceed to CMS.
6. Specify limits on decisions	VSP "Transect Sampling for UXO Target Traversal" module with 10-meter diameter target. Geophysicists will select anomalies at firing points that represent potential DMM burial pits. Anomalies greater than 3 feet across will be the primary selection criteria. All potential pits will be evaluated. In the case where a large number of potential pits are identified, a statistical percentage of these will be investigated using the VSP module.
7. Optimize design for obtaining data	At the Grenade Launcher Range, analog geophysical transects are proposed around the grenade launcher target berm on 10-meter spacing (2.53 acres total) based on VSP. All anomalies will be investigated. In addition, approximately 1 acre of DGM is proposed to identify potential DMM burial pits. Locations that have the potential to contained pits of buried DMM will be investigated.

3.0 FIELD ACTIVITIES AND METHODOLOGY

The MEC investigation strategy that was developed and implemented for each MRS is summarized in **Table 3-1**. For the Anti-Aircraft Range – 4B, Anti-Tank Range 90-MM-2, and Grenade Launcher Range, the MEC investigation was performed initially with an analog geophysical survey over a portion of the MRS to assess MEC/MPPEH on the surface and subsurface, followed by a DGM survey and intrusive investigation of the firing points to assess the presence of burial pits containing DMM. Each element of the MEC investigation strategy is discussed in further detail below.

Table 3-1
MEC Investigation Strategy

MRS	MEC Investigation Strategy
Anti-Aircraft Range – 4A	• Utilize existing dataset
Anti-Aircraft Range – 4B	• Surface reconnaissance in the southeast lobe where a hand grenade was observed • Surface/subsurface Investigation via analog geophysical transects and DGM mini-grids guided by UXO Estimator • DGM survey and intrusive investigation of firing points
Anti-Tank Range 90-MM-2	• Surface/subsurface Investigation via analog geophysical transects guided by UXO Estimator • DGM survey and intrusive investigation of firing points
Grenade Launcher Range	• Surface/subsurface Investigation via analog geophysical transects around grenade launcher target berm guided by VSP • DGM survey and intrusive investigation of 120mm range firing point

3.1 SURFACE RECONNAISSANCE

A 100 percent surface investigation was performed using Schonstedt magnetometers on an 8-acre wooded parcel in the southeastern portion of the Anti-Aircraft Range – 4B in the vicinity of a M67 hand grenade found during a previous investigation. The surface reconnaissance was performed by a team of CB&I UXO Technicians using Schonstedt magnetometers and traversing the area on foot spaced approximately 10 feet apart. The surface reconnaissance was performed as specified in the RFI Work Plan (CB&I, 2015; 2016).

3.2 ANALOG GEOPHYSICAL SURVEY

An analog geophysical investigation was performed using Schonstedt magnetometers in order to evaluate subsurface MEC/MPPEH at the MRSs. This was conducted using handheld, analog instruments in mag and dig fashion in accordance with Section 3.2.2 of the RFI Work Plan (CB&I, 2015; 2016). Transects were placed across the MRSs based on UXO Estimator or VSP as described above in **Table 3-1**. Each transect was proposed as a straight line, although the field team deviated as needed to negotiate terrain conditions. Transects consist of one long line of analog geophysical data where the UXO Technician sweeps the magnetometer back and forth 2 feet on either side of their body giving the transect a width of 4 feet. All metallic anomalies identified on transects were excavated in accordance with Section 3.5 of the RFI Work Plan (CB&I, 2015; 2016) to identify the nature of the metallic item. Proposed transects were also adjusted to avoid sensitive or inaccessible areas.

3.3 DIGITAL GEOPHYSICAL MAPPING ACTIVITIES

DGM activities were carried out by a crew consisting of the site geophysicist and one or two assistants. Geophysical equipment included a Geonics, Ltd. EM61-MK2A subsurface metal detection system (EM61) used in conjunction with either a real-time kinematic (RTK) Global Positioning System (GPS) or a Robotic Total Station (RTS). DGM was the preferred method for identifying large anomalies such as burial pits. The DGM was performed as specified the work plan (CB&I, 2015; 2016).

3.3.1 Equipment

3.3.1.1 EM61-MK2A Geophysical Sensor

The Geonics EM61-MK2A is a four-channel, high-sensitivity, time-domain electromagnetic (EM) sensor designed to detect ferrous and nonferrous metallic objects with good spatial resolution and minimal interference from adjacent metallic features. Time-domain EM sensors work by utilizing a transmitter that generates a pulsed primary EM field, which induces currents in the earth and in nearby metallic objects.

The induced currents produce a secondary magnetic field which in turn creates secondary currents that are measured by the receiver coils of the EM61. Measurements are acquired over a relatively long time after the primary pulse at specified time gates, which allows the current induced in the ground to dissipate, leaving only the current in the metal to still produce a significant secondary field. Secondary voltages induced in the bottom and top coils are measured in millivolts (mV) by the instrument electronics and recorded at a rate of 10 Hz by a Juniper Allegro data logger.

The EM61 was designed to detect individual small items at shallow depths and relatively larger items (e.g., 155-mm projectile) at depths approaching 5 feet. The resulting data can be used to differentiate, in simplistic fashion, the relative size and distance (or depth) of metal items when the anomaly density is relatively low. In cluttered areas where the anomaly density is relatively high (e.g., burial pits, trenches, etc.) and the anomaly signatures overlap, the determination of size and distance (depth) is much more difficult.

3.3.1.2 Real-Time Kinematic Global Positioning System

Positioning information was collected with a Leica Viva GS14 RTK GPS when tree cover did not affect satellite availability. Because most of the area designated for DGM coverage was heavily wooded, the tree canopy provided an effective screen to satellite-based GPS signals. Therefore, the Leica RTK GPS system was not used in wooded areas and the RTS was used.

The Leica RTK GPS utilizes a base station (Model GS10) that is set up on a known position. Once the base station is set, it determines its location using satellites and then calculates a correction based on the offset from the known coordinates at the location. This correction is then used by a rover that is in direct communication with the base station through a radio link. The Leica RTK GPS is capable of recording survey-grade measurements in real time and providing immediate accuracy to within approximately 2 centimeters or better.

Position information in the form of a National Marine Electronics Association data message was streamed at 0.5-second intervals via serial link from the RTK GPS rover to the Juniper Allegro data logger for the EM61. This positioning information was then integrated with data from the EM61.

3.3.1.3 Robotic Total Station Positioning System

A Leica Viva TS12P RTS was used to provide positioning in areas where RTK GPS could not be used (i.e., under tree canopy).

The Leica RTS uses infrared lasers and automatic target recognition to track the location of a reflective prism and has a highly accurate distance/azimuth measurement system to produce ± 2mm accuracy. The RTS system hardware consists of three integrated components: 1) the Leica dual-laser RTS, 2) the RTS rover remote link control panel, and 3) the reflective survey prism that is tracked by the RTS base station. For the purposes of DGM, RTS position data are output as a real-time data stream from the remote link to the geophysical data logger. Position data can also be recorded to a data storage card on the RTS which can then be transferred to a field computer.

Similar to the RTK, positional information from the RTS system was streamed to the geophysical data logger at 0.5-second intervals and integrated with data from the EM61.

3.3.1.4 DGM Survey Platform

A single EM61 unit consists of two 1-meter by 0.5-meter rectangular coils arranged in a coaxial geometry, separated by 40 centimeters (cm). The unit was deployed as a standard-height (i.e., lower coil 42 cm above the ground surface), wheeled-cart system.

Depending on the positioning system being used, either the RTK GPS receiver or the RTS tracking prism was mounted on a tripod attached to and set directly above the center of the EM61 coils.

3.3.2 Survey Control

CB&I initially carried survey control onto the base from U.S. Coast and Geodetic Survey benchmarks located along the Oglethorpe Highway using RTK GPS, and used it to create a series of project control points at each of the MRSs. A Georgia-licensed Public Land Surveyor then established three independent benchmarks at each MRS to validate the project control points. Control was then expanded as necessary. Position data for the project are reported in units of meters, using the UTM Zone 17N, WGS84 coordinate system in order to maintain compatibility with existing information and data. All survey control work was performed in accordance with the RFI Work Plan (CB&I, 2015; 2016).

In addition to providing position data for the geophysical sensor measurements, the RTK GPS and RTS were used for other location tasks as follows:

- Site Feature Identification. Coordinates of surface features such as roads, utilities, fences, buildings, etc. were acquired for the purposes of mapping in order to evaluate their possible effects on the EM61 data, and to facilitate planning for the modification of some of the originally proposed survey areas.
- Anomaly/Target Reacquisition. During the first stage of target reacquisition, the RTS was used to flag the locations of interpreted targets selected for intrusive investigation. The coordinates of each target were uploaded to the RTS rover, and the "stakeout" mode was used to flag each location to an accuracy of ±0.5 foot in accordance with the RFI Work Plan (CB&I, 2015; 2016).

3.3.3 DGM Quality Control

The geophysical quality control (QC) system was designed to ensure the data are of sufficient quantity and quality to meet the project objectives. All DGM QC was performed in accordance with the RFI Work Plan (CB&I, 2015; 2016). Components of the QC system included:

- Instrument Verification Strip (IVS)
- Daily pre and post survey functional checks
- Blind seeding program (used in mini grids in the Anti-Aircraft 4A/4B MRS)
- Tracking of Performance Metrics (discussed in Section 3.3.4.3 Review of Instrument Functional Checks, below)
- Anomaly Verification (discussed in Section 3.3.7 Intrusive Anomaly Verification, below)

3.3.3.1 Instrument Verification Strip

An IVS was constructed to demonstrate functionality of the data acquisition platform and to validate the Geonics EM61-MK2 acquisition methodology proposed for the DGM activities in support of the investigation effort at the four MRS sites. The IVS location was selected as representative of the major types of geologic, soil, and surface terrain conditions present.

The IVS approach used three small industry standard objects (ISOs) to demonstrate sensor performance by comparison of the sensor response to physics-based models developed by the Naval Research Laboratory (NRL). The ISOs were also used to confirm the positioning capabilities of the Leica RTK GPS and the Leica RTS. CB&I also validated the data acquisition parameters (line spacing, sampling frequency, and positioning system accuracy and precision) by comparing the sensor response from the ISOs to standardized, physics-based models of the ISOs created specifically for munitions response projects by the NRL.

Two iterations of preconstruction EM61 surveys were completed. The first to identify subsurface metal items and the second to verify the items identified in the first survey were removed. As part of the original planning activities associated with the project, CB&I buried three items at various depths, consisting of two small ISOs in horizontal positions and a third small ISO in vertical position.

Construction and results of the IVS are discussed in detail in the IVS report (**Appendix D**, provided on CD).

3.3.3.2 Daily Pre and Post Survey Functional Checks

Functional checks of the DGM system were conducted on a daily basis, before commencing with data acquisition and after data acquisition was complete. An exception to this is the Known location check, which was performed every time either of the positioning instruments was set up. Both dynamic and static instrument functional checks were carried out during field operations. Dynamic tests were conducted by acquiring data along the IVS line and along an adjacent "background" or "noise" line. Static tests were conducted at a nearby spot determined to be free of metal. The functional checks were completed as follows:

- Known location check (occupation of survey monument, control point, or grid corner)
- Instrument warm-up
- Static background geophysical sensor check
- Static spike geophysical sensor check
- Personnel test
- Cable shake test
- IVS repeatability
- Dynamic noise test

Some of the field tests listed above were quantitatively evaluated during the initial data processing that occurs each day. The project MS Access Database documents the results of the daily tests that occurred during data processing and the results of the anomaly selection and resolution processes. The following performance metrics were used.

- Known Position Check. This test is performed every time either of the positioning systems is set up. The acceptable difference in location measurement at a control point, or survey monument was less than or equal to 0.5 foot when the DGM system positioning unit is coincident with the known location. All data conformed to this metric.
- Static Background Geophysical Sensor Check. Static background readings for the EM61 remain within 2.5 mV of background for all EM61 MK2 data channels. All data conformed to this metric.
- Static Spike Geophysical Sensor Check. The criteria for this test was based on the average of the first five instrument functional tests performed (approximately 2 days of instrument functional checks). Measurements for the response of the standard test item will be within 10 percent the average, after subtraction of the sensor baseline response. All data conformed to this metric.
- Personnel Test. The measurements for all data channels of the EM61 MK2 remain within 2.5 mV of background. All data conformed to this metric.
- Cable Shake Test. The cable shake test is performed at the beginning and end of each day to document any cable or connection problems. With the instrument motionless and recording, each data cable is gently shaken and cable connectors are wiggled to test for shorts or bad connections. During the cable shake test, no data spikes that exceed 3 mV were seen on any EM61 data channel. All data conformed to this metric.
- IVS Repeatability. This test is completed by recording data along the IVS line in two directions, forward and back. The response of all EM61-MK2A data channels to the IVS test items (three small ISOs) located on IVS centerline will be ≥ 75 percent of the average values from the first five runs. All data conformed to this metric.

- Dynamic Noise Test. This test is completed by recording data along the "noise line" (a metal-free line near the IVS line) in two directions, forward and back. Dynamic background readings (standard deviation) for the EM61-MK2A will remain within 1.5 mV of background for all data channels. All data conformed to this metric.

3.3.3.3 Blind Seed Program

To test and validate the detection process, blind seeds consisting of small ISOs (1-inch by 4-inch Schedule 40 black carbon steel double-threaded pipe nipples) were buried at different depths in the five mini grids surveyed in the Anti-Aircraft Range MRS at a rate of at least one seed per grid. All seed items were identified as targets and were recovered. Blind seeds were not used for the Transect surveys at the Anti-Tank and Grenade Launcher MRSs.

3.3.4 Data Processing

CB&I's standard data processing includes review of data in the field for general quality followed by more extensive analysis by the data processor to include drift correction as needed and statistical assessment of the geophysical data quality metrics. All data processing was performed in accordance with the RFI Work Plan (CB&I, 2015; 2016).

3.3.4.1 Processing Software

CB&I used the following software to process the data:

- Geonics DAT61MK2 for review of data ranges and output of a file in American Standard Code for Information Interchange (ASCII) format
- Geosoft's Oasis Montaj UX Process software to complete statistical analysis of the data in terms of the functional checks and performance metrics, as well as data processing and target selection

3.3.4.2 Data Organization, Data Tracking and Initial Processing

The data processing began by organizing the data on the CB&I server using the following structure:

- Fort Stewart
  - Geophysics Data
    - EM Data

Each data acquisition file name was digitally documented using the project MS Access Database. Readme files describe the corresponding line numbers and QC tests for each survey day.

Initial processing involved converting the data files from the EM61 instrument format to ASCII format, then interpolating the integrated position information in order to assign coordinates to every reading.

3.3.4.3 Review of Instrument Functional Checks

The ASCII data from the initial processing were imported into Oasis Montaj. The QC data for each morning and afternoon test sequence were reviewed to document compliance with the performance metrics. The general steps performed include the following.

- Review of Geophysical Sensor QC Data. Sensor QC test results (static background and spike, cable shake, and personnel tests as well as the twice-daily IVS and dynamic noise results) were reviewed to ensure proper system function. This step validates the repeatability and sensitivity of the geophysical sensor to the standard response to industry standard objects, and provides information on the background noise in the survey area. Conformance with the performance metrics were digitally documented for each data acquisition session.

- Review of Position and Spatial Sampling QC Data. Positioning system QC test results (comparison with a known control point) were reviewed to ensure proper system function. This step validates the repeatability and accuracy of the positioning system as well as the overall data acquisition protocol in terms of the navigation procedures. Conformance with the performance metrics were documented digitally for each data acquisition session.

3.3.4.4 Final Data Processing

The data processor used Oasis Montaj for data QC and to interpolate the EM61 MK2 data channels to generate color-coded images used for analysis and interpretation. The data for each data acquisition session were provided regularly to USACE for independent evaluation via a secure collaborative web portal.

3.3.5 Anomaly Selection

The DGM investigation was designed identify potential burial pits near known firing point locations. As such, anomalies with footprints greater than 1 meter were considered of sufficient size to potentially represent several buried items. A statistically significant number of anomalies with footprints greater than 1 meter were selected using VSP's "Anomaly Sampling for UXO" module. The module parameters were set such that the dig results would provide a 95 percent confidence that 95 percent of the remaining anomalies would be acceptable provided no unacceptable (i.e., MEC) items were identified. Anomaly selection was performed in accordance with the RFI Work Plan (CB&I, 2015; 2016).

3.3.6 Anomaly Reacquisition

Once selected, anomalies or "targets" must be reacquired. Reacquisition is a two-step process: 1) "Flagging" – locating the interpreted coordinates for each individual anomaly on the dig sheet, and 2) "Peaking" – using the EM61 to locate the actual peak of the anomaly thereby refining the interpreted location, and documenting the reacquisition results. Anomaly reacquisition was performed in accordance with the RFI Work Plan (CB&I, 2015; 2016).

3.3.6.1 Flagging

To locate the ground position of the interpreted anomaly coordinates, the appropriate positioning system was used in "Stakeout" mode. The interpreted coordinates for each individual anomaly were reacquired to ± 0.5 foot of the coordinates specified on the dig sheet. A non-metallic pin flag, labeled with the unique anomaly ID, was placed in the ground at the interpreted location.

3.3.6.2 Peaking

The EM61 was used to search an area within a 3-foot radius of the flag to refine the location of the peak value of the anomaly. The flag was adjusted to the peak value location, as necessary, and the peak value and offset from the interpreted location were recorded.

The reacquisition team referred to a map with individual target locations superimposed on a color-coded image of channel 2 data to facilitate the efficient reacquisition of each anomaly.

3.3.7 Intrusive Anomaly Verification

After anomaly locations were reacquired, the following procedures were used for the intrusive verification and reporting of the individual target anomalies in accordance with the RFI Work Plan (CB&I, 2015; 2016).

- The Site Geophysicist reported the anomalies to the Senior Unexploded Ordnance Supervisor (SUXOS) as ready for excavation and identification.
- The SUXOS assigned a UXO team to excavate and identify the anomaly and record the required information as per Data Item Description WERS 004.01.

- The relative offset between the flagged dig sheet location and the actual location of the excavated item(s) were recorded as well as any anomalies that could not be excavated. Examples of instances where an anomaly was not excavated are when the anomaly occurred under a tree. In these cases, an alternate anomaly was pulled from the dig list to maintain the proposed number of initial anomalies.
- The excavation results were documented and entered into the project Microsoft Access database.

3.4 MUNITIONS CONSTITUENTS INVESTIGATION

With the exception of the large disposal pit found near the 120mm firing point in the Grenade Launcher Range, there were no potential sources of MC encountered during the MEC investigation (i.e., exposed fillers, burial pits containing DMM, or small arms berms). No MC samples were collected.

The need for additional environmental sampling, as outlined in the approved work plan, was not identified during the course of RFI activities. Since environmental sampling for MC was not conducted at any of the four MRS sites, neither a comparison to screening levels nor an MC risk assessment was conducted. Therefore, comments previously received from the Georgia Environmental Protection Division (GA EPD) regarding screening levels and risk assessment procedures are not applicable to this RFI Report.

The large disposal pit in the Grenade Launcher Range still contains a large number of munitions that were beyond the scope of this investigation to completely remove. With these items still in the ground, representative soil samples of the sides and bottom of the disposal pit could not be obtained.

4.0 RCRA FACILITY INVESTIGATION RESULTS AND REVISED CONCEPTUAL SITE MODEL

This section presents the results of the MEC investigation and revision of the preliminary CSM discussed in Section 2.1. The MEC investigation was performed from September 2015 to January 2016. Select photographs of the investigation activities at the site are presented in **Appendix A**. Contractor Quality Control Reports and other field documentation are provided in **Appendix B**, provided on CD. Technical Data Sheets for MD items are provided in **Appendix C**, provided on CD. Geophysical Data is provided as **Appendix D**, provided on CD.

4.1 ANTI-AIRCRAFT RANGE – 4A

4.1.1 RFI Results

Based on analysis during the RFI work plan phase, sufficient investigation was previously performed to characterize the MRS and no additional field investigation was warranted. These investigations were described in Sections 1.5.2, 1.5.4, 1.5.5, and 1.5.6, and the reports are provided in **Appendix G**, provided on CD. There was no evidence of stationary land-based targets in the site history or previous investigations, so there are no CMUAs and a homogenous distribution of MEC is assumed.

These investigations searched approximately 200 of the 465 acres finding 2 MEC items, consisting of a point detonating fuze (USACE, 2011a) and a T91 90mm HE-T Projectile (BSEn, 2011) found from soil excavated during construction of the IBCT complex. These data were entered into UXO Estimator: 465-acre MRS, 200 acres investigated, 2 MEC items found, 0.5 MEC/acre target density, and 95 percent confidence level. UXO Estimator calculated with 95 percent probability that there is less than 0.026 MEC per acre in the MRS.

4.1.2 Revised Conceptual Site Model – Anti-Aircraft Range – 4A

4.1.2.1 MEC Exposure Pathway Analysis

The information collected was used to update the CSM and identify all complete and incomplete source-receptor interactions for the MRS, for both current and reasonably anticipated future land uses. An exposure pathway is the course a chemical or physical agent takes from a source to a receptor. Each MEC pathway includes a source, interaction (access and activity), and a receptor. An updated CSM is presented as **Figure 4-1**.

Source

For the Anti-Aircraft Range – 4A, based on previous investigations, removal actions, and the nature of historical training at this MRS, there are no known CMUAs and any residual MEC associated with the use of this MRS as a 40mm and 90mm anti-aircraft range is expected to be dispersed. As summarized below in **Table 4-1**, two isolated MEC items were found during previous investigations: a point detonating fuze and a T91 90mm HE-T Projectile, both found while inspecting previously excavated soil from construction activities. It is uncertain whether the two MEC items were originally located on the surface or in the subsurface because they were found in soil that had already been excavated during construction. The MEC density is expected to be low and less than 0.026 MEC per acre in the MRS based on statistical analysis of data collected. While there is little uncertainty that the MRS contains MEC, there is estimated to be no more than seven MEC items remaining throughout the MRS. Residual MEC may have penetrated into the ground to a shallow depth or become buried to deeper depths during grading of the site. No MEC has reportedly been found on the surface during previous investigations or during extensive development of the MRS and regular grounds keeping activities.

Other MD was found, primarily consisting of M2 target rockets that served as aerial targets for anti-aircraft gunners. The M2 target rocket was fired from a mobile launcher with a solid propellant. These rockets did not contain explosives and pose no explosive hazard after being fired. Other MD found included a 2.75-inch rocket, a 3.5-inch rocket motor, and an 81mm practice mortar. These items were isolated finds that did not indicate widespread usage. A summary of munitions found at the Anti-Aircraft Range – 4A is provided in **Table 4-1**.

Table 4-1
Summary of Items Recovered at the Anti-Aircraft Range – 4A

Source	Item Recovered	Quantity	Classification	Depth
IBCT Construction Site QA Investigation (USACE, 2011a)	Point Detonating Fuze	1	MEC	Unknown*
	M2 Target Rocket	15	MD	Unknown*
	3.5-inch Rocket Motor	1	MD	Unknown*
EOD Responses (Arcadis/Malcolm Pirnie, 2011)	40mm projectile	1	MD	Unknown*
	Mortar (no type specified)	1	MD	Unknown*
	2.75-inch rocket	1	MD	Unknown*
IBCT Construction Site QA Follow On Investigation (USACE, 2011b)	M2 Target Rocket	54	MD	Unknown*
	M2 Target Rocket Motors	19	MD	Unknown*
	81mm Practice Mortar	2	MD	Unknown*
AAFES Shoppette Highway 144 Construction Site MEC Investigation (USACE, 2011c)	Fuze shipping containers	Unknown	Range Debris	Subsurface (unknown depth)
TCRA, 10th Engineer Battalion Site & Dog Kennel Site (BSEn, 2011)	T91 90mm HE-T Projectile	1	MEC	Unknown*
	M2 Target Rocket Motors	Unknown	MD	Unknown
RFI	No further investigation			

*Items were found during construction in excavated soil, so the original location is uncertain.

Interaction

The hazard from MEC arises from direct contact as a result of some human activity. This human activity could be moving or somehow disturbing MEC that could cause it to detonate. This is expected to occur during construction and maintenance activities that involve excavations into the subsurface to whatever depth historical grading of the site has disturbed soil. Receptors simply walking in the area would not interact with MEC because MEC on the surface is not anticipated to be present at this MRS.

Receptors

Anti-Aircraft Range – 4A is comprised of military barracks, administrative buildings, improved roads, a dog kennel facility, and a public mini mart. Receptors include the following:

- Residents living in FTSW barracks
- Indoor Facility Workers who occupy FTSW buildings or the public mini mart for work purposes
- Maintenance and Construction Workers who may perform grounds keeping, landscaping, or excavation activities
- Visitors who may access and walk through the area or visit the mini mart

All of these receptors are expected to walk around the MRS, primarily on roads, sidewalks, and maintained green spaces, but there is no interaction because surface MEC is not anticipated to be present. The maintenance and construction workers may perform activities that involve earth moving and could encounter subsurface MEC.

4.1.2.2 MEC Exposure Conclusions

For the Anti-Aircraft Range – 4A, there are no known CMUAs or firing points. Two MEC items were discovered and removed on the Anti-Aircraft Range – 4A during extensive development and previous investigations of a large percentage of the area. UXO Estimator software "Analyze Field Data" module was run to determine whether adequate coverage was obtained at the MRS, using the following inputs: 465-acre MRS, 200 acres investigated, and 2 MEC items found. UXO Estimator calculated with 95 percent probability that there is less than 0.026 MEC per acre in the MRS. Therefore, it is expected that no more than 7 MEC items remain in the 265 acres that were unsearched.

Residual MEC associated with the use of this MRS is expected to be limited in quantity and widely dispersed in the subsurface. As shown on the updated CSM on **Figure 4-1**, the surface MEC exposure pathway is incomplete for all receptors at the MRS (residents, indoor facility workers, maintenance/construction workers, and visitors). The subsurface MEC exposure pathway is complete for the maintenance/construction workers who have the potential to conduct intrusive activities.

4.2 ANTI-AIRCRAFT RANGE – 4B

4.2.1 RFI Results

RFI field investigations were completed from September 2015 to December 2015 at the Anti-Aircraft Range – 4B and included:

- Surface reconnaissance of 8 acres
- Analog mag and dig investigation on 5.8 acres of transects
- DGM survey of 4.5 acres of grids and select anomaly investigation

The surface reconnaissance was performed on 8 acres in the southeast of the MRS due to the previous finding of an M67 hand grenade in a wooded area. No MEC or MD was identified during the surface reconnaissance, so there is no evidence that the 8 acres were used for munitions training or disposal.

The mag and dig investigation was designed using UXO Estimator to statistically determine a sampling area with 95 percent confidence limit and a target MEC density of 0.5 MEC/acre. A total of 5.8 acres of transects were investigated with mag and dig over the 663-acre Anti-Aircraft Range – 4B, shown on **Figure 4-2**. Ten M-2 target rockets and two M-2 target rocket motors were identified. None of the items recovered were classified as MEC. Mag and dig results are presented in **Table 4-2**, located at the end of Section 4. Some areas along transects could not be completed due to standing water, but the coverage is deemed sufficient to meet the requirements of the investigation. A single small aircraft, possibly a target drone, was observed along transect 006; see **Appendix A** for select photographs. MD was recovered at depths ranging from 1 to 48 inches below ground surface.

Five DGM grids were placed in the approximate location of former firing points. Each grid was approximately 0.9 acres. DGM was completed using an EM61. Within the mapped grids, three 50-foot by 50-foot mini grid locations were selected for 100 percent investigation of targets (**Figures 4-4** and **4-5**). Within the mini grids, all targets identified were intrusively investigated. No MEC or MD was identified in the mini grids.

Additional targets with a footprint greater than 1 meter were also selected for intrusive investigation to determine if DMM disposal occurred (**Figures 4-3, 4-4, 4-5,** and **4-6**). DGM results are presented in **Table 4-3**, located at the end of Section 4. A total of 242 targets with a footprint greater than 1 meter were identified at Anti-Aircraft Range – 4B. Of these 242 targets greater than 1 meter, 52 targets were randomly selected using VSP's "Anomaly Sampling for UXO" module. Based on this model, if 52 of the 242 targets are investigated, and all 52 are determined to be acceptable (non-MEC), then there is a 95 percent confidence that 95 percent of the targets with a footprint greater than 1 meter were acceptable. Three of the targets randomly selected fell within the 50-foot by 50-foot mini grids, and 49 of the randomly selected targets fell outside of the mini grids. No MEC or MD was identified during the investigation of DGM targets and no burial pits were identified during the investigation.

4.2.2 Revised Conceptual Site Model – Anti-Aircraft Range – 4B

4.2.2.1 MEC Exposure Pathway Analysis

The information collected during this investigation was used to update the CSM and identify all complete and incomplete source-receptor interactions for the site, for both current and reasonably anticipated future land uses. An exposure pathway is the course a chemical or physical agent takes from a source to a receptor. Each MEC pathway includes a source, interaction (access and activity), and a receptor. An updated CSM is presented as **Figure 4-7**.

Source

No MEC was found in Anti-Aircraft Range – 4B during this RFI or documented in records reviews. Therefore, there is no MEC source identified for this MRS. No MEC was found in the area where EOD responded to a grenade find, no CMUAs were found, and no DMM was found at firing points. The MRS was used as a 40mm and 90mm anti-aircraft range, but the projectiles are expected to have landed outside the MRS boundary in the operational area. M2 target rockets that served as aerial targets for anti-aircraft gunners can be found, but these rockets did not contain explosives. **Table 4-4** provides a summary of items found to date on the MRS.

Table 4-4
Summary of Items Recovered at the Anti-Aircraft Range – 4B

Source	Item Recovered	Quantity	Classification	Depth
EOD Response (Arcadis/Malcolm Pirnie, 2011)	M67 Hand Grenade	1	MD	Surface
RFI – Surface Reconnaissance	None	None	None	None
RFI – Mag and Dig Transects	M2 Target Rocket Parts	2	MD	Surface
	M2 Target Rocket Parts	10	MD	Variable and Unknown
RFI – DGM Grids	None	None	None	None

Interaction

Interaction describes ways that receptors come into contact with a source, and includes both access and activity considerations. There are no interactions with MEC at this MRS because MEC is not anticipated to be present.

Receptors

Anti-Aircraft Range – 4B is comprised of administrative buildings, several improved roads, a private equestrian club, garden plots utilized by FTSW residents, and areas of undeveloped land where bow hunting is permitted and military maneuvers are sometimes conducted. There are no residences within the MRS. No changes in the land use are anticipated or planned; therefore, the receptors considered for MEC at the Anti-Aircraft Range – 4B are:

- Recreation Receptors who may ride horses at the equestrian club, garden, and hunt in undeveloped areas
- Training Receptors who may conduct maneuvers in undeveloped areas
- Indoor Facility Workers who occupy FTSW buildings or the equestrian club for work purposes
- Maintenance and Construction Workers who may perform grounds keeping, landscaping, or excavation activities
- Visitors who may access and walk through the area

There are no interactions by any receptors with MEC at this MRS because MEC is not anticipated to be present.

4.2.2.2 MEC Exposure Conclusions

For the Anti-Aircraft Range – 4B, there were no MEC found during the RFI. MD in the form of M2 Rockets were observed on the surface and in the subsurface, consistent with historical use of the range. The DGM investigation and random sampling of anomalies did not uncover burial pits near the former firing points. Because no MEC were found during the RFI, all exposure pathways to MEC are considered to be incomplete.

As shown on the updated CSM on **Figure 4-7**, the surface and subsurface MEC exposure pathways are incomplete for all receptors because there is no MEC source.

4.3 ANTI-TANK RANGE 90-MM-2

4.3.1 RFI Results

RFI field investigations were completed from September 2015 to December 2015 at the Anti-Tank Range 90-MM-2 and included:

- Analog mag and dig investigation on 6.0 acres of transects
- DGM survey of 5.8 miles of transects with select anomaly investigation

The mag and dig investigation was designed using UXO Estimator to statistically determine a sampling area with 95 percent confidence limit and a target MEC density of 0.5 MEC/acre. A total of 6.0 acres of transects were investigated with mag and dig over the 546-acre Anti-Tank Range 90-MM-2. During the mag and dig investigation, no MEC was found after digging all anomalies. One 25mm TP-T projectile was found on the surface that was considered MPPEH. Eleven MD items were identified within 18 inches of the ground surface. MD items identified included two 2.36-inch practice rockets, six projectiles, one flare, one 25mm TP-T cartridge, and one practice/training submunition. None of the items found that were associated with the Anti-Tank Range 90-MM-2 were classified as MEC. The 25mm item was considered MPPEH but was in good condition and represents post-1970 vintage and not associated with the historical use of the range. The tank targets are interpreted to have been where the landfill is now located, so finding 40mm and 90mm projectiles in the area to the northwest of the landfill is expected. None of the projectiles were HE filled or otherwise contained explosives. Mag and dig results are presented on **Figure 4-8** and in **Table 4-5**, located at the end of Section 4. Some areas within the Anti-Tank Range 90-MM-2 were not surveyed due to standing water and the presence of the existing landfill cap. However, coverage is deemed sufficient to meet the requirements of the investigation.

DGM transects were placed in the location of former firing points at 50-foot spacing. Transects were surveyed using the EM61-MK2. The transect survey area comprised approximately 5.8 miles which represents approximately 2.3 acres. A total of 733 targets with a footprint greater than 1 meter were identified. Of these 733 targets greater than 1 meter, 57 targets were randomly selected using VSP's "Anomaly Sampling for UXO" module. Based on this model, if 57 of the 733 targets are investigated, and all 57 are determined to be acceptable (non-MEC), then there is a 95 percent confidence that 95 percent of the targets identified were acceptable. **Figure 4-9** presents the 57 targets selected for intrusive investigation. DGM results are presented in **Table 4-3**, located at the end of Section 4. Two MD items were identified during the intrusive investigation of DGM targets in the firing points: one 40mm practice projectile, and frag from an unknown mortar type. The MD items were uncovered along the east and southern areas of the Anti-Tank Range 90-MM-2 (**Figure 4-9**).

4.3.2 Revised Conceptual Site Model – Anti-Tank Range 90-MM-2

4.3.2.1 MEC Exposure Pathway Analysis

The information collected during this investigation was used to update the CSM and identify all complete and incomplete source-receptor interactions for the site, for both current and reasonably anticipated future land uses. An exposure pathway is the course a chemical or physical agent takes from a source to a receptor. Each MEC/MPPEH pathway includes a source, interaction (access and activity), and a receptor. An updated CSM is presented as **Figure 4-10**.

Source

For the Anti-Tank Range 90-MM-2, based on data collected and the nature of historical training at this MRS, there are no known CMUAs. No MEC associated with the use of this MRS as a 40mm and 90mm anti-tank range was found during the RFI. There was no evidence of troops burying DMM (90mm and 40mm projectiles) at the firing points. Therefore, DMM buried in disposal pits is not considered to be a source at the MRS. Other MD found on the MRS include an anti-personnel mine, 2.36-inch practice rockets, and other isolated finds that did not indicate widespread usage. The 25mm TP-T projectile found indicates that an MPPEH source is present on the surface. **Table 4-6** provides a summary of items found to date on the MRS.

Table 4-6
Summary of Items Recovered at the Anti-Tank Range 90-MM-2

Source	Item Recovered	Quantity	Classification	Depth
Confirmation Sampling (Arcadis/Malcolm Pirnie, 2011)	M16A1 Anti-Personnel Mine	1	MD	Surface
RFI – Mag and Dig Transects	2.36-inch practice rockets	2	MD	Surface
	40mm TP projectiles	2	MD	Surface
	40mm TP projectiles	1	MD	6”
	90mm APT projectiles	3	MD	5”, 12”, 18”
	Flare	1	MD	Surface
	25mm TP-T cartridge*	1	MD	Surface
	25mm TP projectile*	1	MPPEH	Surface
	Practice/Training Submunition	1	MD	Surface
RFI – DGM Grids	40mm TP projectile	1	MD	6”
	Mortar (unknown type)	1	MD	12”

*Not associated with historical Anti-Tank Range 90-MM-2 activities.

Interaction

Interaction describes ways that receptors come into contact with a source, and includes both access and activity considerations. A receptor may contact MPPEH that is on the surface simply by walking. There are no interactions with MPPEH for intrusive activities such as construction and landscaping because subsurface MPPEH is not anticipated to be present.

Receptors

Anti-Tank Range 90-MM-2 is comprised of a motor pool, laydown yards, Pond #10, a motor fuel and wash yard, a borrow area, and forested undeveloped land in which bow hunting is permitted and military maneuvers are sometimes conducted. There are no residences within the MRS. No additional changes in the land use are anticipated or planned. Therefore, the receptors considered for MPPEH at the Anti-Tank Range 90-MM-2 are:

- Recreation Receptors who may hunt in undeveloped areas
- Training Receptors who may conduct maneuvers in undeveloped areas
- Indoor Facility Workers who occupy FTSW buildings for work purposes
- Maintenance and Construction Workers who may perform grounds keeping, landscaping, or excavation activities
- Visitors who may access and walk through the area

All of these receptors are expected to walk around the MRS and potentially encounter MPPEH on the surface. The maintenance and construction workers and hunters may perform intrusive activities into the subsurface.

4.3.2.2 MEC Exposure Conclusions

No MEC were found in the Anti-Tank Range 90-MM-2 MRS during the RFI. MD in the form of 40mm and 90mm projectiles was observed on the surface and subsurface during the intrusive investigation, consistent with historical training records. The DGM investigation and random sampling of anomalies did not uncover burial pits near the former firing points. With no MEC found during the RFI, all exposure pathways to MEC are considered to be incomplete. MPPEH in the form of a discarded 25-mm TP-T projectile was found on the ground surface and represents an MPPEH source.

As shown on the updated CSM on **Figure 4-10**, the surface MPPEH exposure pathway is complete for all receptors at the MRS (recreational/training, indoor facility workers, maintenance/construction workers, and visitors) as they can be expected to walk around the MRS. The subsurface MPPEH exposure pathway is incomplete for all receptors because there is no MPPEH source in the subsurface.

4.4 GRENADE LAUNCHER RANGE

4.4.1 RFI Results

RFI field investigations were completed from September 2015 to January 2016 at the Grenade Launcher Range and included:

- Analog mag and dig investigation on 2.6 acres of transects
- DGM survey of 2.4 miles of transects with select anomaly investigation

The mag and dig at the Grenade Launcher Range was conducted on transects spaced 10 meters apart, as shown on **Figure 4-11**. Transect spacing was derived using VSP “Transect Sampling for Target Traversal” module with a 10-meter diameter target. Transects were placed around the former grenade target berm locations. A total of 2.61 acres of mag and dig investigation were conducted at the Grenade Launcher Range. All anomalies encountered were intrusively investigated, and there was no evidence of 40mm grenades remaining. An inert training mine was found 2 inches below the surface adjacent to a dirt road that parallels transect GLR-T009, which is inconsistent with the historical use of the site. Six unfired 25mm TP-T projectiles were found along the bank of the runoff ditch at the edge of transect GLR-T016, which is just outside a storage yard fence in the Grenade Launcher Range. These six 25mm projectiles were classified as MPPEH and were in good condition representing post-1970 vintage. Therefore, these items are from recent disposal, and not from historical range activities. Mag and dig results are presented in **Table 4-7**, located at the end of Section 4.

DGM transects at the Grenade Launcher Range were placed at 25-foot spacing, based on a disturbed area visible on a 1957 historical aerial photograph, to assess the presence of potential burial pits associated with a former 120mm range firing point. Transects were surveyed using a Geonics EM61 MK2. A total of 104 targets were identified (**Figure 4-12**). Of the 104 targets, 92 targets had a footprint greater than 1 meter and were of sufficient size to potentially represent several buried items. Of these, 44 targets were randomly selected using VSP’s “Anomaly Sampling for UXO” module. Based on this model, if 44 of the 92 targets are investigated, and all 44 are determined to be acceptable (non-MEC), then there is a 95 percent confidence that 95 percent of the targets were acceptable.

A 90mm HEAT projectile (M348) and a 250-lb bomb (AN-M57) were uncovered during the first day of intrusive investigation of DGM targets (December 11, 2015). CB&I notified FTSW range control per established notification procedures. Range control subsequently notified EOD who responded and removed both items to their demolition area for disposal. During the hole check in the location of the 250-lb bomb the following day, an 8-inch HE projectile (M106) was uncovered. FTSW EOD returned and uncovered additional munitions while removing the 8-inch projectile. All items identified at the location were removed from the Grenade Launcher Range by FTSW EOD and disposed on operational ranges.

The size of these items prompted a halt to further investigation while new exclusion zone (EZ) distances and safety procedures were established. The Explosives Site Plan was amended to include the 8-inch M103 (TNT filled, fragmenting) as the new Munition with Greatest Fragmentation Distance (MGFD) for the disposal pit area of the Grenade Launcher Range. The 8-inch M103 dictates a Hazardous Fragment Distance (HFD) of 389 feet, which was used as the new EZ distance.

Work was resumed on January 19, 2016, using the new EZ. Intrusive investigation of targets was completed January 20, 2016. A total of 44 targets were intrusively investigated. Additional MD items were identified: 57mm projectile, armor piercing tracer (M70), flare (M49 series), two pieces of frag, three fuzes, and two locations with assorted MD components. No additional MEC was found.

Targets investigated, MEC, and MD locations are presented on **Figure 4-12**. Based on the variety of large items recovered in one location, the area around the 250-lb bomb is considered a former disposal pit. The rest of the disturbed area on the 1957 aerial photo contains MD considered to be associated with the disposal pit (see **Figure 4-13**). DGM results are presented in **Table 4-3**, located at the end of Section 4.

4.4.2 Revised Conceptual Site Model – Grenade Launcher Range

4.4.2.1 MEC Exposure Pathway Analysis

The information collected during this investigation was used to update the CSM and identify all complete and incomplete source-receptor interactions for the site, for both current and reasonably anticipated future land uses. An exposure pathway is the course a chemical or physical agent takes from a source to a receptor. Each MEC pathway includes a source, interaction (access and activity), and a receptor. An updated CSM is presented as **Figure 4-14**.

Source

The MEC investigation searched the area around the target berms, but found no evidence of residual MEC/MPPEH associated with the firing of grenades on the Grenade Launcher Range, so this historical use does not represent a source of MEC. However, several large munitions not associated with the Grenade Launcher Range activities were found in a subsurface munitions disposal pit located near the firing points of the 120mm projectile range. The 25mm TP-T projectiles found indicate that an MPPEH source is present on the surface. **Table 4-8** provides a summary of items found to date on the MRS.

Table 4-8
Summary of Items Recovered at the Grenade Launcher Range

Source	Item Recovered	Quantity	Classification	Depth
Confirmation Sampling (Arcadis/Malcolm Pirnie, 2011)	None	None	None	None
RFI – Mag and Dig Transects	Training mine	1	MD	Surface
	25mm TP projectile*	6	MPPEH	Surface
RFI – DGM Grids	90mm HEAT projectile (M348)	1	MEC	6”
	250-lb bomb (AN-M57	1	MEC	40”
	8-inch HE projectile (M106)	1	MEC	48”
	57mm M70 APT projectile	1	MD	3”
	locations with assorted MD components and/or frag	7	MD	3” to 12”

*Not associated with historical Grenade Launcher Range activities.

Interaction

Interaction describes ways that receptors come into contact with a source, and includes both access and activity considerations. A receptor may contact MPPEH is on the surface simply by walking. A receptor may also contact MEC in the subsurface when performing construction, landscaping, or other intrusive activities at the disposal pit.

Receptors

The Grenade Launcher Range is located on the west side of FTSW and within a recently developed and partly forested area. The MRS contains warehouses and office facilities. No changes in the land use are anticipated or planned. Therefore, the receptors considered for MEC/MPPEH at the Grenade Launcher Range are:

- Indoor Facility Workers who occupy FTSW buildings for work purposes
- Maintenance and Construction Workers who may perform grounds keeping, landscaping, or excavation activities
- Visitors who may access and walk through the area

All of these receptors are expected to walk around the MRS and potentially encounter MPPEH on the surface. The maintenance and construction workers may perform activities that involve earth moving and could encounter subsurface MEC at the disposal pit.

4.4.2.2 MEC Exposure Conclusions

No evidence of grenades or other MEC was found around the target berms at the Grenade Launcher Range. However, a variety of subsurface MEC items were found in a disposal pit on the west side of the MRS. Items recovered included a 250-lb General Purpose Bomb, an 8-inch M106 HE projectile, and a 90mm M348 HE anti-tank projectile. There is evidence that MEC remains at the MRS in the disposal pit identified. Therefore, complete MEC exposure pathways exist for all receptors with activities that encounter the subsurface. MPPEH in the form of discarded 25-mm TP-T projectiles represents a MPPEH source.

As shown on the updated CSM on **Figure 4-14**, the surface MPPEH exposure pathway is complete for all receptors at the MRS (indoor facility workers, maintenance/construction workers, and visitors) as they can be expected to walk around the MRS. The subsurface MEC exposure pathways are also complete for the maintenance/construction workers who have the potential to conduct intrusive activities.

4.4.2.3 MC Exposure Conclusions

If munitions containing sufficient mass of MC as fillers are breached, then there is a potential for MC to have been released and be present in soil underneath the disposal pit at the Grenade Launcher Range MRS. The munitions removed during the RFI were in good condition and did not show evidence of being breached, so the potential for a release is considered to be low. Characterization of soil underneath the pit cannot be safely and adequately performed until the munitions are removed and inspected for signs of a release. Potentially complete pathways exist to construction workers via dermal contact and incidental ingestion should an excavation occur and MC be present in soil. This potential pathway for construction workers is depicted on **Figure 4-15**.

If munitions casings are found to be breached and sufficient MC mass is present in soil, then precipitation infiltration could provide for contaminant mobility into the surficial groundwater aquifer. This aquifer is expected to occur within 10 feet of the ground surface in the MRS. Review of the local topography at the Grenade Launcher Range MRS on **Figure 1-6** indicates a flat to gentle slope to the northwest toward unnamed drainage features flowing to the north as shown on **Figure 1-8**. Receptor contact with groundwater is possible if the soil is disturbed to below the water table through excavation or construction activities. This potential pathway for construction workers is depicted on **Figure 4-15**.

Receptor contact with groundwater as a drinking water source is considered an incomplete pathway as depicted on **Figure 4-15**. The surficial aquifer is not used as a potable water source. The unconfined groundwater is expected to flow with topography to the northwest into the expansive operational ranges of FTSW where there are no receptors. It is unlikely that MC in shallow groundwater would migrate to the deeper aquifers that are used as a local water supply due to the presence of numerous confining units as discussed in Section 1.3.6.

Table 4-2
Anti-Aircraft Range 4B Analog Investigation Results

Item Of Interest - Ft Stewart - RCRA Fall 2015

Site Name	Work Unit Name	Item Number	Operation Date	Easting	Northing	Depth Inches	Quantity	Item Type	Item Description	Item Comments	Fuzed	Intact	Initial Condition	Disposition	Demo	Team Name
AAR4B	AAR4B-T016	AAR4B-T016-T2-1	2015-11-18	441358.62	3530365.52	12	1	Quality Control Seed	Pipe	QC Seed # 8	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T016	AAR4B-T016-T2-2	2015-11-18	441359.13	3530364.44	24	1	Quality Control Seed	Pipe	QC Seed # 7	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T016	AAR4B-T016-T2-3	2015-11-18	441358.28	3530365.76	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T019	AAR4B-T019-T1-1	2015-11-18	441243.76	3530167.63	48	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T022	AAR4B-T022-T1-1	2015-11-18	441513.11	3529968.93	18	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T022	AAR4B-T022-T1-2	2015-11-18	441363.73	3529959.74	18	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T022	AAR4B-T022-T1-1	2015-11-17	441526.03	3529675.79	30	1	Munitions Debris	Rocket motor	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T022	AAR4B-T022-T1-1	2015-11-17	442128.19	3529971.65	12	1	Quality Control Seed	Pipe	QC Seed #5	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T022	AAR4B-T022-T1-2	2015-11-17	442127.02	3529970.38	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T022	AAR4B-T022-T1-3	2015-11-17	442125.50	3529970.49	24	1	Quality Control Seed	Pipe	QC Seed #6	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T024	AAR4B-T024-T1-1	2015-11-17	441586.74	3529775.22	40	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T041	AAR4B-T041-T2-1	2015-11-17	442721.06	3530464.90	2	1	Munitions Debris	Rocket	Weighted Nose from M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 2
AAR4B	AAR4B-T041	AAR4B-T041-T2-2	2015-11-17	442642.45	3530467.05	47	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 2
AAR4B	AAR4B-T041	AAR4B-T041-T2-3	2015-11-17	442617.76	3530468.97	36	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 2
AAR4B	AAR4B-T041	AAR4B-T041-T2-4	2015-11-17	442580.75	3530466.97	9	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 2
AAR4B	AAR4B-T023	AAR4B-T023-T1-1	2015-11-16	441953.43	3529870.99	1	1	Munitions Debris	Rocket motor	Piece of a M2 rocket motor	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T025A	AAR4B-T025A-T1-1	2015-11-16	441923.05	3529672.96	36	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T006	AAR4B-T006-T2-1	2015-11-13	441995.91	3531158.36	24	1	Quality Control Seed	Pipe	QC Seed #9	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T006	AAR4B-T006-T2-2	2015-11-13	441989.25	3531158.82	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T006	AAR4B-T006-T2-3	2015-11-13	441989.42	3531160.03	12	1	Quality Control Seed	Pipe	QC Seed #10	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T009	AAR4B-T009-T2-1	2015-11-12	441758.48	3530862.16	12	1	Quality Control Seed	Pipe	QC Seed #12	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T009	AAR4B-T009-T2-2	2015-11-12	441761.09	3530863.63	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T009	AAR4B-T009-T2-3	2015-11-12	441758.16	3530862.58	24	1	Quality Control Seed	Pipe	QC Seed #11	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T027	AAR4B-T027-T1-1	2015-11-12	441407.59	3529577.31	18	1	Munitions Debris	Rocket	M2 Rocket	N	N	Expended	Demil/Disposal	N	Team 1
AAR4B	AAR4B-T031	AAR4B-T031-T1-1	2015-11-12	441452.47	3529474.31	12	1	Quality Control Seed	Pipe	QC Seed #3	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T031	AAR4B-T031-T1-2	2015-11-12	441446.31	3529472.51	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T031	AAR4B-T031-T1-3	2015-11-12	441444.48	3529475.07	24	1	Quality Control Seed	Pipe	QC Seed #4	NA	NA	NA	QC	N	Team 1

Table 4-2
Anti-Aircraft Range 4B Analog Investigation Results

Item Of Interest - Ft Stewart - RCRA Fall 2015

Site Name	Work Unit Name	Item Number	Operation Date	Easting	Northing	Depth Inches	Quantity	Item Type	Item Description	Item Comments	Fuzed	Intact	Initial Condition	Disposition	Demo	Team Name
AAR4B	AAR4B-T002	AAR4B-T002-T2-1	2015-11-10	442256.74	3531557.39	12	1	Quality Control Seed	Pipe	QC Seed #14	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T002	AAR4B-T002-T2-2	2015-11-10	442259.36	3531556.51	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T002	AAR4B-T002-T2-3	2015-11-10	442261.67	3531556.93	24	1	Quality Control Seed	Pipe	QC Seed #13	NA	NA	NA	QC	N	Team 2
AAR4B	AAR4B-T036	AAR4B-T036-T1-1	2015-11-10	441589.83	3529179.39	12	1	Quality Control Seed	Pipe	QC Seed #1	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T036	AAR4B-T036-T1-2	2015-11-10	441586.90	3529176.05	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T036	AAR4B-T036-T1-3	2015-11-10	441585.72	3529176.91	24	1	Quality Control Seed	Pipe	QC Seed #2	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T050	AAR4B-T050-T1-1	2015-10-29	443693.91	3529624.37	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T050	AAR4B-T050-T1-2	2015-10-29	443692.10	3529624.20	12	1	Quality Control Seed	Pipe	QC Seed #37	NA	NA	NA	QC	N	Team 1
AAR4B	AAR4B-T050	AAR4B-T050-T1-3	2015-10-29	443693.73	3529624.99	24	1	Quality Control Seed	Pipe	QC Seed #38	NA	NA	NA	QC	N	Team 1

Table 4-3
DGM Results

DGM Results - Ft Stewart - RCRA Fall 2015

Site Name	Item ID	Easting	Northing	Ch 2 Response	Selected to Dig (Y/N)	Dig Completed Date	Dig Result	Item Description	DEPTH (in)	Qty	Condition	Disposition	QC Hole Check Date	QC Hole Check Response	QC Hole Check Passed
Anti-Aircraft Range 4B	G001-5-1	442102.8	3529419.08	23.4	Y	12/11/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G001-22-1	442124.1	3529456.95	73.9	Y	12/11/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G001-32-1	442134.53	3529434.15	33.6	Y	12/11/2015	OD	Nails	12	24	Inert	Scrap Bin	12/11/2015	3.8	Y
Anti-Aircraft Range 4B	G001-47-1	442146.83	3529442.33	16.5	Y	12/11/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G001-53-1	442150.2	3529441.8	14.7	Y	12/11/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/11/2015	0.4	Y
Anti-Aircraft Range 4B	G001-57-1	442151.6	3529471.45	43.4	Y	12/11/2015	OD	Miscellaneous OD	8	2	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G001-59-1	442151.9	3529436.39	10.1	Y	12/11/2015	OD	Miscellaneous OD	5	1	Inert	Scrap Bin	12/11/2015	0.9	Y
Anti-Aircraft Range 4B	G001-88-1	442183.67	3529471.62	10.8	Y	12/11/2015	OD	Miscellaneous OD	12	10	Inert	Scrap Bin	12/11/2015	2	Y
Anti-Aircraft Range 4B	G001-92-1	442187.17	3529473.39	26.4	Y	12/11/2015	OD	Miscellaneous OD	24	7	Inert	Scrap Bin	12/11/2015	9.8	Y
Anti-Aircraft Range 4B	G001-111-1	442202.25	3529476.52	42.2	Y	12/11/2015	OD	Miscellaneous OD	2	1	Inert	Scrap Bin	12/11/2015	12	Y
Anti-Aircraft Range 4B	G002-35-1	442222.66	3529477.87	1684	Y	12/12/2015	OD	Miscellaneous OD	12	1	Inert	Scrap Bin	12/12/2015	1667	Y
Anti-Aircraft Range 4B	G002-44-1	442227	3529481.85	31.2	Y	12/12/2015	OD	Miscellaneous OD	8	1	Inert	Scrap Bin	12/12/2015	0.6	Y
Anti-Aircraft Range 4B	G002-84-1	442260.58	3529505.18	34.3	Y	12/12/2015	OD	Miscellaneous OD	7	1	Inert	Scrap Bin	12/12/2015	0.3	Y
Anti-Aircraft Range 4B	G002-128-1	442282.92	3529493.68	28.2	Y	12/12/2015	OD	Miscellaneous OD	12	3	Inert	Scrap Bin	12/12/2015	5.4	Y
Anti-Aircraft Range 4B	G002-152-1	442291.94	3529499.5	48.8	Y	12/12/2015	OD	Miscellaneous OD	12	12	Inert	Scrap Bin	12/12/2015	2.9	Y
Anti-Aircraft Range 4B	G002-161-1	442295.83	3529499.64	45.1	Y	12/12/2015	OD	Miscellaneous OD	16	5	Inert	Scrap Bin	12/12/2015	15.5	Y
Anti-Aircraft Range 4B	G003-44-1	442558.8	3529657.58	26.4	Y	12/11/2015	OD	Miscellaneous OD	8	2	Inert	Scrap Bin	12/11/2015	0	Y
Anti-Aircraft Range 4B	G003-73-1	442577.1	3529672.84	51.3	Y	12/11/2015	OD	Miscellaneous OD	5	5	Inert	Scrap Bin	12/11/2015	0.8	Y
Anti-Aircraft Range 4B	G003-75-1	442578.01	3529693.17	13.7	Y	12/11/2015	OD	Miscellaneous OD	1	1	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G003-82-1	442582.2	3529685.95	11	Y	12/11/2015	OD	Miscellaneous OD	4	4	Inert	Scrap Bin	12/11/2015	0.4	Y
Anti-Aircraft Range 4B	G003-98-1	442586.92	3529687.27	42.2	Y	12/11/2015	OD	Miscellaneous OD	2	2	Inert	Scrap Bin	12/11/2015	0.4	Y
Anti-Aircraft Range 4B	G003-105-1	442590.64	3529685.51	20.8	Y	12/11/2015	OD	Miscellaneous OD	5	4	Inert	Scrap Bin	12/11/2015	0.9	Y
Anti-Aircraft Range 4B	G003-143-1	442600.28	3529686.1	43.9	Y	12/11/2015	OD	Miscellaneous OD	8	13	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G003-173-1	442606.67	3529695.64	242.7	Y	12/10/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/10/2015	0.1	Y
Anti-Aircraft Range 4B	G003-201-1	442617.01	3529687.02	1450.8	Y	12/11/2015	OD	Miscellaneous OD	12	12	Inert	Scrap Bin	12/11/2015	1	Y
Anti-Aircraft Range 4B	G003-216-1	442624.94	3529697.97	15.7	Y	12/11/2015	OD	Miscellaneous OD	8	3	Inert	Scrap Bin	12/11/2015	0.6	Y
Anti-Aircraft Range 4B	G003-241-1	442635.3	3529706.08	11.1	Y	12/11/2015	OD	Miscellaneous OD	3	5	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G003A-1-1	442571.11	3529682.64	4.3	Y	12/10/2015	OD	Miscellaneous OD	4	5	Inert	Scrap Bin	12/10/2015	0.5	Y
Anti-Aircraft Range 4B	G003A-2-1	442571.76	3529689.72	6.7	Y	12/10/2015	OD	Miscellaneous OD	5	3	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003A-3-1	442572.13	3529688.3	4.1	Y	12/10/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/10/2015	0.4	Y
Anti-Aircraft Range 4B	G003A-4-1	442572.9	3529682.67	3.2	Y	12/10/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/10/2015	0.4	Y
Anti-Aircraft Range 4B	G003A-5-1	442573.95	3529684.35	58.3	Y	12/10/2015	OD	Miscellaneous OD	3	1	Inert	Scrap Bin	12/10/2015	0.1	Y
Anti-Aircraft Range 4B	G003A-6-1	442575	3529680.6	16.6	Y	12/10/2015	OD	Miscellaneous OD	5	1	Inert	Scrap Bin	12/10/2015	0.7	Y
Anti-Aircraft Range 4B	G003A-7-1	442575.3	3529678.8	14.3	Y	12/10/2015	OD	Miscellaneous OD	12	1	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003A-8-1	442575.63	3529686.48	4	Y	12/10/2015	OD	Miscellaneous OD	3	1	Inert	Scrap Bin	12/10/2015	0.5	Y
Anti-Aircraft Range 4B	G003A-9-1	442577.55	3529688.25	29.8	Y	12/11/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G003A-10-1	442577.56	3529691.03	3.6	Y	12/11/2015	OD	Miscellaneous OD	5	2	Inert	Scrap Bin	12/11/2015	0.7	Y
Anti-Aircraft Range 4B	G003A-11-1	442578.02	3529692.91	14.9	Y	12/11/2015	OD	Miscellaneous OD	1	1	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G003A-12-1	442579.13	3529691.33	12	Y	12/11/2015	OD	Miscellaneous OD	4	3	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G003A-13-1	442580.24	3529688.92	2.8	Y	12/11/2015	OD	Miscellaneous OD	8	1	Inert	Scrap Bin	12/11/2015	0.3	Y
Anti-Aircraft Range 4B	G003A-14-1	442581.58	3529683.6	5.6	Y	12/11/2015	OD	Miscellaneous OD	8	3	Inert	Scrap Bin	12/11/2015	0.6	Y
Anti-Aircraft Range 4B	G003A-15-1	442582.09	3529686.11	13.7	Y	12/11/2015	OD	Miscellaneous OD	4	4	Inert	Scrap Bin	12/11/2015	0.4	Y
Anti-Aircraft Range 4B	G003A-16-1	442582.65	3529691.7	19.1	Y	12/11/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/11/2015	0.7	Y
Anti-Aircraft Range 4B	G003A-17-1	442582.91	3529685.08	6.1	Y	12/11/2015	OD	Miscellaneous OD	1	2	Inert	Scrap Bin	12/11/2015	0.3	Y
Anti-Aircraft Range 4B	G003A-18-1	442583.4	3529689.75	18.2	Y	12/11/2015	OD	Miscellaneous OD	2	3	Inert	Scrap Bin	12/11/2015	0	Y
Anti-Aircraft Range 4B	G003A-19-1	442583.7	3529686.6	37.7	Y	12/11/2015	OD	Miscellaneous OD	4	4	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G003A-20-1	442584.56	3529681.73	6.7	Y	12/11/2015	OD	Miscellaneous OD	1	3	Inert	Scrap Bin	12/11/2015	0.5	Y
Anti-Aircraft Range 4B	G003A-21-1	442586.25	3529683.45	10.5	Y	12/11/2015	OD	Miscellaneous OD	3	2	Inert	Scrap Bin	12/11/2015	0.4	Y
Anti-Aircraft Range 4B	G003A-22-1	442586.75	3529685.39	269	Y	12/11/2015	OD	Miscellaneous OD	1	4	Inert	Scrap Bin	12/11/2015	0.6	Y
Anti-Aircraft Range 4B	G003A-23-1	442588.05	3529682.17	14.6	Y	12/11/2015	OD	Miscellaneous OD	4	4	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G003A-24-1	442571.8	3529687.3	3.4	Y	12/10/2015	OD	Miscellaneous OD	2	1	Inert	Scrap Bin	12/10/2015	0.4	Y
Anti-Aircraft Range 4B	G003A-25-1	442577.62	3529676.05	25.1	Y	12/10/2015	OD	Miscellaneous OD	14	6	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003A-26-1	442585.7	3529686.87	9.3	Y	12/11/2015	OD	Miscellaneous OD	2	2	Inert	Scrap Bin	12/11/2015	0.4	Y

Table 4-3
DGM Results

DGM Results - Ft Stewart - RCRA Fall 2015

Site Name	Item ID	Easting	Northing	Ch 2 Response	Selected to Dig (Y/N)	Dig Completed Date	Dig Result	Item Description	DEPTH (in)	Qty	Condition	Disposition	QC Hole Check Date	QC Hole Check Response	QC Hole Check Passed
Anti-Aircraft Range 4B	G003B-1-1	442602.9	3529705.05	8.9	Y	12/10/2015	OD	Miscellaneous OD	8	3	Inert	Scrap Bin	12/10/2015	0.9	Y
Anti-Aircraft Range 4B	G003B-2-1	442604.22	3529698.94	28.9	Y	12/10/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-3-1	442604.85	3529701	21.3	Y	12/11/2015	OD	Miscellaneous OD	6	5	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-4-1	442604.96	3529703.69	5.6	Y	12/10/2015	OD	Miscellaneous OD	7	3	Inert	Scrap Bin	12/10/2015	0.4	Y
Anti-Aircraft Range 4B	G003B-5-1	442605.47	3529705.62	4	Y	12/10/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/10/2015	0.4	Y
Anti-Aircraft Range 4B	G003B-6-1	442605.78	3529706.64	9	Y	12/10/2015	OD	Miscellaneous OD	5	5	Inert	Scrap Bin	12/10/2015	2.6	Y
Anti-Aircraft Range 4B	G003B-7-1	442606.67	3529695.64	242.7	Y	12/10/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/10/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-8-1	442606.95	3529702.12	5.8	Y	12/11/2015	OD	Miscellaneous OD	5	5	Inert	Scrap Bin	12/11/2015	0.5	Y
Anti-Aircraft Range 4B	G003B-9-1	442607.4	3529700.55	9.2	Y	12/11/2015	OD	Miscellaneous OD	4	6	Inert	Scrap Bin	12/11/2015	0	Y
Anti-Aircraft Range 4B	G003B-10-1	442607.89	3529704.17	4.8	Y	12/11/2015	OD	Miscellaneous OD	5	2	Inert	Scrap Bin	12/11/2015	0.4	Y
Anti-Aircraft Range 4B	G003B-11-1	442608.6	3529701.95	3.1	Y	12/11/2015	OD	Miscellaneous OD	8	4	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-12-1	442608.71	3529707.27	2.6	Y	12/10/2015	OD	Miscellaneous OD	18	2	Inert	Scrap Bin	12/10/2015	0	Y
Anti-Aircraft Range 4B	G003B-13-1	442608.83	3529692.71	6.7	Y	12/10/2015	OD	Miscellaneous OD	8	6	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-14-1	442608.88	3529696.75	334.1	Y	12/10/2015	OD	Miscellaneous OD	5	1	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-15-1	442609.31	3529698.28	56.2	Y	12/10/2015	OD	Miscellaneous OD	4	3	Inert	Scrap Bin	12/10/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-16-1	442609.82	3529703.49	3.1	Y	12/10/2015	OD	Miscellaneous OD	5	5	Inert	Scrap Bin	12/10/2015	0.5	Y
Anti-Aircraft Range 4B	G003B-17-1	442610.1	3529694.85	54.7	Y	12/10/2015	OD	Miscellaneous OD	6	6	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-18-1	442610.1	3529707.9	17.6	Y	12/10/2015	OD	Miscellaneous OD	7	3	Inert	Scrap Bin	12/10/2015	0.7	Y
Anti-Aircraft Range 4B	G003B-19-1	442611.37	3529701.98	7.4	Y	12/10/2015	OD	Miscellaneous OD	8	4	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-20-1	442611.38	3529699.96	3.5	Y	12/10/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/10/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-21-1	442611.64	3529709.46	2.9	Y	12/11/2015	OD	Miscellaneous OD	5	3	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-22-1	442611.98	3529697.8	3.7	Y	12/10/2015	OD	Miscellaneous OD	5	4	Inert	Scrap Bin	12/10/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-23-1	442612.12	3529703.8	3.8	Y	12/10/2015	OD	Miscellaneous OD	6	3	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-24-1	442612.42	3529708.28	6.7	Y	12/11/2015	OD	Miscellaneous OD	8	4	Inert	Scrap Bin	12/11/2015	1.9	Y
Anti-Aircraft Range 4B	G003B-25-1	442612.55	3529701.27	3.5	Y	12/10/2015	OD	Miscellaneous OD	8	2	Inert	Scrap Bin	12/10/2015	0.4	Y
Anti-Aircraft Range 4B	G003B-26-1	442612.89	3529704.97	4.1	Y	12/10/2015	OD	Miscellaneous OD	7	1	Inert	Scrap Bin	12/10/2015	0.3	Y
Anti-Aircraft Range 4B	G003B-27-1	442613.43	3529710.37	4	Y	12/11/2015	OD	Miscellaneous OD	5	8	Inert	Scrap Bin	12/11/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-28-1	442613.7	3529702.95	9.4	Y	12/10/2015	OD	Miscellaneous OD	7	4	Inert	Scrap Bin	12/10/2015	1.5	Y
Anti-Aircraft Range 4B	G003B-29-1	442613.75	3529706.33	5.5	Y	12/10/2015	OD	Miscellaneous OD	7	1	Inert	Scrap Bin	12/10/2015	0.3	Y
Anti-Aircraft Range 4B	G003B-30-1	442614.94	3529709.46	3.2	Y	12/11/2015	OD	Miscellaneous OD	36	1	Inert	Scrap Bin	12/11/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-31-1	442615.2	3529695.15	3.5	Y	12/10/2015	OD	Miscellaneous OD	2	2	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-32-1	442615.2	3529702.8	11.4	Y	12/10/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/10/2015	20	Y
Anti-Aircraft Range 4B	G003B-33-1	442616.74	3529705.58	43	Y	12/10/2015	OD	Miscellaneous OD	5	1	Inert	Scrap Bin	12/10/2015	0.1	Y
Anti-Aircraft Range 4B	G003B-34-1	442617.05	3529695.92	4.8	Y	12/10/2015	OD	Miscellaneous OD	12	9	Inert	Scrap Bin	12/10/2015	0.2	Y
Anti-Aircraft Range 4B	G003B-35-1	442618.27	3529701.75	5.7	Y	12/10/2015	OD	Miscellaneous OD	5	1	Inert	Scrap Bin	12/10/2015	0	Y
Anti-Aircraft Range 4B	G004-7-1	442727.91	3529768.78	55.7	Y	12/12/2015	OD	Miscellaneous OD	6	12	Inert	Scrap Bin	12/12/2015	0.2	Y
Anti-Aircraft Range 4B	G004-15-1	442730.38	3529780.48	13	Y	12/12/2015	OD	Miscellaneous OD	8	2	Inert	Scrap Bin	12/12/2015	0.4	Y
Anti-Aircraft Range 4B	G004-61-1	442743.6	3529776	12.2	Y	12/12/2015	OD	Miscellaneous OD	24	12	Inert	Scrap Bin	12/12/2015	0.4	Y
Anti-Aircraft Range 4B	G004-75-1	442746.89	3529747.78	6.7	Y	12/12/2015	OD	Miscellaneous OD	8	1	Inert	Scrap Bin	12/12/2015	0.1	Y
Anti-Aircraft Range 4B	G004-77-1	442747.27	3529783.95	261.6	Y	12/12/2015	OD	Miscellaneous OD	6	7	Inert	Scrap Bin	12/12/2015	0.9	Y
Anti-Aircraft Range 4B	G004-82-1	442749.75	3529744.35	15.7	Y	12/12/2015	OD	Miscellaneous OD	8	1	Inert	Scrap Bin	12/12/2015	0.1	Y
Anti-Aircraft Range 4B	G004-86-1	442750.5	3529759.35	9.3	Y	12/12/2015	OD	Miscellaneous OD	18	12	Inert	Scrap Bin	12/12/2015	0.4	Y
Anti-Aircraft Range 4B	G004-97-1	442753.42	3529748.7	14.2	Y	12/12/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/12/2015	1.2	Y
Anti-Aircraft Range 4B	G004-164-1	442781.35	3529772.27	52.7	Y	12/12/2015	OD	Miscellaneous OD	12	2	Inert	Scrap Bin	12/12/2015	0.1	Y
Anti-Aircraft Range 4B	G004-187-1	442787.63	3529787.4	40.6	Y	12/9/2015	OD	Miscellaneous OD	0	1	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004-192-1	442789.02	3529769.18	78.6	Y	12/12/2015	OD	Miscellaneous OD	18	8	Inert	Scrap Bin	12/12/2015	2	Y
Anti-Aircraft Range 4B	G004-197-1	442789.86	3529764.02	21.1	Y	12/12/2015	OD	Miscellaneous OD	4	12	Inert	Scrap Bin	12/12/2015	0.2	Y
Anti-Aircraft Range 4B	G004-214-1	442793.25	3529799.55	33.4	Y	12/9/2015	OD	Miscellaneous OD	5	3	Inert	Scrap Bin	12/9/2015	0.2	Y
Anti-Aircraft Range 4B	G004-264-1	442807.31	3529796.65	31.3	Y	12/9/2015	OD	Miscellaneous OD	3	1	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004-273-1	442810.95	3529793.17	20.3	Y	12/9/2015	OD	Miscellaneous OD	5	5	Inert	Scrap Bin	12/9/2015	0.3	Y
Anti-Aircraft Range 4B	G004-279-1	442812	3529779.65	48	Y	12/11/2015	OD	Miscellaneous OD	4	4	Inert	Scrap Bin	12/11/2015	0.9	Y
Anti-Aircraft Range 4B	G004-285-1	442813.35	3529804.8	89.8	Y	12/9/2015	OD	Miscellaneous OD	5	7	Inert	Scrap Bin	12/9/2015	0.2	Y
Anti-Aircraft Range 4B	G004-286-1	442813.5	3529786.35	98.7	Y	12/11/2015	OD	Miscellaneous OD	10	10	Inert	Scrap Bin	12/11/2015	0.9	Y
Anti-Aircraft Range 4B	G004-290-1	442816.35	3529794.6	30.3	Y	12/9/2015	OD	Miscellaneous OD	4	2	Inert	Scrap Bin	12/9/2015	0.2	Y

Table 4-3
DGM Results
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DGM Results - Ft Stewart - RCRA Fall 2015

Site Name	Item ID	Easting	Northing	Ch 2 Response	Selected to Dig (Y/N)	Dig Completed Date	Dig Result	Item Description	DEPTH (in)	Qty	Condition	Disposition	QC Hole Check Date	QC Hole Check Response	QC Hole Check Passed
Anti-Aircraft Range 4B	G004A-1-1	442793.55	3529805.41	3.3	Y	12/9/2015	OD	Miscellaneous OD	4	3	Inert	Scrap Bin	12/9/2015	0	Y
Anti-Aircraft Range 4B	G004A-2-1	442794.02	3529799.52	58.6	Y	12/9/2015	OD	Miscellaneous OD	4	3	Inert	Scrap Bin	12/9/2015	0.2	Y
Anti-Aircraft Range 4B	G004A-3-1	442794.03	3529798.17	15.3	Y	12/9/2015	OD	Miscellaneous OD	4	2	Inert	Scrap Bin	12/9/2015	0.4	Y
Anti-Aircraft Range 4B	G004A-4-1	442794.95	3529804.5	4.3	Y	12/9/2015	OD	Miscellaneous OD	6	4	Inert	Scrap Bin	12/9/2015	0.2	Y
Anti-Aircraft Range 4B	G004A-5-1	442796.25	3529798.35	9.5	Y	12/9/2015	OD	Miscellaneous OD	6	5	Inert	Scrap Bin	12/9/2015	2	Y
Anti-Aircraft Range 4B	G004A-6-1	442796.28	3529806.71	3.2	Y	12/9/2015	OD	Miscellaneous OD	7	2	Inert	Scrap Bin	12/9/2015	0.4	Y
Anti-Aircraft Range 4B	G004A-7-1	442796.55	3529800.98	2.7	Y	12/9/2015	OD	Miscellaneous OD	12	1	Inert	Scrap Bin	12/9/2015	0.2	Y
Anti-Aircraft Range 4B	G004A-8-1	442796.72	3529791.66	3.3	Y	12/9/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/9/2015	0.4	Y
Anti-Aircraft Range 4B	G004A-9-1	442798.18	3529796.73	2.9	Y	12/9/2015	OD	Miscellaneous OD	6	2	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-10-1	442799.39	3529805.5	7.2	Y	12/9/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-11-1	442799.45	3529802.99	43.6	Y	12/9/2015	OD	Miscellaneous OD	12	7	Inert	Scrap Bin	12/9/2015	0.5	Y
Anti-Aircraft Range 4B	G004A-12-1	442799.86	3529797.5	4	Y	12/9/2015	OD	Miscellaneous OD	7	3	Inert	Scrap Bin	12/9/2015	0	Y
Anti-Aircraft Range 4B	G004A-13-1	442800.13	3529801.09	4.3	Y	12/9/2015	OD	Miscellaneous OD	4	5	Inert	Scrap Bin	12/9/2015	0.3	Y
Anti-Aircraft Range 4B	G004A-14-1	442800.35	3529806.09	19.2	Y	12/9/2015	OD	Miscellaneous OD	5	1	Inert	Scrap Bin	12/9/2015	0.2	Y
Anti-Aircraft Range 4B	G004A-15-1	442800.9	3529799.7	10	Y	12/9/2015	OD	Miscellaneous OD	8	2	Inert	Scrap Bin	12/9/2015	0.5	Y
Anti-Aircraft Range 4B	G004A-16-1	442801.72	3529793.92	6.7	Y	12/9/2015	OD	Miscellaneous OD	10	10	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-17-1	442802.04	3529791.75	3.5	Y	12/9/2015	OD	Miscellaneous OD	10	8	Inert	Scrap Bin	12/9/2015	0	Y
Anti-Aircraft Range 4B	G004A-18-1	442802.94	3529795.49	3.4	Y	12/9/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-19-1	442803.6	3529792.65	13	Y	12/9/2015	OD	Miscellaneous OD	8	4	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-20-1	442804.05	3529805.25	71.6	Y	12/9/2015	OD	Miscellaneous OD	10	3	Inert	Scrap Bin	12/9/2015	0	Y
Anti-Aircraft Range 4B	G004A-21-1	442805.01	3529803.15	4.4	Y	12/9/2015	OD	Miscellaneous OD	5	2	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-22-1	442805.29	3529795	3	Y	12/9/2015	OD	Miscellaneous OD	3	3	Inert	Scrap Bin	12/9/2015	0	Y
Anti-Aircraft Range 4B	G004A-23-1	442805.89	3529796.93	8.4	Y	12/9/2015	OD	Miscellaneous OD	12	6	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-24-1	442806.45	3529803.9	18.4	Y	12/9/2015	OD	Miscellaneous OD	1	1	Inert	Scrap Bin	12/9/2015	30	Y
Anti-Aircraft Range 4B	G004A-25-1	442807.31	3529796.65	31.3	Y	12/9/2015	OD	Miscellaneous OD	3	1	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-26-1	442807.46	3529800.89	4	Y	12/9/2015	OD	Miscellaneous OD	8	4	Inert	Scrap Bin	12/9/2015	0.2	Y
Anti-Aircraft Range 4B	G004A-27-1	442807.95	3529791.9	9.4	Y	12/9/2015	OD	Miscellaneous OD	5	4	Inert	Scrap Bin	12/9/2015	0	Y
Anti-Aircraft Range 4B	G004A-28-1	442808.37	3529804.34	4.7	Y	12/9/2015	OD	Miscellaneous OD	5	4	Inert	Scrap Bin	12/9/2015	0.3	Y
Anti-Aircraft Range 4B	G004A-29-1	442808.43	3529799.85	3.5	Y	12/9/2015	OD	Miscellaneous OD	5	4	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G004A-30-1	442808.51	3529794.72	4.4	Y	12/9/2015	OD	Miscellaneous OD	4	4	Inert	Scrap Bin	12/9/2015	0.1	Y
Anti-Aircraft Range 4B	G005-17-1	443136.69	3529964.73	178.5	Y	12/12/2015	OD	Miscellaneous OD	0	1	Inert	Scrap Bin	12/12/2015	473	Y
Anti-Aircraft Range 4B	G005-19-1	443137.49	3529953.18	19.3	Y	12/12/2015	OD	Miscellaneous OD	12	1	Inert	Scrap Bin	12/12/2015	0.1	Y
Anti-Aircraft Range 4B	G005-31-1	443142.67	3529956.48	16.2	Y	12/12/2015	OD	Miscellaneous OD	12	3	Inert	Scrap Bin	12/12/2015	0.6	Y
Anti-Aircraft Range 4B	G005-49-1	443149.2	3529951.27	9.6	Y	12/12/2015	OD	Miscellaneous OD	18	1	Inert	Scrap Bin	12/12/2015	0.2	Y
Anti-Aircraft Range 4B	G005-51-1	443149.8	3529986.23	13.3	Y	12/12/2015	OD	Miscellaneous OD	8	1	Inert	Scrap Bin	12/12/2015	0	Y
Anti-Aircraft Range 4B	G005-146-1	443177.58	3529953.16	8.4	Y	12/12/2015	OD	Miscellaneous OD	6	6	Inert	LIP	12/12/2015	1.9	Y
Anti-Tank Range	ATR90-19-1	439430.6	3527915	15.8	Y	12/8/2015	MD	Projectile, 40mm, practice, model unknown	6	1	Expended	Demil/Disposal	12/8/2015	0.5	Y
Anti-Tank Range	ATR90-27-1	439441.52	3527957.86	17.1	Y	12/8/2015	OD	Miscellaneous OD	2	1	Inert	Scrap Bin	12/8/2015	0.5	Y
Anti-Tank Range	ATR90-47-1	439460.65	3528017.9	26.8	Y	12/8/2015	OD	Miscellaneous OD	3	2	Inert	Scrap Bin	12/8/2015	0.2	Y
Anti-Tank Range	ATR90-94-1	439536.51	3527994.4	48.5	Y	12/8/2015	OD	Fence material	2	1	Inert	Scrap Bin	12/8/2015	0.3	Y
Anti-Tank Range	ATR90-104-1	439549.37	3527746.54	54.1	Y	12/8/2015	OD	Miscellaneous OD	9	2	Inert	Scrap Bin	12/8/2015	1.9	Y
Anti-Tank Range	ATR90-129-1	439584.04	3527760.72	109.4	Y	12/8/2015	OD	Bolt	2	5	Inert	Scrap Bin	12/8/2015	0.6	Y
Anti-Tank Range	ATR90-159-1	439619.45	3527761.73	40.7	Y	12/9/2015	OD	Miscellaneous OD	8	22	Inert	Scrap Bin	12/9/2015	11.2	Y
Anti-Tank Range	ATR90-171-1	439631.15	3527743.88	93.4	Y	12/8/2015	OD	Rebar	5	2	Inert	Scrap Bin	12/8/2015	3.4	Y
Anti-Tank Range	ATR90-181-1	439643.99	3527685.59	26.5	Y	12/8/2015	OD	Miscellaneous OD	6	4	Inert	Scrap Bin	12/8/2015	0.5	Y
Anti-Tank Range	ATR90-184-1	439647.26	3527699.67	25.9	Y	12/8/2015	OD	Cable	5	2	Inert	Scrap Bin	12/8/2015	2	Y
Anti-Tank Range	ATR90-189-1	439652.34	3527729.79	13.8	Y	12/8/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/8/2015	0.2	Y
Anti-Tank Range	ATR90-226-1	439682.45	3527714.75	14.4	Y	12/7/2015	OD	Nails	8	5	Inert	Scrap Bin	12/7/2015	1.8	Y
Anti-Tank Range	ATR90-239-1	439693.37	3528048.44	6	Y	12/7/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/7/2015	0.2	Y
Anti-Tank Range	ATR90-244-1	439696.2	3527669.37	37.7	Y	12/8/2015	OD	Rebar	4	1	Inert	Scrap Bin	12/8/2015	0.7	Y
Anti-Tank Range	ATR90-254-1	439702.88	3528005.28	38.2	Y	12/7/2015	OD	Wire	6	1	Inert	Scrap Bin	12/7/2015	2.9	Y
Anti-Tank Range	ATR90-263-1	439716.99	3527701.38	189.2	Y	12/10/2015	OD	Anchor, ground	4	1	Inert	Scrap Bin	12/10/2015	129	Y
Anti-Tank Range	ATR90-265-1	439719.21	3527701.04	31.7	Y	12/10/2015	OD	Miscellaneous OD	7	3	Inert	Scrap Bin	12/10/2015	0.5	Y

Table 4-3
DGM Results

DGM Results - Ft Stewart - RCRA Fall 2015

Site Name	Item ID	Easting	Northing	Ch 2 Response	Selected to Dig (Y/N)	Dig Completed Date	Dig Result	Item Description	DEPTH (in)	Qty	Condition	Disposition	QC Hole Check Date	QC Hole Check Response	QC Hole Check Passed
Anti-Tank Range	ATR90-275-1	439726.1	3527730.73	22.4	Y	12/8/2015	OD	Rebar	12	2	Inert	Scrap Bin	12/8/2015	188	Y
Anti-Tank Range	ATR90-283-1	439728.82	3527683.87	29.5	Y	12/8/2015	MD	Mortar, unknown	12	1	Inert	Demil/Disposal	12/8/2015	1	Y
Anti-Tank Range	ATR90-294-1	439734.91	3527700.15	12.9	Y	12/8/2015	OD	Miscellaneous OD	5	4	Inert	Scrap Bin	12/8/2015	0.7	Y
Anti-Tank Range	ATR90-300-1	439738.57	3527669.49	7.9	Y	12/8/2015	OD	Miscellaneous OD	3	4	Inert	Scrap Bin	12/8/2015	0.3	Y
Anti-Tank Range	ATR90-301-1	439738.8	3527625.41	68.3	Y	12/8/2015	OD	Bolt	2	2	Inert	Scrap Bin	12/8/2015	0.9	Y
Anti-Tank Range	ATR90-314-1	439748.04	3527714.63	24	Y	12/7/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/7/2015	2.9	Y
Anti-Tank Range	ATR90-346-1	439757.84	3527758.81	82.7	Y	12/8/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/8/2015	2	Y
Anti-Tank Range	ATR90-351-1	439760.28	3527991.06	11.6	Y	12/8/2015	OD	Fence material	12	1	Inert	Scrap Bin	12/8/2015	234	Y
Anti-Tank Range	ATR90-358-1	439761.49	3527714.87	78	Y	12/7/2015	OD	Miscellaneous OD	6	2	Inert	Scrap Bin	12/7/2015	3	Y
Anti-Tank Range	ATR90-359-1	439761.53	3527639.54	93.5	Y	12/7/2015	OD	Miscellaneous OD	12	1	Inert	Scrap Bin	12/7/2015	2.3	Y
Anti-Tank Range	ATR90-363-1	439762.76	3527652.49	45.5	Y	12/8/2015	OD	Rebar	6	1	Inert	Scrap Bin	12/8/2015	1	Y
Anti-Tank Range	ATR90-397-1	439774.99	3527607.66	160.1	Y	12/8/2015	OD	Miscellaneous OD	4	2	Inert	Scrap Bin	12/8/2015	1.9	Y
Anti-Tank Range	ATR90-406-1	439778.33	3527670.12	64.6	Y	12/8/2015	OD	Miscellaneous OD	10	1	Inert	Scrap Bin	12/8/2015	1.1	Y
Anti-Tank Range	ATR90-418-1	439783.88	3527685.58	7.6	Y	12/8/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/8/2015	0.7	Y
Anti-Tank Range	ATR90-420-1	439785.13	3527976.52	40.2	Y	12/7/2015	OD	Miscellaneous OD	12	2	Inert	Scrap Bin	12/7/2015	0.7	Y
Anti-Tank Range	ATR90-427-1	439788.43	3527685.67	9.5	Y	12/8/2015	OD	Miscellaneous OD	12	10	Inert	Scrap Bin	12/8/2015	0.6	Y
Anti-Tank Range	ATR90-441-1	439793.11	3527622.43	73.3	Y	12/8/2015	OD	Miscellaneous OD	5	3	Inert	Scrap Bin	12/8/2015	3.2	Y
Anti-Tank Range	ATR90-469-1	439806.45	3527746.84	13.4	Y	12/8/2015	OD	Miscellaneous OD	12	2	Inert	Scrap Bin	12/8/2015	1.4	Y
Anti-Tank Range	ATR90-470-1	439806.93	3527825.27	120.5	Y	12/8/2015	OD	Fence post	8	1	Inert	Scrap Bin	12/8/2015	1.9	Y
Anti-Tank Range	ATR90-476-1	439810.56	3527790.97	11.5	Y	12/8/2015	OD	Bolt	8	5	Inert	Scrap Bin	12/8/2015	0.1	Y
Anti-Tank Range	ATR90-489-1	439814.68	3527852.04	9.5	Y	12/8/2015	OD	Miscellaneous OD	5	1	Inert	Scrap Bin	12/8/2015	1.9	Y
Anti-Tank Range	ATR90-501-1	439818.53	3527638.19	55.8	Y	12/7/2015	OD	Miscellaneous OD	6	1	Inert	Scrap Bin	12/7/2015	0.3	Y
Anti-Tank Range	ATR90-503-1	439819.19	3527881.16	209.2	Y	12/7/2015	OD	Fence post	6	1	Inert	Scrap Bin	12/7/2015	1	Y
Anti-Tank Range	ATR90-505-1	439819.78	3527790.52	2691	Y	12/8/2015	OD	Fence post	6	2	Inert	Scrap Bin	12/8/2015	2.9	Y
Anti-Tank Range	ATR90-510-1	439821.31	3527605.41	158.8	Y	12/8/2015	OD	Fence material	4	1	Inert	Scrap Bin	12/8/2015	2	Y
Anti-Tank Range	ATR90-512-1	439821.63	3527638.23	397.6	Y	12/7/2015	OD	Fence post	1	1	Inert	Scrap Bin	12/7/2015	2	Y
Anti-Tank Range	ATR90-520-1	439823.67	3527593.85	41.3	Y	12/8/2015	OD	Fence material	2	1	Inert	Scrap Bin	12/8/2015	0.4	Y
Anti-Tank Range	ATR90-590-1	439848.64	3527898.07	211.7	Y	12/7/2015	OD	Scrap Metal	8	2	Inert	Scrap Bin	12/7/2015	4.9	Y
Anti-Tank Range	ATR90-616-1	439860.06	3527791.29	21.2	Y	12/8/2015	OD	Miscellaneous OD	6	3	Inert	Scrap Bin	12/8/2015	0.3	Y
Anti-Tank Range	ATR90-654-1	439874.14	3527931.12	33.8	Y	12/7/2015	OD	Fence material	5	1	Inert	Scrap Bin	12/7/2015	0.9	Y
Anti-Tank Range	ATR90-674-1	439881.53	3527592.14	461.2	Y	12/8/2015	OD	Fence post	4	1	Inert	Scrap Bin	12/8/2015	0.2	Y
Anti-Tank Range	ATR90-710-1	439903.33	3527851.9	11	Y	12/8/2015	OD	Miscellaneous OD	12	1	Inert	Scrap Bin	12/8/2015	564	Y
Anti-Tank Range	ATR90-714-1	439905.06	3527790.94	13.5	Y	12/7/2015	OD	Wire	6	4	Inert	Scrap Bin	12/7/2015	0.1	Y
Anti-Tank Range	ATR90-723-1	439916.23	3527791.38	22.7	Y	12/7/2015	OD	Miscellaneous OD	14	6	Inert	Scrap Bin	12/7/2015	3	Y
Anti-Tank Range	ATR90-737-1	439928.05	3527791.35	44	Y	12/8/2015	OD	Miscellaneous OD	1	3	Inert	Scrap Bin	12/8/2015	0.3	Y
Anti-Tank Range	ATR90-747-1	439940.02	3527807.77	20.5	Y	12/7/2015	OD	Miscellaneous OD	6	4	Inert	Scrap Bin	12/7/2015	0.3	Y
Anti-Tank Range	ATR90-791-1	440005.1	3527821.01	38.1	Y	12/7/2015	OD	Fence post	12	1	Inert	Scrap Bin	12/7/2015	950	Y
Anti-Tank Range	ATR90-795-1	440016.37	3527820.44	392.7	Y	12/7/2015	OD	Fence post	12	1	Inert	Scrap Bin	12/7/2015	817	Y
Anti-Tank Range	ATR90-825-1	440049.27	3527743.84	16.3	Y	12/7/2015	OD	Miscellaneous OD	8	1	Inert	Scrap Bin	12/7/2015	0.2	Y
Anti-Tank Range	ATR90-862-1	440106.29	3527730.4	121.6	Y	12/7/2015	OD	Cable	6	2	Inert	Scrap Bin	12/7/2015	0.2	Y
Grenade Launcher Range		438338.12	3525134.57	22.8	Y		No Dig								
Grenade Launcher Range		438354.77	3525165.35	11.6	Y		No Dig								
Grenade Launcher Range	GLR-7-1	438393.13	3525203.82	572.2	Y	12/11/2015	OD	Miscellaneous OD	2	5	Inert	Scrap Bin	12/11/2015	0.7	Y
Grenade Launcher Range	GLR-9-1	438396.61	3525188.76	7.9	Y	1/20/2016	OD	Miscellaneous OD	4	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-11-1	438402.19	3525222.67	11.2	Y	12/11/2015	OD	Miscellaneous OD	4	1	Inert	Scrap Bin	12/11/2015	0.3	Y
Grenade Launcher Range	GLR-14-1	438405.73	3525195.05	13.1	Y	1/20/2016	MD	Frag	5	1	Inert	Demil/Disposal	1/20/2016	0	Y
Grenade Launcher Range	GLR-17-1	438428.94	3525176.24	57.1	Y	1/20/2016	OD	Miscellaneous OD	8	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range		438437.06	3525192.17	248.4	Y		No Dig								
Grenade Launcher Range	GLR-22-1	438451.62	3525224.12	11.1	Y	1/20/2016	OD	Miscellaneous OD	6	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-24-1	438457.68	3525255.62	82.4	Y	12/12/2015	MEC-UXO	Projectile, 90mm, high explosive, anti-tank, M348	6	1	Live	EOD	NULL	NULL	P
Grenade Launcher Range		438460.79	3525249.05	6.2	Y		No Dig								
Grenade Launcher Range		438463.44	3525260.6	50.4	Y		No Dig								
Grenade Launcher Range	GLR-28-1	438466.49	3525273.23	7	Y	12/11/2015	OD	Miscellaneous OD	12	3	Inert	Scrap Bin	12/11/2015	0.9	Y

DGM Results - Ft Stewart - RCRA Fall 2015

Site Name	Item ID	Easting	Northing	Ch 2 Response	Selected to Dig (Y/N)	Dig Completed Date	Dig Result	Item Description	DEPTH (in)	Qty	Condition	Disposition	QC Hole Check Date	QC Hole Check Response	QC Hole Check Passed
Grenade Launcher Range	GLR-32-1	438475.11	3525280.24	406.2	Y	12/11/2015	OD	Miscellaneous OD	2	1	Inert	Scrap Bin	12/11/2015	0.7	Y
Grenade Launcher Range	GLR-35-1	438479.16	3525262.93	131.5	Y	12/10/2015	OD	Miscellaneous OD	14	3	Inert	Scrap Bin	12/10/2015	0.5	Y
Grenade Launcher Range		438485.11	3525278.48	18.7	Y		No Dig								
Grenade Launcher Range	GLR-43-1	438487.24	3525243.86	8	Y	1/20/2016	OD	Miscellaneous OD	8	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-45-1	438490.04	3525271.52	501	Y	12/11/2015	MEC-UXO	Bomb, 250 lb, general purpose, AN-M57	40	1	Live	EOD	12/11/2015	1275	P
Grenade Launcher Range	GLR-45-2	438490.04	3525271.52	501	Y	12/11/2015	MEC-UXO	Projectile, 8inch, high explosive, M106	48	1	Live	EOD	12/11/2015	1275	P
Grenade Launcher Range		438501.44	3525273.3	123.3	Y		No Dig								
Grenade Launcher Range	GLR-51-1	438503.17	3525235.23	9.1	Y	1/20/2016	MD	Frag	3	1	Inert	Demil/Disposal	1/20/2016	0	Y
Grenade Launcher Range	GLR-52-1	438508.26	3525267.15	17.1	Y	1/20/2016	OD	Miscellaneous OD	2	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-54-1	438512.6	3525270.89	11.8	Y	1/20/2016	MD	Fuze, Unknown	5	1	Inert	Demil/Disposal	1/20/2016	0	Y
Grenade Launcher Range	GLR-55-1	438514.35	3525273.02	74.6	Y	1/20/2016	OD	Miscellaneous OD	8	2	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-56-1	438515.16	3525223.44	88.6	Y	1/20/2016	MD	Assorted MD Components	4	1	Expended	Demil/Disposal	1/20/2016	0	Y
Grenade Launcher Range	GLR-58-1	438515.85	3525274.32	359.8	Y	1/20/2016	OD	Miscellaneous OD	2	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-59-1	438516.21	3525198.67	226.5	Y	1/20/2016	NF	NA	0	0	NA	NA	1/20/2016		Y
Grenade Launcher Range	GLR-60-1	438518.53	3525257.99	160.8	Y	1/20/2016	MD	Assorted MD Components	6	1	Expended	Demil/Disposal	1/20/2016	0	Y
Grenade Launcher Range	GLR-61-1	438538.11	3525263.4	282.8	Y	1/20/2016	OD	Miscellaneous OD	2	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-62-1	438539.79	3525254.45	34.2	Y	1/20/2016	MD	Projectile, 57mm, Armor Piercing Tracer, M70	3	1	Expended	Demil/Disposal	1/20/2016	0	Y
Grenade Launcher Range	GLR-63-1	438554.37	3525205.95	5.8	Y	1/19/2016	MD	Fuze, Unknown	9	1	Expended	Demil/Disposal	1/19/2016	0	Y
Grenade Launcher Range	GLR-65-1	438558.09	3525259.27	534.2	Y	1/20/2016	OD	Miscellaneous OD	2	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-66-1	438559.56	3525131.94	154.5	Y	1/19/2016	OD	Miscellaneous OD	8	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-67-1	438562.82	3525253.53	143.7	Y	1/20/2016	OD	Miscellaneous OD	4	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-68-1	438565.4	3525255.55	440.9	Y	1/20/2016	OD	Miscellaneous OD	3	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range		438576.67	3525245.08	647.8	Y		No Dig								
Grenade Launcher Range	GLR-71-1	438577.87	3525175.28	7	Y	1/19/2016	OD	Miscellaneous OD	7	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range		438580.48	3525247.99	222	Y		No Dig								
Grenade Launcher Range	GLR-75-1	438584.92	3525132.46	27.6	Y	1/19/2016	OD	Miscellaneous OD	5	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-76-1	438586.86	3525223.82	74.4	Y	1/19/2016	MD	Flare, Surface, Trip, M49 Series	3	1	Expended	Demil/Disposal	1/19/2016	0	Y
Grenade Launcher Range	GLR-77-1	438590.05	3525194.31	138.9	Y	1/19/2016	OD	Miscellaneous OD	6	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-78-1	438590.25	3525177.2	9.3	Y	1/19/2016	OD	Miscellaneous OD	5	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range		438590.61	3525236.3	373.5	Y		No Dig								
Grenade Launcher Range	GLR-81-1	438600.79	3525234.82	19.1	Y	1/20/2016	MD	Fuze, Unknown	12	1	Expended	Demil/Disposal	1/20/2016	0	Y
Grenade Launcher Range	GLR-82-1	438601.77	3525235.62	67.3	Y	1/19/2016	OD	Miscellaneous OD	10	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-83-1	438603.5	3525146.25	83.5	Y	1/19/2016	OD	Miscellaneous OD	7	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-86-1	438609.74	3525203.32	45.5	Y	1/19/2016	OD	Miscellaneous OD	2	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-87-1	438619.24	3525220.48	203.4	Y	1/20/2016	OD	Miscellaneous OD	3	1	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-88-1	438621	3525211.85	217.6	Y	1/19/2016	OD	Miscellaneous OD	6	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-89-1	438623.16	3525223.65	14.9	Y	1/19/2016	OD	Miscellaneous OD	6	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-91-1	438628.63	3525228.48	11.3	Y	1/19/2016	OD	Miscellaneous OD	6	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-93-1	438637.32	3525225.09	1849.2	Y	1/20/2016	OD	Miscellaneous OD	3	2	Inert	LIP	1/20/2016	0	Y
Grenade Launcher Range	GLR-96-1	438647.75	3525223	52.6	Y	1/19/2016	OD	Miscellaneous OD	3	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-97-1	438652.48	3525175.97	149.6	Y	1/19/2016	OD	Miscellaneous OD	2	1	Inert	LIP	1/19/2016	0	Y
Grenade Launcher Range	GLR-98-1	438661.12	3525214.26	352.4	Y	1/19/2016	OD	Miscellaneous OD	5	1	Inert	LIP	1/19/2016	0	Y

Table 4-5
Anti-Tank Range 90-MM-2 Analog Investigation Results

Item of Interest - Fort Stewart - RCRA Fall 2015

Site Name	Work Unit Name	Item Number	Operation Date	Easting	Northing	Depth Inches	Quantity	Item Type	Item Description	Item Comments	Fuzed	Intact	Initial Condition	Disposition	Demo	Team Name
ATR90	ATR90-T035	ATR90-T035-T2-1	2015-12-08	439789.74	3527642.70	2	1	Munitions Debris	Cartridge, 25mm, TP-T		N	Y	Inert	Demil/Disposal	Y	Team 2
ATR90	ATR90-T028	ATR90-T028-T2-1	2015-12-07	439856.74	3527881.07	2	1	Munitions Debris	Submunition	Remote Anti-Armor Munition (RAAM) Practice/Training	N	N	Inert	Demil/Disposal	Y	Team 2
ATR90	ATR90-T031	ATR90-T031-T2-1	2015-12-04	439467.62	3527719.18	0	1	Munitions Debris	Projectile, 25mm TP		N	N	Inert	Demil/Disposal	N	Team 2
ATR90	ATR90-T037B	ATR90-T037B-T1-1	2015-12-03	438304.31	3527552.76	12	1	Quality Control Seed	Pipe	QC Seed #15	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T037B	ATR90-T037B-T1-2	2015-12-03	438304.45	3527552.89	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T037B	ATR90-T037B-T1-3	2015-12-03	438306.64	3527552.11	24	1	Quality Control Seed	Pipe	QC Seed #16	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T026	ATR90-T026-T2-1	2015-12-02	438146.56	3527884.11	24	1	Quality Control Seed	Pipe	QC Seed #17	NA	NA	NA	QC	N	Team 2
ATR90	ATR90-T026	ATR90-T026-T2-2	2015-12-02	438143.79	3527884.12	12	1	Quality Control Seed	Pipe	QC Seed #18	NA	NA	NA	QC	N	Team 2
ATR90	ATR90-T026	ATR90-T026-T2-3	2015-12-02	438144.03	3527884.14	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 2
ATR90	ATR90-T016	ATR90-T016-T2-1	2015-12-01	438670.03	3528053.93	0	1	Munitions Debris	Flare	Expended slap flare	NA	N	Expended	Demil/Disposal	N	Team 2
ATR90	ATR90-T015	ATR90-T015-T2-1	2015-11-24	438364.96	3528052.88	2	1	Munitions Debris	Rocket, 2.36-inch, prac		N	N	Expended	Demil/Disposal	N	Team 2
ATR90	ATR90-T025	ATR90-T025-T2-1	2015-11-24	438336.97	3527966.52	2	1	Munitions Debris	Rocket, 2.36-inch, prac		N	N	Expended	Demil/Disposal	N	Team 2
ATR90	ATR90-T042	ATR90-T042-T1-1	2015-11-24	438438.94	3527220.16	12	1	Quality Control Seed	Pipe	QC Seed #19	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T042	ATR90-T042-T1-2	2015-11-24	438439.32	3527219.88	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T042	ATR90-T042-T1-3	2015-11-24	438439.98	3527221.13	24	1	Quality Control Seed	Pipe	QC Seed #20	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T008	ATR90-T008-T2-1	2015-11-20	439387.98	3528550.13	12	10	Other (Non Munitions) Debris	Other	Household trash. Transect next to current landfill.	NA	NA	NA	LIP	N	Team 2
ATR90	ATR90-T046	ATR90-T046-T1-1	2015-11-20	439353.31	3526887.55	12	1	Quality Control Seed	Pipe	QC Seed #21	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T046	ATR90-T046-T1-2	2015-11-20	439349.59	3526889.12	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T046	ATR90-T046-T1-3	2015-11-20	439347.27	3526889.02	24	1	Quality Control Seed	Pipe	QC Seed #22	NA	NA	NA	QC	N	Team 1
ATR90	ATR90-T002	ATR90-T002-T2-1	2015-11-19	438710.10	3528795.80	2	1	Munitions Debris	Projectile, 40mm TP		N	Y	Inert	Demil/Disposal	Y	Team 2
ATR90	ATR90-T002	ATR90-T002-T2-2	2015-11-19	438696.55	3528799.30	2	1	Munitions Debris	Projectile, 40mm TP		N	Y	Inert	Demil/Disposal	Y	Team 2
ATR90	ATR90-T002A	ATR90-T002A-T2-1	2015-11-19	438626.07	3528800.88	12	1	Munitions Debris	Projectile, 90mm APT		N	N	Expended	Demil/Disposal	Y	Team 2
ATR90	ATR90-T006	ATR90-T006-T2-1	2015-11-19	438572.93	3528632.72	18	1	Munitions Debris	Projectile, 90mm APT		N	N	Expended	Demil/Disposal	Y	Team 2
ATR90	ATR90-T009	ATR90-T009-T2-1	2015-11-19	438542.45	3528554.85	5	1	Munitions Debris	Projectile, 90mm APT		N	N	Expended	Demil/Disposal	Y	Team 2
ATR90	ATR90-T009	ATR90-T009-T2-2	2015-11-19	438530.64	3528548.75	6	1	Munitions Debris	Projectile, 40mm TP		N	N	Expended	Demil/Disposal	Y	Team 2

Table 4-7
Grenade Launcher Range Analog Investigation Results

Item Of Interest - Ft Stewart - RCRA Fall 2015

Site Name	Work Unit Name	Item Number	Operation Date	Easting	Northing	Depth Inches	Quantity	Item Type	Item Description	Item Comments	Fuzed	Intact	Initial Condition	Disposition	Demo	Team Name
GLR	GLR-T002	GLR-T002-T1-1	2015-11-10	439067.99	3525844.18	12	1	Quality Control Seed	Pipe	QC Seed #30	NA	NA	NA	QC	N	Team 1
GLR	GLR-T002	GLR-T002-T1-2	2015-11-10	439061.55	3525845.87	0	3	Quality Control Seed	Nails	QC Seeds - 3 Nails	NA	NA	NA	QC	N	Team 1
GLR	GLR-T002	GLR-T002-T1-3	2015-11-10	439057.08	3525841.44	24	1	Quality Control Seed	Pipe	QC Seed #31	NA	NA	NA	QC	N	Team 1
GLR	GLR-T006	GLR-T006-T1-1	2015-11-09	439094.10	3525822.50	12	1	Quality Control Seed	Pipe	QC Seed #28	NA	NA	NA	QC	N	Team 1
GLR	GLR-T006	GLR-T006-T1-2	2015-11-09	439095.59	3525816.68	0	3	Quality Control Seed	Nails	QC Seeds - 3 Nails	NA	NA	NA	QC	N	Team 1
GLR	GLR-T006	GLR-T006-T1-3	2015-11-09	439084.96	3525816.05	24	1	Quality Control Seed	Pipe	QC Seed #29	NA	NA	NA	QC	N	Team 1
GLR	GLR-T009	GLR-T009-T2-1	2015-11-09	439040.69	3525744.11	2	1	Munitions Debris	Mine	Practice Mine	N	Y	Inert	Demil/Disposal	N	Team 2
GLR	GLR-T009	GLR-T009-T2-2	2015-11-09	438599.95	3525390.34	12	1	Quality Control Seed	Pipe	QC Seed #27	NA	NA	NA	QC	N	Team 2
GLR	GLR-T009	GLR-T009-T2-3	2015-11-09	438598.54	3525389.69	0	3	Quality Control Seed	Nails	QC Seeds - 3 Nails	NA	NA	NA	QC	N	Team 2
GLR	GLR-T009	GLR-T009-T2-4	2015-11-09	438598.26	3525387.43	24	1	Quality Control Seed	Pipe	QC Seed #26	NA	NA	NA	QC	N	Team 2
GLR	GLR-T012	GLR-T012-T2-1	2015-11-06	439342.46	3525959.50	24	1	Quality Control Seed	Pipe	QC Seed #35	NA	NA	NA	QC	N	Team 2
GLR	GLR-T012	GLR-T012-T2-2	2015-11-06	439335.56	3525955.61	12	1	Quality Control Seed	Pipe	QC Seed #36	NA	NA	NA	QC	N	Team 2
GLR	GLR-T012	GLR-T012-T2-3	2015-11-06	439336.66	3525956.74	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 2
GLR	GLR-T014A	GLR-T014A-T1-1	2015-11-05	438635.57	3525375.75	12	1	Quality Control Seed	Pipe	QC Seed #25	NA	NA	NA	QC	N	Team 1
GLR	GLR-T014A	GLR-T014A-T1-2	2015-11-05	438634.64	3525371.83	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
GLR	GLR-T014A	GLR-T014A-T1-3	2015-11-05	438632.86	3525368.01	24	1	Quality Control Seed	Pipe	QC Seed #24	NA	NA	NA	QC	N	Team 1
GLR	GLR-T015	GLR-T015-T1-1	2015-11-04	439349.20	3525929.80	24	1	Quality Control Seed	Pipe	QC Seed #33	NA	NA	NA	QC	N	Team 1
GLR	GLR-T015	GLR-T015-T1-2	2015-11-04	439349.26	3525926.81	0	3	Quality Control Seed	Nails	QC Seed Nails	NA	NA	NA	QC	N	Team 1
GLR	GLR-T015	GLR-T015-T1-3	2015-11-04	439346.98	3525923.75	12	1	Quality Control Seed	Pipe	QC Seed #34	NA	NA	NA	QC	N	Team 1
GLR	GLR-T016	GLR-T016-T2-1	2015-11-04	439249.72	3525835.57	1	1	Munitions Debris	Projectile, 25mm	25mm TP	N	Y	Inert	Demil/Disposal	Y	Team 2
GLR	GLR-T016	GLR-T016-T2-2	2015-11-04	439295.03	3525870.16	0	4	Munitions Debris	Projectile, 25mm	25mm TP	N	Y	TBD	Demil/Disposal	Y	Team 2
GLR	GLR-T016	GLR-T016-T2-3	2015-11-04	439277.24	3525858.69	1	1	Munitions Debris	Projectile, 25mm	25mm TP	N	Y	TBD	Demil/Disposal	Y	Team 2

5.0 MEC HAZARD ASSESSMENT

This section describes the processes and findings of the MEC HA for the Anti-Aircraft Range – 4A and Grenade Launcher Range due to complete exposure pathways to MEC. The RFI has determined that exposure pathways are incomplete for the Anti-Aircraft Range – 4B and the Anti-Tank Range 90-MM-2, so MEC HA was not run for these MRSs.

The Interim MEC HA Methodology (USEPA, 2008) was used, which evaluates the potential explosive hazard associated with conventional MEC present at an MRS under a variety of site conditions, including various cleanup scenarios and land-use assumptions. The MEC HA methodology does not address hazards (explosive or toxic) posed by chemical warfare materiel (CWM), MEC that is present underwater, nor environmental or ecological hazards that may be associated with MEC.

The MEC HA is structured into three components consisting of severity, accessibility, and sensitivity. Each of these components requires input factors that have two or more categories. These input factors are assigned a numeric score that is summed to calculate a hazard level. **Table 5-1** presents the four hazard levels and the corresponding minimum and maximum scores for each level of the MEC HA.

Table 5-1
Summary of the MEC HA Hazard Levels

Hazard Level	Maximum MEC HA Score	Minimum MEC HA Score	Description
1	1000	840	Highest potential explosive hazard condition
2	835	725	High potential explosive hazard condition
3	720	530	Moderate potential explosive hazard condition
4	525	125	Low potential explosive hazard condition

The MEC HA is designed to be used at several points, such as: a) at the end of the RFI to describe the MEC hazard based on current and future site conditions; and b) during the feasibility study to evaluate the efficacy of various cleanup alternatives and/or land use controls. However, the MEC HA does not provide a "point of departure" or a "how clean is clean" answer where remedial action is deemed to be warranted or recommended. Remedial options are also not usually addressed in the RFI. The MEC HA was developed through a collaborative, consensus approach to promote consistent evaluation of potential explosive hazards at MRSs (USEPA, 2008).

The MEC HA Workbook v1.02 is run on Microsoft Excel platform. The automatically generated report and tables are provided in **Appendix E** (provided on CD) for each MRS.

5.1 ANTI-AIRCRAFT RANGE – 4A

The Anti-Aircraft Range – 4A MRS consists of 465 acres. The following sections discuss the components that comprise the MEC HA and provide rationale for the input factors chosen.

5.1.1 Severity

This component is defined in the MEC HA guidance as "[t]he potential consequences of the effect (e.g., injury or death) on a human receptor should a MEC item detonate." Two input factors are required to determine this component, energetic material type and location of human receptors. The first factor describes the hazard associated with MEC known or suspected to be present at the site. The second factor accounts for the possibility that secondary receptors could be affected in addition to the receptor that initiated the detonation of a MEC item.

5.1.1.1 Energetic Material Type

During previous removal activities, two MEC items were identified, a point detonating fuze and a T91 90mm HE-T projectile (USACE, 2011a; BSEn, 2011). Multiple MD items, including M2 Target Rockets, 3.5-inch rocket motors, and 81mm practice mortars were identified. Energetic material type is determined to be high explosive (HE) due to the T91 90mm HE-T.

5.1.1.2 Location of Human Receptors

Unintentional detonation of a MEC item would result not only in injury (or death) to the individual initiating the detonation, but also to other receptors that may be exposed to the overpressure or fragmentation hazards from the MEC detonation. For this factor, a determination is made whether there are places where people congregate that are either within the MRS or within the explosive safety-quantity distance (ESQD). The HFD for a 90mm HE projectile is 288 feet based on the DoD fragmentation database, which is small in comparison to the size of the MRS. The boundary of the MRS plus 288 feet was considered as the total area where receptors may congregate. These areas include a dog kennel and the IBCT complex with barracks, a dining facility, operations facilities, tactical equipment maintenance facility, brigade/battalion headquarters, a fitness center, and a family care clinic. These facilities were recently constructed so this input is not anticipated to change in the foreseeable future.

5.1.2 Accessibility

The accessibility component is defined in the MEC HA guidance as "[t]he likelihood that a human receptor will be able to come into contact with a MEC item." The following five input factors are required to determine this component:

- Site accessibility
- Potential contact hours
- Amount of MEC
- Minimum MEC depth relative to the maximum receptor intrusive depth
- Migration potential

Details for each of the five input factors are described in the following sections

5.1.2.1 Site Accessibility

The input factor for site accessibility describes the ease with which people can access the MRS. The Anti-Aircraft Range – 4A is accessible by the public. The input factor for "site accessibility" is determined to be "Full Accessibility," which indicates that there are no barriers to entry, including signage but no fencing. Most of the MRS is located on FTSW property and comprised of the IBCT Complex with access available after passing the facility gate. Another fence surrounds the 10th Engineer Battalion facility which has a higher level of security, but again, authorized receptors have access. There are no plans for future development, so this input is not anticipated to change for the foreseeable future.

5.1.2.2 Potential Contact Hours

The input factor for potential contact hours estimates the total number of receptor hours per year. Both the number of receptors and the amount of time they spend at the MRS can affect the likelihood of the receptor encountering MEC. The Anti-Aircraft Range – 4A includes barracks, operations facilities, tactical equipment maintenance facilities, Brigade/Battalion Headquarters facility, a dog kennel, dining facility, a physical fitness center, and family care clinic. The area is available to authorized installation personnel, residents, contractors/visitors, recreational users, and trespassers. None of these potential receptors are likely to contact MEC that is in the subsurface. Receptors that may contact subsurface MEC are maintenance workers and construction workers. The following types of activities/receptors/ hours were assumed for current use intrusive activities at the MRS:

- Maintenance Workers: 20 people per year x 5 hours per week x 50 weeks a year = 5,000 receptor hours/year

- Construction Workers: 10 people per year x 40 hours per week x 4 weeks a year = 1,600 receptor hours/year

The receptor hours per year for each activity are then summed and determined to be in one of the following four categories:

- Many hours (greater than 1,000,000 receptor hours/year)
- Some hours (100,000 to 999,999 receptor hours/year)
- Few hours (10,000 to 99,999 receptor hours/year)
- Very few hours (less than 10,000 receptor hours/year)

Based on the intrusive activities that assume to be currently taking place, the approximate number of receptor hours per year was determined to be 6,600, resulting in the lowest category of "Very few hours." Even though the assumptions for calculating this input factor are somewhat idealized and estimated, the calculated number of receptor hours per year is well below the next category. Therefore, even if the usage assumptions are changed slightly, the category does not change. There are no plans for future development, so this input is not anticipated to change for the foreseeable future.

5.1.2.3 Amount of MEC

This input factor qualitatively describes the amount of MEC that may be present due to past munitions-related activities at the MRS. This input factor is assessed by determining the type of munitions activities that took place at the MRS (some of the categories are target area, open burn/open detonation (OB/OD) area, maneuver area, safety buffer area, storage, etc.). The majority of Anti-Aircraft Range – 4A was used as a firing point. The "Firing Point" is described as "the location from which a projectile, grenade, ground signal, rocket, guided missile, or other device is to be ignited, propelled, or released." As the area was historically used for firing 40mm anti-aircraft and 90mm anti-aircraft rounds, "Firing Point" was identified as the most appropriate category.

5.1.2.4 Minimum MEC Depth Relative to Maximum Receptor Intrusive Depth

The input factor for minimum MEC depth relative to maximum receptor intrusive depth describes whether MEC items are located where receptor activities take place. The depth of the two MEC items found in previous investigations could not be determined because they were found in already excavated spoils piles. It is conservatively assumed that MEC could be present within the subsurface directly below the ground surface. All anticipated intrusive activities for construction, landscaping, and grounds maintenance at the Anti-Aircraft Range – 4A would reach this depth.

5.1.2.5 Migration Potential

The input factor for migration potential describes the likelihood that MEC items can be moved and potentially exposed by natural processes such as erosion or frost heaving (repeated freeze/thaw cycles). The Anti-Aircraft Range – 4A isn't susceptible to frost heave and erosion caused by heavy rains which may mobilize MEC items. Based on these factors, the migration potential is determined to be "Not Probable." This input is based on climatic conditions and topography and is not anticipated to change for the foreseeable future.

5.1.3 Sensitivity

The sensitivity component is defined in the MEC HA guidance as "the likelihood that a MEC item will detonate if a human receptor interacts with it." Two input factors are required to determine this component consisting of MEC classification and MEC size.

5.1.3.1 MEC Classification

The MEC HA guidance defines six categories of MEC for the following MEC classification input factors:

- UXO Special Case
- UXO

- Fuzed DMM Special Case
- Fuzed DMM
- Unfuzed DMM
- Bulk Explosives

The category selected for the MEC classification was "Unfuzed DMM" as the 90mm projectile was found with no fuze and it is not clear if it had been fired.

5.1.3.2 MEC Size

The MEC size input factor is used to account for the ease with which a MEC item can be moved by a receptor, which increases the likelihood that they will pick it up or otherwise disturb the item. Two categories are used to describe the MEC size, either "small" (MEC items that weigh less than 90 lbs) or "large" (MEC items that weigh 90 lbs or more). The MEC HA indicates that if "any of the items" weigh less than 90 lbs, than the category "small" must be used as the input. Since all munitions items associated with the MRS would be less than 90 lbs, the category selection resulted in "small."

5.1.4 MEC HA Results

The input factors previously described were used in the MEC HA automated workbook. The automatically generated report and tables are provided in **Appendix E**, provided on CD.

Based on current conditions at the site and the current use scenario, the MEC HA methodology resulted in a score of 545, which results in a Hazard Level of 3 (moderate potential explosive hazard condition).

5.2 ANTI-AIRCRAFT RANGE – 4B

The RFI Work Plan (CB&I, 2015; 2016) indicated that an evaluation of the MEC hazard at the Anti-Aircraft Range – 4B MRS was to be prepared. However, no MEC were identified at the Anti-Aircraft Range – 4B MRS during the RFI field activities, which has been interpreted to indicate no MEC source or explosive safety hazard is present at the MRS. Based on the findings of the RFI field work, the calculation of a MEC HA score was not warranted for the Anti-Aircraft Range – 4B MRS.

5.3 ANTI-TANK RANGE 90-MM-2

The RFI Work Plan (CB&I, 2015; 2016) indicated that an evaluation of the MEC hazard at the Anti-Tank Range 90-MM-2 MRS was to be prepared. However, no MEC were identified at the Anti-Tank Range 90-MM-2 MRS during the RFI field activities, which has been interpreted to indicate no MEC source or explosive safety hazard is present at the MRS. Based on the findings of the RFI field work, the calculation of a MEC HA score was not warranted for the Anti-Tank Range 90-MM-2 MRS.

5.4 GRENADE LAUNCHER RANGE

The Grenade Launcher Range MRS consists of 143 acres. The following sections discuss the components that comprise the MEC HA and provide rationale for the input factors chosen.

5.4.1 Severity

This component is defined in the MEC HA guidance as "[t]he potential consequences of the effect (e.g., injury or death) on a human receptor should a MEC item detonate." Two input factors are required to determine this component, energetic material type and location of human receptors. The first factor describes the hazard associated with MEC known or suspected to be present at the site. The second factor accounts for the possibility that secondary receptors could be affected in addition to the receptor that initiated the detonation of a MEC item.

5.4.1.1 Energetic Material Type

During the RFI field activities, MEC items were identified which included 90mm M384 HE Projectile, AN-M57 250-lb Bomb, and 8-inch M106 HE Projectile. Energetic material type is determined to be HE.

5.4.1.2 Location of Human Receptors

Unintentional detonation of a MEC item would result not only in injury (or death) to the individual initiating the detonation, but also to other receptors that may be exposed to the overpressure or fragmentation hazards from the MEC detonation. For this factor, a determination is made whether there are places where people congregate that are either within the MRS or within the ESQD. The 8-inch M106 HE Projectile was identified as the MGFD, which has a HFD of 389 feet. The boundary of the MRS with a 389-foot buffer was considered as the total area where receptors may congregate. Facility offices and warehouses are located within the MRS and 389-foot buffer. There are no plans for changes in land use, so this input is not anticipated to change for the future land use scenario.

5.4.2 Accessibility

The accessibility component is defined in the MEC HA guidance as "[t]he likelihood that a human receptor will be able to come into contact with a MEC item." The following five input factors are required to determine this component:

- Site accessibility
- Potential contact hours
- Amount of MEC
- Minimum MEC depth relative to the maximum receptor intrusive depth
- Migration potential

Details for each of the five input factors are described in the following sections.

5.4.2.1 Site Accessibility

The input factor for site accessibility describes the ease with which people can access the MRS. The Grenade Launcher Range is accessible by the public. There are no fences or posted signage at the site. As a result, the input factor for "site accessibility" is determined to be "Full Accessibility," which indicates no barriers to entry, including signage but no fencing.

5.4.2.2 Potential Contact Hours

The input factor for potential contact hours estimates the total number of receptor hours per year. Both the number of receptors and the amount of time they spend at the MRS can affect the likelihood of the receptor encountering MEC. The Grenade Launcher Range includes offices and warehouses. The area is available to authorized personnel, contractors/visitors, recreational users, and trespassers. None of these potential receptors are likely to contact MEC that is in the subsurface. Receptors that may contact subsurface MEC are maintenance workers and construction workers.

The following types of activities/receptors/hours were assumed for current use activities at the MRS:

- Construction/Maintenance: 20 people per year x 40 hours a week x 2 weeks a year = 1,600 receptor hours/year
- Warehouse: 150 people per year x 40 hours a week x 50 weeks a year = 300,000 receptor hours/year
- Office: 150 people per year x 40 hours a week x 50 weeks a year = 300,000 receptor hours/year

The receptor hours per year for each activity are then summed and determined to be in one of the following four categories:

- Many hours (greater than 1,000,000 receptor hours/year)
- Some hours (100,000 to 999,999 receptor hours/year)

- Few hours (10,000 to 99,999 receptor hours/year)
- Very few hours (less than 10,000 receptor hours/year)

Based on the activities that assume to be currently taking place, the approximate number of receptor hours per year was determined to be 601,600 resulting in a category of "some hours." Even though the assumptions for calculating this input factor are somewhat estimated and idealized, the calculated number of receptor hours per year would not likely change to the next category even if the usage assumptions are changed slightly. This input is not anticipated to change for the future land use scenario.

5.4.2.3 Amount of MEC

This input factor qualitatively describes the amount of MEC that may be present due to past munitions-related activities at the MRS. This input factor is assessed by determining the type of munitions activities that took place at the MRS (some of the categories are target area, OB/OD area, maneuver area, safety buffer area, storage, etc.). The majority of Grenade Launcher Range was used as a firing point for small arms and grenade launchers, but no MEC source is associated with these activities. Based on the RFI findings, a portion of the site was also used as a burial pit for munitions. Therefore, "Burial Pit" was identified as the most appropriate category. "Burial Pit" is described as the location of a burial of large quantities of MEC items.

5.4.2.4 Minimum MEC Depth Relative to Maximum Receptor Intrusive Depth

The input factor for minimum MEC depth relative to maximum receptor intrusive depth describes whether MEC items are located where receptor activities take place. Results of the RFI indicate MEC items located in the subsurface. The depth of burial in the disposal pit can be assumed to be directly below the ground surface. Intrusive activities would be expected within the upper 4 feet to install utilities. This input is not anticipated to change for current or future land uses at the Grenade Launcher Range.

5.4.2.5 Migration Potential

The input factor for migration potential describes the likelihood that MEC items can be moved and potentially exposed by natural processes such as erosion or frost heaving (repeated freeze/thaw cycles). The Grenade Launcher Range is not susceptible to frost heave and erosion caused by heavy rains which may mobilize MEC items. Based on these factors, the migration potential is determined to be "Not Probable." This input is based on climatic conditions and topography and is not anticipated to change for the foreseeable future.

5.4.3 Sensitivity

The sensitivity component is defined in the MEC HA guidance as "the likelihood that a MEC item will detonate if a human receptor interacts with it." Two input factors are required to determine this component consisting of MEC classification and MEC size.

5.4.3.1 MEC Classification

The MEC HA guidance defines six categories of MEC for the following MEC classification input factors:

- UXO Special Case
- UXO
- Fuzed DMM Special Case
- Fuzed DMM
- Unfuzed DMM
- Bulk Explosives

The category selected for the MEC classification was "Unfuzed DMM" for the MEC identified in the disposal pit.

5.4.3.2 MEC Size

The MEC size input factor is used to account for the ease with which a MEC item can be moved by a receptor, which increases the likelihood that they will pick it up or otherwise disturb the item. Two categories are used to describe the MEC size, either “small” (MEC items that weigh less than 90 lbs) or “large” (MEC items that weigh 90 lbs or more). The MEC HA indicates that if “any of the items” weigh less than 90 lbs, than the category “small” must be used as the input. Since MEC items less than 90 lbs were found, the category selection resulted in “small.”

5.4.4 MEC HA Results

The input factors previously described were used in the MEC HA automated workbook. The automatically generated report and tables are provided in **Appendix E**, provided on CD.

Based on current conditions at the site and the current use scenario, the MEC HA methodology resulted in a score of 665, which results in a Hazard Level of 3 (moderate potential explosive hazard condition).

6.0 MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL SUMMARY

The Munitions Response Site Prioritization Protocol (MRSPP) ranking was conducted for each MRS during the Phase 2 CS, and MRSPP ratings were updated based on RFI results. Updated MRSPP Tables are presented in **Appendix F** (provided on CD). The Explosive Hazard Evaluation (EHE) factors include the details of the hazard, accessibility to the MRS, and receptor information. The Chemical Warfare Material Hazard Evaluation (CHE) evaluated the history of CWM use at the individual site. The Health Hazard Evaluation (HHE) included an evaluation of MC and any non-munitions-related incidental contaminants present, receptor information, and details pertaining to environmental migration pathways.

Each MRS priority was then determined by comparing the EHE, CHE, and HHE ratings. The MRSPP priority can range from 1 to 8, with 1 indicating the highest potential hazard and 8 indicating the lowest potential hazard. These MRSPP scores are then used to help sequence future MRS response actions. The MRSPP performed during the FTSW Phase 2 CS resulted in an overall MRS Priority between 3 and 5 based on the three hazard evaluation modules, summarized in **Table 6-1**.

RFI results reduced the MRSPP priorities for all four MRSs either due to the finding of no MEC or the confirmation that the surface MEC exposure pathway is incomplete.

Table 6-1
Updated MRSPP Summary, Ft Stewart, Georgia

MRS Name	Updated EHE Module Rating	Updated CHE Module Rating	Updated HHE Module Rating	Overall Priority from Phase 2 CS	Updated Overall Priority from RFI
Anti-Aircraft Range – 4A	D	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	3	5
Anti-Aircraft Range – 4B	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	3	No Known or Suspected Hazard
Anti-Tank Range 90-MM-2	F	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	5	7
Grenade Launcher Range	D	No Known or Suspected CWM Hazard	Evaluation Pending	4	5

7.0 SUMMARY AND CONCLUSIONS

This section summarizes the significant results obtained and the conclusions reached as a result of the RFI activities conducted at FTSW. Only the most significant findings are presented in this section and are reproduced directly or abstracted from information contained in this report.

7.1 SUMMARY OF RFI ACTIVITIES

The RFI compiled and evaluated information for four MRSs located at FTSW; Anti-Aircraft – 4A, Anti-Aircraft – 4B, Anti-Tank Range 90-MM-2, and Grenade Launcher Range, relating to the presence of MEC and MC. It was determined that there was no additional data needed to evaluate the nature and extent of MEC at Anti-Aircraft–- 4A. Analog and digital geophysical investigations were conducted at Anti-Aircraft – 4B, Anti-Tank Range 90-MM-2, and Grenade Launcher Range. This information was reviewed and used to develop and refine the CSMs for potential exposures to MEC. The CSMs related the indicated sources of explosive items to potential human health and ecological receptors at the MRSs in consideration of both the current and projected future land use. These land-use scenarios were evaluated with respect to how people would interact with the land at the MRSs. The compiled information was then used to conduct an assessment of the potential explosive and environmental hazards for the site.

7.2 SUMMARY OF RFI FINDINGS

Munitions and Explosives of Concern

The following summarizes the MEC findings for each MRS:

- Anti-Aircraft-4A. This MRS has undergone development and a significant portion of the site has already been evaluated during previous investigations. Since two MEC items were found during previous investigations, exposure pathways to MEC in the subsurface are considered complete. Since no MEC was found on the ground surface and the MRS is heavily developed and maintained, exposure pathways to MEC on the surface are considered incomplete. Based on results from previous investigations, there is a 95 percent confidence that there are less than 0.026 MEC items per acre in the MRS.
- Anti-Aircraft – 4B. No MEC was found, and 12 MD items were found during the intrusive subsurface anomaly investigation. The MD was primarily in the form of inert, practice M2 rockets, consistent with historical training records. A sampling of large DGM anomalies did not uncover burial pits near the former firing points. Since no MEC were found, exposure pathways to MEC on the surface and in the subsurface are considered incomplete.
- Anti-Tank Range 90-MM-2. No MEC was found, and 11 MD items were identified during the RFI investigation, which included 2.36-inch practice rockets, 40mm and 90mm projectiles, a flare, a 25-mm TP-T cartridge, and a practice/training submunition. An unfired 25mm projectile was also found and classified as MPPEH, but due to its recent age and condition, it is not considered to be associated with historical range activities. A sampling of large DGM anomalies did not uncover burial pits near the former firing points. Due to the 25mm projectile, exposure pathways to MPPEH on the surface are considered complete. Since no MEC/MPPEH was found in the subsurface, exposure pathways to MEC/MPPEH in the subsurface are considered incomplete.
- Grenade Launcher Range. There was no evidence of residual MEC associated with the small arms ranges also used for grenade launchers. However, six unfired 25mm projectiles were found on the surface and classified as MPPEH. Due to their recent age and condition, they are not considered to be associated with historical range activities. The DGM investigation uncovered a subsurface disposal pit near the 120mm projectile firing point. This area can be seen as disturbed on a 1957 aerial photograph. Three MEC items were recovered, including a 250-lb General Purpose Bomb, an 8-inch M106 HE projectile, and a 90mm M348 HE anti-tank projectile. The pit was large enough that it could not be fully removed under the scope of this investigation, so there is potential for additional MEC to remain. Due to the 25mm

projectiles, exposure pathways to MPPEH on the surface are considered complete. Due to the MEC in the disposal pit, exposure pathways to MEC in the subsurface are considered complete.

Munitions Constituents

The only potential MC source identified during the RFI was a disposal pit for munitions at the Grenade Launcher Range that was too large to remove under the scope of this RFI. Adequate characterization of the soil in this disposal pit is not possible without accessing the soil below the munitions. For this reason and because no other potential sources of MC were found (i.e., exposed fillers, other burial pits, or small arms berms), no MC samples were collected for the RFI.

The need for additional environmental sampling, as outlined in the approved work plan, was not identified during the course of RFI activities. Since environmental sampling for MC was not conducted at any of the four MRS sites, neither a comparison to screening levels nor an MC risk assessment was conducted. Therefore, comments previously received from GAEPD regarding screening levels and risk assessment procedures are not applicable to this RFI Report.

7.3 CONCLUSIONS

For the Anti-Aircraft – 4B, exposure pathways to MEC and MC are incomplete and NFA is recommended. For the Anti-Aircraft – 4A, Anti-Tank Range 90-MM-2, and Grenade Launcher Range exposure pathways to MEC and/or MPPEH are complete and it is recommended that a CMS be performed to evaluate remedial options to address MEC/MPPEH. For the Grenade Launcher Range, the CMS should also address potential MC releases to soil underneath the disposal pit. The RFI summary and recommendations are presented for each MRS in **Table 7-1**.

Table 7-1
RFI Summary and Recommendations

MRS	MEC	MC	Recommendations
Anti-Aircraft Range – 4A (FTSW-009-R-01)	Used existing data to evaluate MEC extent. Exposure pathways to MEC in the subsurface are complete. MEC HA score of 545 indicating a Hazard Level of 3 (moderate potential explosive hazard condition).	No evidence of MC releases.	Conduct CMS to evaluate alternatives to address MEC.
Anti-Aircraft Range – 4B (FTSW-009-R-02)	No MEC found. Exposure pathways to MEC are incomplete so no MEC HA scoring performed.	No evidence of MC releases.	NFA
Anti-Tank Range 90-MM-2 (FTSW-010-R-01)	No MEC found, but MPPEH from recent discarding of 25mm projectiles found. Exposure pathways to MPPEH on the ground surface are complete. Exposure pathways to MEC are incomplete so no MEC HA scoring performed.	No evidence of MC releases.	Conduct CMS to evaluate alternatives to address MPPEH on the surface from recent discarding of munitions.
Grenade Launcher Range (FTSW-011-R-01)	MEC (250-lb bomb, 90mm HE projectile, and 8-inch HE projectile) were found in a disposal pit and MPPEH was found on the surface from recent discarding of 25mm projectiles. Exposure pathways to MPPEH on the ground surface and MEC in the subsurface are complete. MEC HA score 665, which results in a Hazard Level of 3 (moderate potential explosive hazard condition).	No evidence of MC releases associated with the small arms and grenade launcher ranges. MC releases may be associated with the subsurface disposal pit which could not be assessed without removing the disposal pit.	Conduct CMS to evaluate alternatives to address MPPEH on the surface from recent discarding of munitions and MEC and MC in the disposal pit near the 120mm firing point.

8.0 REFERENCES

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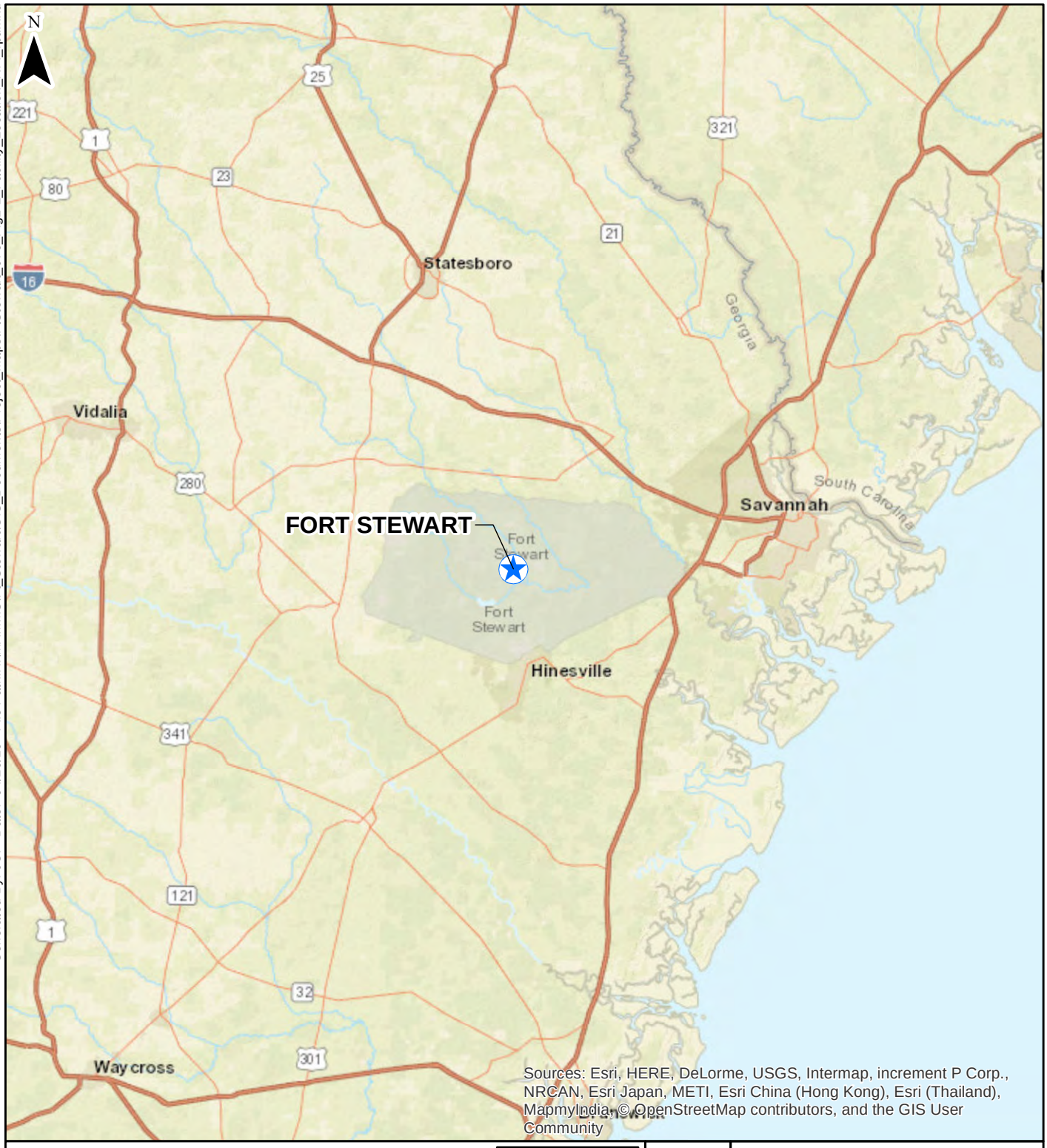

Fort Stewart Location

0 15 30 Miles

Projection : NAD_1983_UTM_Zone_16N

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BALTIMORE DISTRICT

MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER
1-1

FORT STEWART LOCATION
FORT STEWART, GEORGIA

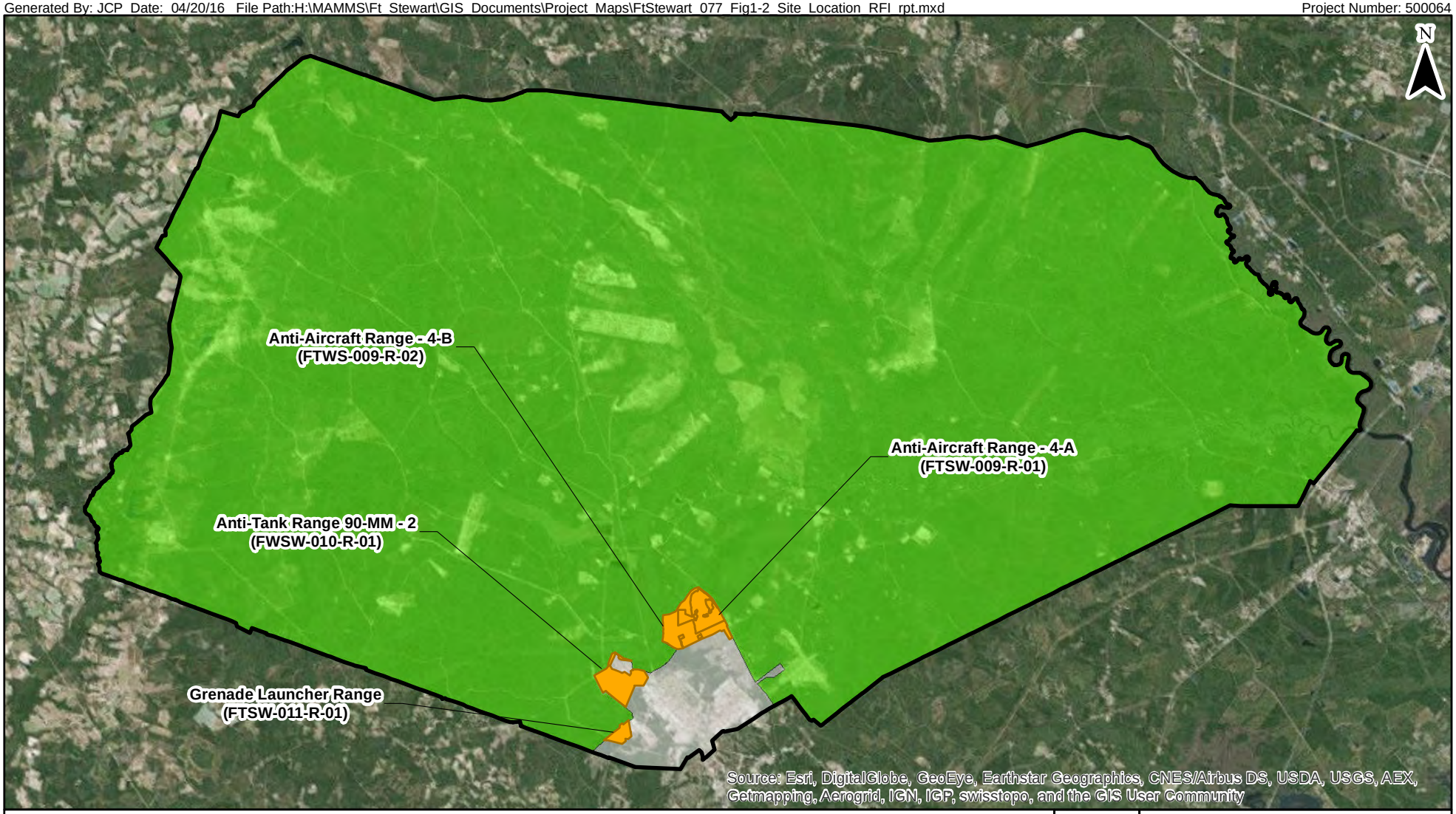
CB&I Federal Services LLC
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017

Generated By: JCP Date: 04/20/16 File Path:H:\MAMMS\Ft_Stewart\GIS_Documents\Project_Maps\FtStewart_076_Fig1-1_Facility_Location_RFI_rpt.mxd

Project Number: 500064

Generated By: JCP Date: 04/20/16 File Path:H:\MAMMS\Ft Stewart\GIS Documents\Project Maps\FtStewart 077 Fig1-2 Site Location RFI rpt.mxd

Project Number: 500064



Munitions Response Site

Fort Stewart Installation Boundary

Installation Data

Other than Operational Area

Operational Area

0 20,000 40,000 Feet

Projection : WGS_1984_UTM_Zone_17N

U.S. ARMY CORPS OF ENGINEERS
BALTIMORE DISTRICT

MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-2

MUNITIONS RESPONSE SITES SITE LOCATION FORT STEWART, GEORGIA

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Belcamp, Maryland 21017

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Project Number: 500064

N

10th Engineer Battalion

4th ICBT Complex

Dog Kennel

AAFES Mini Mart

Anti-Aircraft Range - 4-A

Anti-Aircraft Range - 4-B

0 2,000 4,000 Feet

Anti-Aircraft Range 4-A Munitions Response Site

Anti-Aircraft Range 4-B Munitions Response Site Boundary

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo,

Fort Stewart Installation Boundary

Historical Range Fans

40-mm Anti-Aircraft (C 40-mm 11850 YRDS) 1941

90-mm Anti-Aircraft (C 90-mm 20500 YRDS) 1941

90-mm Anti-Aircraft (C Range) 1957, 1962, 1964

Anti-Aircraft Range 4-A Munitions Response Site

Anti-Aircraft Range 4-B Munitions Response Site

Installation Data

Other than Operational Area

Operational Area

0 12,000 24,000 Feet

Projection : WGS_1984_UTM_Zone_17N

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BALTIMORE DISTRICT

MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-3

ANTI-AIRCRAFT RANGE 4 MUNITIONS RESPONSE SITE LOCATION FORT STEWART, GA

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Belcamp, Maryland 21017

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Project Number: 500064

N

Anti-Tank Range 90-MM - 2

Anti-Tank Range 90 MM

A Range

B Range

0 2,000 4,000 Feet

Anti-Tank Range 90 MM
(Not to be Investigated)

Anti-Tank Range 90-MM - 2

A Range

B Range

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Anti-Tank Range 90 MM Munitions Response Site

Anti-Tank Range 90-MM - 2 Munitions Response Site

Installation Data

Other than Operational Area

Operational Area

Fort Stewart Installation Boundary

Historical Range Fans

40-mm Anti-Aircraft (E 40-mm 8500 YRDS) 1941

120-mm Anti-Aircraft

Anti-Tank (E 90-mm 14540 yards) 1941

Small Arms (HBANM RANGES) 1940

Small Arms 1944

Grenade Launcher Range

0 17,000 34,000 Feet

Projection : WGS_1984_UTM_Zone_17N

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BALTIMORE DISTRICT

MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-4

ANTI-TANK RANGE 90-MM-2 MUNITIONS RESPONSE SITE LOCATION FORT STEWART, GA

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Project Number: 500064

N

Grenade Launcher Range

A Range

B Range

H Range

Firing Berm
Target Berm
Infiltration Course
Munitions Response Site Boundary

0 600 1,200 Feet

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Historical Range Fans

- 120-mm Anti-Aircraft
- Small Arms 1944
- Grenade Launcher Range

- Fort Stewart Installation Boundary
- Munitions Response Site

Installation Data

- Other than Operational Area
- Operational Area

0 12,000 24,000 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-5

GRENADE LAUNCHER RANGE
MUNITIONS RESPONSE SITE LOCATION
FORT STEWART, GA

CB&I Federal Services LLC
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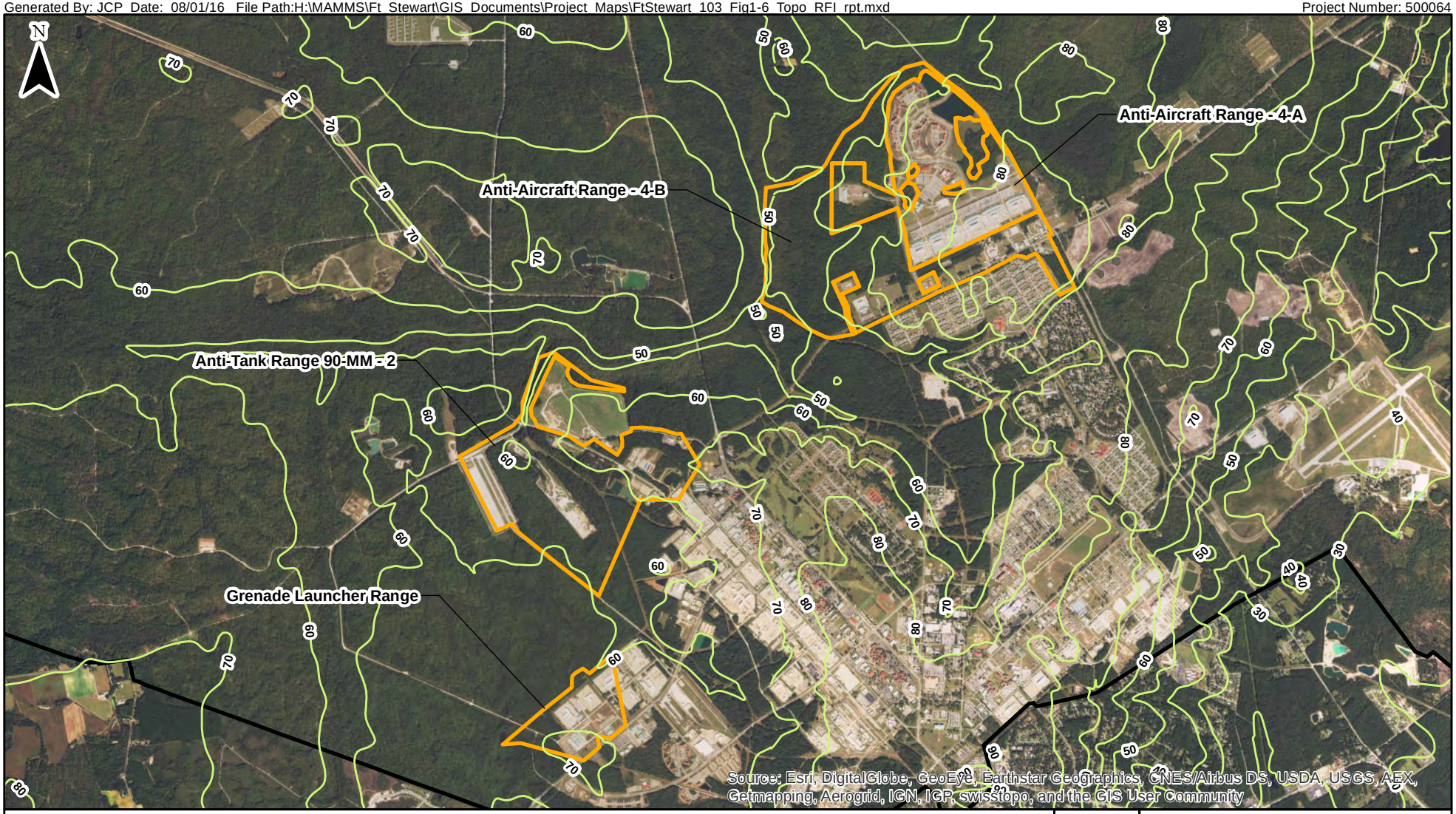
Belcamp, Maryland 21017

Generated By: JCP Date: 08/01/16 File Path:H:\MAMMS\Ft Stewart\GIS Documents\Project Maps\FtStewart 103 Fig1-6 Topo RFI rpt.mxd

Project Number: 500064



Ground Surface Contour (10-Foot Interval)

Munitions Response Site Boundary

Fort Stewart Installation Boundary

Note:
1) Ground surface contour data was obtained from the U.S. Geological Survey (USGS).

0 4,500 9,000 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-6

TOPOGRAPHY
FORT STEWART, GEORGIA

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Belcamp, Maryland 21017

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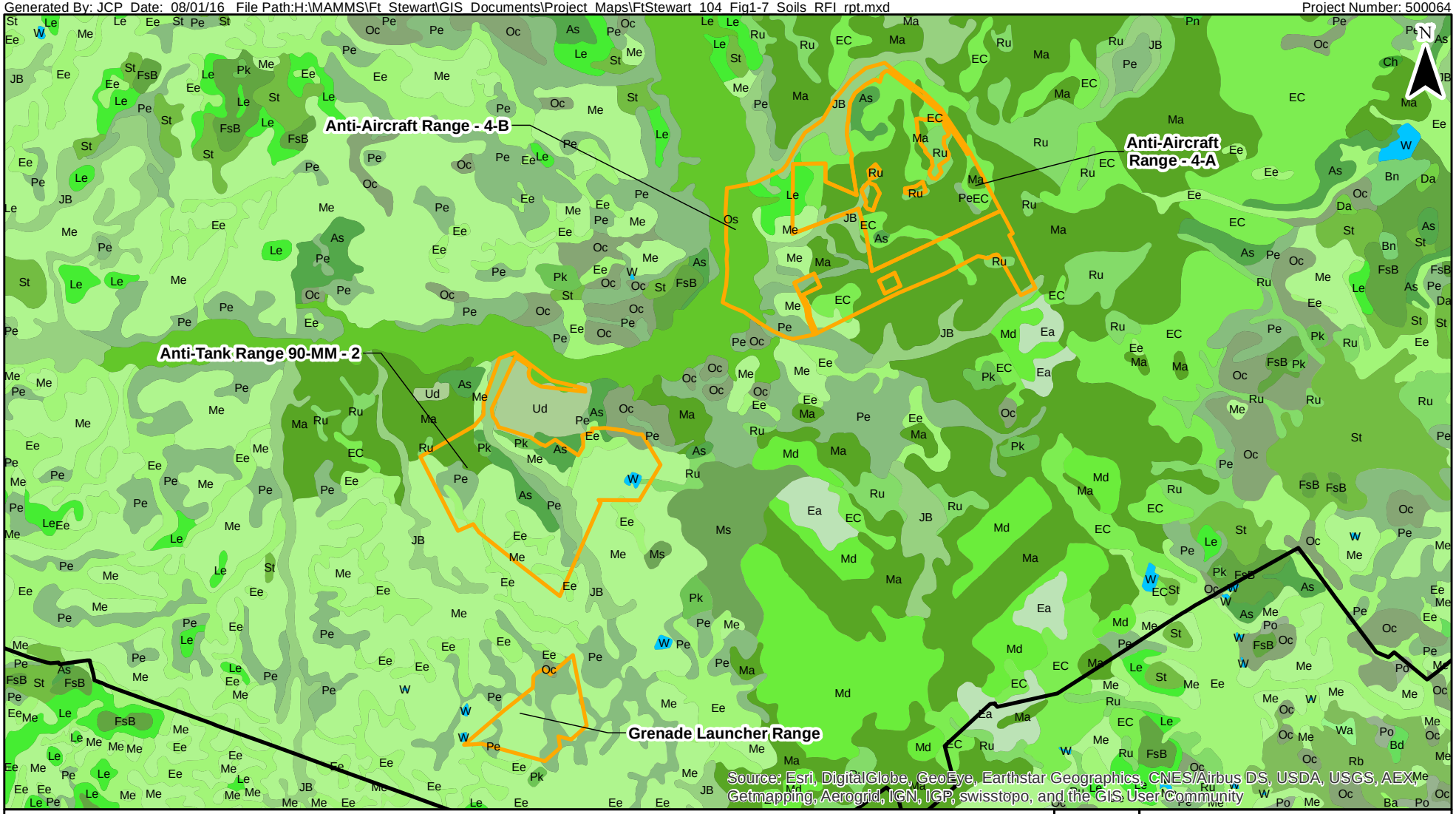
Project Number: 500064



Munitions Response Site Boundary

Fort Stewart Installation Boundary

Note:
1) Soils data set was obtained from the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS).

0 4,500 9,000 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-7

USDA SOILS MAP
FORT STEWART, GEORGIA

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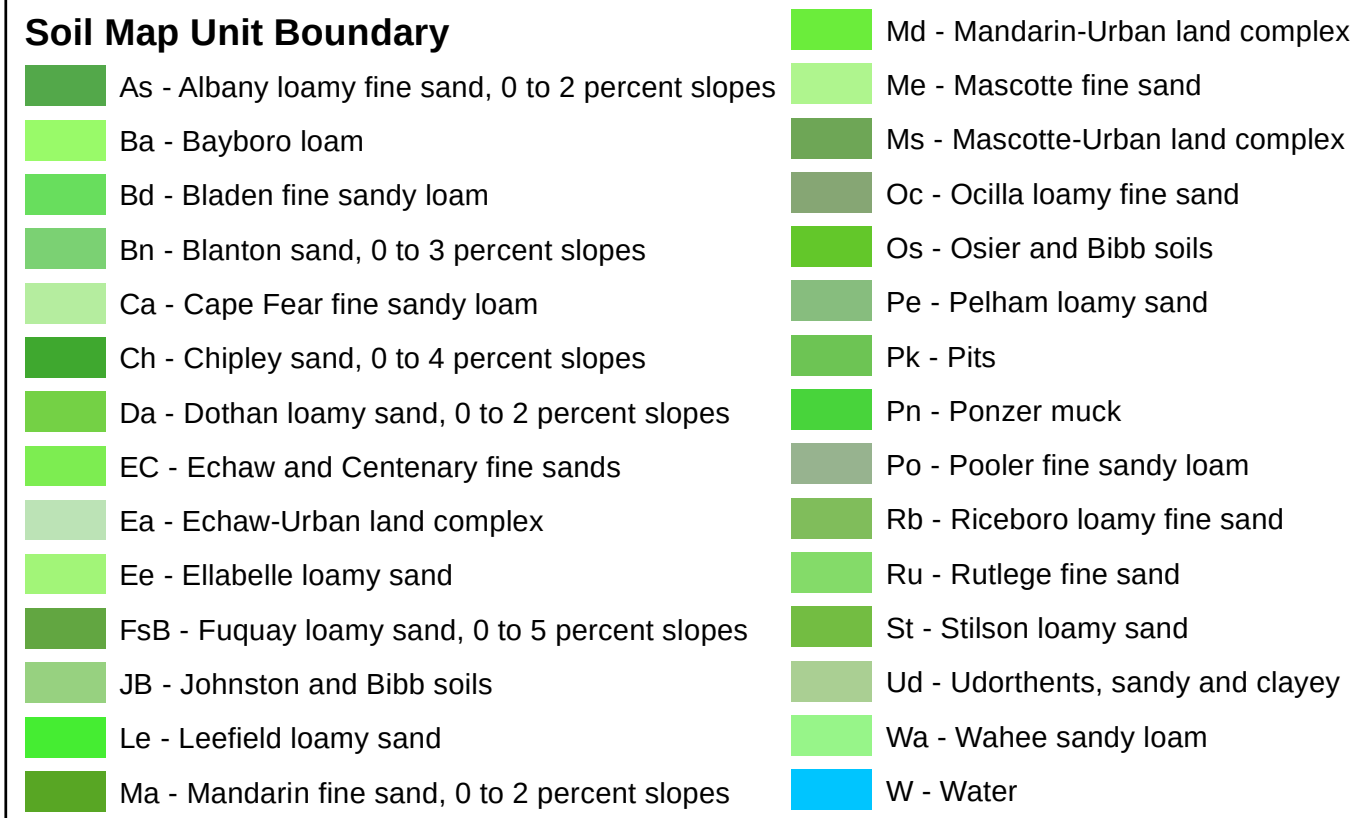
Belcamp, Maryland 21017



Note:
1) Soils data set was obtained from the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS).

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MILITARY MUNITIONS RESPONSE PROGRAM

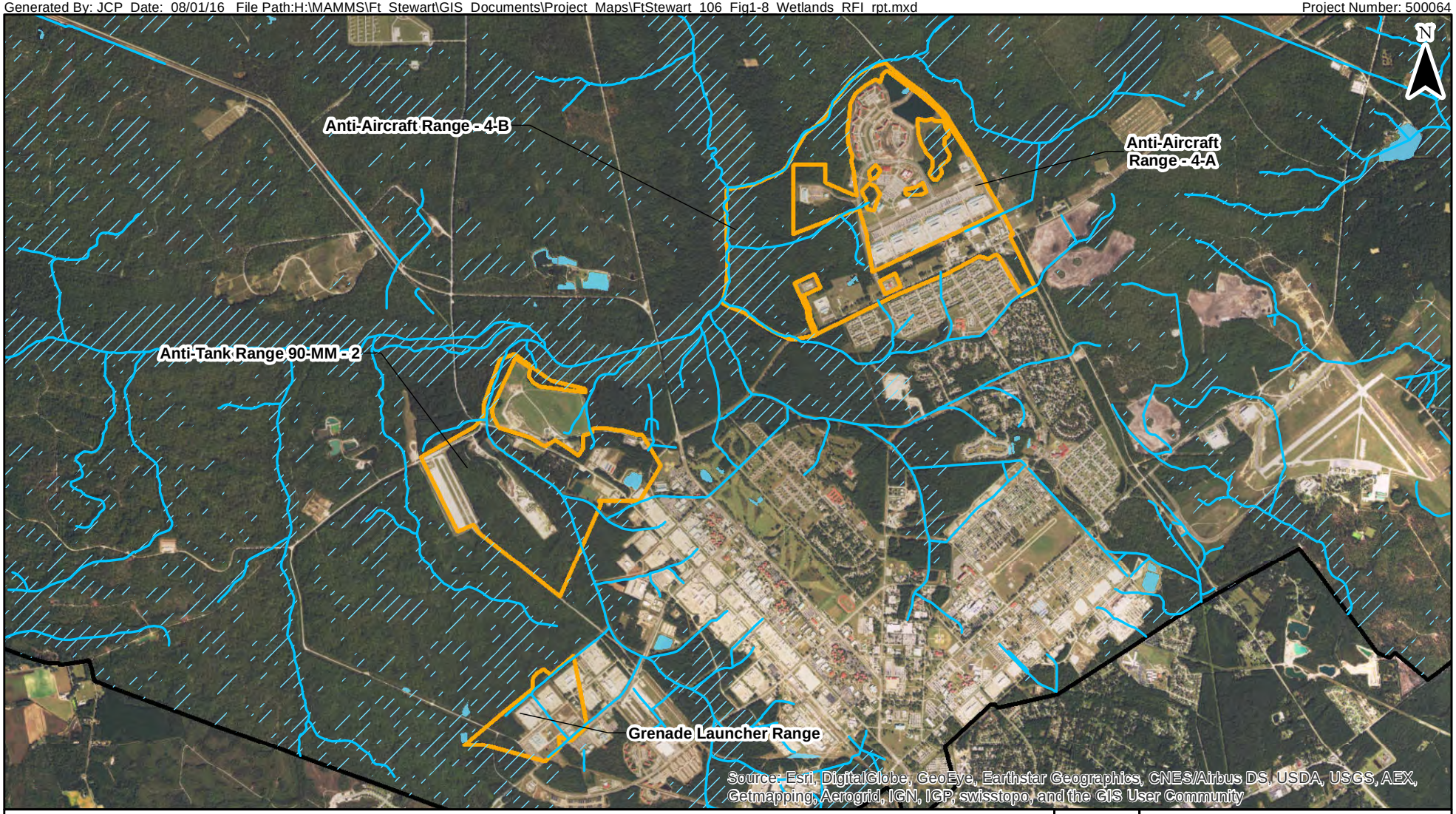
FIGURE NUMBER
1-7a

USDA SOILS MAP LEGEND
FORT STEWART, GEORGIA

Shaw Environmental & Infrastructure, Inc.
(A CB&I Company)
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017

Generated By: JCP Date: 08/01/16 File Path:H:\MAMMS\Ft Stewart\GIS Documents\Project Maps\FtStewart 106 Fig1-8 Wetlands RFI rpt.mxd

Project Number: 500064



Water Feature

Munitions Response Site Boundary

Fort Stewart Installation Boundary

Water Body

Wetland

Notes:
1) Water features and bodies source: National Hydrography Dataset, U.S. Geological Survey (USGS).
1) Wetlands source: National Wetlands Inventory, U.S. Fish & Wildlife Service (USFWS).

0 4,500 9,000 Feet

Projection : WGS_1984_UTM_Zone_17N

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BALTIMORE DISTRICT

MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-8

WETLANDS
FORT STEWART, GEORGIA

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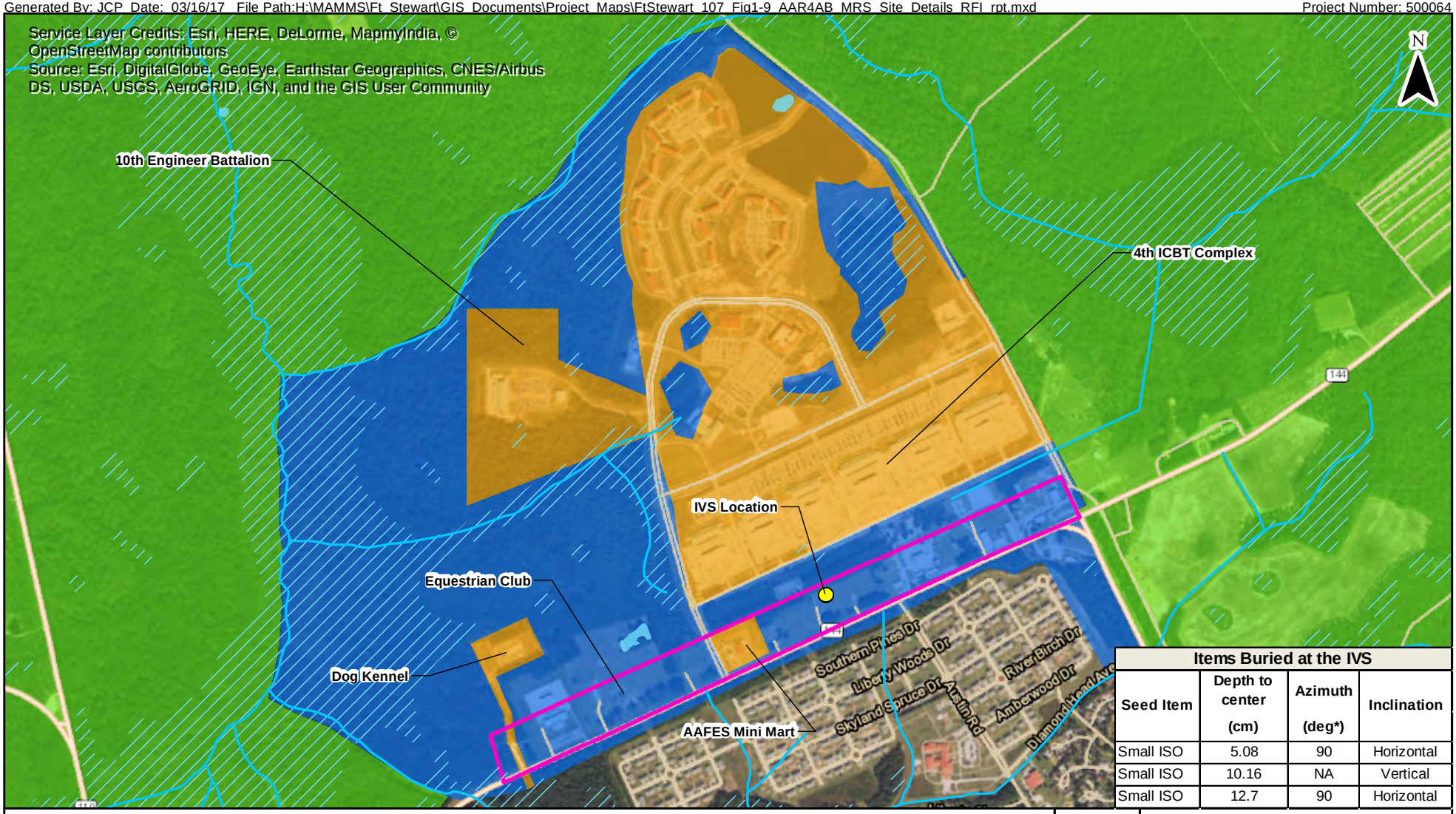

Items Buried at the IVS			
Seed Item	Depth to center (cm)	Azimuth (deg*)	Inclination
Small ISO	5.08	90	Horizontal
Small ISO	10.16	NA	Vertical
Small ISO	12.7	90	Horizontal

IVS Location

Water Feature

Water Body

Wetland

Operational Area

Anti-Aircraft Range 4-A Munitions Response Site

Anti-Aircraft Range 4-B Munitions Response Site

Approximate Historical Firing Points Boundary

Notes:
1) Water features and bodies source: National Hydrography Dataset, U.S. Geological Survey (USGS).
2) Wetlands source: National Wetlands Inventory, U.S. Fish & Wildlife Service (USFWS).
3) Stated azimuth is relative to trend of data acquisition line directly over buried items, 0 degrees is parallel to the direction of travel.
4) * Azimuth units are degrees (deg = degrees).
5) cm = centimeters.
6) ISO = Industry Standard Object.
7) m = meters.
8) NA = not applicable.

0 1,600 3,200 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-9

ANTI-AIRCRAFT RANGE 4 MUNITIONS RESPONSE SITE DETAILS FORT STEWART, GEORGIA

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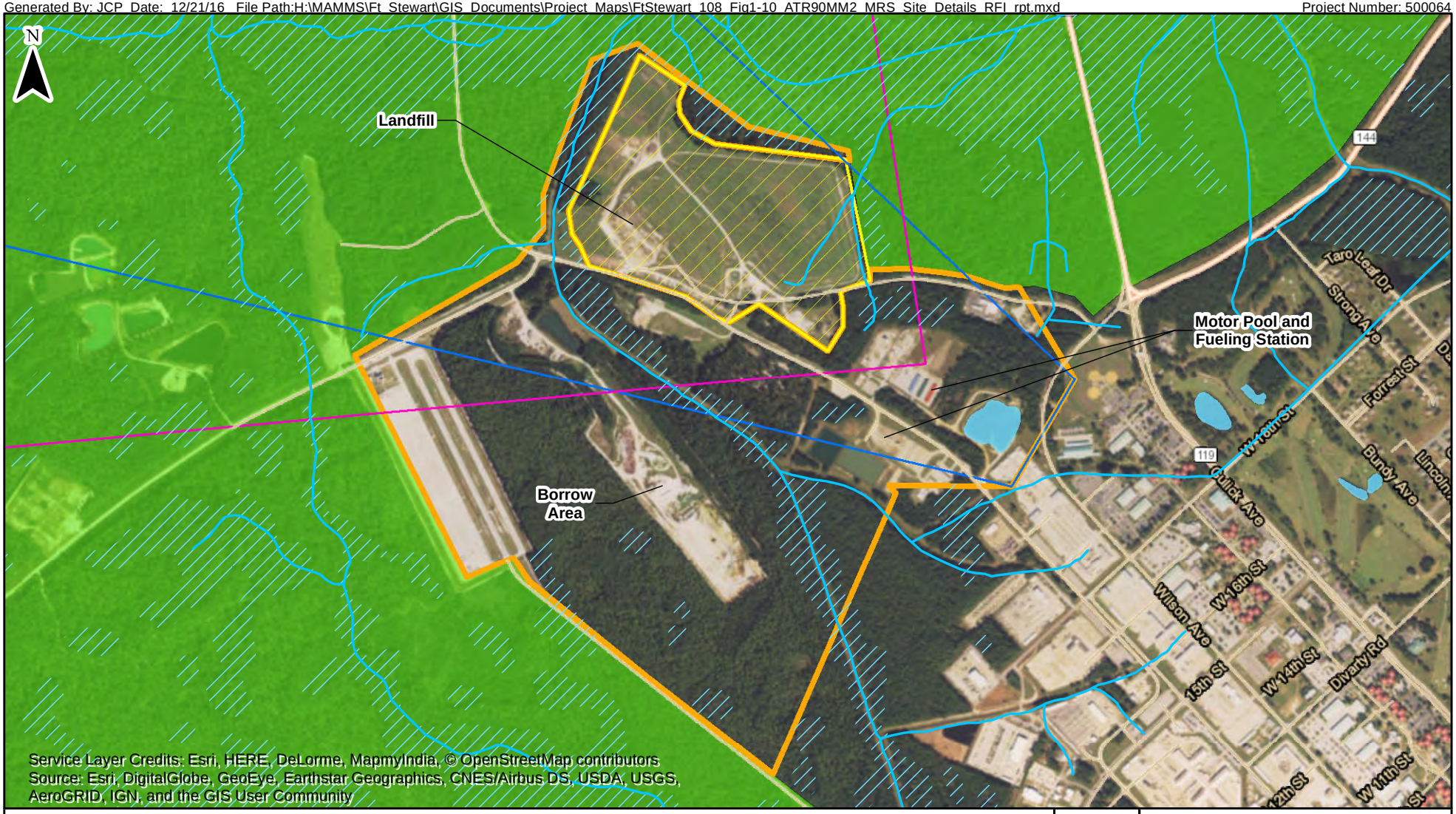

Water Feature
Water Body
Wetland
Operational Area

Anti-Tank Range 90 MM Munitions Response Site
Anti-Tank Range 90-MM - 2 Munitions Response Site

Historical Range Fans

40-mm Anti-Aircraft (E 40-mm 8500 YRDS) 1941
Anti-Tank (E 90-mm 14540 yards) 1941

0 1,500 3,000 Feet

Projection : WGS_1984_UTM_Zone_17N

Notes:
1) Water features and bodies source: National Hydrography Dataset, U.S. Geological Survey (USGS).
1) Wetlands source: National Wetlands Inventory, U.S. Fish & Wildlife Service (USFWS).

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-10

ANTI-TANK RANGE 90-MM-2
LANDFILL AREA
MUNITIONS RESPONSE SITE DETAILS
FORT STEWART, GEORGIA

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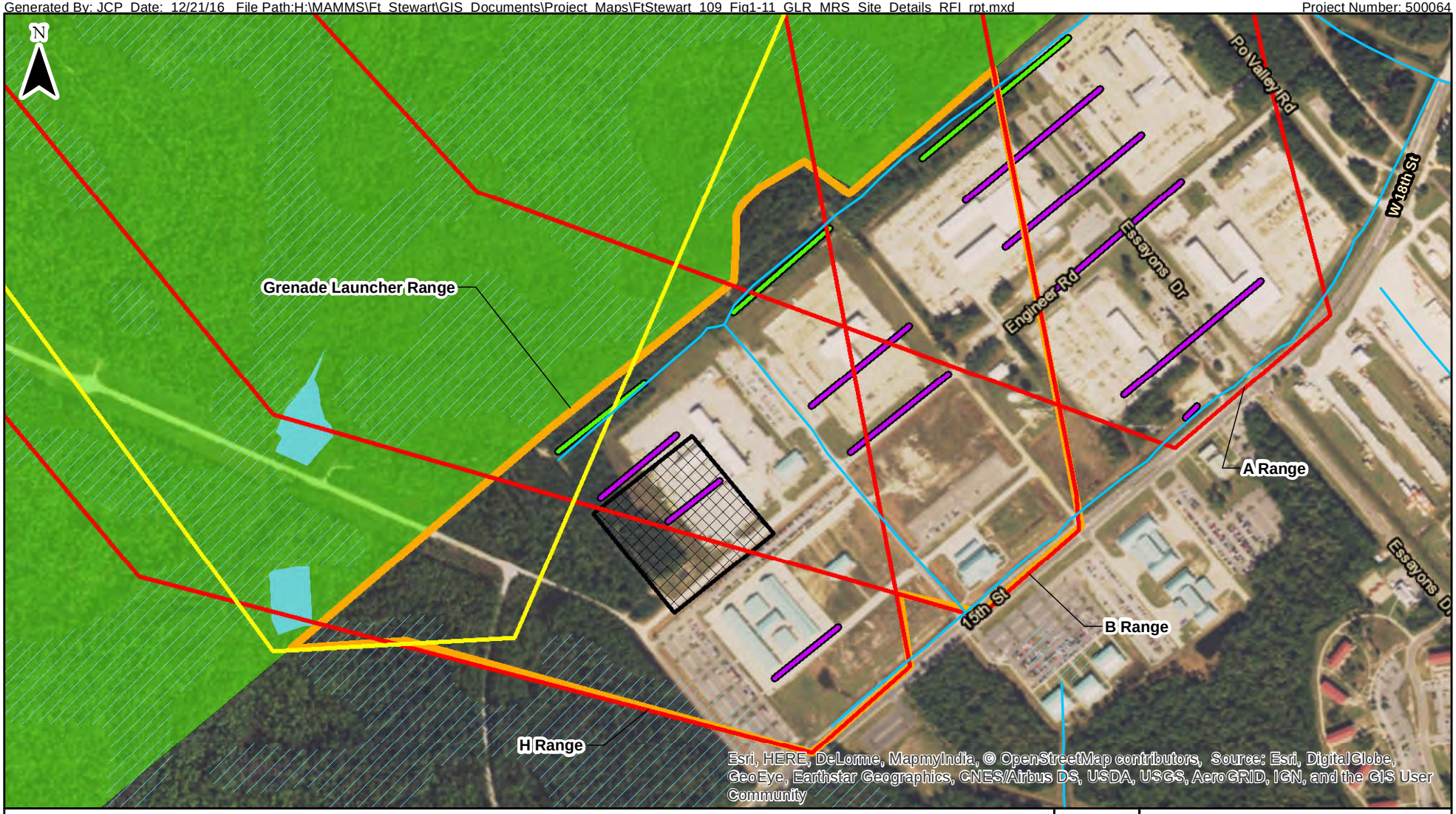
Belcamp, Maryland 21017

Generated By: JCP Date: 12/21/16 File Path:H:\MAMMS\Ft_Stewart\GIS_Documents\Project_Maps\FtStewart_109_Fig1-11_GLR_MRS_Site_Details_RFI_rpt.mxd

Project Number: 500064



Firing Berm
Target Berm
Water Feature
Water Body
Wetland
Munitions Response Site Boundary
Operational Area
Infiltration Course

Historical Range Fans

Small Arms 1944
120-mm Anti-Aircraft

0 700 1,400 Feet

Projection : WGS_1984_UTM_Zone_17N

Notes:
1) Water features and bodies source: National Hydrography Dataset, U.S. Geological Survey (USGS).
1) Wetlands source: National Wetlands Inventory, U.S. Fish & Wildlife Service (USFWS).

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 1-11

GRENADE LAUNCHER RANGE MUNITIONS RESPONSE SITE DETAILS FORT STEWART, GEORGIA

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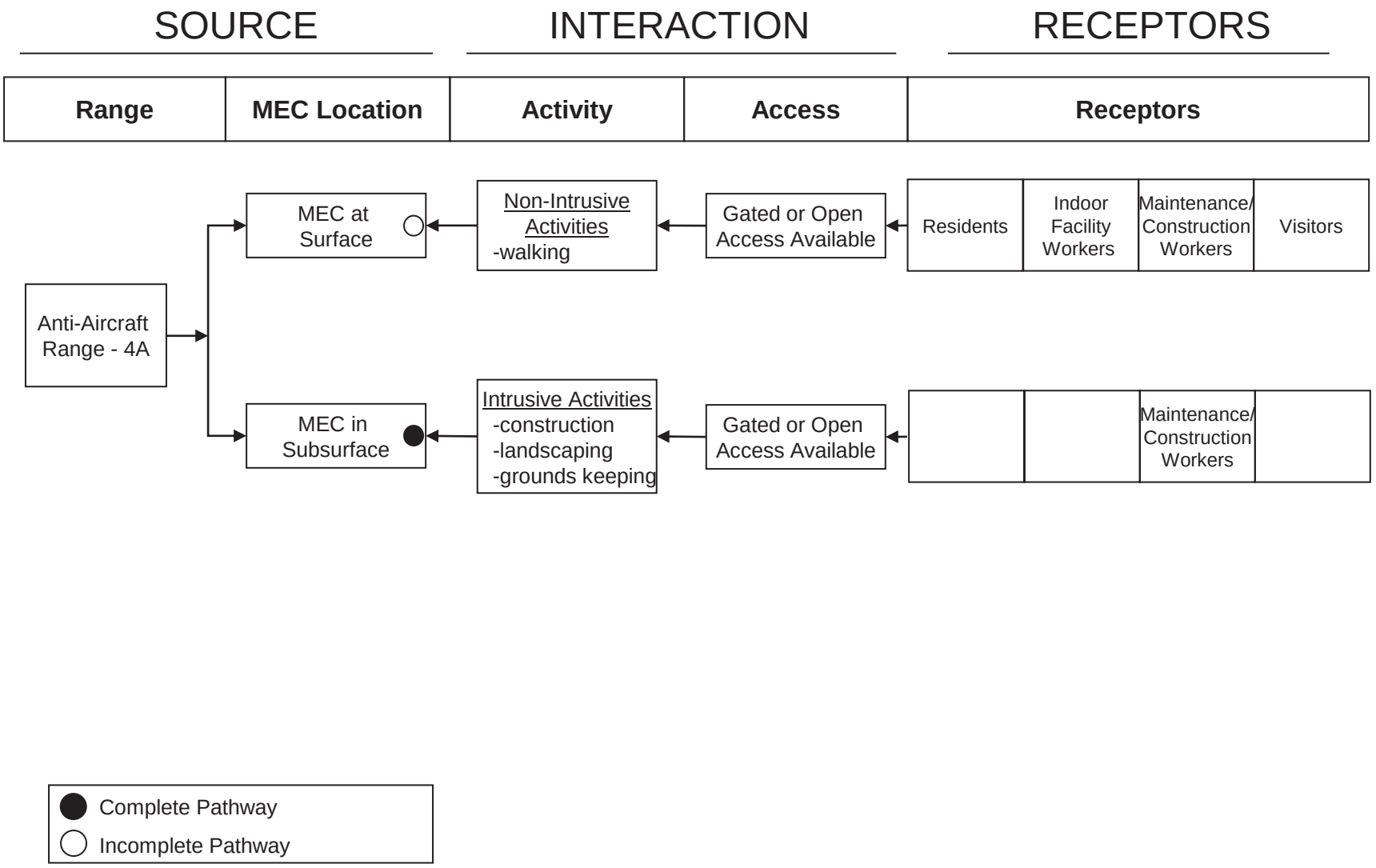
Belcamp, Maryland 21017

Figure 4-1
MEC Conceptual Site Model Anti-Aircraft Range - 4A



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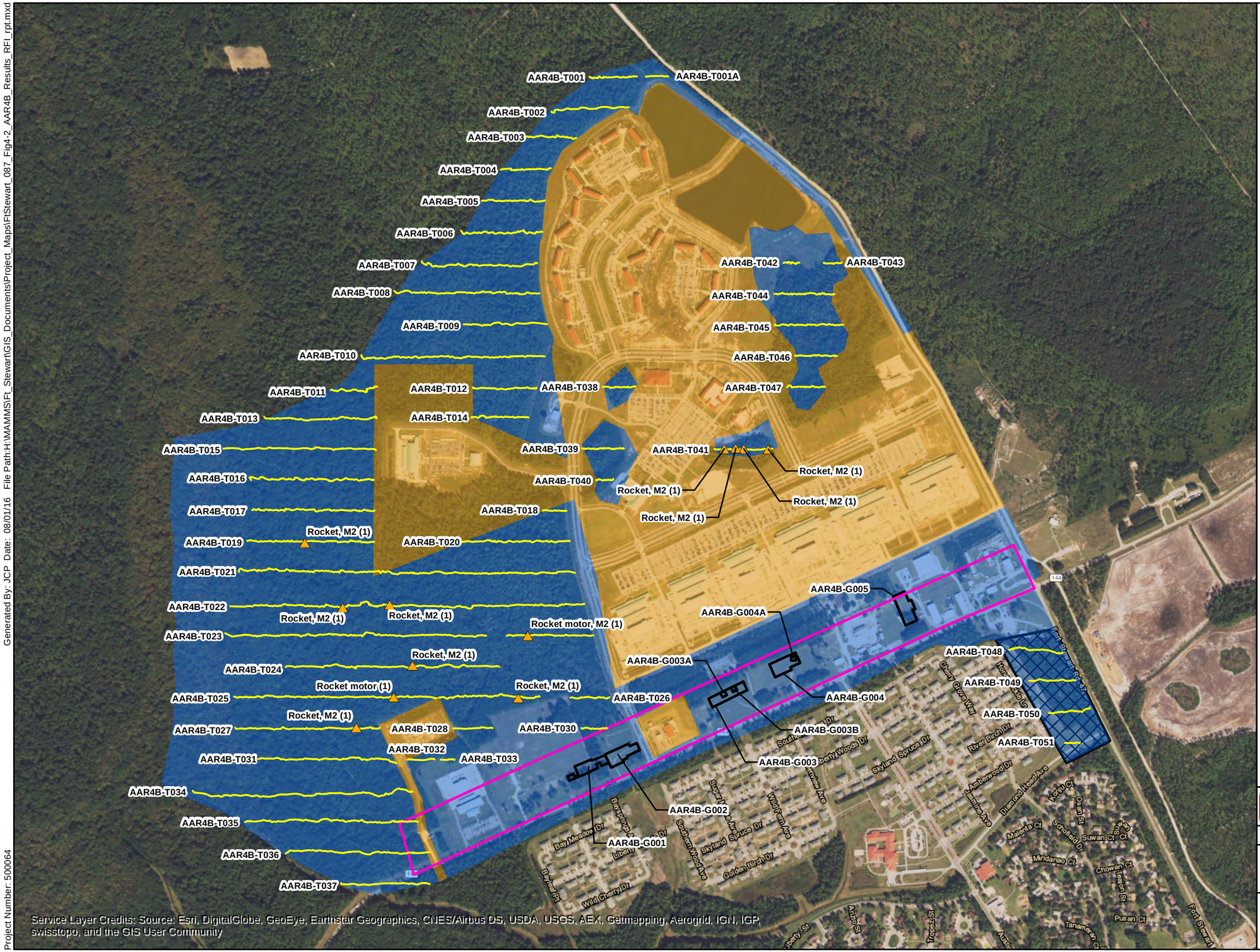

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Mag and Dig Result

- Munitions Debris (MD)

Note: No items found during the surface reconnaissance or DGM investigations.

- Mag and Dig Investigation Transect
- DGM Investigation Grid
- Surface Clearance Area
- Approximate Historical Firing Points Boundary
- Anti-Aircraft Range 4-A Munitions Response Site
- Anti-Aircraft Range 4-B Munitions Response Site

N

0 1,000 2,000 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-2

ANTI-AIRCRAFT RANGE 4B
DGM, MAG AND DIG, AND SURFACE RECONNAISSANCE INVESTIGATION RESULTS
FORT STEWART, GA

CB&I Federal Services LLC
4696 Millennium Drive, Suite 320
Belcamp, Maryland 21017

DGM Target Investigated

DGM Investigation Grid

Note: No MD found.

-4.6 -3.8 -3.1 -2.3 -1.5 -0.8 0.0 0.8 1.5 2.3 3.1 3.8 4.6 5.4 6.2 6.9 7.7 8.5 9.2

Channel 2 Leveled Response

0 60 120 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-3

ANTI-AIRCRAFT RANGE 4B
DGM INVESTIGATION TARGETS AND RESULTS
GRIDS G001 AND G002
FORT STEWART, GA

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Belcamp, Maryland 21017

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Project Number: 500064

DGM Target Investigated

50x50 Foot Mini Grid Selected for 100% Investigation of Targets Greater Than 1 Meter

Note: No MD found.

-4.6 -3.8 -3.1 -2.3 -1.5 -0.8 0.0 0.8 1.5 2.3 3.1 3.8 4.6 5.4 6.2 6.9 7.7 8.5 9.2

Channel 2 Leveled Response

0 60 120 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-4

ANTI-AIRCRAFT RANGE 4B
DGM INVESTIGATION TARGETS AND RESULTS
GRIDS G003, G003A, AND G003B
FORT STEWART, GA

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Belcamp, Maryland 21017

Project Number: 500064

Generated By: JCP Date: 04/20/16 File Path:H:\MAMM\SFt_Stewart\GIS_Documents\Project_Maps\FtStewart_097_Fig4-5_AAR4B_G4_DGM_Investigation_RFI_rpt.mxd

Project Number: 500064

N

AAR4B-G004

AAR4B-G004A

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

DGM Target Investigated

50x50 Foot Mini Grid Selected for 100% Investigation of Targets Greater Than 1 Meter

Note: No MD found.

-4.6 -3.8 -3.1 -2.3 -1.5 -0.8 0.0 0.8 1.5 2.3 3.1 3.8 4.6 5.4 6.2 6.9 7.7 8.5 9.2

Channel 2 Leveled Response

0 50 100 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-5

ANTI-AIRCRAFT RANGE 4B
DGM INVESTIGATION TARGETS AND RESULTS
GRIDS G004 AND G004A
FORT STEWART, GA

CB&I Federal Services LLC
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Belcamp, Maryland 21017

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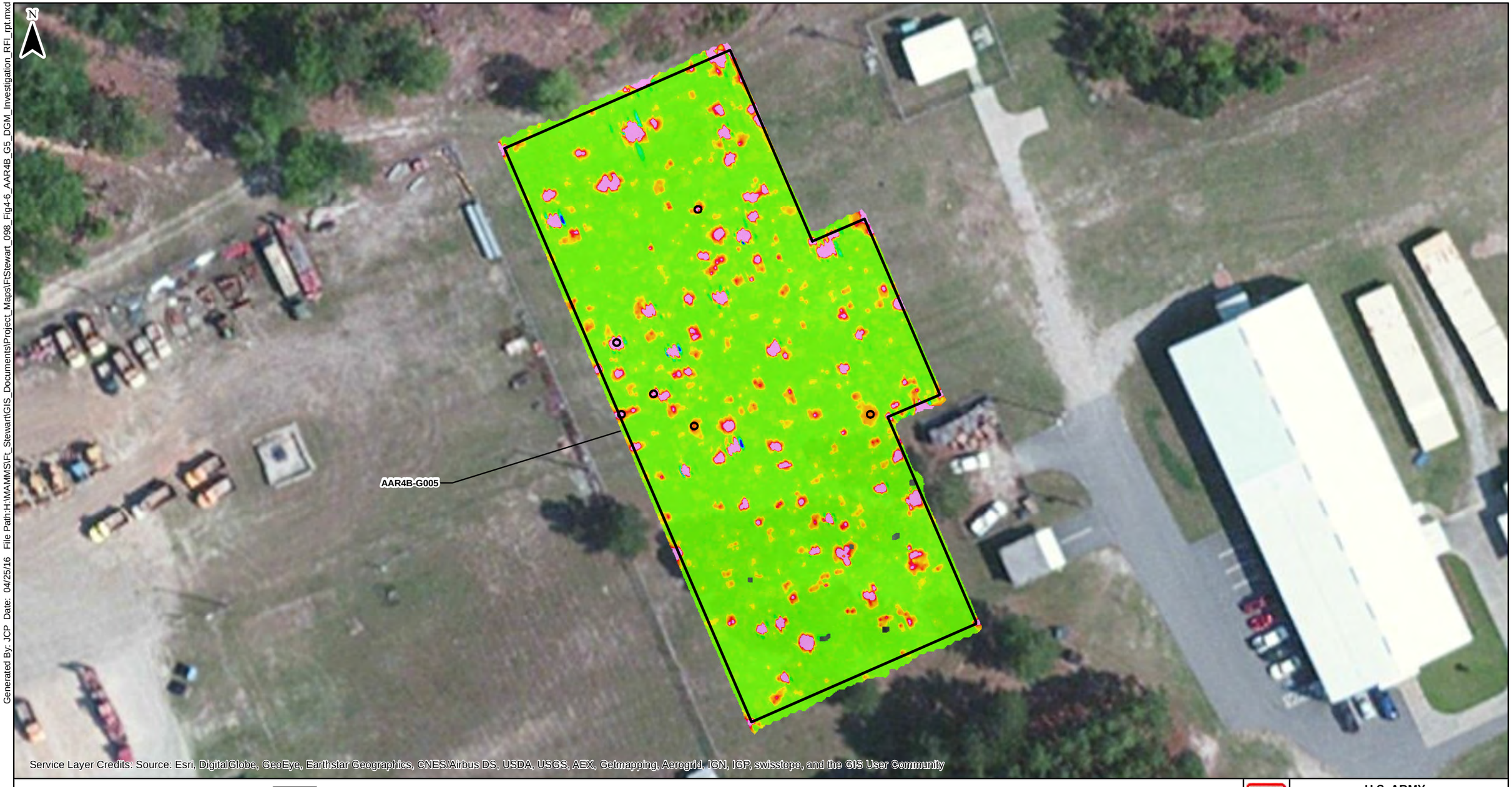
Project Number: 500064



DGM Target Investigated

DGM Investigation Grid

Note: No MD found.

-4.6 -3.8 -3.1 -2.3 -1.5 -0.8 0.0 0.8 1.5 2.3 3.1 3.8 4.6 5.4 6.2 6.9 7.7 8.5 9.2

Channel 2 Leveled Response

0 50 100 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-6

ANTI-AIRCRAFT RANGE 4B
DGM INVESTIGATION TARGETS AND RESULTS
GRID G005
FORT STEWART, GA

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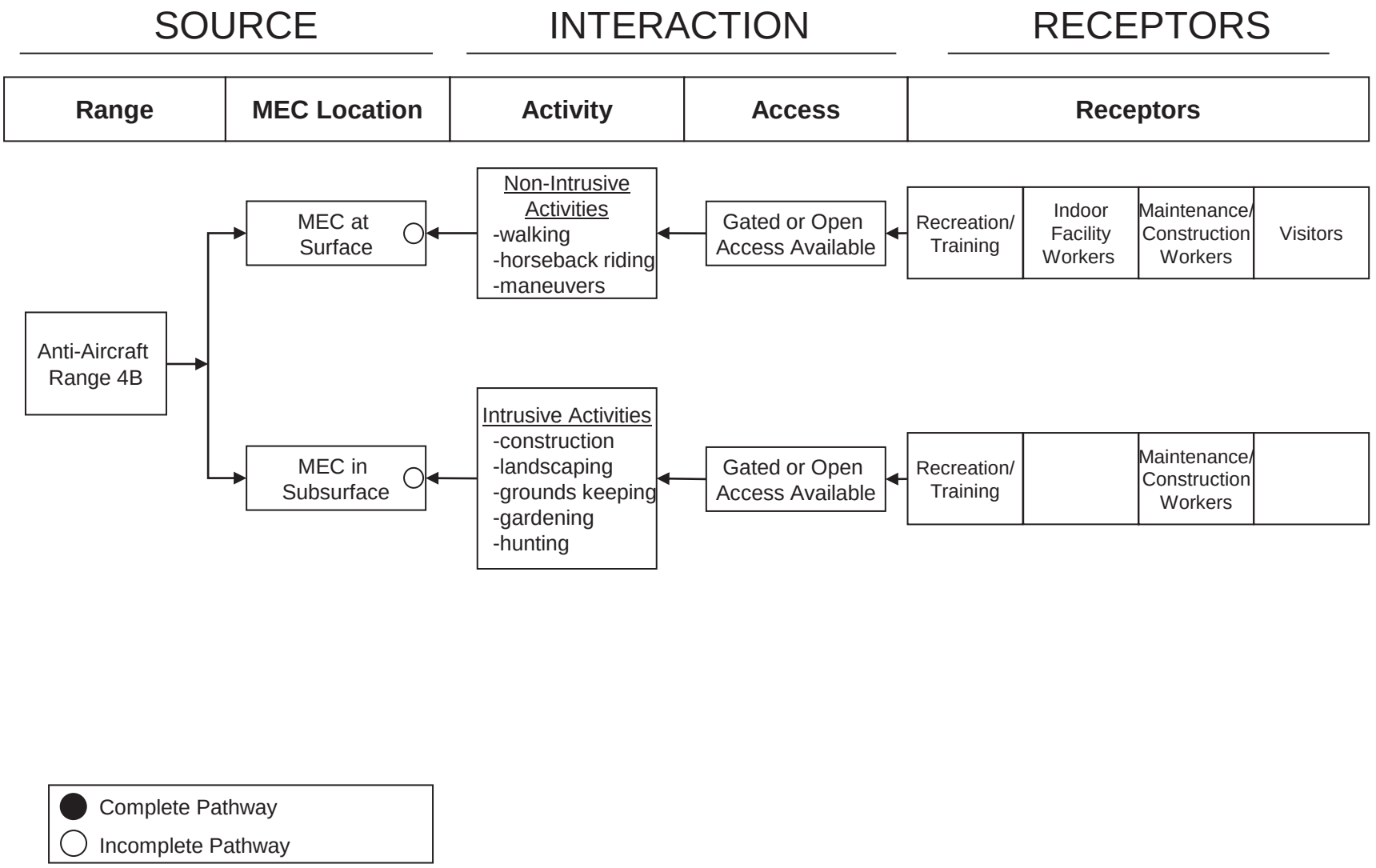
Belcamp, Maryland 21017

Figure 4-7
MEC Conceptual Site Model Anti-Aircraft Range - 4B



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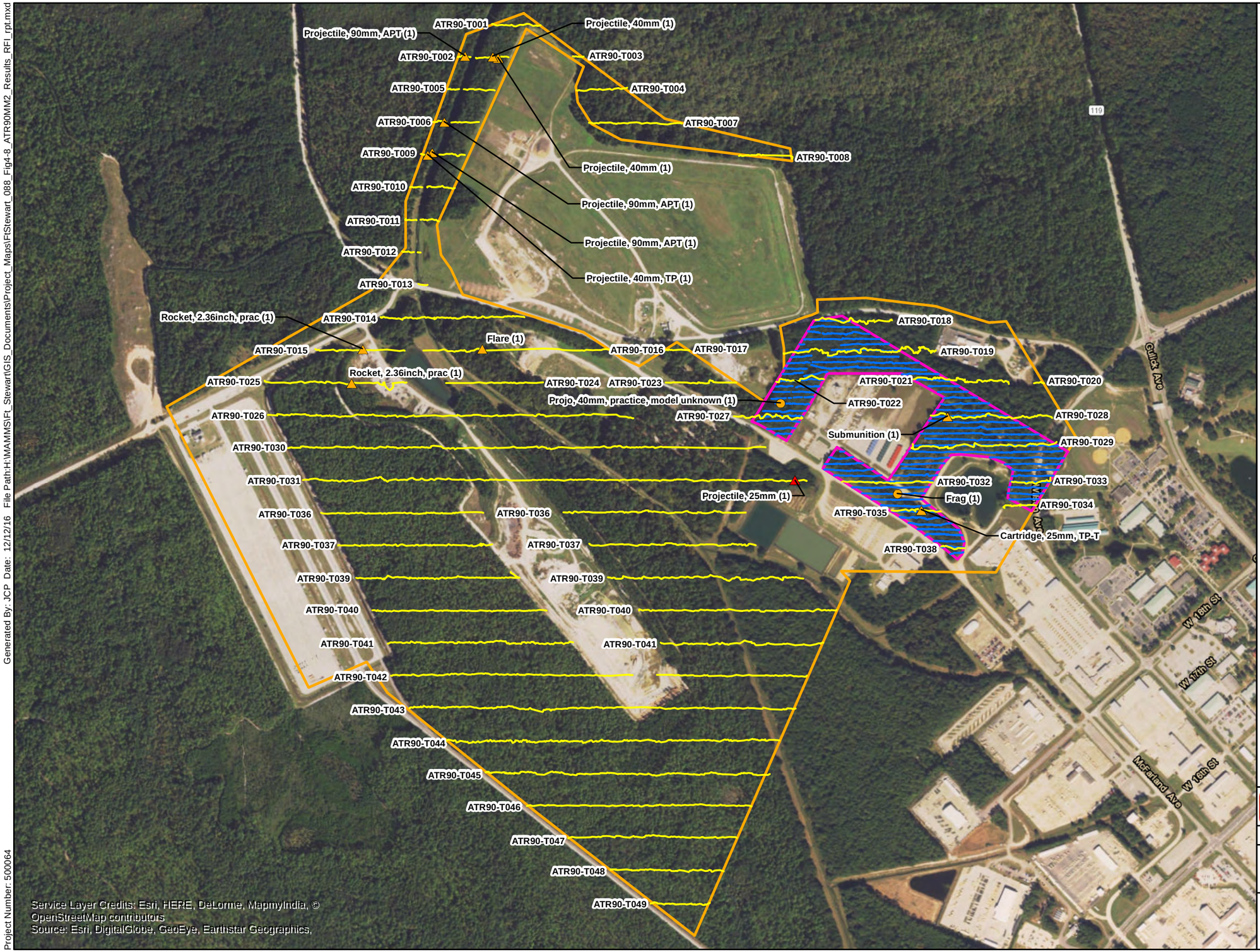
Project Number: 500064



Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics,

DGM Target Dig Result

- Munitions Debris (MD)

Mag and Dig Result

- Munitions Debris (MD)
- MPPEH
- DGM Investigation Transect
- Mag and Dig Investigation Transect
- Munitions Response Site Boundary
- Approximate Historical Firing Points Boundary

N

0 800 1,600 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-8

ANTI-TANK RANGE 90-MM2
MAG AND DIG INVESTIGATION RESULTS
FORT STEWART, GA

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Project Number: 500064

ATR90-T050
ATR90-T051
ATR90-T052
ATR90-T053
ATR90-T054
ATR90-T055
ATR90-T056
ATR90-T057
ATR90-T058
ATR90-T114
ATR90-T113
ATR90-T112
ATR90-T111
ATR90-T110
ATR90-T109
ATR90-T108
ATR90-T107
ATR90-T106
ATR90-T105
ATR90-T104
ATR90-T103
ATR90-T102
ATR90-T099
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ATR90-T068
ATR90-T069
ATR90-T070
ATR90-T074
ATR90-T075
ATR90-T076
ATR90-T077
ATR90-T078
ATR90-T079
ATR90-T080
ATR90-T081

Flooded Area

Water Filled Ditch

Projo, 40mm, practice, model unknown (1)

Frag (1)

-4.6 -3.8 -3.1 -2.3 -1.5 -0.8 0.0 0.8 1.5 2.3 3.1 3.8 4.6 5.4 6.2 6.9 7.7 8.5 9.2

Channel 2 Leveled Response

DGM Target Investigated

Fence

Road Edge

Pond

Munitions Response Site Boundary

N

0 200 400 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-9

ANTI-TANK RANGE 90-MM2
DGM INVESTIGATION
TARGETS AND RESULTS
FORT STEWART, GA

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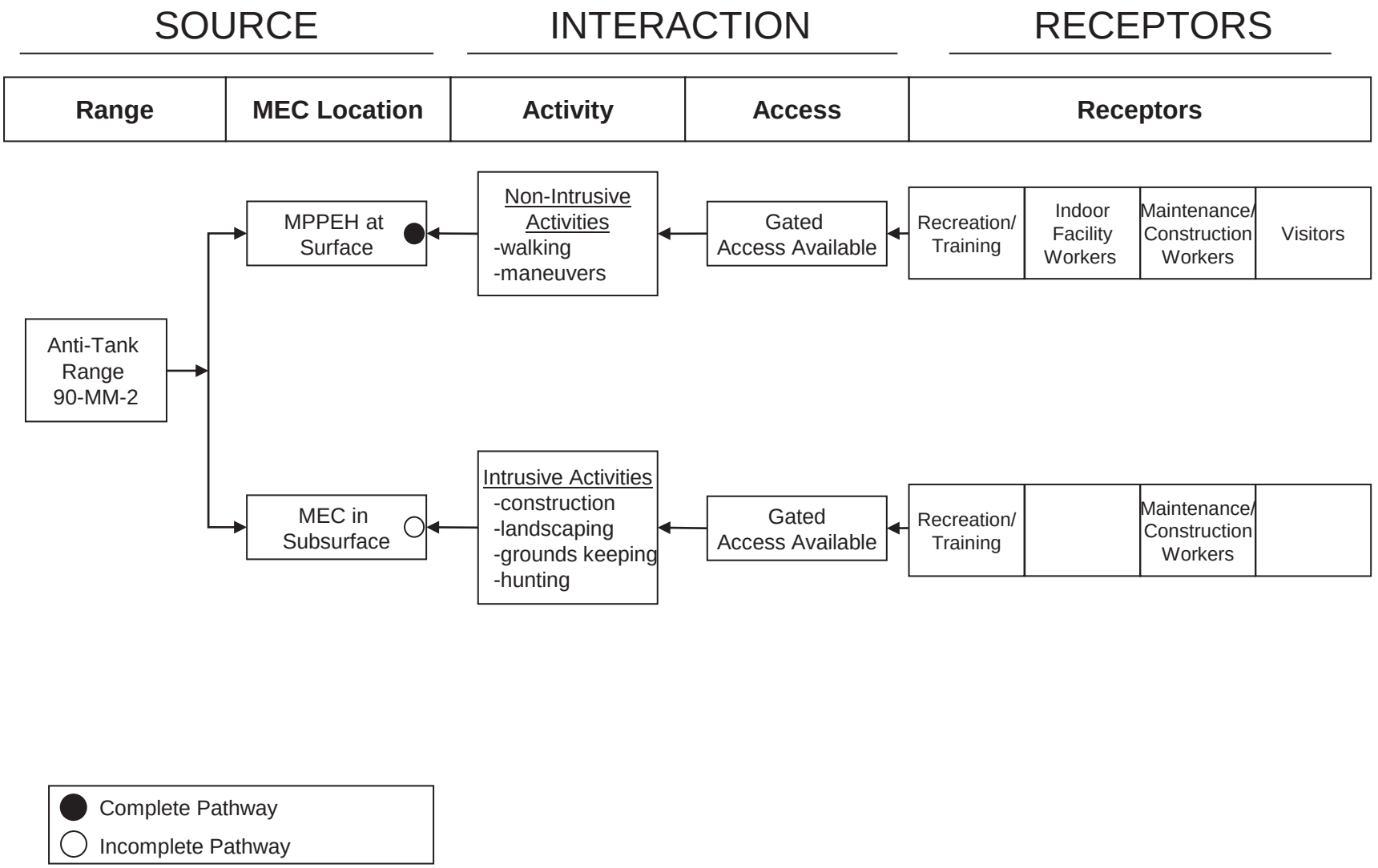
Figure 4-10
MEC Conceptual Site Model Anti-Tank Range 90-MM-2



Mag and Dig Result

- Munitions Debris (MD)
- Mag and Dig Investigation Transect
- Firing Berm
- Target Berm
- Infiltration Course
- Munitions Response Site Boundary

Suspected Munitions Areas

- Grenade Launcher and Small Arms
- 120-mm Anti-Aircraft and Small Arms
- Small Arms

0 420 840 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-11

GRENADE LAUNCHER RANGE
MAG AND DIG INVESTIGATION RESULTS
FORT STEWART, GA

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Project Number: 500064

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Project Number: 500064

Disposal Pit Containing MPPEH
Bomb, 250 lb, general purpose, AN-M57 (1)
Projo, 8inch, HE, M106 (1)
Projo, 90mm, HEAT, M348 (1)
Ordnance component(s), See comments
Assorted MD Components (1)
Projo, 57mm, AP-T, M70 (1)
Ordnance component(s), See comments
Frag (1)
Assorted MD Components (1)
Flare, surface, trip, M49 series (1)
Ordnance component(s), See comments
Frag (1)

GLR-T018
GLR-T019
GLR-T020
GLR-T021
GLR-T022
GLR-T023
GLR-T024
GLR-T025
GLR-T026
GLR-T027
GLR-T028
GLR-T029
GLR-T030
GLR-T031
GLR-T032
GLR-T033
GLR-T034
GLR-T035
GLR-T036
GLR-T037
GLR-T038
GLR-T039
GLR-T040
GLR-T041
GLR-T042
GLR-T043
GLR-T044
GLR-T045

DGM Target Investigated — Road Edge — Munitions Response Site Boundary

-4.6 -3.8 -3.1 -2.3 -1.5 -0.8 0.0 0.8 1.5 2.3 3.1 3.8 4.6 5.4 6.2 6.9 7.7 8.5 9.2
Channel 2 Leveled Response

0 100 200 Feet
Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-12

GRENADE LAUNCHER RANGE
DGM INVESTIGATION
TARGETS AND RESULTS
FORT STEWART, GA

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Project Number: 500064

N

Ordnance component(s), See comments (1)

Bomb, 250 lb, general purpose, AN-M57 (1)

Projo, 8inch, HE, M106 (1)

Disposal Pit containing MPPEH

Projo, 90mm, HEAT, M348 (1)

Assorted MD Components (1)

Frag (1)

Assorted MD Components (1)

Frag (1)

Projo, 57mm, AP-T, M70 (1)

Ordnance component(s), See comments (1)

Flare, surface, trip, M49 series (1)

Ordnance component(s), See comments (1)

GLR-T018 GLR-T019 GLR-T020 GLR-T021 GLR-T022 GLR-T023 GLR-T024 GLR-T025 GLR-T026 GLR-T027 GLR-T028 GLR-T029 GLR-T030 GLR-T031 GLR-T032 GLR-T033 GLR-T034 GLR-T035 GLR-T036 GLR-T037 GLR-T038 GLR-T039 GLR-T040 GLR-T041 GLR-T042 GLR-T043 GLR-T044 GLR-T04

Service Layer Credits:

DGM Target Investigated

DGM Target Dig Result

MEC-UXO

MD

DGM Investigation Transect

Munitions Response Site Boundary

0 90 180 Feet

Projection : WGS_1984_UTM_Zone_17N

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MILITARY MUNITIONS RESPONSE PROGRAM

FIGURE NUMBER 4-13

GRENADE LAUNCHER RANGE
DGM RESULTS & 1957 AERIAL
FORT STEWART, GA

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Figure 4-14
MEC Conceptual Site Model Grenade Launcher Range

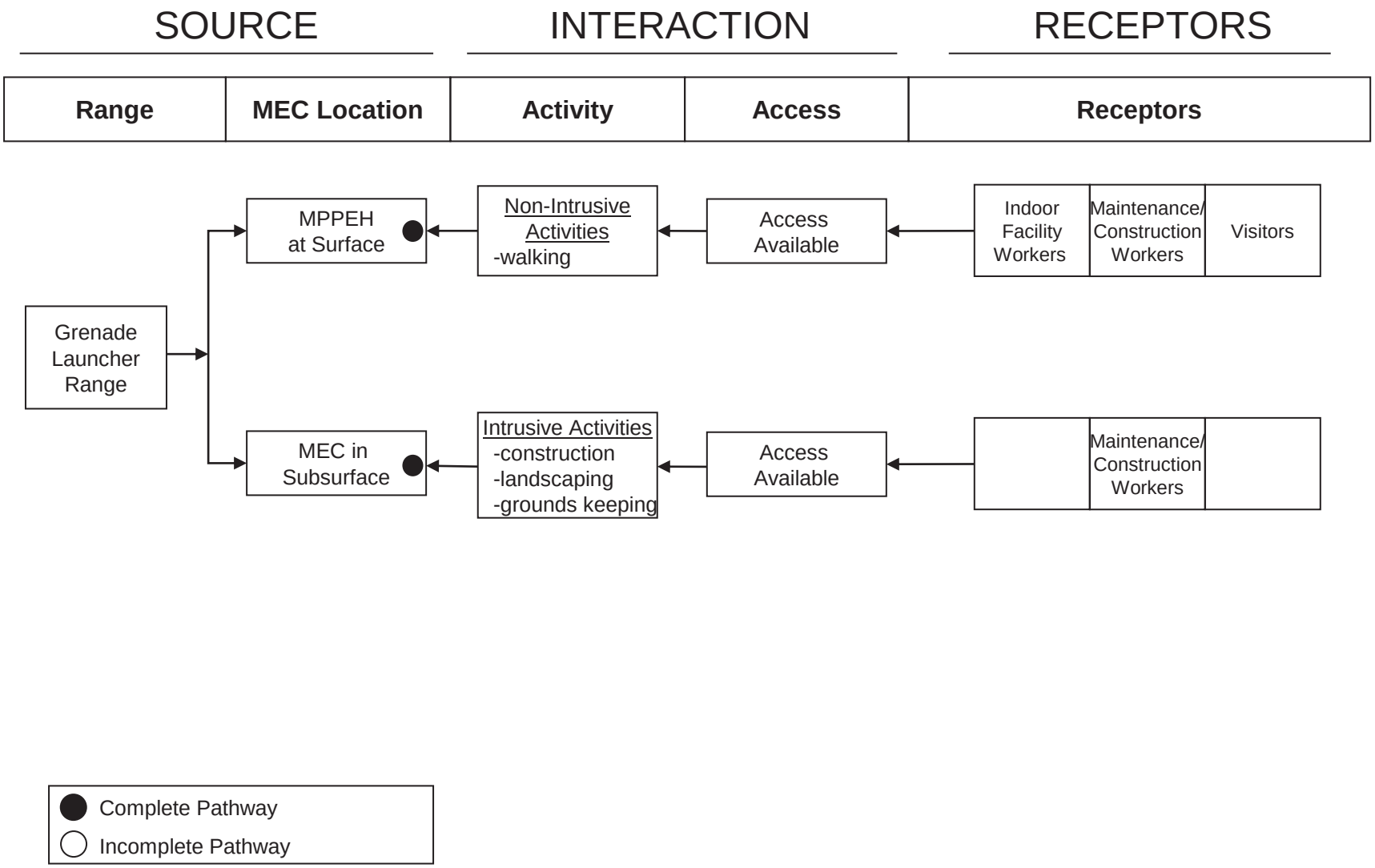
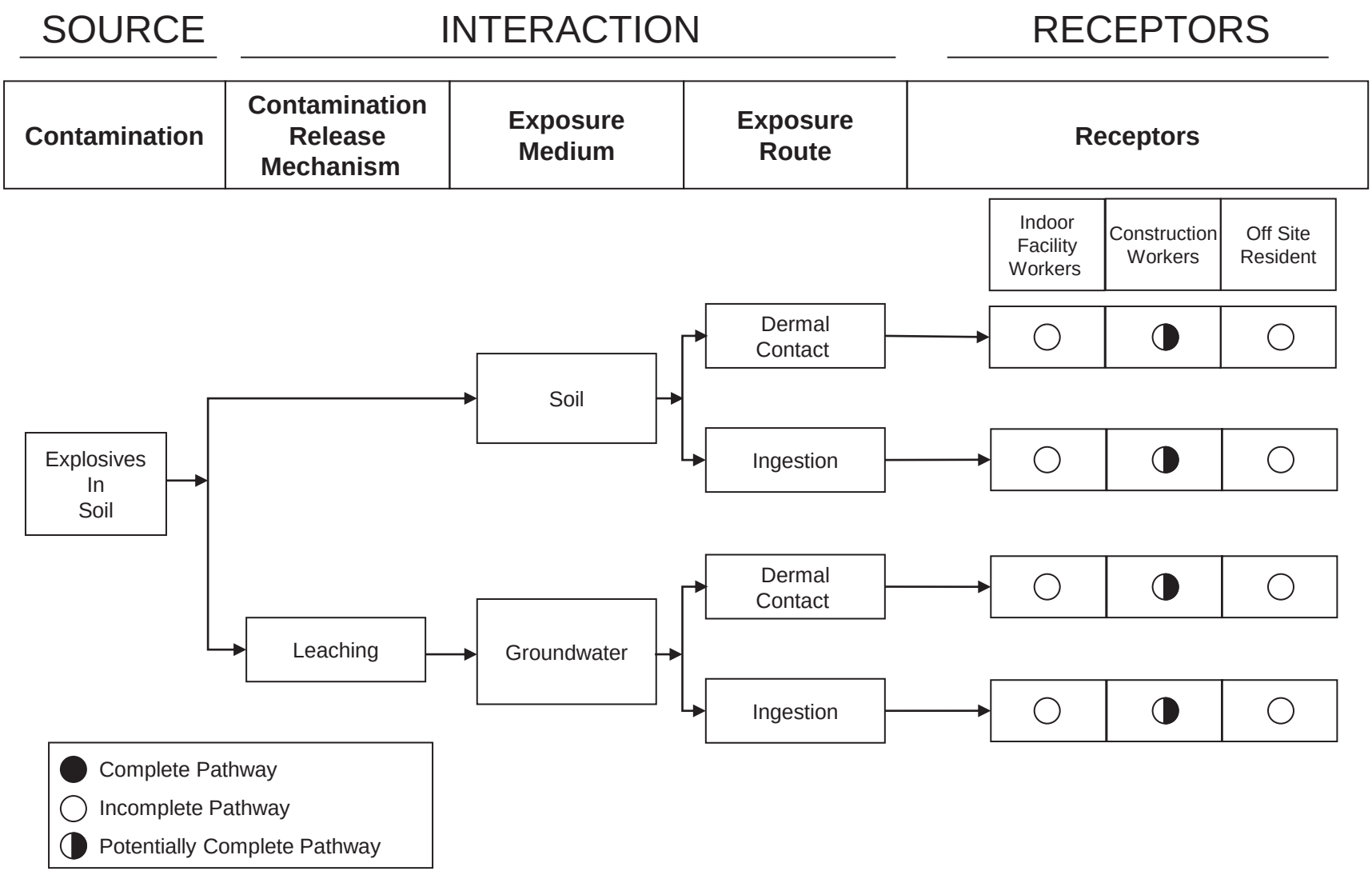


Figure 4-15
MC Conceptual Site Model Grenade Launcher Range



Appendix A
Photo-Documentation Log

Ft Stewart: Photo Catalog

Project Site Level Photos

Work Unit Level Photos

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T001**

Description: Tall and thick vegetation at Transect 001

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T006QC**

Description: Small aircraft

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T006QC**

Description: Small aircraft

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T006QC**

Description: Thick vegetation at Transect 006

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T006QC**

Description: Small aircraft

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T007QC**

Description: Thick vegetation at Transect 007

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T013QC**

Description:Thick vegetation at Transect 013

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T014QC**

Description: Vegetation at Transect 014

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T019**

Description: Swamy terrain at Transect 019

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T020**

Description: Dense and tall vegetation at Transect 020

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T022**

Description: Expended M2 Rocket found on Transect 022

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T022**

Description: Expended M2 Rocket found on Transect 022

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T023**

Description: Thick vegetation at Transect 023

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T023**

Description: Piece of Expended M2 Rocket found on Transect 023

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T023**

Description: Piece of Expended M2 Rocket found on Transect 023

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T023**

Description: Swampy terrain at Transect 023

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T025**

Description: Pieces of expended M2 rocket

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T025A**

Description: Extremely thick vegetation at Transect 025

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T038**

Description: Fence at Transect 038

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T039**

Description: Thick vegetation at Transec 039

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T041**

Description: Pieces M2 Rockets

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T042**

Description: Tall and thick vegetation at Transect 042

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T044**

Description: Vegetation at Transect 044

Project: RCRA Fall 2015 **Site: AAR4B** **Work Unit: AAR4B-T046**

Description: Tall and thick vegetation at Transect 046

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T001**

Description: Vegetation at Transect 001

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T001QC**

Description: Swampy terrain at Transect 001

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T002**

Description: Inert 40mm Projectile

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T009**

Description: Expended TP 40mm Projectile

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T002**

Description: Inert 40mm Projectile

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T002A**

Description: Expended 90mm Projectile

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T006**

Description: Expended 90mm Projectile

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T006**

Description: Vegetation at Transect 006

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T009**

Description: Thick vegetation at Transect 009

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T009A**

Description: Thick and tall vegetation at Transect 009A

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T012**

Description: Tall and thick vegetation at Transect 012

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T012A**

Description: Fence at Transect 012A

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T015**

Description: 2.36inch Practice Rocket

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T016**

Description: Expended Slap Flare

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T017**

Description: Thicj vegetation at Transect 017

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T019**

Description: Vegetation at Transect 019

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T025**

Description: 2.36inch Practice Rocket

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T026**

Description: Thick vegetation at Transect 026

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T028**

Description: Submunition

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T028**

Description: Submunition

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T031**

Description: TP 25mm Projectile

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T031**

Description: Vegetation at Transect 031

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T043**

Description: Vegetation at Transect 043

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T045**

Description: Thick vegetation at Transect 045

Project: RCRA Fall 2015 **Site: ATR90** **Work Unit: ATR90-T045**

Description: Vegtation at Transect 045

Project: RCRA Fall 2015 **Site: GLR** **Work Unit: GLR-T009**

Description: Practice Mine

Project: RCRA Fall 2015 **Site: GLR** **Work Unit: GLR-T016**

Description: TP 25mm Porjectiles

Item of Interest Level Photos

Project: **RCRA Fall 2015** **Site:** **GLR** **Date:** **11/4/2015**

Item Number:

GLR-T016-T2-3

Easting:

439277.243911486

Northing:

3525858.69033604

Quantity:

1

Item Type:

Munitions Debris

Item Description:

Projectile, 25mm

Comments:

25mm TP

Project: RCRA Fall 2015 **Site:** AAR4B **Date:** 11/17/2015

Item Number:
AAR4B-T024-T1-1

Easting:
441586.741215005

Northing:
3529775.21771836

Quantity:
1

Item Type:
Munitions Debris

Item Description:
Rocket, M2

Comments:
Expended M2 Rocket

Project: RCRA Fall 2015 **Site:** AAR4B **Date:** 11/18/2015

Item Number:
AAR4B-T019-T1-1

Easting:
441243.761325712

Northing:
3530167.62642886

Quantity:
1

Item Type:
Munitions Debris

Item Description:
Rocket, M2

Comments:
Expended M2 Rocket

Project: RCRA Fall 2015 **Site:** AAR4B **Date:** 11/16/2015

Item Number:

AAR4B-T025A-T1-1

Easting:

441923.048888276

Northing:

3529672.96318166

Quantity:

1

Item Type:

Munitions Debris

Item Description:

Rocket, M2

Comments:

Expended M2 Rocket

Project: RCRA Fall 2015 **Site:** ATR90 **Date:** 11/19/2015

Item Number:

ATR90-T009-T2-1

Easting:

438542.447932221

Northing:

3528554.85050788

Quantity:

1

Item Type:

Munitions Debris

Item Description:

Projectile, 90mm, APT

Comments:

90mm APT Projectile

Appendix B
Field Documentation

Provided on CD.

Appendix C
MEC Technical Data Sheets

Provided on CD.

Appendix D
Geophysical Data

Provided on CD.

Appendix E
MEC HA Worksheets

Provided on CD.

Appendix F
MRSPP Tables

Provided on CD.

Appendix G
Historical Reports

Provided on CD.