November 19, 2010

FINAL

Remedial Investigation Work Plan

Former Cape Poge Little Neck Bomb Target MRS, Former Moving Target Machine Gun Range at South Beach MRS, & Tisbury Great Pond MRS

Martha's Vineyard, Massachusetts

Contract Number: W912DY–04–D–0019
Task Order Number: 0006
U.S. Army Engineering & Support Center, Huntsville

Prepared for:

US Army Corps of Engineers, New England District

Prepared by:

UXB International, Inc.
2020 Kraft Drive, Suite 2100
Blacksburg, Virginia 24060 USA
Tel: 540.443.3700
Fax: 540.443.3790
solutions@uxb.com
www.uxb.com

Richmond H. Dugger, IV
President

David Douthat, CSP
VP, Quality & Safety

TABLE OF CONTENTS

1 INTRODUCTION 1-1

1.3 PROJECT AUTHORIZATION 1-1
1.4 PURPOSE AND SCOPE 1-2
1.5 WORK PLAN ORGANIZATION 1-2
1.6 PROJECT LOCATION 1-4
1.7 SITE DESCRIPTIONS 1-4
1.7.3 Former Cape Poge Little Neck Bomb Target MRS 1-4
1.7.4 Former Moving Target Machine Gun Range Site at South Beach MRS 1-8
1.7.5 Tisbury Great Pond MRS 1-8
1.7.6 Former Cape Poge Little Neck Bomb Target MRS 1-10
1.7.7 Former Moving Target Machine Gun Range at South Beach MRS 1-11
1.7.8 Tisbury Great Pond MRS 1-11
1.8 CURRENT AND PROJECTED LAND USE 1-12
1.9 PREVIOUS INVESTIGATIONS 1-13
1.9.2 Inventory Project Report 1-13
1.9.3 Archives Search Report and Supplement for the Former Tisbury Great Pond 1-13
1.9.4 Tisbury Great Pond Site Inspection 1-14
1.9.5 Inventory Project Report Cape Poge Little Neck Bomb Target Site 1-15
1.9.6 Cape Poge Little Neck Bomb Target Site Preliminary Assessment 1-15
1.9.7 Time Critical Removal Action at the Former Cape Poge Little Neck Bomb Target Site, & the Former Moving Target Machine Gun Range at South Beach 1-18
1.10 CONCEPTUAL SITE MODEL 1-19
1.10.2 Former Cape Poge Little Neck Bomb Target MRS 1-19
1.10.3 Former Moving Target Machine Gun Range at South Beach MRS 1-22
1.10.4 Tisbury Great Pond MRS 1-22

2 TECHNICAL MANAGEMENT PLAN 2-1

2.1 OBJECTIVES 2-1
2.2 ORGANIZATION 2-2
2.3 PERSONNEL 2-2
2.3.2 MEC Operations 2-3
2.3.3 MEC Dive Operations 2-5
2.3.4 Geophysics 2-7
2.3.5 RI/FS & Environmental Management 2-7
2.4 COMMUNICATION & REPORTING 2-8
2.5 DELIVERABLES 2-8
2.6 SCHEDULE 2-8
2.7 PERIODIC REPORTING 2-8
2.8 COSTING & BILLING 2-9
2.9 PUBLIC RELATIONS SUPPORT 2-9
2.10 SUBCONTRACTOR MANAGEMENT PROCEDURES 2-9
2.11 FIELD OPERATIONS MANAGEMENT PROCEDURES 2-10
2.11.5 Travel 2-10
2.11.6 Site Training 2-10
2.11.7 Lodging 2-11
2.11.8 Site Office/Storage 2-11
2.11.9 Work Hours/Holidays 2-11

3 FIELD INVESTIGATION PLAN 3-1

3.1 OVERALL APPROACH TO MUNITIONS RESPONSE ACTIVITIES 3-1
3.1.1 Site Characterization Goals 3-1
3.1.2 Project Data Quality Objectives 3-1
3.1.3 Data Incorporation into the RI/FS 3-2
3.1.4 MEC Exposure Analysis 3-2
3.1.5 MC Investigation Planning 3-3
3.1.6 Use of Time Critical Removal Actions during the RI 3-4
3.1.7 Follow-on Activities 3-4
3.2 IDENTIFICATION OF AREAS OF CONCERN 3-4
3.2.3 Former Cape Poge Little Neck Bomb Target MRS 3-4
3.2.4 Former Moving Target Machine Gun Range at South Beach MRS 3-5
3.2.5 Tisbury Great Pond MRS 3-5
3.3 GEOPHYSICAL INVESTIGATION PLAN 3-6
3.3.4 Geophysical Investigation Transect Layouts: Former Cape Poge Little Neck Bomb Target MRS 3-7
3.3.5 Geophysical Investigation Transect Layouts: Former Moving Target Machine Gun Range Site at South Beach MRS 3-7
3.3.6 Geophysical Investigation Transect Layouts: Tisbury Great Pond MRS 3-8
3.3.7 Geophysical Data Quality Objectives 3-8
3.3.8 Geophysical System Verification 3-13
3.3.9 Geophysical Survey Types 3-18
3.3.10 Geophysical Field Equipment & Procedures 3-20
3.3.11 Data Processing 3-26
3.3.12 Anomaly Selection & Decision Criteria 3-29
3.3.13 Anomaly Reacquisition & Resolution Procedures 3-30
3.4 GEOSPATIAL INFORMATION & ELECTRONIC SUBMITTALS 3-32
3.4.2 Survey 3-32
3.4.3 Mapping/GIS 3-32
3.4.4 Other Submittals 3-33
3.5 INTRUSIVE INVESTIGATION 3-33
3.5.2 General Methodology 3-33
3.5.3 MEC Accountability & Records Management 3-33
3.5.4 UXO Personnel Qualifications 3-34
3.5.5 Anomaly Sampling Location 3-34
3.5.6 Anomaly Sampling Procedures 3-34
3.5.7 Identification of Munitions with Greatest Fragmentation Distance (MGFD) 3-36
3.5.8 Minimum Separation Distances 3-36
3.5.9 Anomaly Identification 3-36
3.5.10 MEC Removal 3-37
3.5.11 MEC Storage 3-38
3.5.12 MEC Disposal Procedures 3-38
3.5.13 DGM System Positioning 3-51
3.5.14 Downline Data Density 3-51
3.5.15 Survey Coverage (Across Line Applicable Only to Grids) 3-51
3.5.16 Dynamic Detection Repeatability 3-51
3.5.17 Dynamic Positioning Repeatability 3-52
3.5.18 DGM System Data Repeatability 3-52

3.5.19 Speed ... 3-52
3.6 INVESTIGATION DERIVED WASTE (IDW) PLAN ... 3-52
3.7 RISK CHARACTERIZATION & ANALYSIS ... 3-52
3.8 TRANSPORT STUDY ... 3-52
3.8.2 South Beach Grids ... 3-53
3.8.3 Tisbury Great Pond Grids ... 3-53

4 QUALITY CONTROL PLAN ... 4-1

4.3 DATA MANAGEMENT ... 4-1
4.4 QC DUTIES ... 4-1
4.5 EQUIPMENT CALIBRATIONS/PROVE OUT ... 4-2
4.6 ANOMALY INVESTIGATION ... 4-3
4.7 QUALITY CONTROL PROCESS ... 4-3
4.8 PREPARATORY PHASE INSPECTIONS ... 4-3
4.9 INITIAL PHASE INSPECTION ... 4-4
4.10 FOLLOW-UP PHASE INSPECTION (SURVEILLANCE) ... 4-5
4.11 DEFICIENCIES & NONCONFORMANCE ... 4-5
4.12 ROOT CAUSE ANALYSIS ... 4-5
4.13 CORRECTIVE ACTION ... 4-6
4.14 QC DOCUMENTATION ... 4-6
4.15 DAILY QC REPORT ... 4-6
4.16 MONTHLY QC REPORT ... 4-7
4.17 LESSONS LEARNED ... 4-7

5 EXPLOSIVES MANAGEMENT PLAN ... 5-1

5.1 GENERAL ... 5-1
5.2 LICENSES/PERMITS ... 5-1
5.3 ACQUISITION ... 5-1
5.3.1 Description & Estimated Quantity of Explosives ... 5-1
5.3.2 Acquisition Source ... 5-2
5.4 INITIAL RECEIPT ... 5-2
5.4.1 Procedures for Receipt of Explosives ... 5-2
5.4.2 Reconciling Discrepancies in Quantities Shipped & Received ... 5-3
5.5 STORAGE ... 5-3
5.5.1 Explosives Storage Facility ... 5-3
5.6 TRANSPORTATION ... 5-3
5.6.2 From Storage Facility to Disposal Locations ... 5-3
5.6.3 Vehicle Requirements ... 5-4
5.7 RECEIPT PROCEDURES ... 5-5
5.7.2 Accounting for Each Explosive Item ... 5-5
5.7.3 Authorized Individuals ... 5-5
5.8 INVENTORY ... 5-5
5.8.2 Physical Inventory of the Explosives in the Explosives Storage Facility ... 5-6
5.8.3 Reconciliation of Discrepancies ... 5-6
5.8.4 Lost, Stolen, or Unauthorized Use of Explosives ... 5-6
5.8.5 Disposing of Any Explosives Remaining at the End of Site Activities ... 5-7

6 EXPLOSIVE SITING PLAN ... 6-1

6.1 SITE ... 6-3

6.2 ANTICIPATED DATES 6-3
6.3 PURPOSE 6-3
6.4 SITE BACKGROUND & CURRENT CONDITIONS 6-3
6.5 EXECUTING AGENCIES 6-5
6.6 SCOPE OF INVESTIGATIVE/CHARACTERIZATION ACTION 6-5
6.7 SAFETY CRITERIA 6-7
6.8 METHODS OF DISPOSAL 6-10

7 ENVIRONMENTAL PROTECTION PLAN 7-1

7.1 INTRODUCTION 7-1
7.2 COORDINATION WITH AGENCIES/ORGANIZATIONS/STAKEHOLDERS 7-2
7.3 ENVIRONMENTAL PROTECTION PLAN (EPP) FOR NATURAL RESOURCES PROTECTION 7-6
7.3.1 Threatened & Endangered Species & Species of Special Concern 7-6
7.3.2 Wetlands, Water Resources, & Natural Communities 7-10
7.3.3 Measures to Avoid, Minimize, and/or Mitigate Environmental Impacts 7-11
7.3.4 Reasons for Avoidance, Minimization, and/or Mitigating Actions 7-13
7.3.5 Worker Education Briefing 7-13
7.3.6 Vegetation Clearing for Geophysical Surveys & Acquisition of Selected Anomalies 7-13
7.3.7 Vegetation Impact Mitigation 7-14
7.3.8 Trees & Shrubs 7-14
7.3.9 Control/Introduction/Spread of Invasive Plants 7-14
7.3.10 Federally-Listed & State-Listed Protected Species (Flora & Fauna) 7-16
7.3.11 State-Listed Species 7-17
7.3.12 Discussion of Federal- & State-Listed Species 7-18
7.3.13 Protection for State-Listed Plants 7-29
7.3.14 Manifesting, Transportation, & Disposal of Wastes 7-29
7.3.15 Burning Activities 7-29
7.3.16 Dust & Emission Control 7-29
7.3.17 Spill Control & Prevention 7-30
7.3.18 Storage & Temporary Facilities 7-30
7.3.19 Access Routes 7-30
7.3.20 Control of Water Run-on & Run-off 7-30
7.3.21 Decontamination & Disposal of Equipment 7-30
7.3.22 Minimizing Areas of Disturbance – Phase 2 7-31
7.3.23 Post-Activity Cleanup & Site Restoration 7-31
7.3.24 Air Monitoring Plan 7-31
7.4 ENVIRONMENTAL PROTECTION PLAN (EPP) FOR CULTURAL RESOURCES PROTECTION 7-31
7.4.1 Cultural & Archeological Resources On-Site 7-31
7.4.2 Cape Poge Little Neck Bomb Target MRS & the Moving Target Machine Gun Range at South Beach 7-32
7.4.3 Discovery of Human Remains 7-32
7.4.4 Escort Visiting Parties to Sites 7-32
7.4.5 Underwater Investigation 7-33

8 PROPERTY MANAGEMENT PLAN 8-1

9 INTERIM HOLDING FACILITY (RCWM) 9-1

10 PHYSICAL SECURITY PLAN (RCWM) 10-1

11 REFERENCES 11-1

TABLE OF FIGURES

FIGURE 1-1: SITE LOCATION 1-6
FIGURE 1-2: RI/FS MRS LOCATIONS 1-7
FIGURE 1-3: HISTORIC TARGET LOCATIONS 1-16
FIGURE 1-4: TISBURY GREAT POINT MRS 2008 SITE INSPECTION 1-17
FIGURE 1-5: FORMER CAPE POGE BOMB TARGET MRS 2009 TRCA RESULTS 1-20
FIGURE 1-6: FORMER MOVING TARGET MACHINE GUN RANGE AT SOUTH BEACH MRS 2009 TRCA RESULTS 1-21
FIGURE 1-7: CONCEPTUAL SITE EXPOSURE MODEL, FORMER CAPE POGE LITTLE NECK BOMB TARGET MRS 1-26
FIGURE 1-8: CONCEPTUAL SITE EXPOSURE MODEL, FORMER MOVING TARGET MACHINE GUN RANGE AT SOUTH BEACH MRS 1-29
FIGURE 1-9: CONCEPTUAL SITE EXPOSURE MODEL, TISBURY GREAT POND MRS 1-33
FIGURE 2-1: TEAM ORGANIZATION CHART 2-2
FIGURE 2-2: SCHEDULE 2-12
FIGURE 3-1: FORMER CAPE POGE LITTLE NECK BOMB TARGET SITE MRS 3-9
FIGURE 3-2: FORMER MOVING TARGET MACHINE GUN RANGE AT SOUTH BEACH MRS 3-10
FIGURE 3-3: TISBURY GREAT POND MRS 3-11
FIGURE 3-4: INDUSTRY STANDARD OBJECT 3-14
FIGURE 5-1: PROCEDURES FOR RECEIPT OF EXPLOSIVES 5-3
FIGURE 5-2: ATF FORM 5400.5 5-8
FIGURE 6-1: AREA LOCATION MAP 6-13
FIGURE 6-2: CAPE POGE LITTLE NECK TARGET SITE Q-D ARCS 6-14
FIGURE 6-3: FORMER MOVING TARGET RANGE AT SOUTH BEACH Q-D ARCS 6-15
FIGURE 6-4: TISBURY GREAT POND Q-D ARCS 6-16
FIGURE 6-5: MAGAZINE LOCATION MAP 6-17
FIGURE 7-1: PRIORITY HABITATS OF RARE SPECIES 7-9
FIGURE 7-2: WETLANDS & DEEPWATER HABITATS 7-12
FIGURE 7-3: 2009 SHOREBIRD NEST LOCATIONS 7-20
FIGURE 7-4: 2010 SHOREBIRD NEST LOCATIONS 7-21

TABLE OF TABLES

TABLE 1-1: CSM SUMMARY, FORMER CAPE POGE LITTLE NECK BOMB TARGET MRS 1-22
TABLE 1-2: CSM SUMMARY, FORMER MOVING TARGET MACHINE GUN RANGE AT SOUTH BEACH MRS 1-27
TABLE 1-3: CSM SUMMARY, TISBURY GREAT POND MRS 1-30
TABLE 5-1: ANTICIPATED EXPLOSIVES REQUIREMENTS 5-2
TABLE 6-1: DIFFERENT MRS TO BE INVESTIGATED 6-7
TABLE 6-2: MINIMUM SEPARATION DISTANCES (MSD) 6-9
TABLE 6-3: VESSEL & PERSONNEL WITHDRAWAL DISTANCES BASED ON THE 5-INCH MK 1 ROCKET 6-9

TABLE 7-1: AGENCIES/ORGANIZATIONS/STAKEHOLDERS 7-2
TABLE 7-2: THREATENED, ENDANGERED, & SPECIES OF CONCERN 7-7
TABLE 7-3: PROTECTED AVAIAN SPECIES NO WORK WINDOWS 7-25

TABLE OF ATTACHMENTS

ATTACHMENT 5-1: BATFE USER OF HIGH EXPLOSIVES LICENSE 5-10
ATTACHMENT 5-2: BATFE NOTICE OF CLEARANCE FOR INDIVIDUALS TRANSPORTING, SHIPPING, RECEIVING, OR POSSESSING EXPLOSIVE MATERIALS 5-11
ATTACHMENT 7-1: RARE, THREATENED, & ENDANGERED SPECIES CONSULTATION REQUEST 7-34
ATTACHMENT 7-2: RARE, THREATENED, & ENDANGERED SPECIES CONSULTATION RESPONSE 7-37
ATTACHMENT 7-3: MASSACHUSETTS HISTORICAL COMMISSION CONCURRENCE 7-39

TABLE OF APPENDICES

APPENDIX A: ..... TASK ORDER STATEMENT OF WORK
APPENDIX B: ..... SITE MAPS
APPENDIX C: ..... LOCAL POINTS OF CONTACT
APPENDIX D: ..... ACCIDENT PREVENTION PLAN
APPENDIX E: ..... MC SAMPLING AND ANALYSIS PLAN
APPENDIX F: ..... CONTRACTOR FORMS
APPENDIX G: ..... MSD CALCULATION SHEETS
APPENDIX H: ..... RESUMES
APPENDIX I: ..... TECHNICAL PROJECT PLANNING (TPP) WORK SHEETS

LIST OF ACRONYMS

AGM ..... Analog Geophysical Mapping

AMEC ..... AMEC Earth and Environmental, Inc.

APP ..... Accident Prevention Plan

ASI ..... Aqua Survey, Inc.

BASS ..... Broadband Acoustic Spread-Spectrum

BATFE/AFT ..... Bureau of Alcohol, Tobacco, Firearms, & Explosives

BEM ..... Buried Explosion Module

BIP ..... Blown in Place

C ..... Celsius

CD ..... compact disk

CENAE ..... Corps of Engineers North Atlantic Engineering District

CERCLA.....Comprehensive Environmental Response, Compensation, & Liability Act
CO .....Commanding Officer
CSM..... Conceptual Site Model
CSP.....Certified Safety Professional
CWM..... Chemical Warfare Material
DA.....Department of the Army
DDESB .....Department of Defense Explosives Safety Board
DERP..... Defense Environmental Restoration Program
DGM.....Digital Geophysical Mapping
DID .....Data Item Description
DMM .....Discarded Military Munitions
DNT .....Dinitrotoluene
DOD/DoD.....Department of Defense
DOT.....Department of Transportation
DQO .....Data Quality Objectives
DVD.....Digital Video Disc
EM .....Electromagnetic
EMR .....Electromagnetic Radiation
EOD.....Explosive Ordnance Disposal
EODT .....EOD Technology, Inc.
EPA .....Environmental Protection Agency
EPP.....Environmental Protection Plan
ESP .....Explosive Site Plan
ESS .....Explosives Safety Submission
ESTCP..... Environmental Security Technology Certification Program
F ..... Fahrenheit
FAR .....Federal Acquisition Regulations
FDE .....Findings & Determination of Eligibility
FDEM.....Frequency-Domain Electromagnetic
FUDS..... Formerly Used Defense Sites
GIS.....Geographic Information System
GPS..... Global Positioning System
GSV ..... Geophysical System Verification

HAZMAT ..... Hazardous Materials
HTRW ..... Hazardous, Toxic, & Radioactive Waste
IDW ..... Investigation Derived Waste
INPR ..... Inventory Project Report
ISO ..... Industry Standard Objects
IVS ..... Instrument Verification Strip
JTR ..... Joint Travel Regulations
lb ..... pound
LBL ..... Long Baseline
MC ..... Munitions Constituents
MDAS ..... Material Designated as Safe
MEC ..... Munitions and Explosives of Concern
MGFD ..... Munitions with Greatest Fragmentation Distance
MK ..... Mark
MMRP ..... Military Munitions Response Program
MOFB ..... Miniature Open Front Barricade
mph ..... miles per hour
MPPEH ..... Materials Potentially Presenting an Explosive Hazard
MR ..... Munitions Response
MRSs ..... Munitions Response Sites
MRSPP ..... Munitions Response Site Prioritization Protocol
MSD ..... Minimum Safety Distance
NAEVA ..... NAEVA Geophysics, Inc.
NCP ..... National Contingency Plan
NOAA ..... National Oceanic & Atmospheric Administration
NWI ..... National Wetlands Inventory
OE ..... Ordnance and Explosives
OFB ..... Open Front Barricade
OSHA ..... Occupational Safety and Health Administration
PA ..... Preliminary Assessment
PE ..... Professional Engineer
PIP ..... Public Involvement PlAN
PM ..... Project Manager

QA ..... Quality Assurance
QAPP ..... Quality Assurance Project Plan
QC ..... Quality Control
QCI ..... Quality Control Inspection
QCS ..... Quality Control Specialist
RF ..... Radio Frequency
RI ..... Remedial Investigation
RI/FS ..... Remedial Investigation/Feasibility Study
RTK ..... Real-Time Kinematic
SAP ..... Sampling & Analysis Plan
SARA ..... Superfund Amendments & Reauthorization Act
SDSFIE ..... Spatial Data Standards for Facilities Infrastructure and Environment
SI ..... Site Investigation
SOPs ..... Standard Operating Procedures
SOW ..... Statement of Work
SSEPP ..... Site-Specific Environmental Protection Plan
SUXOS ..... Senior UXO Supervisor
TO ..... Task Order
TCRA ..... Time-Critical Removal Action
TPP ..... Technical Project Planning
TTOR ..... The Trustees of Reservations
UFP ..... Uniform Federal Policy
USACE ..... United States Army Corps of Engineers
USAESCH ..... US Army Engineering and Support Center, Huntsville
USBL ..... Ultra Short Baseline
UTM ..... Universal Transverse Mercator
UXB ..... UXB International, Inc.
UXO ..... Unexploded Ordnance
UXOQCS ..... UXO Quality Control Specialist
UXOSO ..... UXO Safety Officer
VRH ..... VRHabilis
VSP ..... Visual Sample Plan
WBS ..... Work Breakdown Structure

WP ..... Work Plan

WWII ..... World War II

1. INTRODUCTION

1.1. This Work Plan (WP), with its associated appendices, describes the procedures, sequence, and resources that will be utilized while conducting a Remedial Investigation (RI) at three munitions response sites (MRSs) located on Martha's Vineyard, Massachusetts. The three MRSs include the Former Cape Poge Little Neck Bomb Target Site, the Former Moving Target Machine Gun Range at South Beach, and the Tisbury Great Pond.

1.2. The Department of Defense (DOD) has established the Military Munitions Response Program (MMRP) to address non-operational ranges and training areas suspected of containing munitions and explosives of concern (MEC) or munitions constituents (MC) that don't necessarily present an explosive hazard. MEC includes unexploded ordnance (UXO), discarded military munitions (DMM), and MC that pose an explosive hazard. Under the MMRP, the US Army Corps of Engineers (USACE) is conducting environmental response activities under the Defense Environmental Restoration Program-Formerly Used Defense Sites (DERP-FUDS). All work is and will be conducted in accordance with the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA) 1980, as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Contingency Plan (NCP). In addition, investigative work will be performed in compliance with applicable Commonwealth of Massachusetts laws and regulations.

1.3. PROJECT AUTHORIZATION

1.3.1. UXB International, Inc. (UXB) has been directed by the U.S. Army Engineering and Support Center, Huntsville (USAESCH), under Contract W912DY-04-D-0019, Task Order No. 006 to perform a Remedial Investigation/Feasibility Study (RI/FS) under the MMRP at the Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and the Tisbury Great Pond Bomb MRS located on Martha's Vineyard, Massachusetts. UXB will use a team of specialty subcontractors to support the work as follows: AMEC, environmental/engineering support; VRHabilis, dive support, underwater MEC investigation/demolition; Aqua Survey, Inc, underwater digital geophysical mapping (DGM); NAEVA Geophysics, land-based DGM; and Test America, for laboratory analytical services. The roles, responsibilities, and key personnel are outlined in Chapter 2.

1.4. PURPOSE AND SCOPE

1.4.1. The purpose of the RI Work Plan is to describe the planning and field activities required to adequately determine the nature and extent of MEC and munitions debris at the MRSs in order to develop future response actions. The objective of the RI process is not the unobtainable goal of removing all uncertainty, but rather to gather information sufficient to support an informed risk management decision regarding which remedy appears to be most appropriate for a given MRS.

1.4.2. The objective of the RI Work Plan will be met through the execution of the following:

1.4.2.1. Characterize explosive safety hazards, including MEC and material potentially presenting an explosive hazard (MPPEH) both on the surface and subsurface of each MRS;

1.4.2.2. Characterize the horizontal and vertical extent of MEC, MPPEH, and munitions debris (MD) through geophysical and visual confirmation by qualified UXO technicians;

1.4.2.3. Conduct sampling of surface water, sediment, soil, and groundwater to characterize potential munitions constituents (MC) that do not necessarily pose an explosive hazard;

1.4.2.4. Perform MEC and MPPEH destruction and MD removal of items found during intrusive investigation; and

1.4.2.5. Support the development of a FS to evaluate the appropriate remedial alternatives for future response actions.

1.4.3. In order to meet the above mentioned goals, field activities will include instrument assisted ground reconnaissance, geophysical investigations, intrusive investigations of subsurface anomalies, and sampling of surface water, sediment, soil, and groundwater.

1.5. WORK PLAN ORGANIZATION

1.5.1. This work plan has been divided into 11 sections and 9 appendices as detailed in Data Item Description (DID) MR-001 (USACE, 2003). The following sections are included in this RI Work Plan:

1.5.1.1. Section 1 – Introduction

1.5.1.2. Section 2 - Technical Management Plan

1.5.1.3. Section 3 - Field Investigation Plan

1.5.1.4. Section 4 - Quality Control Plan

1.5.1.5. Section 5 - Explosive Management Plan

1.5.1.6. Section 6 – Explosives Siting Plan

1.5.1.7. Section 7 - Environmental Protection Plan

1.5.1.8. Section 8 – Property Management Plan

1.5.1.9. Section 9 – Interim Holding Facility Siting Plan RCWM

1.5.1.10. Section 10 – Physical Security Plan for RCWM

1.5.1.11. Section 11 – References

1.5.2. The following appendices are included as part of this Work Plan:

1.5.2.1. Appendix A: Statement of Work (SOW)

1.5.2.2. Appendix B: Site Maps

1.5.2.3. Appendix C: Points of Contact

1.5.2.4. Appendix D: Accident Prevention Plan (APP)

1.5.2.5. Appendix E: MC Sampling and Analysis Plan

1.5.2.6. Appendix F: Contractor Forms

1.5.2.7. Appendix G: MSD Calculation Sheets

1.5.2.8. Appendix H: Resumes

1.5.2.9. Appendix I: TPP Work Sheets

1.5.3. In the event that unforeseen circumstances arise during the execution of this work plan that requires a revision, the following procedures will be followed:

1.5.4. Under no circumstances will any change to the approved work plan be implemented without prior approval of the UXB Project Manager (PM) and USAESCH.

1.5.5. In the event that the recommended change(s) involves safety or quality, the task(s) affected by the change will be suspended until the written procedures are approved by USAESCH.

1.5.6. The UXB PM will develop the changes in conjunction with USAESCH.

1.5.7. When the USAESCH Contracting Officer approves the change(s), it will be incorporated into this work plan and all applicable personnel briefed about the changes.

1.6. PROJECT LOCATION

1.6.1. The three project sites, MRSs, are located in Dukes County of southeastern Massachusetts on the Island of Martha's Vineyard. Martha's Vineyard is located approximately five miles southwest of Falmouth, Cape Cod Massachusetts (**Figure 1-1**).

1.7. SITE DESCRIPTIONS

1.7.1. The following sections provide descriptions of the sites which will be evaluated under this remedial investigation. The three sites include the Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and the Tisbury Great Pond MRS. The MRS boundaries were defined based on previous investigations and archival searches. The three MRSs to be investigated under this Work Plan are depicted on **Figure 1-2**.

1.7.2. For this investigation the following definitions will be used to describe the land and water environments:

1.7.2.1. Beach – Beach is defined as the land adjacent to either marine or fresh water;

1.7.2.2. Land – Land is defined as the land excluding beach and dunes;

1.7.2.3. Inland Water – Inland Water is defined as protected marine or fresh water environments, such as coves or ponds; and

1.7.2.4. Ocean – Ocean will be defined as those waters directly associated with the Atlantic Ocean, Vineyard Sound, or Nantucket Sound.

1.7.3. Former Cape Poge Little Neck Bomb Target MRS

1.7.3.1. The Former Cape Poge Little Neck Bomb Target MRS is located on Chappaquiddick Island, which is located within the Town of Edgartown, Martha's Vineyard, Massachusetts. The Site encompasses an area of approximately 800 acres: 1) approximately 153 acres of land; 2) approximately 83 acres of beach: 3) approximately 500 acres of inland water; and 4) approximately 64 acres of ocean. The Cape Poge Little Neck MRS includes the following primary landowners:

1.7.3.1.1. Primarily The Trustees of Reservations (TTOR)

1.7.3.1.2. Private Landowners

1.7.3.1.3. Commonwealth of Massachusetts – Inland and Coastal Waters

1.7.3.2. The topography of Little Neck can generally be described as a relatively flat maritime shrub thicket, salt marsh, and maritime beach. Salt marshes are composed of Salt Marsh Cordgrass, Salt Meadow Cordgrass, Black Grass, Salt Marsh Fleabane and glassworts, with Marsh Elder and Groundsel Tree along their fringes

1.7.3.3. The topography of Cape Poge can generally be described as relatively flat dunes with cedar, maritime interdunal swale, maritime dunes, and maritime beach. Cape Poge contains maritime Eastern Red Cedar woodland thickets of Blackberry, Bristly Dewberry, Black Huckleberry, Greenbrier, and Groundsel Tree. Interdunal swales are found in small depressions in the Cedars. The swales are ephermal and form when winds scour sand until the water table is reached (TTOR 2004 Cape Poge & Wasque Management Plan, The Trustees of the Reservation).

1.7.3.4. The soils can be characterized as undulating or rolling, very deep, excessively drained soils composed of windblown deposits; nearly level beaches; and nearly level, very deep, poorly drained mucky peat formed in organic deposits along coastal shorelines. The area north of Little Neck can best be characterized as nearly level, very deep, excessively drained, sandy soils formed in glacial outwash on outwash plains and moraines (USACE 2009 Draft Preliminary Assessment Cape Poge Little neck Bomb Target Site Chappaquiddick Island, MA).

1.7.3.5. The Former Cape Poge Little Neck Target MRS and the island of Martha’s Vineyard are relicts of the last ice age and the warming trends that followed. Repeated glaciations scraped soil and rock from the mainland of New England. Eighteen thousand years ago the glaciers reached their southernmost extent and began to melt and retreat, depositing the rock and soil, once trapped within the ice, as terminal moraines. These terminal moraines can be found on Martha’s Vineyard and Chappaquidick.

1.7.3.6. The geological deposits that make up the Former Cape Poge Little Neck MRS consist of recent beach and marsh sediments, glacial deposits, interglacial deposits, and glacially deformed ancient coastal plain sediments. The county consists mostly of deposits from the last glacial stage, but in places consists of glacial or interglacial deposits as much as 300,000 years old. The Quaternary section and coastal plain deposits overlie solid bedrock and range from 500 feet thick on the north shore of Martha’s Vineyard to 900 feet thick on the south shore (USACE 2009 Draft Preliminary Assessment Cape Poge Little neck Bomb Target Site Chappaquiddick Island, MA).

Figure 1-1: Site Location

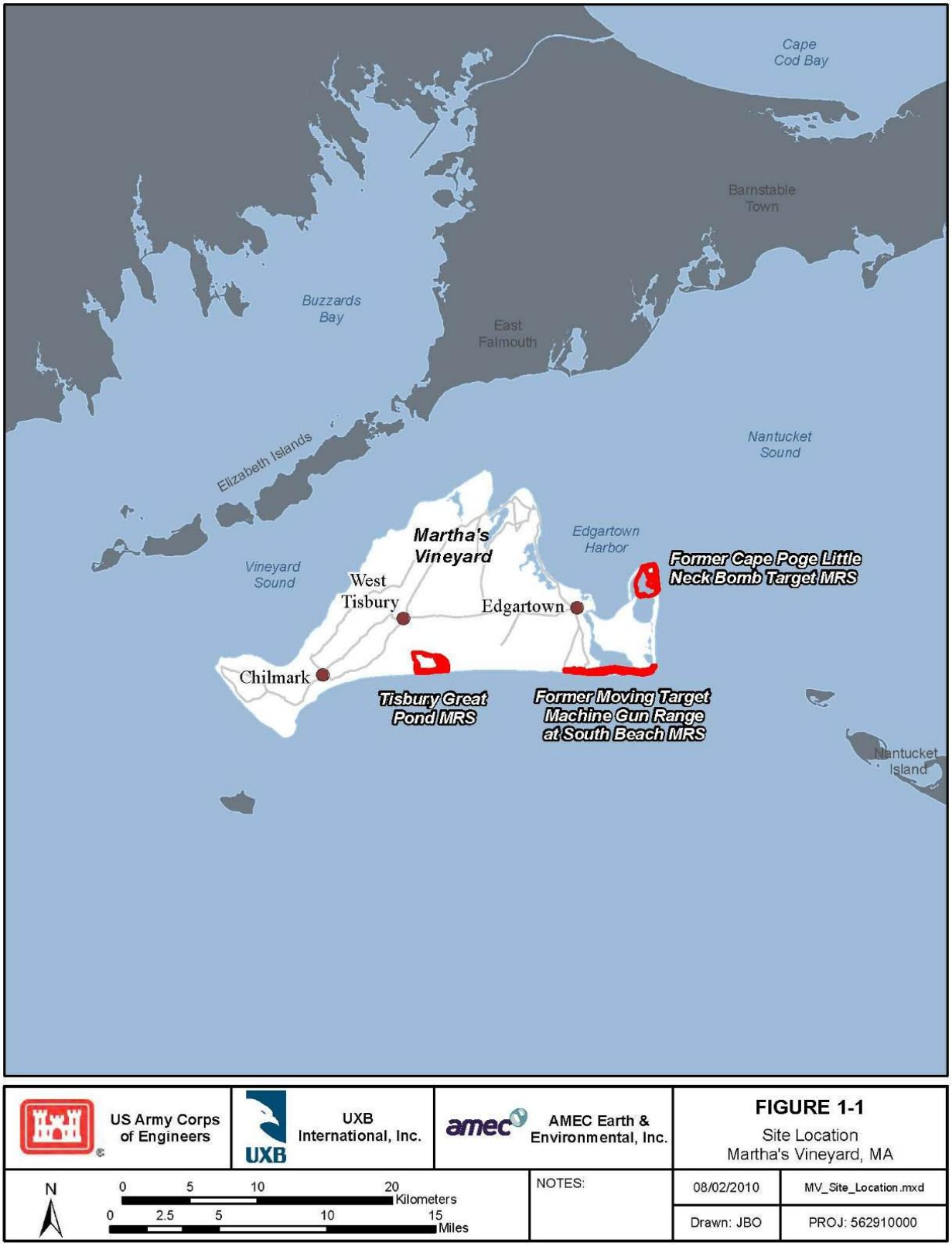
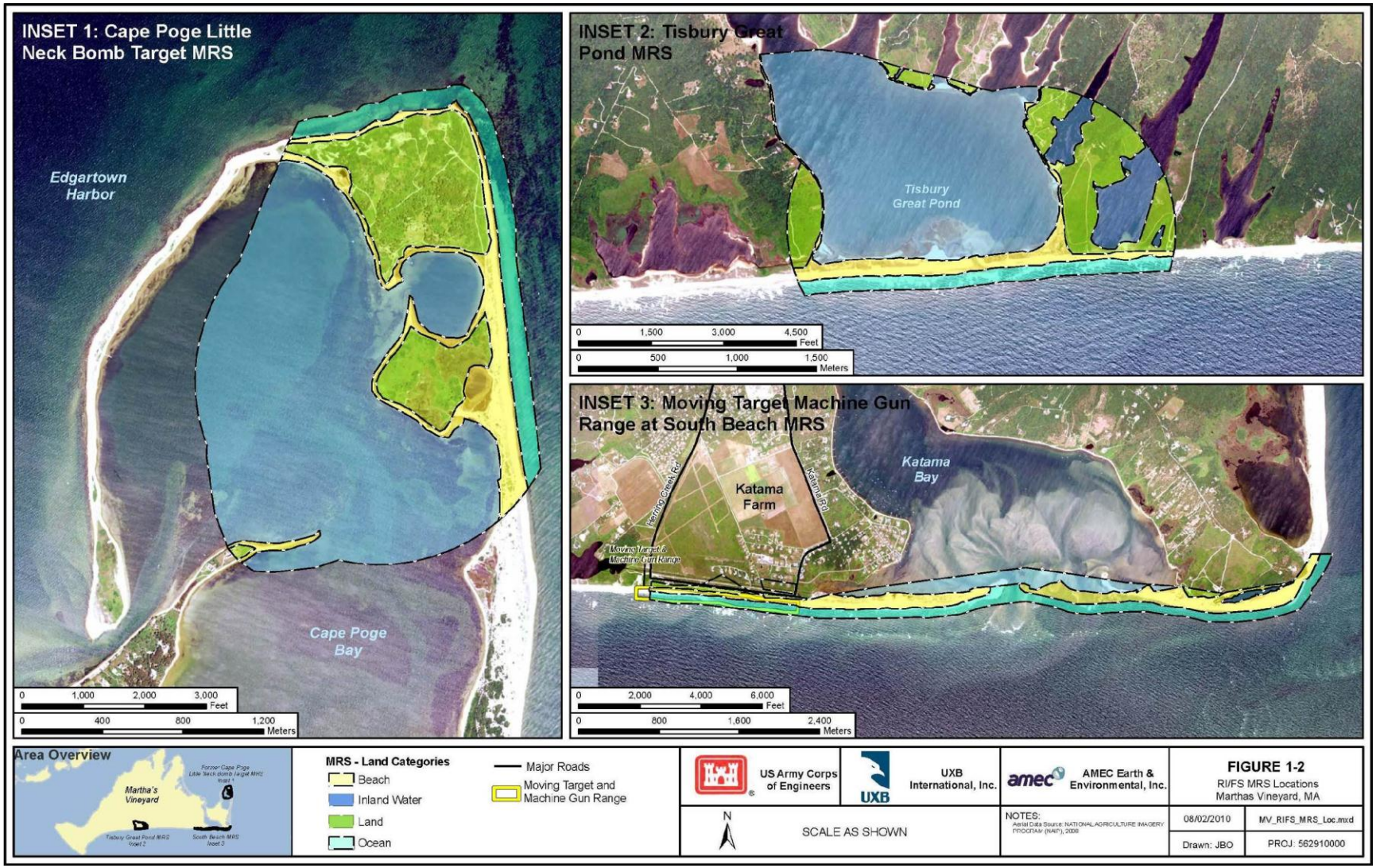


Figure 1-2: RI/FS MRS Locations



1.7.4. Former Moving Target Machine Gun Range Site at South Beach MRS

1.7.4.1. The Former Moving Target Machine Gun Range at South Beach is located within the town of Edgartown along the southern shore of Martha's Vineyard, Massachusetts. The South Beach MRS encompasses approximately 478 acres: 1) approximately 18.7 acres of land; 2) approximately 182.7 acres of beach; 3) approximately 7.7 acres of inland water; and 4) approximately 268.7 acres of ocean. Due to extensive beach erosion, the former range is now thought to be approximately 150 yards off South Beach (USACE 2009 Draft Preliminary Assessment Cape Poge Little Neck Bomb Target Site Chappaquiddick Island, MA). The Former South Beach Moving Target Machine Gun Range MRS includes the following primary landowners:

1.7.4.1.1. Primarily Dukes County (MA Department of Conservation and Recreation)

1.7.4.1.2. Private Landowners

1.7.4.1.3. Commonwealth of Massachusetts – Some beach property, Inland and Coastal Waters

1.7.5. Tisbury Great Pond MRS

1.7.5.1. The Tisbury Great Pond MRS is located within the towns of Chilmark and West Tisbury, Martha's Vineyard, Massachusetts. The site encompasses approximately 768 acres: 1) approximately 198.1 acres of land; 2) approximately 61.5 acres of beach; 3) approximately 456.3 acres of inland water; and 4) approximately 52.4 acres of ocean. The Tisbury Great Pond MRS includes the following primary landowners.

1.7.5.1.1. Primarily Private Landowners

1.7.5.1.2. TTOR

1.7.5.1.3. Commonwealth of Massachusetts – Inland and Coastal Waters

1.7.5.2. Tisbury Great Pond has elevations that range from sea level to three feet above mean sea level near the coast line in the southern portion of the site to approximately 15 feet in the northern portion. The majority of the area is flat with sand dunes, some of which are approximately 5 to 10 feet high (USACE 2008 Site Inspection Report for Tisbury Great Pond). The shoreline gently slopes downward to the coast. There is a large dune separating Tisbury Great Pond from the Atlantic Ocean. At times (at least once per year), the barrier dune is breached to allow Tisbury Great Pond to discharge freshwater to the Atlantic Ocean and allow saltwater to enter the pond (USACE 2008 Site Inspection Report for Tisbury Great Pond).

1.7.5.3. The vegetation surrounding Tisbury Great Pond consists of predominantly low grasses and areas of barren beaches. The northern portion is covered with numerous tree and shrub species. Common species found throughout the site are poison ivy, beach plum, and bayberry. Tree species found in the northern portion of the site include maple, various pine tree species, oak, and beech.

1.7.5.4. Surface soil in the southern near-shore portion of the site is predominantly medium to fine grained, clean, brownish-yellow sand with trace quantities of silt. These soils are excessively drained and have a high permeability. The thickness of this surface soil layer varies considerably and ranges from 0 to 5 feet below ground surface to tens of feet thick in other areas. Surface soil in the northern portion of the site is similar in composition, thin (0 to 6-inch) layer of loamy sand present with appreciable organic content. Surface soil adjacent to the Tisbury Great Pond shoreline contains large amounts of fine sediments including fine sands, silts, clays, and a high organic material content. The subsurface soil unit is glacial till deposited over successive glacial events dating back to more than 300,000 years ago and as recently as 10,000 years ago. The glacial till is composed of sand, gravel, cobbles and boulders with trace quantities of fines deposited as the glaciers receded. The glacial till deposits extend to depths as much as 500 feet below ground surface (USACE 2008 Site Inspection Report for Tisbury Great Pond).

1.7.5.5. Climate

1.7.5.5.1. Martha’s Vineyard is an island with a relatively mild climate due mostly to the moderating influence of the nearby Gulf Stream. Frequent abrupt changes in weather conditions can occur when the prevailing eastward air movement from the mainland meets the contrasting air masses from higher and lower latitudes. The average summertime temperature is 67 degrees Fahrenheit (°F) and the average daily maximum temperature is 76 °F, with the highest recorded at 94 °F. Average precipitation is 46 inches per year, and of this total, 22 inches usually fall during the April through September time frame. The average relative humidity in mid-afternoon is about 70 percent. In winter the average daily minimum temperature is 22 °F with the lowest temperature on record of -9 degrees Celsius (°C). (USACE 2008 Site Inspection Report for Tisbury Great Pond).

1.7.5.5.2. The prevailing wind comes from the southwest between March through September and from the northwest or northeast from October through February. The monthly average wind speed ranges from 10 miles per hour (mph) to 14 mph. However, nor’easters, cold-core low pressure systems, are not uncommon during the winter months. Nor’easters can reach intensities similar to a strong hurricane.

The high surf associated with nor'easters can cause a significant amount of severe beach erosion.

1.7.5.6. Site Histories

1.7.5.6.1. Between 1943 and 1944 the Department of the Navy acquired the leases to the properties which comprised the former ranges at the Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range Site at South Beach MRS and Tisbury Great Pond MRS. The sites were used to provide training for the 1st Naval District, whose flight operations were based at Naval Air Station Quonset Point, Rhode Island, and the Naval Auxiliary Air Station Martha's Vineyard located on Martha's Vineyard, Massachusetts. The leases for the Cape Poge parcels were held until 1945, and until 1947 for Little Neck, South Beach and Tisbury Great Pond parcels.

1.7.6. Former Cape Poge Little Neck Bomb Target MRS

1.7.6.1. The United States acquired four leasehold interests on approximately 141 acres beginning 1 July 1944. The leases were acquired by the Department of the Navy for the purpose of a bombing target in connection with the 1st Naval District flight training program at Naval Air Station Quonset Point, Rhode Island, and Naval Auxiliary Air Station Martha's Vineyard, Massachusetts. Three leases were renewed for one-year terms through 30 June 1947 and one lease was renewed for one-year terms through 30 June 1946. Prior to 1944, Chappaquiddick Island and Cape Pogue were used for agricultural purposes and as a summer resort. One lease was terminated on 31 March 1946. The Little Neck Bomb Target range continued to be active until 15 March 1947, when the Navy approved the discontinuance of the range. The range leases were terminated on 18 May 1947. By 1959, most of Cape Poge had been donated to TTOR (the current owner) by Charles S. Bird and Oliver D. Filley.

1.7.6.2. The Little Neck Bomb Target Range was used as a practice bombing range. Military practice ordnance used at the Little Neck Bomb Target range included, Mark (MK) 4, MK 5, MK 6, MK 15, MK 23, and MK 43 practice bombs, and MK 26 parachute flares. Practice bombs and bomb fragments have been observed on the property.

1.7.6.3. The PA conducted at Cape Poge also included an investigation of the Cape Poge Beach Calibration Target that was used to train pilots on optimal glide paths for air to ground targets. Based on archival searches and individual testimonials, it was determined that no ordnance had been dropped on the Cape Poge Beach Calibration Target. The Munitions Response Site Prioritization Protocol (MRSPP) score for Cape Poge Beach Calibration Target gave a ranking of No Known or Suspected

Hazards (USACE 2009 Draft Preliminary Assessment Cape Poge Little Neck Bomb Target Site Chappaquiddick, MA). Based on the information gathered during previous investigations this target is not included in the RI.

1.7.7. Former Moving Target Machine Gun Range at South Beach MRS

1.7.7.1. The Former Moving Machine Gun Range at South Beach consisted of approximately 264 acres. The Department of the Navy acquired the leasehold interests on approximately 264 acres beginning in 1944. The leases were acquired by the Department of the Navy for the purpose of a gunnery and rocket firing range in connection with the 1st Naval District flight training program at Naval Air Station Quonset Point, Rhode Island, and Naval Auxiliary Air Station Martha's Vineyard, Massachusetts. The Navy approved the discontinuance of the range in 1947. A car shelter, an oval shaped target, and other support features were constructed within a few yards of the ocean. A large portion of the beach has eroded since 1947. The Moving Target Machine Gun Range track was removed after military training activities and approximately half of the area where the track resided is underwater. The remaining half was present on what is currently beach and sand dunes. The "Target Car Shelter" structure was not demolished and is located approximately 500 feet off-shore. Prior to 1944, the site was used for recreational activities.

1.7.7.2. Military ordnance used at the Former Moving Machine Gun Range Site included 0.30 and 0.50 caliber ammunition, MK 1 rockets, and 2.25 inch to 5 inch rockets. Rockets, bombs, and bomb fragments have been observed on the property.

1.7.8. Tisbury Great Pond MRS

1.7.8.1. The former Tisbury Great Pond Site consists of approximately 17 acres of beach and 497 acres of water, including many coves, with a barrier beach separating the pond from the Atlantic Ocean. The Department of the Navy acquired the leasehold interests on approximately 514 acres beginning in 1943. The former Tisbury Great Pond MRS served as a dive bombing and strafing range in support of the fighter training program of Quonset Point Naval Air Station and the Naval Auxiliary Air Station Martha's Vineyard, Massachusetts. During the initial operational period of the range, strafing and masthead targets were constructed on the range, at which student pilots could hone their gunnery and bombing skills utilizing 0.30 caliber ammunition, 0.50 caliber ammunition, and several practice bomb types. By the end of World War II it is surmised that ordnance activity ceased on the Tisbury Target Area. However, on 27 March 1947, the target area was reinstated for practice bombing use by the carrier fleet based at Newport, Rhode Island. A masthead target was constructed about midway on the beach between Tisbury Great Pond and the

ocean for use by the fleet. On 4 April 1947, the Navy suspended its bombing program on Tisbury Great Pond, and the target was removed from the area in May 1947.

1.7.8.2. On 3 June 1947, the Bureau of Lands and Docks terminated one of the three leases for the Tisbury Great Pond Target Area. It is believed that the remaining two leases were terminated before or on the same dates, with all lands ·returned to the original landowners. Following site closure and land transfer, the Tisbury Great Pond developed into a shellfish harvest area, remaining under state control. The barrier beach area was subdivided into numerous parcels of beach recreation areas and sold to numerous private landowners. No ownership or control remains with the Department of Defense.

1.7.8.3. Military practice ordnance used at the Former Tisbury Great Pond MRS included, 0.30 and 0.50 caliber ammunition, MK 5, MK 15, MK 21, MK 23 and MK 43 practice bombs, and 300 lb general purpose bombs not loaded with high explosives. Practice bombs and bomb fragments have been observed on the property.

1.8. CURRENT AND PROJECTED LAND USE

1.8.1. The Island of Martha's Vineyard, located off the southwest shore of Cape Cod, is nestled between the Elizabeth Islands to the west and the Island of Nantucket to the east. Martha's Vineyard represents one of the two major island watersheds in Massachusetts. Current use includes residential, commercial, industrial, and recreational activities including hunting, fishing, shellfish harvesting, wildlife observation, wildlife photography, wildlife education, wildlife interpretation, and water activities in the summer. The Martha's Vineyard Watershed drains approximately 89 square miles, encompasses all six towns on the Island of Martha's Vineyard, and includes 13 named streams, 42 lakes, approximately 125 miles of coastline, and 8,777 acres of estuaries.

1.8.2. Part of the Former Cape Poge Little Neck Bomb Target MRS is within the Cape Poge Wildlife Refuge, which is owned and operated by TTOR. The Cape Poge Wildlife Refuge is open to the public for recreational use, such as hiking, hunting, canoeing, kayaking, fishing, clamming, crabbing, wildlife observation, wildlife photography, wildlife education, wildlife interpretation, and other water related activities. Other primary landowners include private landowners and the Commonwealth of Massachusetts (inland and coastal waters). The land use for this area is not expected to change in the future.

1.8.3. The Former Moving Target Machine Gun Range at South Beach MRS includes a public beach used for recreational purposes such as hiking, canoeing, kayaking, fishing, clamming, crabbing, wildlife observation, wildlife photography, wildlife education, wildlife interpretation, and water related activities. Dukes County, private landowners and the Commonwealth of Massachusetts (some beach areas, inland and coastal waters) The Edgartown Parks and Recreation Department manages South Beach from May 1 through Labor Day. The land use for this area is not expected to change in the future.

1.8.4. A large portion of the land comprising the Tisbury Great Pond area is used for recreational activities such as hiking, canoeing, kayaking, fishing, shellfish harvesting, wildlife observation, wildlife photography, wildlife education, wildlife interpretation, and other water related activities. A portion of the Tisbury Great Pond includes the Long Pond Wildlife Refuge which is owned and managed by TTOR. The remaining area of the MRS includes many private landowners, and some lands, inland and coastal waters owned by the Commonwealth of Massachusetts. The barrier beach at the southern end of the pond is privately owned. The land use for this area is not expected to change in the future.

1.9. PREVIOUS INVESTIGATIONS

1.9.1. The following sections summarize the previous investigations that have been conducted at the three MRSs. **Figure 1-3** illustrates some of the historic information provided by the previous investigations. Historic target locations and documented impacted properties are identified in **Figure 1-3**.

1.9.2. Inventory Project Report

1.9.2.1. In 1996, the New England District of the U.S. Army Corps of Engineers prepared an Inventory Project Report (INPR) for the Tisbury Great Pond Site in support of the DERP for FUDS. The Findings and Determination of Eligibility (FDE) for the Tisbury Great Site established the eligibility of 514 acres as a FUDS. A MMRP project was proposed and the INPR identified only a MEC category hazard potential. The INPR assigned a Risk Assessment Code (RAC) of 2 for the MRS, indicating a high priority on completion of the INPR and recommended further action by USAESCH.

1.9.3. Archives Search Report and Supplement for the Former Tisbury Great Pond

1.9.3.1. The Corps of Engineers prepared an Archives Search Report for the former Tisbury Great Pond in 1999 in support of the DERP for FUDS (USACE 1999 Final Archives Search Report for the former Tisbury Great Pond). This study provided information

such as maps of the Martha's Vineyard area (including the "Bomb Target Site"), confirmation of Naval activity in the area, and a site description of a property which lies in the same county as the subject FUDS property. Interviews conducted indicate that no explosions were heard during practice bombings, the flight lines were north to south (Tisbury Great Pond to ocean), and multiple residents found various types of practice bombs in and along Tisbury Great Pond. One of the original landowners, Deloris Bissell Bigelow, requested a cleanup from the Navy of the metal debris on her property after the property was returned. The 11.1 acres was located closest to the target and is depicted on **Figure 1-3**. A visual site inspection, conducted in June through July 1997, confirmed ordnance and explosive presence in the form of MK 15 series 100 pound (lb) practice bombs. The ASR also determined there was no evidence of chemical warfare storage, usage, or disposal.

1.9.3.2. An ASR Supplement was subsequently prepared in 2004 (USACE 2004 ASR Supplement Tisbury Great Pond, west Tisbury, MA). The ASR Supplement identified the Tisbury Great Pond MRS to include 1,236 acres and determined that a variety of practice bombs and general small arms were used during training activities.

1.9.4. Tisbury Great Pond Site Inspection

1.9.4.1. A Site Inspection (SI) Report was prepared by Alion Science and Technology in September 2008, to document SI activities and findings for the Tisbury Great Pond FUDS (USACE 2008 SI Report for Tisbury Great Pond). The primary purpose was to evaluate the presence of MEC and MC related to the historical use of the property, and to determine if further response actions were warranted.

1.9.4.2. SI field activities were performed on 29 January 2008. A combination of analog geophysics and visual observations were used to perform a qualitative site reconnaissance over 4.49 acres of land and water. During the reconnaissance, no MEC, MD, or additional areas of interest were identified. One underwater anomaly was recorded in the eastern portion of Tisbury Great Pond and one subsurface anomaly was detected; however the composition of the anomaly could not be identified. A qualitative MEC screening level risk assessment was conducted, which concluded that the potential risk posed by MEC was low-to-moderate, primarily due to the historic MD finding.

1.9.4.3. A total of six surface samples and one subsurface sample were collected, along with five sediment samples, two surface water samples, and background samples (two surface soil and two sediment). These samples were analyzed for dinitrotoluene (DNT) and associated DNT breakdown products, nitroglycerine, and metals. The analyses found concentrations of antimony and lead in surface soil that could present

potentially unacceptable risks to ecological receptors. However, no exceedances of the human health screening values were observed for any of the MC of interest where screening criteria were available. The SI Report concluded that while neither a time-critical removal action (TCRA) nor a non-TCRA was recommended; an RI/FS for the MRS was recommended to address both MEC and MC. **Figure 1-4** presents the results of the 2008 Site Inspection conducted at Tisbury Great Pond.

1.9.5. Inventory Project Report Cape Poge Little Neck Bomb Target Site

1.9.5.1. In 2008, the New England District of the U.S. Army Corps of Engineers prepared an INPR for the Cape Poge Little Neck Bomb Target Site in support of the DERP for FUDS. The Findings and Determination of Eligibility (FDE) for the Cape Poge Little Neck Bomb Target Site established the eligibility of 141 acres as a FUDS. A MMRP project was proposed and the Inventory Project Report (INPR) identified only a MEC category hazard potential.

1.9.6. Cape Poge Little Neck Bomb Target Site Preliminary Assessment

1.9.6.1. The U.S. Army Corps of Engineers St. Louis District prepared a Draft Preliminary Assessment (PA) at the Cape Poge Little Neck Bomb Target Site for the U.S. Army Corps of Engineers New England District and U.S. Army Engineering and Support Center, Huntsville in 2009 (USACE 2009 Draft PA Cape Poge Little Neck Bomb Target Site) . The information in the PA was obtained through historical research at various archives and records holding facilities. The investigation was primarily a textual, cartographic, and photographic research and analysis effort. It also included interviews with individuals associated with the property and its operations and a visual property inspection. No sampling or quantitative field assessment techniques were conducted to gather data. Research efforts were directed toward determining the presence of hazardous substances as a result of previous DOD use, storage, and/or disposal. The PA is currently in Draft form. The information contained in the draft PA is not expected to change significantly and is pertinent to the RI.

1.9.6.2. Analysis of the information gathered during the PA confirmed one MRS, the L-5-V Little Neck Dive Bombing Target. The report concluded that a clear MEC potential exists on the FUDS based on the observance of the miniature practice bombs. A Munitions Response Site Prioritization Protocol (MRSPP) ranking score of 5 was developed for this MRS. The MRSPP ranking for L-4-V Cape Poge Beach Calibration Range was concluded to be “No Known or Suspected Hazards.”

Figure 1-3: Historic Target Locations

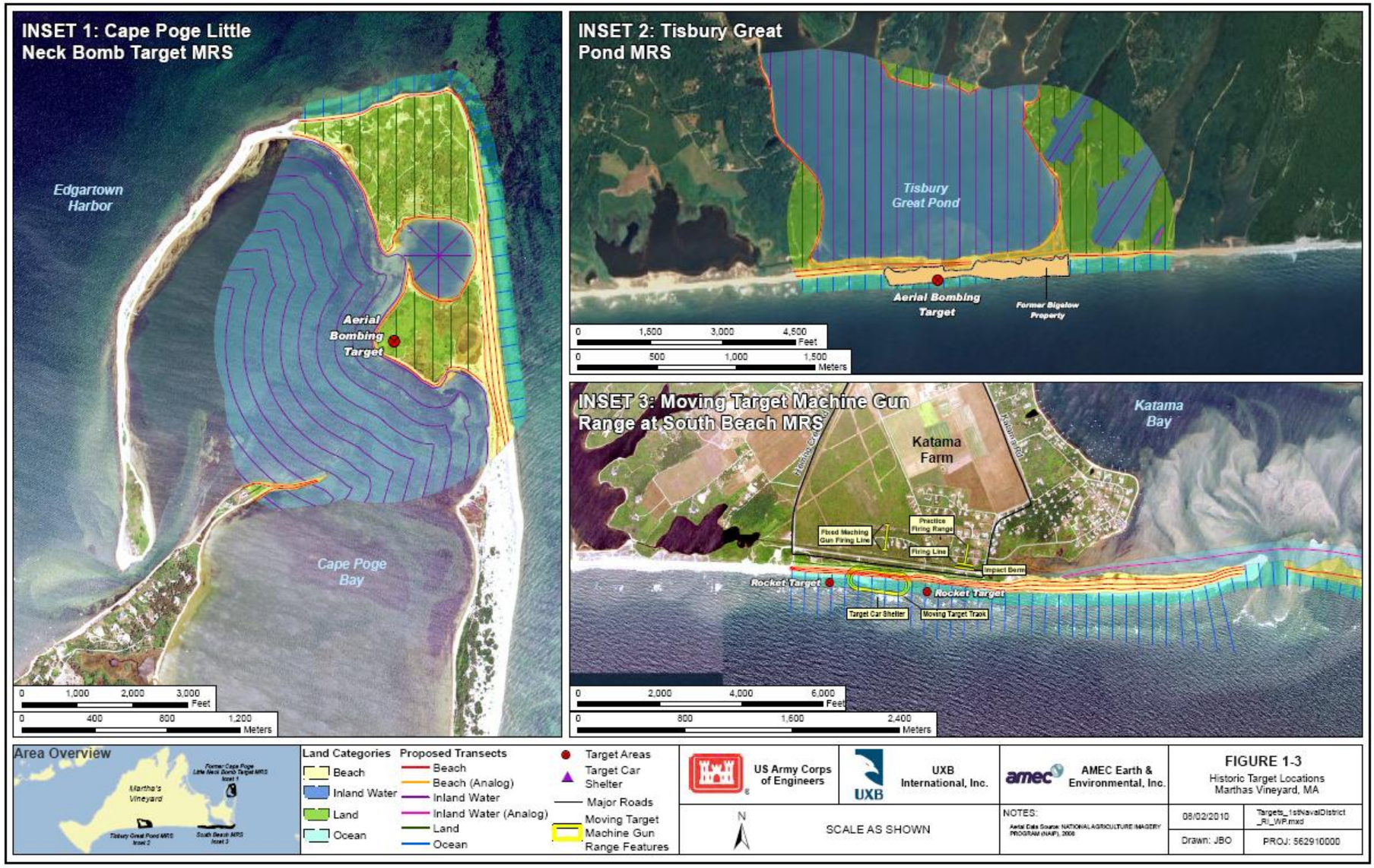
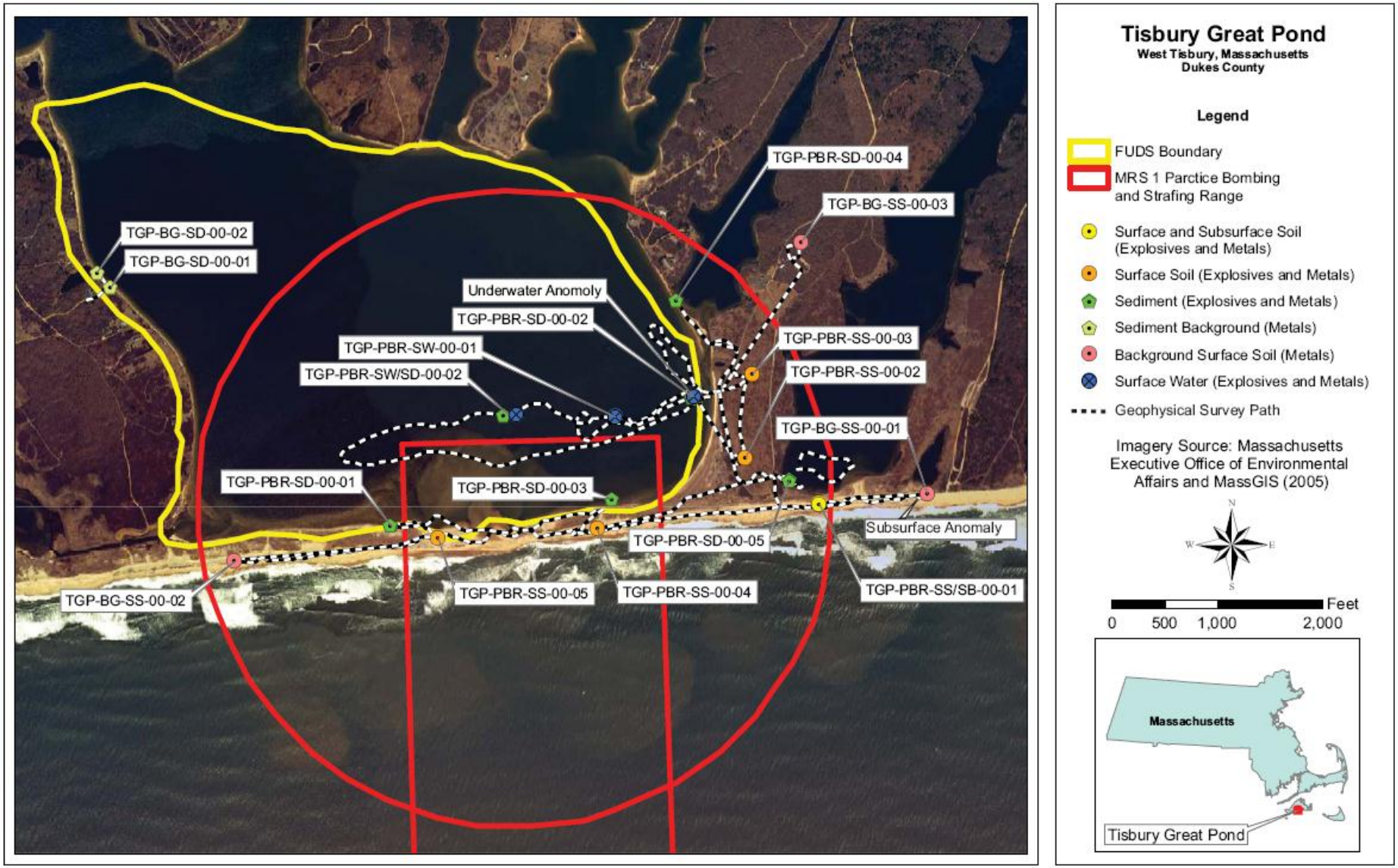


Figure 1-4: Tisbury Great Pond MRS 2008 Site Inspection



1.9.7. Time Critical Removal Action at the Former Cape Poge Little Neck Bomb Target Site, and the Former Moving Target Machine Gun Range at South Beach

1.9.7.1. A TCRA was conducted by EOD Technology, Inc. (EODT) in 2009 (USACE 2010 Draft Final Site Specific Report for the Time Critical Removal Action (TCRA) at Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Dukes County, Massachusetts, and Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts) to: 1) remove MEC, MPPEH, and explosive hazards at the former Cape Poge Little Neck Bomb Target Site and the Former Moving Target Machine Gun Range at South Beach; 2) provide on-call UXO support; and, 3) design and install Public Education Awareness signs .

1.9.7.2. The TCRA was conducted in 2009 on land and in water. The following activities were conducted at the Former Cape Poge Little Neck Bomb Target Site as a part of the TCRA:

1.9.7.2.1. removal range-related debris ≥ AN-MK 23, ANMK 5 Practice Bomb

1.9.7.2.2. recovery of 127 MD items, and

1.9.7.2.3. recovery of 1,916 lbs of cultural debris.

1.9.7.3. **Figure 1-5** presents the results of the 2009 TCRA activities conducted at Former Cape Poge Little Neck Bomb Target MRS.

1.9.7.4. The following activities were conducted at the Former Moving Target Machine Gun Range at South Beach as a part of the TCRA:

1.9.7.4.1. demolition of ordnance - 5 demolition events,

1.9.7.4.2. recovery of range-related debris (2.25" to 5" Sub-caliber Aircraft Rocket(s)),

1.9.7.4.3. recovery of 617 MD items,

1.9.7.4.4. Recovery of 42 inert items including:

1.9.7.4.4.1. Mk 5" Rocket Warheads,

1.9.7.4.4.2. 1 - 3.5" Rocket Warhead,

1.9.7.4.4.3. 3 - 3.25" Rockets with Rocket Warhead,

1.9.7.4.4.4. 3 - 3.25" Rockets with 5" Rocket Warhead, and

1.9.7.4.4.5. 1 - Nose Cup, and

1.9.7.4.5. recovery of 933 lbs of cultural debris.

1.9.7.5. No restoration was required as excavations were naturally filled in upon removal of items.

1.9.7.6. **Figure 1-6** presents the 2009 TCRA results of the removal action at the Former Moving Target Machine Gun Range at South Beach MRS.

1.10. CONCEPTUAL SITE MODEL

1.10.1. Conceptual Site Models (CSM) were developed for each of the above mentioned MRSs to achieve a better understanding of the facility, physical, release, land use, and ecological profiles at each MRS. This information is used to better understand human health and ecological risks associated with MEC and MC which could potentially be found within the MRSs. A summary table providing information on each MRS including historical and current owners and activities, ordnance used or discovered at each site based on historical documents and identified items, hazards, stakeholders, and cultural and natural resources is presented to guide the investigation by updating the CSM as the investigation progresses. The ecological and human health exposure pathway models are presented below for each MRS..

1.10.2. Former Cape Poge Little Neck Bomb Target MRS

1.10.2.1. A summary of the available information for the Former Cape Poge Little Neck Bomb Target MRS is presented in **Table 1-1** and **Figure 1-7**.

1.10.2.2. MEC have been observed at the Little Neck Bomb Target Site. There is also the potential for MC contaminants to be present in the soil, sediment, groundwater, and surface water within the site due to the degradation of MEC. The potential MC contaminants would be primarily metals, since practice bombs contain very small amounts of explosives. Since the site is currently used for public recreational and educational activities, the site is considered accessible. Therefore, there are potential human health and ecological risks associated MEC and MC at this site. The data collected as part of this RI Work Plan will be used to further refine this CSM in the RI Report.

Figure 1-5: Former Cape Poge Bomb Target MRS 2009 TCRA Results

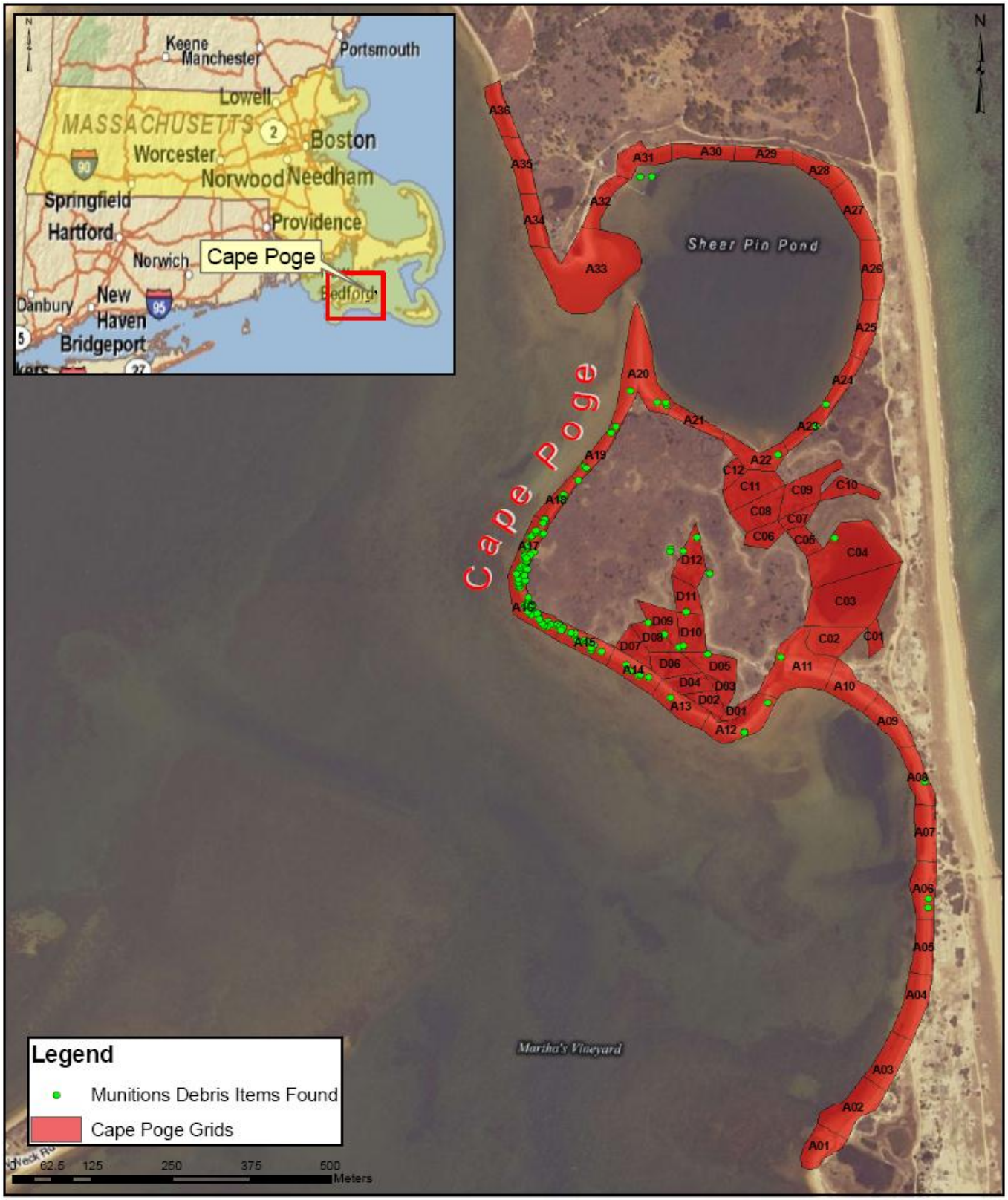
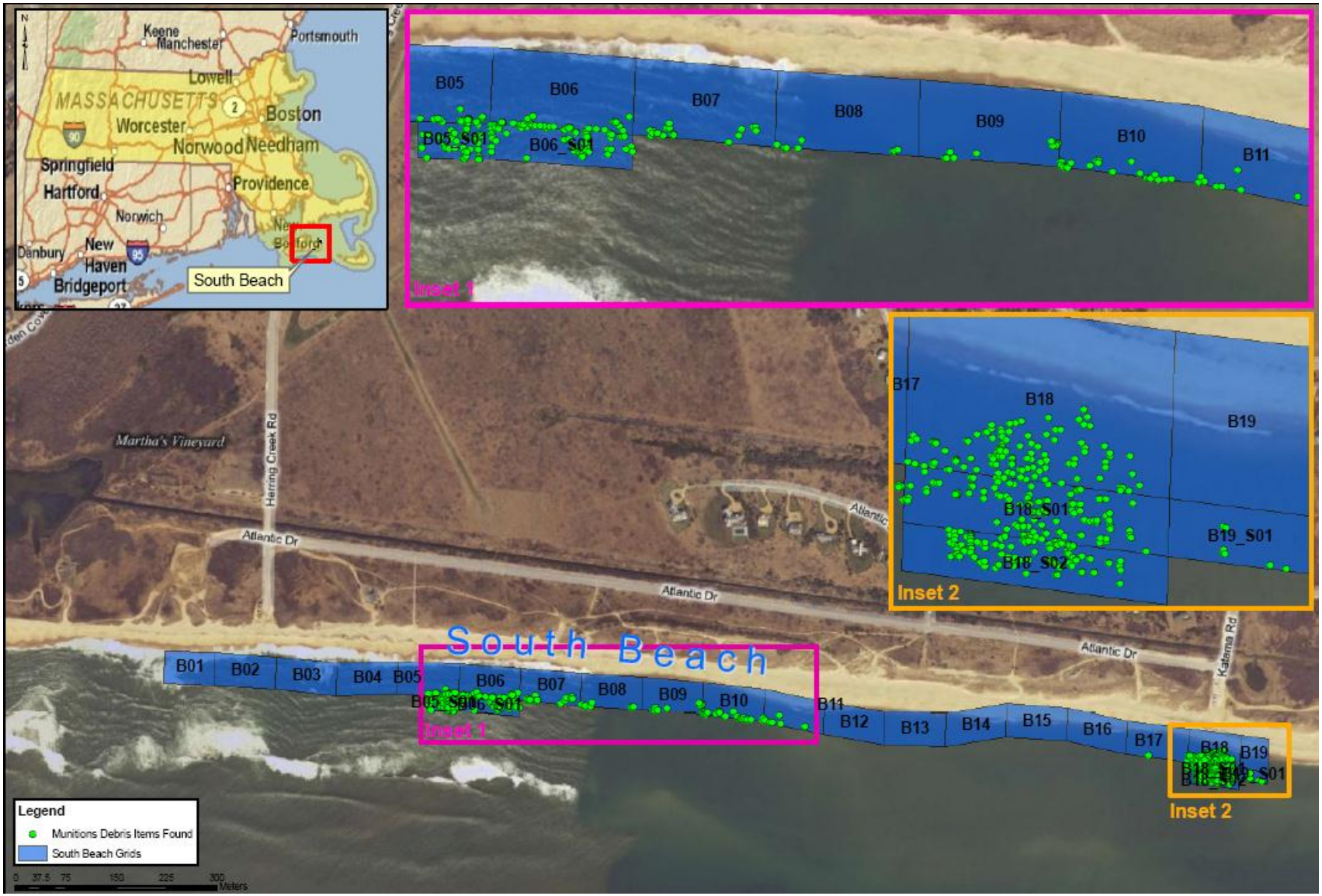


Figure 1-6: Former Moving Target Machine Gun Range at South Beach MRS 2009 TCRA Results



1.10.3. Former Moving Target Machine Gun Range at South Beach MRS

1.10.3.1. A summary of the available information for the Former Moving Target Machine Gun Range at South Beach MRS is presented in **Table 1-2** and **Figure 1-8**. MEC has been observed at the Former Moving Target Machine Gun Range at South Beach MRS. There is also the potential for MC contaminants to be present in the soil, sediment, groundwater, and surface water within the site due to the degradation of MEC and MC. The potential MC contaminants would be metals, high explosives and high explosive degradation products (e.g.,TNT and dinitrotoluene), rocket propellants, and the propellant's degradation products. Since the site is currently used for public recreational and educational activities, the site would be considered accessible. Therefore, there are potential human health and ecological risks associated MEC and MC at this site. The data collected as part of this RI Work Plan will be used to further refine this CSM in the RI Report.

1.10.4. Tisbury Great Pond MRS

1.10.4.1. A summary of the available information for the Tisbury Great Pond MRS is presented in **Table 1-3** and **Figure 1-9**. MEC have been observed at the Tisbury Great Pond Site. There is also the potential for MC contaminants to be present in the soil, sediment, groundwater, and surface water within the site due to the degradation of MEC. The potential MC contaminants would be primarily metals, since practice bombs contain very small amounts of explosives. Since the site is currently used for recreational and water related activities, the site would be considered accessible. Therefore, there are potential human health and ecological risks associated MEC and MC at this site. The data to be collected as part of this RI Work Plan will be used to further refine this CSM in the RI Report.

Table 1-1: CSM Summary, Former Cape Poge Little Neck Bomb Target MRS

	Former Cape Poge Little Neck Bomb Target MRS
FUDS Project No.	D01MA0595
County	Dukes
Town	Edgartown
Current Owners	The Trustees of Reservations (Cape Poge Wildlife Refuge)
	Private Landowners
	Commonwealth of Massachusetts (inland and coastal waters)
Operational Dates	1944 - 1947
Historical Owners	
Doris Huxford Chouinard (Lease #Noy(R)-36802)	NA

	Former Cape Poge Little Neck Bomb Target MRS
Doris Huxford Chouinard (Lease #Noy(R)-36801)	42.59 acres
Alice Rankin Lee (Lease # Noy(R)-36842)	26.8 acres
Luther M. Sibley (Noy(R)-36819)	13.5 acres
Total Area	82.89 acres
Leaser	
1st Naval Division (Quonset Point Naval Air Station, RI - Naval Auxiliary Air Station Martha's Vineyard, MA)	**x**
Target Locations	
L-5-V (dive) N41°24.5' W70°27.3'	**x**
Ordnance Used or Discovered	
0.30 caliber ammunition	NA
MK 4 mods 3&4 signal practice bomb	**Used**
MK 5 3 lb practice bomb	**Used**
AN-MK 5 mod 1 practice bomb	**Used**
MK 6 mod 0 signal practice bomb	**Used**
MK 15 100 lb practice bomb	**Used**
AN MK 23 3 lb practice bomb	**Used**
MK26 & AN-MK26 parachute flare	**Used**
AN MK 43 practice bomb	**Used**
M26 & AN MK26 aircraft parachute flare	**Used**
Hazard Severity	
Munitions Response Site Prioritization Protocol (MRSPP)	5 - Known MEC practice bombs [1]
Previous Investigations	
Inventory Project Report Cape Poge Little Neck Bomb Target Site (MassDEP, 2008)	**x**
PA Cape Poge Little Neck Bomb Target Site Chappaquiddick Island, MA FUDS Property No. D01MA0595 (USACE Feb 2009)	**x**
Previous Actions	
TCRA at Former Cape Poge Little Neck Bomb Target Site (EODT, 2010)	**x**
Stakeholders	
Federal	
EPA	**x**
US Fish and Wildlife Service	**x**
NOAA National Marine Fisheries Service	**x**
Commonwealth of Massachusetts	
MA DEP	**x**
MA Division of Fisheries and Wildlife	**x**
MA Dept. of Conservation and Recreation	**x**
MA Historical Commission	**x**

	Former Cape Poge Little Neck Bomb Target MRS
MA Board of Underwater Archaeological Resources	x
Dukes County	x
Town of Edgartown	x
The Trustees of Reservations	x
Wampanoag Tribe of Gay Head (Aquinnah)	x
Historic Sites	
National Register of Historic Places	none
Potential Historic Site Stakeholders	
Wampanoag Tribe of Gay Head (Aquinnah)	x
MA Historical Commission	x
MA Board of Underwater Archaeological Resources	x
Threatened and Endangered Species [2, 3, 4]	
Birds	
Common Tern (*Sterna hirundo*)	x
Least Tern (*Sterna antillarum*)	x
Northern Harrier (*Circus syneus*)	x
Piping Plover (*Charadrius melodus*)	x
Roseate Tern (*Sterna dougallii dougallii*)	x
Reptiles	
Green Sea Turtle (*Chelonia mydas*)	x
Kemp's Ridley Sea Turtle (*Lepidochelys kempi*)	x
Leatherback Sea Turtle (*Dermochelys coriacea*)	x
Loggerhead Sea Turtle (*Caretta caretta*)	x
Insects	
none	x
Plants	
Sea-Beach Knotweed (*Polygonum glaucum*)	x

Notes:

DEP - Department of Environmental Protection
EPA - Environmental Protection Agency
FUDS - Formerly Used Defense Site
L – Land
MA – Massachusetts
MEC – Munitions and Explosives of Concern
MK – Mark
N – North
NA - Not Applicable
NOAA - National Oceanographic and Atmospheric Administration
RI - Rhode Island
TCRA – Time Critical Removal Action
V - Martha's Vineyard
W - West

[1] PA Cape Poge Little Neck Bomb Target Site Chappaquiddick Island, MA FUDS Property No. D01MA0595 (USACE Feb 2009)

[2] Letter from the Natural Heritage and Endangered Species Program (NHESP) of the MA Division of Fisheries and Wildlife, NHESP Tracking Number 09-26472, dated April 15, 2009 (NHESP 2009)

[3] Letter from National Marine Fisheries Service, dated May 11, 2009 (NMFS 2009)

[4] Federally Listed Endangered and Threatened Species in Massachusetts, U.S. Fish and Wildlife Service, New England Field Office, Endangered Species Reviews/Consultations (http://www.fws.gov/newengland/EndangeredSpec-Consultation_Project_Review.htm)

Figure 1-7: Conceptual Site Exposure Model, Former Cape Poge Little Neck Bomb Target MRS

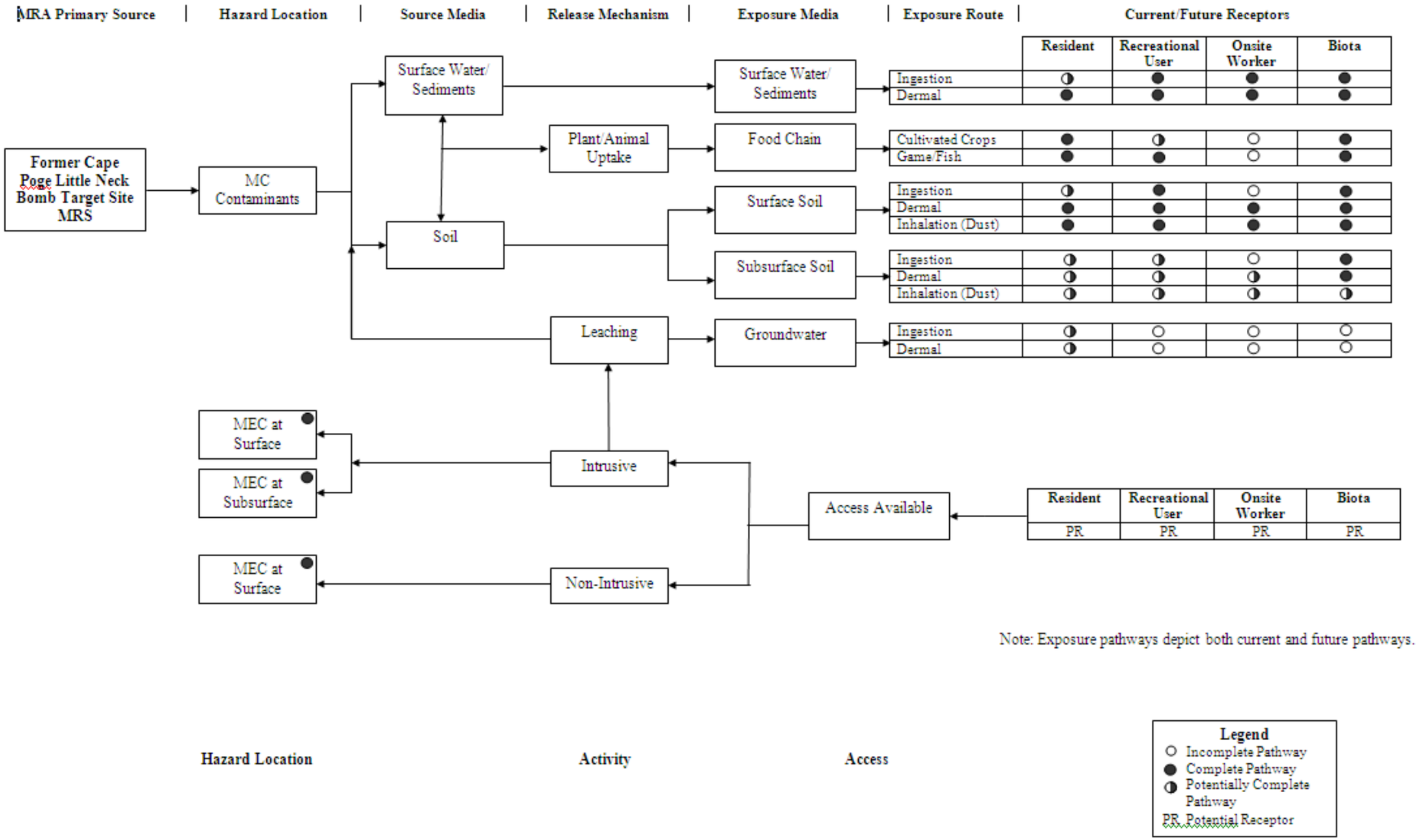


Table 1-2: CSM Summary, Former Moving Target Machine Gun Range at South Beach MRS

	Moving Machine Gun Range at South Beach
FUDS Project No.	D01MA0486
County	Dukes
Town	Edgartown
Current Owner	Dukes County
	Private landowners
	Commonwealth of Massachusetts (some beach areas, inland and coastal waters)
Operational Dates	1944 - 1947
Historical Owners	
Terrestrial Area Used	264.3 acres
Total Area	264.3 acres
Leaser	
1st Naval Division (Quonset Point Naval Air Station, RI - Naval Auxiliary Air Station Martha's Vineyard, MA)	**x**
Target Locations	
LR-1-V (rocket projectile) N40°20.8' W70°32'	**x**
LR-2-V (rocket projectile) N40°20.8' W70°32'	**x**
fixed machine gun	**x**
Ordnance Used or Discovered	
0.30 caliber ammunition	**Used**
0.50 caliber ammunition	**Used**
100 lb high explosive bomb	Discovered[2]
MK 1 rocket	**Used**
2.25 to 6 inch rockets w/warheads	**Used**
Hazard Severity	
Munitions Response Site Prioritization Protocol (MRSPP)	NA
Previous Investigations	
	none
Previous Actions	
TCRA at Former Moving Target Machine Gun Range at South Beach (EODT 2010)	**x**
Stakeholders	
Federal	
EPA	**x**
US Fish and Wildlife Service	**x**
NOAA National Marine Fisheries Service	**x**
Commonwealth of Massachusetts	
MA DEP	**x**
MA Division of Fisheries and Wildlife	**x**
MA Dept. of Conservation and Recreation	**x**
MA Historical Commission	**x**
MA Board of Underwater Archaeological Resources	**x**
Dukes County	**x**

	Moving Machine Gun Range at South Beach
Town of Edgartown	x
The Trustees of Reservations	NA
Wampanoag Tribe of Gay Head (Aquinnah)	x
Historic Sites	
National Register of Historic Places	none
Potential Historic Site Stakeholders	
Wampanoag Tribe of Gay Head (Aquinnah)	x
MA Historical Commission	x
MA Board of Underwater Archaeological Resources	x
Threatened and Endangered Species [3, 4, 5]	
Birds	
Least Tern (*Sterna antillarum*)	x
Roseate Tern (*Sterna dougallii dougalii*)	x
Common Tern (*Sterna hirundo*)	x
Northern Harrier (*Circus syneus*)	x
Piping Plover (*Charadrius melodus*)	x
Reptiles	
Green Sea Turtle (*Chelonia mydas*)	x
Kemp's Ridley Sea Turtle (*Lepidochelys kempi*)	x
Leatherback Sea Turtle (*Dermochelys coriacea*)	x
Loggerhead Sea Turtle (*Caretta caretta*)	x
Insects	
Purple Tiger Beetle (*Cicindela purpurea*)	x
Chain Dot Geometer (*Cingilia catenaria*)	x
Coastal Heathland Cutworm (*Abagrotis nefascia*)	x
Three-Lined Angle Moth (*Digrammia eremiata*)	x
Plants	
Nantucket Shadbush (*Amelanchier nantucketensis*)	x
Bristly Foxtail (*Setaria parviflora*)	x

Notes:

[1] Based on historical records, it is presumed that high explosive ordnance was not used on this site (PA Cape Poge Little Neck Bomb Target Site Chappaquiddick Island, MA FUDS Property No. D01MA0595 [USACE Feb 2009]).

[2]The determination that the bombs discovered on South Beach in 2008 and 2009 were high explosive bombs was made by Navy EOD personnel after detonation.

[3] Letter from the Natural Heritage and Endangered Species Program (NHESP) of the MA Division of Fisheries and Wildlife, NHESP Tracking Number 09-26472, dated April 15, 2009 (NHESP 2009)

[4] Letter from National Marine Fisheries Service, dated May 11, 2009 (NMFS 2009)

[5] Federally Listed Endangered and Threatened Species in Massachusetts, U.S. Fish and Wildlife Service, New England Field Office, Endangered Species Reviews/Consultations (http://www.fws.gov/newengland/EndangeredSpec-Consultation_Project_Review.htm)

Figure 1-8: Conceptual Site Exposure Model, Former Moving Target Machine Gun Range at South Beach MRS

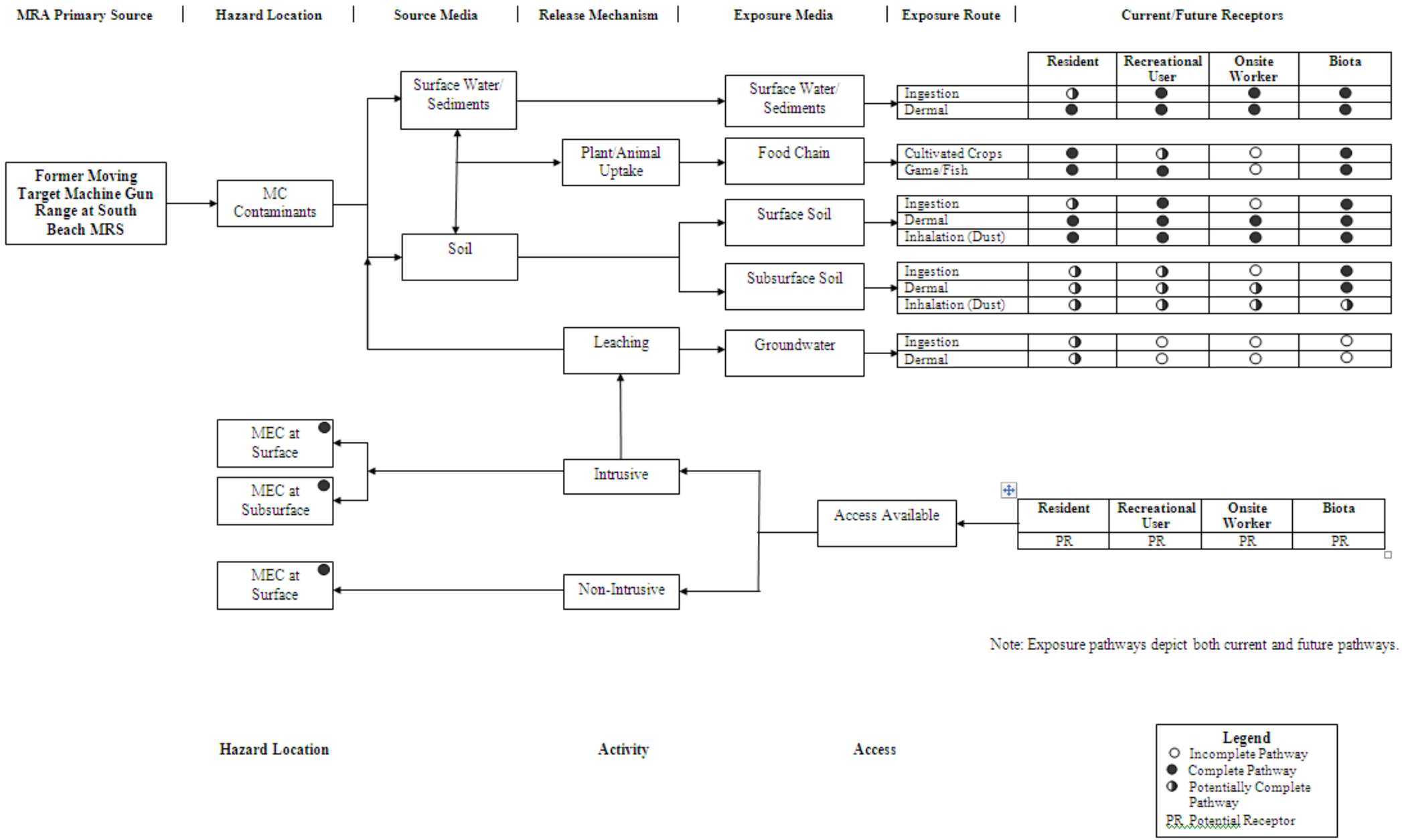


Table 1-3: CSM Summary, Tisbury Great Pond MRS

	Tisbury Great Pond
FUDS Project No.	D01MA045301
County	Dukes
Town	West Tisbury and Chilmark
Current Owner	The Trustees of Reservations (Long Pond Wildlife Refuge)
	Private landowners
	Commonweatth of Massachusetts (some lands, inland and coastal waters)
Operational Dates	1943 - 1947
Historical Owners	
MA (Lease # No(R)-35350)	480 acres
Deloris B. Bigelow (Lease # Noy(R)-39456)	11.1 acres
Tisbury Pond Club (condemnation leasehold MA civil suit #6796)	5.6 acres
Area of Water Used (does not include buffer/danger zones)	497 acres
Terrestrial Area Used	17 acres
Total Area	514 acres
Leaser	
1st Naval Division (Quonset Point Naval Air Station, RI - Naval Auxiliary Air Station Martha's Vineyard, MA)	**x**
Target Locations	
L-3-V (masthead) N41°20.8' W70°39'	**x**
Ordnance Used or Discovered	
0.30 caliber ammunition	**Used**
0.50 caliber ammunition	**Used**
MK 4 mods 3&4 signal practice bomb	
MK 5 3 lb practice bomb	**Used**
MK 15 100 lb practice bomb	**Used**
MK 21 practice bomb	**Used**
AN MK 23 3 lb practice bomb	**Used**
AN MK 43 practice bomb	**Used**
300 lb general purpose bomb bodies not loaded with high explosives	**Used**
Hazard Severity	marginal
Munitions Response Site Prioritization Protocol (MRSPP)	6[1]
Previous Investigations	
Archives Search Report for the Former Tisbury Great Pond, Martha's Vineyard, MA, FUDS Property No. D01MA045301 (USACE 1999	**x**
Final SI Report for Tisbury Great Pond, FUDS Property No D01MA045301 (USACE 2008)	**x**
Previous Actions	
	none
Stake Holders	
Federal	
EPA	**x**
US Fish and Wildlife Service	**x**

	Tisbury Great Pond
NOAA National Marine Fisheries Service	x
Commonwealth of Massachusetts	
MA DEP	x
MA Division of Fisheries and Wildlife	x
MA Dept. of Conservation and Recreation	x
MA Historical Commission	x
MA Board of Underwater Archaeological Resources	x
Dukes County	x
Town of Edgartown	
Town of West Tisbury	x
Town of Chilmark	x
The Trustees of Reservations	x
Wampanoag Tribe of Gay Head (Aquinnah)	x
Historic Sites	
National Register of Historic Places	NA
Potential Historic Site Stakeholders	
Wampanoag Tribe of Gay Head (Aquinnah)	x
MA Historical Commission	x
MA Board of Underwater Archaeological Resources	x
Threatened and Endangered Species [2, 3, 4]	
Birds	
Least Tern (*Sterna antillarum*)	x
Roseate Tern (*Sterna dougallii dougalii*)	x
Common Tern (*Sterna hirundo*)	x
Northern Harrier (*Circus syneus*)	x
Piping Plover (*Charadrius melodus*)	x
Reptiles	
Green Sea Turtle (*Chelonia mydas*)	x
Kemp's Ridley Sea Turtle (*Lepidochelys kempi*)	x
Leatherback Sea Turtle (*Dermochelys coriacea*)	x
Loggerhead Sea Turtle (*Caretta caretta*)	x
Insects	
Gerhard's Underwing Moth (*Catocala Herodias gerhardi*)	x
Faded Grey Geometer (*Stenoporpia polygrammaria*)	x
Pine Barrens Zale (*Zale sp 1 nr lunifera*)	x
Pink Sallow (*Psectraglaea carnosa*)	x
Sandplain Euchlaena (*Euchlaena madusaria*)	x
Barrens Buckmoth (*Hemileuca maia*)	x
Melsheimer's Sack Bearer (*Cicinnus melsheimeri*)	x
Pine Barrens Lycia (*Lycia ypsilon*)	x
Coastal Swamp Metarranthis Moth (*Metarranthis pilosaria*)	x
Slender Clearwing Sphinx Moth (*Hemaris gracilis*)	x
Chain Dot Geometer (*Cingilia catenaria*)	x
Coastal Heathland Cutworm (*Abagrotis nefascia*)	x
Spartina Borer Moth (*Spartiniphaga inops*)	x
Imperial Moth (*Eacles imperialis*)	x
Barrens Metarranthis Moth (*Metarranthis apiciaria*)	x
Comet Darner (*Anax longipes*)	x
Northeastern Beach Tiger Beetle (*Cicindela dorsalis dorsalis*)	x
Purple Tiger Beetle (*Cicindela purpurea*)	x
Plants	

	Tisbury Great Pond
Purple Needlegrass (*Aristida purpurascens*)	x
Sandplain Flax (*Linum intercursum*)	x
Gerardia Sandplain (*Agalinus acuta*)	x
Bushy Rockrose (*Helianthemum dumosum*)	x
Nantucket Shadbush (*Amelanchier nantucketensis*)	x
Sandplain Blue-Eyed Grass (*Sisyrinchium fuscatum*)	x
Bristly Foxtail (*Setaria parviflora*)	x
Sea-Beach Knotweed (*Polygonum glaucum*)	x
Saltpond Pennywort (*Hydrocotyle verticillata*)	x
Pygmyweed (*Tillaea aquatica*)	x

Notes:

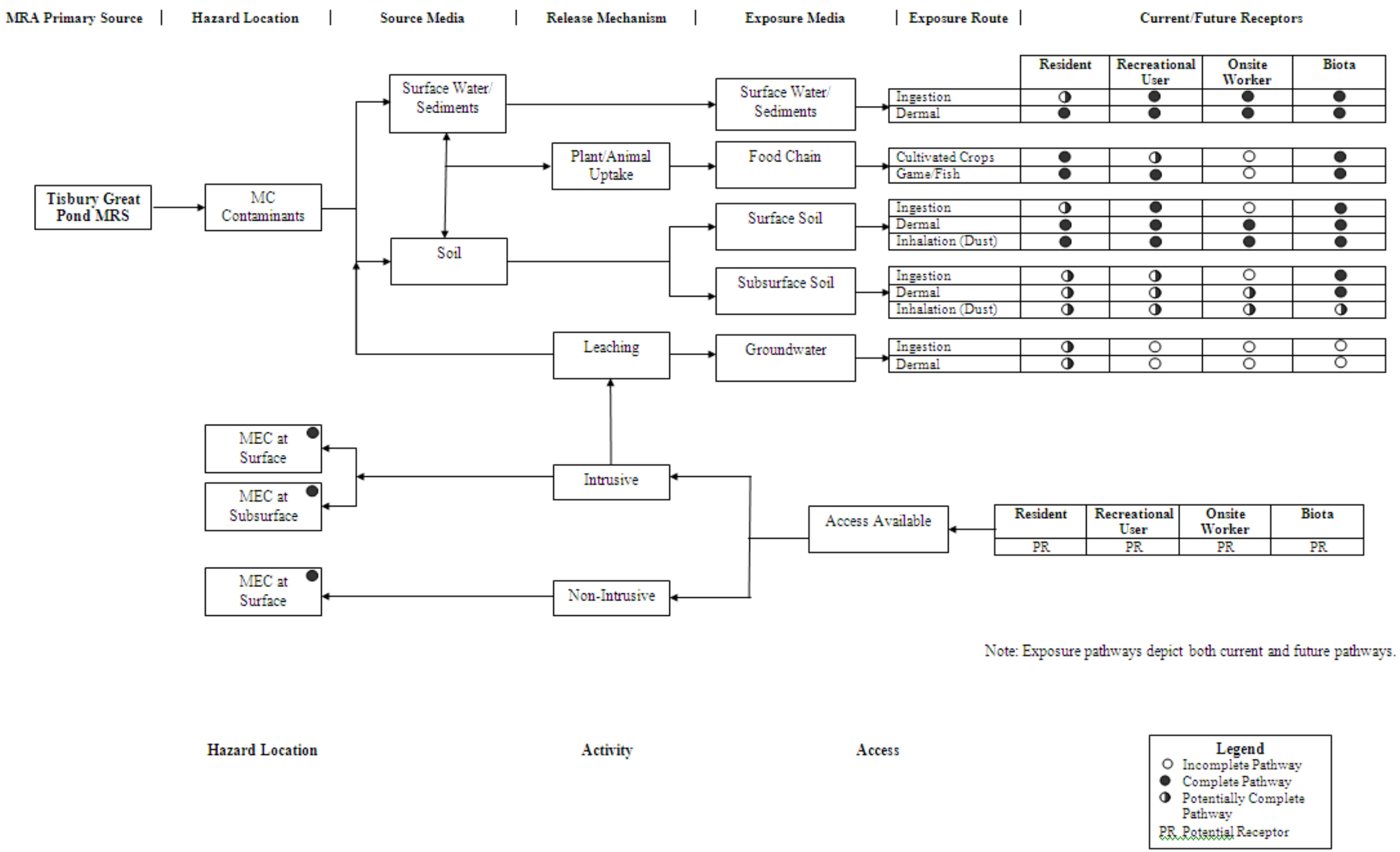
[1] Final SI Report for Tisbury Great Pond, FUDS Property No D01MA045301 (USACE 2008). USAESCH has submitted a revised MRSPP Score of 3 due to munitions debris identified in the trench cuts since the completion of the SI. However, approval of the score by the MRSPP evaluation team is pending.

[2] Letter from the Natural Heritage and Endangered Species Program (NHESP) of the MA Division of Fisheries and Wildlife, NHESP Tracking Number 07-23616, dated November 28, 2007 (NHESP 2007)

[3] Letter from National Marine Fisheries Service, dated May 11, 2009 (NMFS 2009)

[4] Federally Listed Endangered and Threatened Species in Massachusetts, U.S. Fish and Wildlife Service, New England Field Office, Endangered Species Reviews/Consultations (http://www.fws.gov/newengland/EndangeredSpec-Consultation_Project_Review.htm)

Figure 1-9: Conceptual Site Exposure Model, Tisbury Great Pond MRS



2 TECHNICAL MANAGEMENT PLAN

2.1 OBJECTIVES

2.1.1 This Technical Management Plan describes the approach, procedures, and operational methods that will be used to perform RI field activities at the three MRSs located on Martha's Vineyard, Dukes County, Massachusetts.

2.1.2 UXB and their Subcontractors, AMEC, Aqua Survey, Inc. (ASI), NAEVA Geophysics, Inc. (NAEVA), and VRHabilis, are providing all necessary management, personnel, materials, transportation, supplies, and equipment except as specified herein as Government-Furnished for the RI. An abbreviated work plan was previously prepared and approved for Environmental Security Technology Certification Program (ESTCP) and Transport Study dive support operations to track MEC/MD movement in the ocean, a subset of the overall scope which is ongoing; this work plan covers the balance of the work to complete the RI/FS. The Transport Study has also been included in the RI work plan, and these sections supersede the abbreviated work plan.

2.1.3 The objective of this Technical Management Plan is to communicate safe processes and procedures for UXB personnel, subcontractors, and other essential personnel to conduct geophysical and environmental sampling activities on land, beach, inland water, and on- and off-shore areas of Cape Poge, South Beach, and Tisbury Great Pond. A detailed description of project activities is described in Chapter 3.0, Field Investigation Plan.

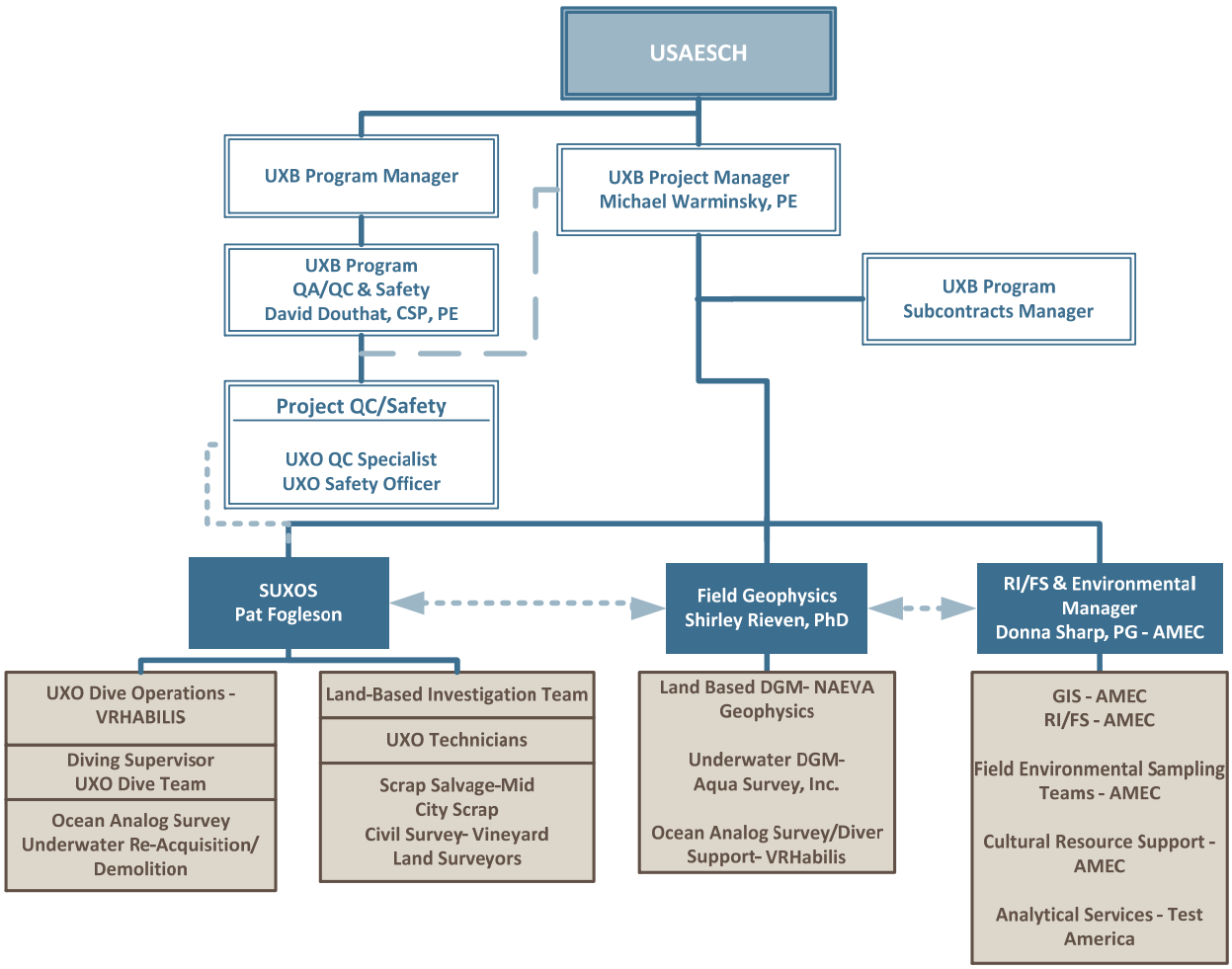
2.1.4 MEC is a safety hazard and may constitute an imminent and substantial endangerment to the general public, on-site personnel, and the environment. The work will be performed in accordance with the CERCLA Section 104, and the NCP, Sections 300.120 (d) and 300.400(e).

2.1.5 All activities involving work in areas potentially containing MEC hazards shall be performed in a manner consistent with USAESCH, North Atlantic Engineering District (CENAE), Department of the Army (DA), and DOD requirements regarding personnel, equipment, and procedures. Additionally Diving Operations will follow the VRHabilis Safe Dive Plan (Appendix D) currently approved by the New England CENAE Diving Coordinator. The ESP, prepared by USAESCH, is included as Chapter 6 of the work plan, with the MSD calculation sheets included in Appendix G.

2.2 ORGANIZATION

2.2.1 The Project Manager will be the single point of contact for USAESCH, with the organizational structure and lines of communication highlighted in **Figure 2-1**.

Figure 2-1: Team Organization Chart



2.3 PERSONNEL

2.3.1 Following is a list of personnel roles and responsibilities. Resumes of key people are included in Appendix H.

2.3.1.1 <u>CENAE Project Manager</u> – The CENAE PM is the project sponsor. Responsibilities include coordination for site access; review of project work plans and documents, communication with the news media and public, and coordination with state and local regulatory agencies.

2.3.1.2 USAESCH Project Manager - The USAESCH PM is the implementing agency for this project and has approval authority for project execution. The USAESCH PM responsibilities include providing expertise for MC and MEC-related activities, procuring contractor services and directing the contractor, controlling the budget and schedule, and coordinating document reviews, and serves as the point of contact for the UXB project manager.

2.3.1.3 UXB Project Manager - The Project Manager (PM), Mr. Michael Warminsky, PE, makes resources available (personnel, facilities, and equipment); communicates and directs instructions for scoping, negotiating, or modifying delivery order costs and schedules; manages all aspects of the project; coordinates all contract work; and oversees task identification and resolutions.

2.3.1.3.1 The PM is responsible for achieving the contractual cost and schedule targets. The PM coordinates the preparation of detailed work order specifications and schedules, identifies the technical and site personnel to accomplish the work scope, assists the Quality Control personnel and the UXO Safety Officer in the implementation of project quality and safety and health procedures, and directs personnel.

2.3.1.3.2 The PM ensures that the proper project documentation is on-site. This documentation includes such items as personnel certifications, the approved work plan, and corporate memoranda and policies. The PM interfaces directly with the USAESCH Project Manager, advising of progress, and promptly implementing authorized changes.

2.3.1.4 UXB Program Quality and Safety Manager -The Program Quality and Safety Manager for this project will be Mr. David Douthat, PE, CSP. Mr. Douthat brings over 33 years of experience as a certified safety professional (CSP) with over 28 years of direct experience in UXO projects to support this contract. Mr. Douthat will review all project plans and conduct audits to ensure the safety of the workforce, the public, and the environment. The field quality and safety personnel will report directly to Mr. Douthat.

2.3.2 MEC Operations

2.3.2.1 UXB will perform all land-based analog surveys, MEC intrusive investigation, and demolition activities as required. In addition, UXB will supervise all other land-based activities, UXO dive activities, and provide UXO escort for all land-based digital geophysical mapping (DGM) operations.

2.3.2.2 Senior UXO Supervisor - The Senior UXO Supervisor (SUXOS), Pat Fogleson, assists in developing site-specific work plans, identifies personnel and equipment requirements, and directly supervises all daily surface MEC activities. This individual is responsible for the successful performance of field teams, early detection and identification of potential problem areas, and instituting corrective measures. The SUXOS will execute instructions from UXB's PM, document site conditions, photographically document operations, prepare project reports, and identify efforts to accomplish the SOW. The SUXOS reports to UXB's PM. For activities involving dive operation, he will assist the Master Diver with UXO demolition and will insure munitions designated as safe (MDAS) is appropriately handled.

2.3.2.3 UXO Safety Officer - The UXO Safety Officer (UXOSO), implements the approved UXO and explosives safety program in compliance with all DOD, federal, state, and local statutes and codes; analyzes UXO and explosives operational risks, hazards, and safety requirements; establishes and ensures compliance with all site-specific safety requirements for UXO and explosives operations; enforces personnel limits and safety exclusion zones for UXO clearance operations, UXO and explosives transportation, storage, and destruction; conducts safety inspections to ensure compliance with UXO and explosives safety codes; and operates and maintains air monitoring equipment for airborne contaminates (as required). The UXOSO reports to UXB's Program Quality and Safety Manager.

2.3.2.4 UXO Quality Control Specialist - The UXO Quality Control Specialist (UXOQCS) will implement the UXO specific sections of the Quality Control Program for all MR MEC related evolutions, conduct quality control inspections of all UXO and explosives operations for compliance with established procedures, and direct and approve all corrective actions to ensure all MR MEC related work complies with contractual requirements. The UXOQCS reports to UXB's Quality and Safety Manager.

2.3.2.4.1 During project phases involving less than 14 personnel on site, the UXOQC and UXO Safety roles may be dual-hatted.

2.3.2.5 UXO Technician III - The UXO Technician III (Team Leader) supervises and performs on-site disposal of ordnance and explosives, prepares explosive storage plans in accordance with applicable guidance, prepares required MEC administrative reports, prepares Standard Operating Procedures (SOPs) for on-site MR operations, performs risk hazard analyses, conducts daily site safety briefings, and supervises the conduct of all on-site evolutions directly related to MR MEC operations.

2.3.2.5.1 The UXO Technician III is able to perform all of the functions enumerated for UXO Sweep Personnel and UXO Technicians I and II.

2.3.2.5.2 The UXO Technician III reports to the SUXOS.

2.3.2.6 Demolition Supervisor - A UXO Technician III will serve as Demolition Supervisor and direct all demolition activities. The Demolition Supervisor is responsible for training all personnel regarding the nature of the materials, hazards, and precautions.

2.3.2.6.1 The Demolition Supervisor shall coordinate with the SUXOS to ensure all notifications are completed prior to demolition and shall be present during all on-site disposal operations.

2.3.2.6.2 If demolition is to be conducted underwater, the Dive Supervisor will also serve as Demolition Supervisor and direct all demolition activities. The Demolition Supervisor is responsible for training all personnel regarding the nature of the materials, hazards, and precautions. The Demolition Supervisor shall coordinate with the SUXOS to ensure all notifications are completed prior to demolition, and shall be present during all on-site disposal operations. The Demolition Supervisor reports to the SUXOS. The Demolition Supervisor reports to the SUXOS.

2.3.2.7 UXO Technician II - The UXO Technician II conducts the surface clearance and construction support, locates UXO, operates equipment, conducts UXO procedures, properly stores MEC material in accordance with applicable guidance, identifies fuzes and determines fuze condition, determines a magnetic azimuth using current navigational/locating equipment, performs field expedient identification procedures to identify explosives contaminated soil; prepares an on-site holding area for MEC material, and operates vehicles transporting MEC material, when appropriate. The UXO Technician II functions as a member of the demolition team, as required. The UXO Technician II is able to perform all of the functions enumerated for UXO Sweep Personnel and UXO Technician I.

2.3.2.7.1 The UXO Technician II reports to the assigned Technician III.

2.3.3 MEC Dive Operations

2.3.3.1 VRHabilis will perform MEC dive operations to include ocean analog surveys, MEC transport study support, underwater anomaly reacquisition and intrusive investigation, and underwater demolition as required.

2.3.3.2 UXO Dive teams - The Dive Team is comprised of a minimum: Diving Supervisor-No UXO requirement; SUXOS – Must meet all requirements for SUXO; Diver – Minimum Tech; Standby Diver -Minimum Tech ; Tender Minimum Tech I if he will

dive at any point; All divers/SUXOS must be UXO Certified IAW DDESB TP-18. If the diver is a UXO I the video system must be on and the video feed watched by a UXO Tech II or UXO Tech III.

2.3.3.2.1 All divers are required to have a complete Hazardous Materials (HAZMAT)/Diving physical examination every year certified by a license physician and cleared for diving operations. All UXB personnel supervising dive operations will also be UXO qualified IAW DDESP TP-18. All personnel will complete the Occupational Safety and Health Administration (OSHA) 40-hour training course for hazardous waste site workers (29 CFR 1910.120). Additional site-specific training will be provided to all personnel upon initial mobilization, in accordance with 29 CFR 1910.120, EM 385-1-1 (USACE Safety and Health Requirements Manual), and ER 385-1-92 (Safety and Occupational Health Document Requirements for Hazardous, Toxic, and Radioactive Waste [HTRW] and Munitions Response [MR] MEC Activities). Each dive team member will read and sign the dive manual.

2.3.3.2.2 In addition, all Diving UXO Technicians meet the requirements of Department of Defense Explosives Safety Board (DDESB) TP-18 and the US Navy Diving Regulations. The USAESCH will receive the list of key personnel 15 days prior to work start. If additional key personnel are assigned, their personal information will be submitted to the Contracting Officer (CO) for approval prior to commencing work. Certificates are maintained on file at the corporate office and on-site.

2.3.3.3 Diving Supervisor/Safety Officer - The Diving Supervisor will be designated in writing and in charge of the actual diving operation for a particular dive or series of dives. Diving operations shall not be conducted without the presence of the Diving Supervisor. The Diving Supervisor has the authority and responsibility to discontinue diving operations in the event of unsafe diving conditions. The Diving Supervisor shall be included in preparing the operational plans. The Diving Supervisor shall consider contingencies, determine equipment requirements, recommend diving assignments, and establish back-up requirements for the operation. The Diving Supervisor shall be familiar with all divers on the team and shall evaluate the qualifications and physical fitness of the divers selected for each particular job. The Diving Supervisor will inspect all equipment and conduct pre-dive briefings of personnel prior to every dive. While the operation is underway, the Diving Supervisor monitors progress, debriefs divers, and updates instructions to subsequent divers and other personnel as necessary are advised of progress and of any changes to

the original plan. The Diving Supervisor will terminate the dive and report any unsafe conditions, actions, or events that may occur to the VRHabilis PM and as soon as possible for resolution and documentation. When the mission has been completed, the Diving Supervisor gathers appropriate data, analyzes the results of the mission, prepares reports to be submitted to higher authority, and ensures that required records are completed. These records may range from equipment logs to individual diving records.

2.3.4 Geophysics

2.3.4.1 Geophysics involves both land-based and underwater surveys.

2.3.4.2 UXB Geophysicist - Dr. Shirley Rieven will review the geophysics data for the Instrument Verification Strip (IVS) and also review the geophysics data from the DGM at each MRS. Once the picks are defined, a dig list will be generated with precise locations that will enable the UXO technicians to conduct the intrusive investigation. The results of each dig will then be entered into the GIS database. That information will be presented to the USAESCH in the final RI report.

2.3.4.3 Land-based geophysics – NAEVA will perform land-based DGM surveys including both DGM recon transects and DGM grids as described in Section 3.3.

2.3.4.4 Underwater Geophysics - Aqua Survey, Inc. will perform underwater DGM surveys in inland water areas using either a towed sled, or walking diver with hand-held coil as described in Section 3.3.

2.3.5 RI/FS and Environmental Management

2.3.5.1 AMEC will oversee preparation of the RI/FS documents and will provide sampling teams for conducting MC sampling of surface soil, , subsurface soil, surface water, sediment, and groundwater for the RI. They will determine the locations and numbers of samples to be collected in order to satisfy the objectives of the RI. They will provide the equipment and labor for sample collection. The sampling team will consist of a team leader (geologist or engineer), sampling technicians, and an UXO escort. All sampling technicians will have current 40 hour HAZWOPER certification. Aqua Survey, Inc. will provide the sampling equipment and labor for collecting sediment samples. The AMEC and Aqua Survey, Inc. team leaders will report to the UXB PM.

2.3.5.2 RI/FS and Environmental Manager – Ms. Donna Sharp (AMEC) will serve as the RI/FS and Environmental Manager. She will report the UXB Project Manager and

will lead the preparation of the RI work plan, site environmental sample collection, preparation of RI/FS reports, and decision documents.

2.4 COMMUNICATION AND REPORTING

2.4.1 Communications flow from the USAESCH PM downward through the UXB Project Manager and line management structure. Information flows upward through the team structure to the USAESCH PM, with all information exchange through the UXB Project Manager.

2.4.2 The SUXOS will coordinate site activities with the USAESCH Safety Specialist if on site, the CENAE Dive Coordinator, and other stakeholders as required. Information will be disseminated to the public as outlined in Section 2.9.

2.5 DELIVERABLES

2.5.1 In addition to this Work Plan, deliverables for this initial work include an Explosive Site Plan (ESP) (prepared by USAESCH), Dive Plan, updated Public Involvement Plan (PIP), and RI/FS report. Subsequent deliverables based on this work will also include a Proposed Plan and Decision Document.

2.6 SCHEDULE

2.6.1 UXB has prepared a detailed project schedule for the fieldwork outlined in this Work Plan; please see **Figure 2-2.** The schedule reflects the project specific tasks and provides sound rationale and logic for completing the work. The work schedule is based on a 40 hour work week for intrusive activities.

2.7 PERIODIC REPORTING

2.7.1 UXB will conduct bi-weekly conference calls with the USAESCH and CENAE and submit meeting minutes after each call. In addition, UXB will submit a weekly report in accordance with DID MR-085 and include a brief description of project scope, cost/schedule/progress data, discussion of issues relating to project expenditures and work progress, summary of work accomplished each week, safety and quality issues, and work planned for the upcoming week. The weekly reports will be consolidated into a monthly Project Status Report. Reports will include information such as: Cost/Schedule/ Progress Data, Discussion of Issues Relating to Project Expenditures and Work Progress, Field Information, and Exposure Data. Reports for each previous week will be submitted by facsimile or e-mail on the first working day of each week. All reports will be signed by the Project Manager.

2.8 COSTING AND BILLING

2.8.1 All work is performed per the work breakdown structure and cost proposal submitted. Each line item in the Work Breakdown Structure (WBS) is assigned a unique cost tracking number in the UXB Project Accounting System. Daily reports capturing work completed, personnel/assets utilized, and materials expended are completed by the SUXOS and forwarded to the Project Manger daily. The project manager reviews and ensures items used are coded correctly and submits to accounting department for roll-up into monthly cost summary/invoice. Any discrepancies are resolved between the Project Manager and SUXOS and amended accordingly. Firm fixed price tasks are billed per the approved payment milestone schedule, and cost plus fixed fee tasks are billed on actual effort during the period. Invoices are submitted electronically to USAESCH.

2.9 PUBLIC RELATIONS SUPPORT

2.9.1 Technical Project Planning (TPP) meetings with project stakeholders will be convened in accordance with Interim Guidance 01-02 and EM 200-1-02. The first meeting with regulators and stakeholders was held March 24 and 25, 2010, discussing the scope of work covered in this RI Work Plan. A follow-up conference call with stakeholders to finalize the TPP Meeting Minutes and was held on 27 May 2010. A subsequent TPP meeting will be held to review the draft-final RI Work plan, with a final TPP meeting to review the RI and FS Reports.

2.9.2 CENAE will lead in public relations support. Any inquiries from the public will be referred to the CENAE Project. UXB will host public meetings not related to the TPP and maintain information repositories at the closest libraries to the MRSs. Public announcements may be made by radio, television, and newspaper as well as outlined in the updated Public Involvement Plan (PIP).

2.10 SUBCONTRACTOR MANAGEMENT PROCEDURES

2.10.1 Subcontractors are governed by the signed subcontract agreements between UXB and each subcontractor as identified in Section 2.3. All performance metrics, safety, schedule, and cost elements flow from prime contract to subcontract. UXB Director of Contracts ensures all Federal Acquisition Regulations (FAR) provisions are met in procuring these services. Subcontractor Task managers will report to UXB Project Manager. Field work will be coordinated between Subcontractors field manager and UXB SUXOS.

2.11 FIELD OPERATION MANAGEMENT PROCEDURES

2.11.1 Field Operations management resides with the Project Manager who communicates requirements, performance direction, and customer feedback to the operational manager (SUXOS).

2.11.2 The SUXOS, in concert with subcontractors and vendors as identified above, is responsible for the implementation of this Work Plan, ensuring safety of personnel, regulatory conformance, production efficiencies, obtaining results, and documenting task order efforts. Operational personnel and subcontractors or vendors (if applicable) report to the SUXOS.

2.11.3 Management of task order sub tasks are designed for sequential implementation with processes and procedures designed to be repetitive and evaluated for effectiveness. The SUXOS, Dive Safety Officer, and UXO Safety Officer monitor safety and performance through surveillance, peer-oversight feedback, inspections, and planned audits.

2.11.4 Observations of non-conformance (if applicable) result in interactive Project Manager, SUXOS, and non-compliant party communications. Corrective actions focus first on refinement of systems, processes, and procedures, then simplify understanding, fortify training, and if required, may result in disciplinary actions.

2.11.5 Travel

2.11.5.1 UXB, as a private corporation, is under no obligation to provide travel benefits in accordance with the US Government Joint Travel Regulations (JTR), as amended from time to time. UXB provides reimbursement for travel expenses solely in accordance with UXB's own internal Travel Policies. These policies reference the maximum per-diem tables from the JTR; but are otherwise not strictly compliant with the terms of the JTR.

2.11.5.2 Questions regarding allow-ability of certain travel expenses or an employee's eligibility for a particular travel reimbursement should be directed to UXB's Human Resources Department.

2.11.6 Site Training

2.11.6.1 Upon arrival at the work site, operations personnel will receive comprehensive familiarity indoctrination. This involves a tour of the work areas, a project briefing/presentation, and any site-specific training.

2.11.6.2 Each employee will be required to sign that he/she has been briefed and agrees to the WP prior to starting work.

2.11.7 Lodging

2.11.7.1 UXB provides lodging to personnel in strict accordance with UXB's Travel Policies, which states that eligible employees are provided with lodging.

2.11.8 Site Office/Storage

2.11.8.1 UXB will establish a small site office/storage area at Edgartown Marine. Included with the site office will be portable sanitary facilities, potable water, and appropriate first aid equipment.

2.11.8.2 The site office will be equipped with cellular telephone. Due the proximity to the ocean and nature of the work, the office will also include a very high frequency (VHF) radio to monitor NOAA weather alerts and communicate with the field team. Cellular phones will be used as a backup to two-way radio communication.

2.11.8.3 UXB plans to store equipment and supplies within a lockable storage container (high cube van and/or cargo trailer) that will be placed adjacent to the site office. Range residue that is inspected and certified free from explosive hazards will be transported to a sealed lockbox staged at Edgartown Police Station.

2.11.8.4 All explosive demolition operations will be conducted per the ESP, Chapter 6. Explosives to be used for demolition activities will be delivered to the existing magazine as noted in the ESP and will be transported to the site each day as needed in properly placarded vehicles equipped with appropriate magazine.

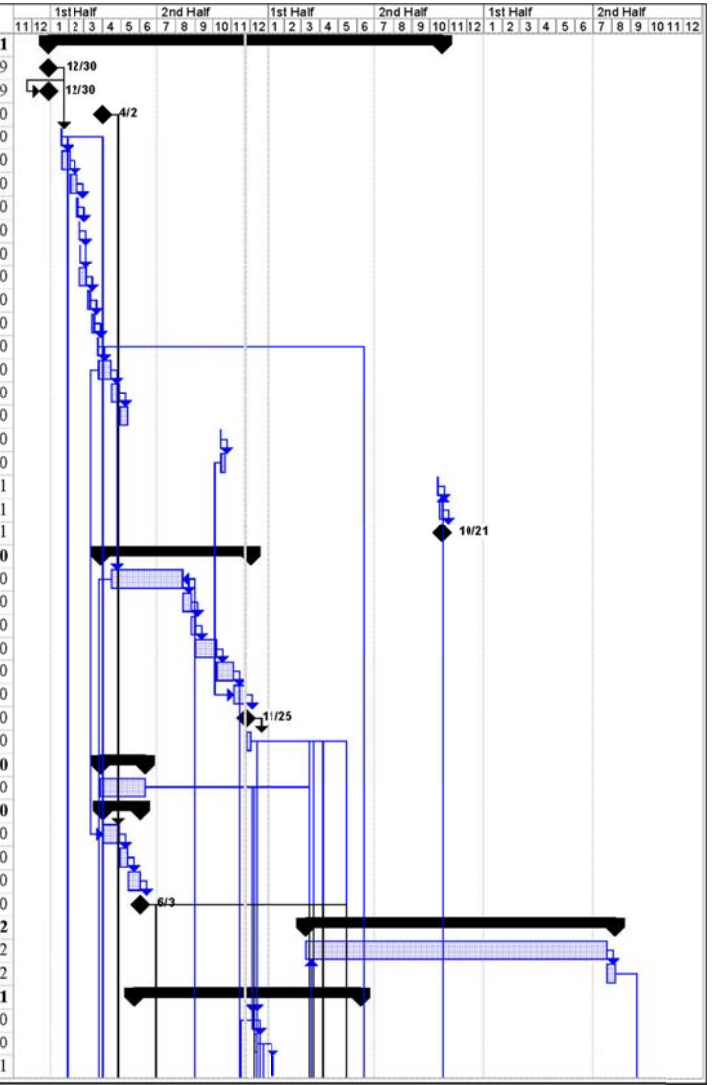
2.11.9 Work Hours/Holidays

2.11.9.1 The RI field activities (consisting of primarily of ocean/inland water geophysical surveys) may be conducted over the summer tourist season. This work will be conducted with minimal impact to tourists as the work is predominantly done by boat or by walking divers, minimizing beach/overland traffic.

2.11.9.2 If a federal holiday occurs during a workweek, an alternative workday will be selected for operational activities. The standard work week and any special alternative schedules will be subject to prior approval from the USAESCH PM.

Figure 2-2: Schedule

ID	Task Name	Duration	Start	Finish
1		**463 days**	**Wed 12/30/09**	**Fri 10/21/11**
2	Project Award	0 days	Wed 12/30/09	Wed 12/30/09
3	Funding for TPP and RI/FS Work Plan	0 days	Wed 12/30/09	Wed 12/30/09
4	Funding for Balance of Project	0 days	Fri 4/2/10	Fri 4/2/10
5	KO Meeting	1 day	Wed 1/20/10	Wed 1/20/10
6	Prepare AAPP for Site Visit	2 wks	Thu 1/21/10	Wed 2/3/10
7	USACE Review	2 wks	Thu 2/4/10	Wed 2/17/10
8	UXB Site Visit to Martha's Vineyard	3 days	Wed 2/17/10	Fri 2/19/10
9	Prepare Draft Transects	1 day	Mon 2/22/10	Mon 2/22/10
10	Geophysics Meeting/Huntsville	1 day	Tue 2/23/10	Tue 2/23/10
11	Prepare Advance TPP and CSM	2 wks	Mon 2/22/10	Fri 3/5/10
12	USACE Review	5 days	Mon 3/8/10	Fri 3/12/10
13	Incorporate Comments/Finalize TPP materials	5 days	Mon 3/15/10	Fri 3/19/10
14	TPP Meeting #1	2 days	Wed 3/24/10	Thu 3/25/10
15	Draft TTP Memorandum	3 wks	Fri 3/26/10	Thu 4/15/10
16	USACE Review	2 wks	Fri 4/16/10	Thu 4/29/10
17	Final TPP Memorandum	2 wks	Fri 4/30/10	Thu 5/13/10
18	TPP Meeting #2	1 day	Thu 10/14/10	Thu 10/14/10
19	TPP Meeting #2 meeting Minutes	1 wk	Fri 10/15/10	Thu 10/21/10
20	TPP Meeting #3	2 days	Thu 10/13/11	Fri 10/14/11
21	TPP Meetin #3 meeting Minutes	1 wk	Mon 10/17/11	Fri 10/21/11
22	TPP Complete	0 days	Fri 10/21/11	Fri 10/21/11
23	**Task 2 RI/FS Work Plan**	**180 days**	**Mon 3/29/10**	**Fri 12/3/10**
24	Prepare Draft Work Plan	17 wks	Fri 4/16/10	Thu 8/12/10
25	USACE Review	2 wks	Fri 8/13/10	Thu 8/26/10
26	Prepare Draft Final Work Plan	1 wk	Fri 8/27/10	Thu 9/2/10
27	USACE Back Check	5 wks	Fri 9/3/10	Thu 10/7/10
28	Regulator Review	4 wks	Fri 10/8/10	Thu 11/4/10
29	Final Work Plan	3 wks	Fri 11/5/10	Thu 11/25/10
30	RI/FS Workplan Complete	0 days	Thu 11/25/10	Thu 11/25/10
31	Notice To Proceed for RI Field Work	6 days	Fri 11/26/10	Fri 12/3/10
32	**Task 2a Optional Explosive Siting Plan**	**55 days**	**Mon 3/29/10**	**Fri 6/11/10**
33	Prepare ESS (By USACE)	11 wks	Mon 3/29/10	Fri 6/11/10
34	**Task 2b Optional Dive Plan**	**45 days**	**Fri 4/2/10**	**Thu 6/3/10**
35	Prepare Draft Dive Plan	4 wks	Fri 4/2/10	Thu 4/29/10
36	USACE Review	2 wks	Fri 4/30/10	Thu 5/13/10
37	Prepare Final Dive Plan	3 wks	Fri 5/14/10	Thu 6/3/10
38	Dive Plan Complete	0 days	Thu 6/3/10	Thu 6/3/10
39	**Task 3 GIS**	**370 days**	**Wed 3/9/11**	**Tue 8/7/12**
40	GIS Data Collection	360 days	Wed 3/9/11	Tue 7/24/12
41	Final GIS Files on CD	2 wks	Wed 7/25/12	Tue 8/7/12
42	**Task 4 RI/FS Field Activities**	**263 days**	**Mon 5/24/10**	**Wed 6/8/11**
43	Mobilize Land (analog) Geophysics	3 days	Mon 12/6/10	Wed 12/8/10
44	Mobilie Beach (DGM) Geophysics	3 days	Thu 12/9/10	Mon 12/13/10
45	Mobilize Intrusive Investigation (Land)	3 days	Tue 1/11/11	Thu 1/13/11

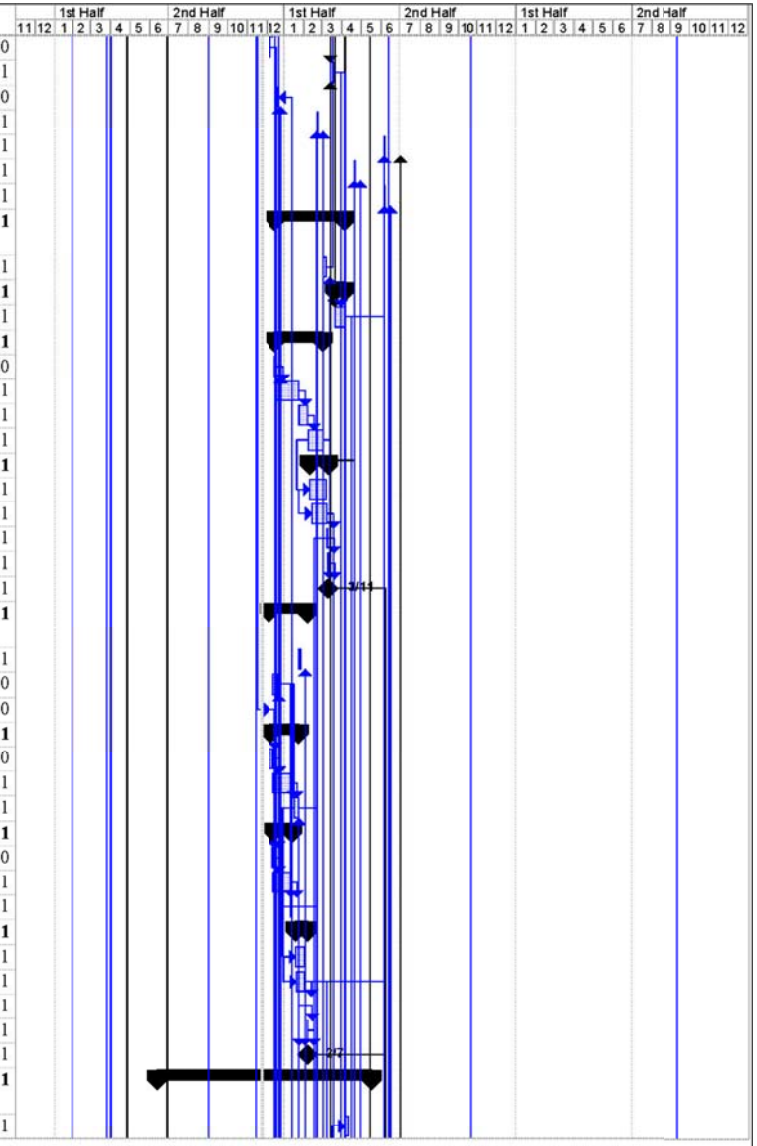


Project: Martha's Vineyard Proposed S
Date: Tue 11/23/10

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Page 1

ID	Task Name	Duration	Start	Finish
46	Mobilize Inland Water Geophysics	2 days	Thu 12/9/10	Fri 12/10/10
47	Mobilize Ocean Geophysics	5 days	Tue 3/15/11	Mon 3/21/11
48	Demobilize Land (analog) Geophysics	2 days	Thu 12/23/10	Fri 12/24/10
49	Demobilize Beach (DGM) Geophysics	2 days	Tue 2/22/11	Wed 2/23/11
50	Demobilize Intrusive Investigation (Land)	2 days	Tue 6/7/11	Wed 6/8/11
51	Demobilize Inland Water Geophysics	2 days	Thu 4/21/11	Fri 4/22/11
52	Demobilize Ocean Geophysics	2 days	Tue 6/7/11	Wed 6/8/11
53	**Task 4a Optional Ocean/Inland Water Area, Cape Poge**	**69 days**	**Fri 12/17/10**	**Wed 4/6/11**
54	Civil Survey	3 days	Fri 3/4/11	Tue 3/8/11
55	**Ocean Survey**	**12 days**	**Tue 3/22/11**	**Wed 4/6/11**
56	Analog Transects	12 days	Tue 3/22/11	Wed 4/6/11
57	**Inland Water Survey**	**45 days**	**Fri 12/17/10**	**Thu 3/3/11**
58	Geophysical Test Strip	2 days	Fri 12/17/10	Mon 12/20/10
59	DGM Transects	15 days	Tue 12/21/10	Mon 1/24/11
60	Transect Data Review	2 wks	Tue 1/25/11	Mon 2/7/11
61	DGM Grids	18 days	Tue 2/8/11	Thu 3/3/11
62	**Intrusive Investigation**	**21 days**	**Fri 2/11/11**	**Fri 3/11/11**
63	Prepare Dig Sheets	18 days	Fri 2/11/11	Tue 3/8/11
64	Reacquire/Dig Anomalies	18 days	Mon 2/14/11	Wed 3/9/11
65	MEC Disposal	1 day	Thu 3/10/11	Thu 3/10/11
66	MPPEH/MD Disposal	1 day	Fri 3/11/11	Fri 3/11/11
67	Task 4a Complete	0 days	Fri 3/11/11	Fri 3/11/11
68	**Task 4b Optional Former Cape Poge Bomb Site Land/Beach Area**	**35 days**	**Tue 12/7/10**	**Mon 2/7/11**
69	Civil Survey	3 days	Tue 1/25/11	Thu 1/27/11
70	Clearing	7 days	Wed 12/15/10	Thu 12/23/10
71	Geophysical Test Strip	1 day	Tue 12/7/10	Tue 12/7/10
72	**Land Area**	**23 days**	**Thu 12/9/10**	**Mon 1/24/11**
73	Site Recon/Analog Transects	4 days	Thu 12/9/10	Tue 12/14/10
74	Transect Data Review	10 days	Wed 12/15/10	Tue 1/11/11
75	DGM Grids	6 days	Mon 1/17/11	Mon 1/24/11
76	**Beach Area**	**14 days**	**Tue 12/14/10**	**Fri 1/14/11**
77	Site Recon/Digital Transects	1 day	Tue 12/14/10	Tue 12/14/10
78	Transect Data Review	2 wks	Wed 12/15/10	Tue 1/11/11
79	DGM Grids	3 days	Wed 1/12/11	Fri 1/14/11
80	**Intrusive Investigation**	**13 days**	**Thu 1/20/11**	**Mon 2/7/11**
81	Prepare Dig Sheets	10 days	Thu 1/20/11	Wed 2/2/11
82	Reacquire/Dig Anomalies	10 days	Fri 1/21/11	Thu 2/3/11
83	MEC Disposal	1 day	Fri 2/4/11	Fri 2/4/11
84	MPPEH/MD Disposal	1 day	Mon 2/7/11	Mon 2/7/11
85	Task 4b Complete	0 days	Mon 2/7/11	Mon 2/7/11
86	**Task 4c Optional Ocean/Inland Water Area, South Beach**	**233 days**	**Mon 6/14/10**	**Wed 5/18/11**
87	Civil Survey	4 days	Thu 4/7/11	Tue 4/12/11

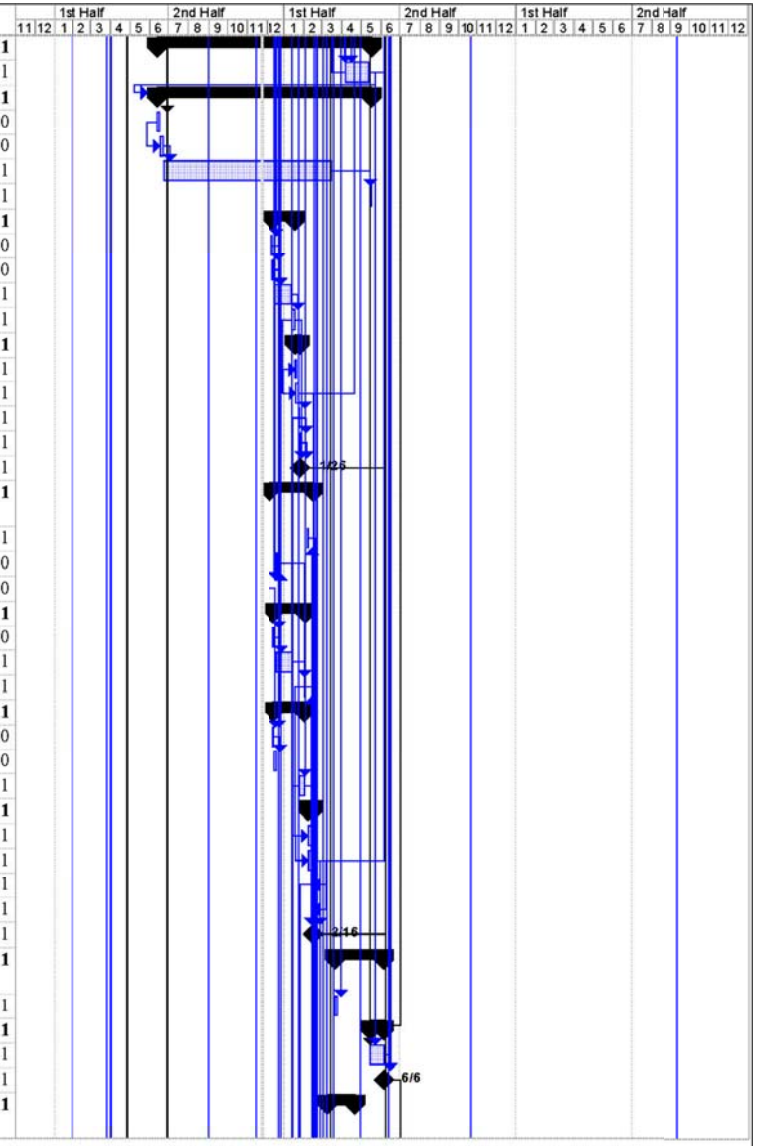


Project: Martha's Vineyard Proposed S
Date: Tue 11/23/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Page 2

ID	Task Name	Duration	Start	Finish
88	**Ocean Survey**	**233 days**	**Mon 6/14/10**	**Wed 5/18/11**
89	Analog Transects	27 days	Thu 4/7/11	Fri 5/13/11
90	**MEC Transport Study Analog Grid**	**233 days**	**Mon 6/14/10**	**Wed 5/18/11**
91	Delineate Grid	4 days	Mon 6/14/10	Thu 6/17/10
92	Seed Grid	4 days	Fri 6/18/10	Wed 6/23/10
93	Monitor Grid	180 days	Thu 6/24/10	Wed 3/16/11
94	Recover Seeded Items	3 days	Mon 5/16/11	Wed 5/18/11
95	**Inland Water Survey**	**17 days**	**Mon 12/13/10**	**Tue 1/18/11**
96	Geophysical Test Strip	1 day	Mon 12/13/10	Mon 12/13/10
97	DGM Transects	3 days	Tue 12/14/10	Thu 12/16/10
98	Transect Data Review	2 wks	Fri 12/17/10	Thu 1/13/11
99	DGM Grids	3 days	Fri 1/14/11	Tue 1/18/11
100	**Intrusive Investigation**	**6 days**	**Wed 1/19/11**	**Wed 1/26/11**
101	Prepare Dig Sheets	3 days	Wed 1/19/11	Fri 1/21/11
102	Reacquire/Dig Anomalies	3 days	Thu 1/20/11	Mon 1/24/11
103	MEC Disposal	1 day	Tue 1/25/11	Tue 1/25/11
104	MPPEH/MD Disposal	1 day	Wed 1/26/11	Wed 1/26/11
105	Task 4c Complete	0 days	Wed 1/26/11	Wed 1/26/11
106	**Task 4d Optional South Beach Site Land/Beach Area**	**41 days**	**Wed 12/8/10**	**Wed 2/16/11**
107	Civil Survey	2 days	Mon 2/7/11	Tue 2/8/11
108	Clearing	2 days	Mon 12/20/10	Tue 12/21/10
109	Geophysical Test Strip	1 day	Wed 12/8/10	Wed 12/8/10
110	**Land Area**	**28 days**	**Wed 12/15/10**	**Fri 2/4/11**
111	Site Recon/Analog Transects	3 days	Wed 12/15/10	Fri 12/17/10
112	Transect Data Review	10 days	Mon 12/20/10	Fri 1/14/11
113	DGM Grids	2 days	Thu 2/3/11	Fri 2/4/11
114	**Beach Area**	**26 days**	**Wed 12/15/10**	**Wed 2/2/11**
115	Site Recon/Digital Transects	2 days	Wed 12/15/10	Thu 12/16/10
116	Transect Data Review	2 days	Fri 12/17/10	Mon 12/20/10
117	DGM Grids	7 days	Tue 1/25/11	Wed 2/2/11
118	**Intrusive Investigation**	**7 days**	**Tue 2/8/11**	**Wed 2/16/11**
119	Prepare Dig Sheets	6 days	Tue 2/8/11	Tue 2/15/11
120	Reacquire/Dig Anomalies	6 days	Wed 2/9/11	Wed 2/16/11
121	MEC Disposal	1 day	Wed 2/16/11	Wed 2/16/11
122	MPPEH/MD Disposal	1 day	Wed 2/16/11	Wed 2/16/11
123	Task 4d Complete	0 days	Wed 2/16/11	Wed 2/16/11
124	**Task 4e Optional Ocean Area Tisbury Great Pond**	**55 days**	**Tue 3/22/11**	**Mon 6/6/11**
125	Civil Survey	4 days	Tue 3/22/11	Fri 3/25/11
126	**Ocean Survey**	**16 days**	**Mon 5/16/11**	**Mon 6/6/11**
127	Analog Transects	16 days	Mon 5/16/11	Mon 6/6/11
128	Task 4e Complete	0 days	Mon 6/6/11	Mon 6/6/11
129	**Task 4f Optional Pond Area of Tisbury Great Pond**	**32 days**	**Thu 3/10/11**	**Fri 4/22/11**

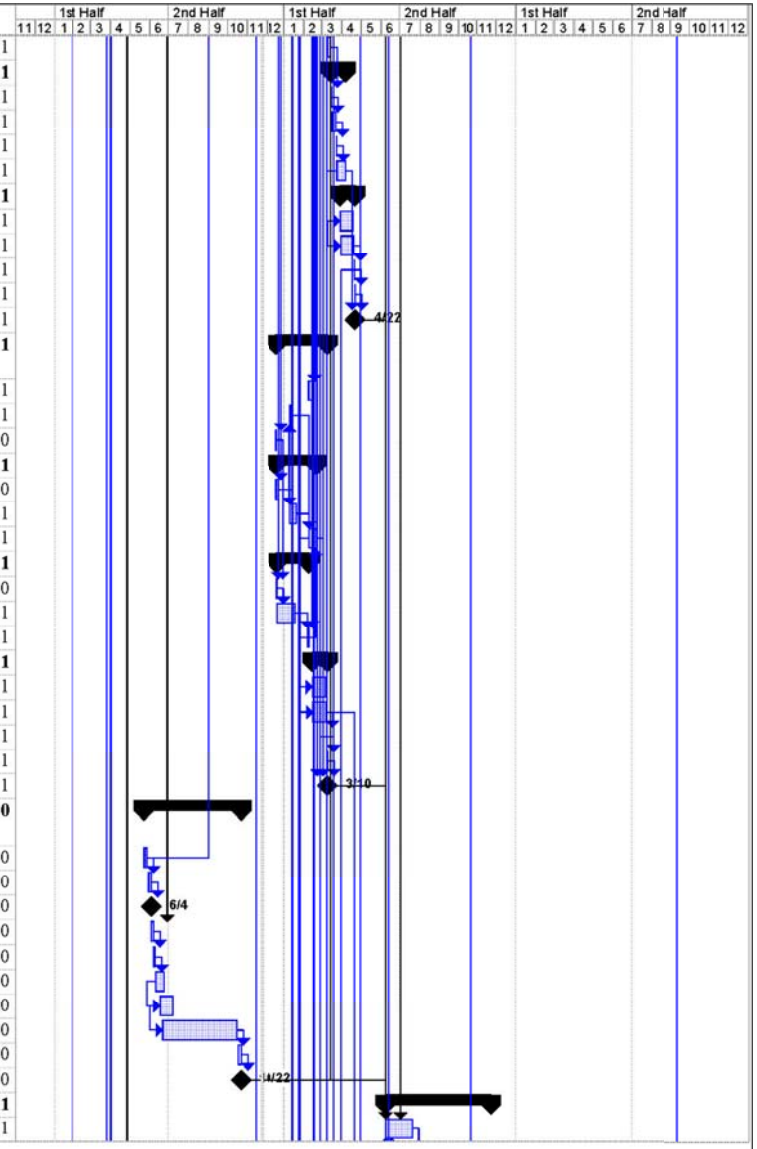


Project: Martha's Vineyard Proposed S
Date: Tue 11/23/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Page 3

ID	Task Name	Duration	Start	Finish
130	Civil Survey	4 days	Thu 3/10/11	Tue 3/15/11
131	**Pond Survey**	**17 days**	**Wed 3/16/11**	**Thu 4/7/11**
132	Geophysical Test Strip	1 day	Wed 3/16/11	Wed 3/16/11
133	DGM Transects	5 days	Thu 3/17/11	Wed 3/23/11
134	Transect Data Review	1 day	Thu 3/24/11	Thu 3/24/11
135	DGM Grids	10 days	Fri 3/25/11	Thu 4/7/11
136	**Intrusive Investigation**	**18 days**	**Wed 3/30/11**	**Fri 4/22/11**
137	Prepare Dig Sheets	15 days	Wed 3/30/11	Tue 4/19/11
138	Reacquire/Dig Anomalies	15 days	Thu 3/31/11	Wed 4/20/11
139	MEC Disposal	1 day	Thu 4/21/11	Thu 4/21/11
140	MPPEH/MD Disposal	1 day	Fri 4/22/11	Fri 4/22/11
141	Task 4f Complete	0 days	Fri 4/22/11	Fri 4/22/11
142	**Task 4g Optional Tisbury Great Pond Land/Beach**	**49 days**	**Mon 12/20/10**	**Thu 3/10/11**
143	Civil Survey	4 days	Wed 2/9/11	Mon 2/14/11
144	Clearing	4 days	Mon 1/10/11	Thu 1/13/11
145	Geophysical Test Stip	1 day	Mon 12/20/10	Mon 12/20/10
146	**Land Area**	**36 days**	**Mon 12/20/10**	**Mon 2/21/11**
147	Site Recon/Analog Transects	5 days	Mon 12/20/10	Fri 12/24/10
148	Transect Data Review	2 wks	Mon 1/10/11	Fri 1/21/11
149	DGM Grids	8 days	Thu 2/10/11	Mon 2/21/11
150	**Beach Area**	**27 days**	**Tue 12/21/10**	**Wed 2/9/11**
151	Site Recon/Digital Transects	1 day	Tue 12/21/10	Tue 12/21/10
152	Transect Data Review	10 days	Wed 12/22/10	Tue 1/18/11
153	DGM Grids	3 days	Mon 2/7/11	Wed 2/9/11
154	**Intrusive Investigation**	**18 days**	**Tue 2/15/11**	**Thu 3/10/11**
155	Prepare Dig Sheets	15 days	Tue 2/15/11	Mon 3/7/11
156	Reacquire/Dig Anomalies	15 days	Wed 2/16/11	Tue 3/8/11
157	MEC Disposal	1 day	Wed 3/9/11	Wed 3/9/11
158	MPPEH/MD Disposal	1 day	Thu 3/10/11	Thu 3/10/11
159	Task 4g Complete	0 days	Thu 3/10/11	Thu 3/10/11
160	**Task 4h Optional Investiagation of Anomalies Requiring Dive Support**	**110 days**	**Mon 5/24/10**	**Fri 10/22/10**
161	Prepare Abbreviated Work Plan	5 days	Mon 5/24/10	Fri 5/28/10
162	Government Review	5 days	Mon 5/31/10	Fri 6/4/10
163	Abbreviated Work Plan Approved	0 days	Fri 6/4/10	Fri 6/4/10
164	Mobilize	2 days	Fri 6/4/10	Mon 6/7/10
165	Set IVS	3 days	Tue 6/8/10	Thu 6/10/10
166	ESTCP Underwater Survey (By Others)	2 wks	Fri 6/11/10	Thu 6/24/10
167	ESTP Dig Sheet Prep (By Others)	3 wks	Fri 6/18/10	Thu 7/8/10
168	Reacquire/Dig Anomalies	84 days	Tue 6/22/10	Fri 10/15/10
169	MEC Disposal	5 days	Mon 10/18/10	Fri 10/22/10
170	Task 4h Complete	0 days	Fri 10/22/10	Fri 10/22/10
171	**Task 5 Remedial Investigation Report**	**120 days**	**Thu 6/9/11**	**Wed 11/23/11**
172	Prepare Draft RI Report with GIS on CD	6 wks	Thu 6/9/11	Wed 7/20/11

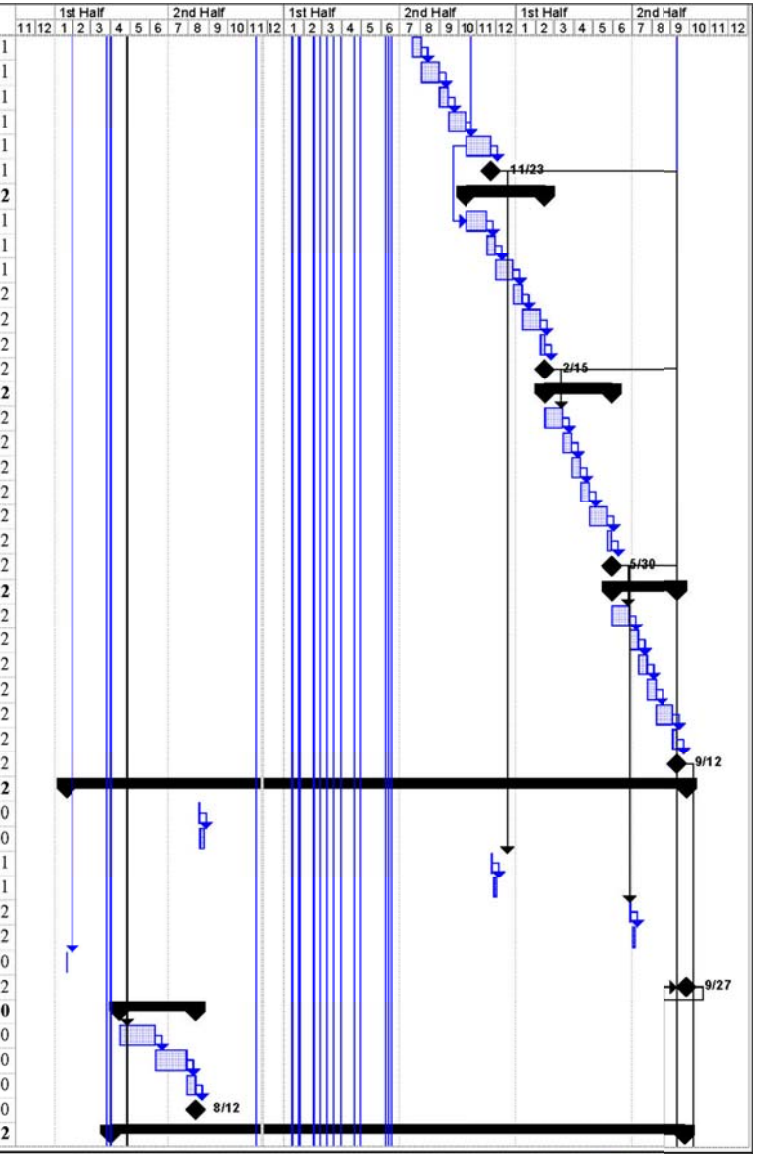


Project: Martha's Vineyard Proposed S
Date: Tue 11/23/10

Task | Progress | Summary | External Tasks | Deadline
Split | Milestone | Project Summary | External Milestone

Page 4

ID	Task Name	Duration	Start	Finish
173	USACE Review	2 wks	Thu 7/21/11	Wed 8/3/11
174	Prepare Draft Final RI Report	4 wks	Thu 8/4/11	Wed 8/31/11
175	USACE Back Check	2 wks	Thu 9/1/11	Wed 9/14/11
176	Regulator Review	4 wks	Thu 9/15/11	Wed 10/12/11
177	Prepare Final RI Report	6 wks	Thu 10/13/11	Wed 11/23/11
178	RI Report Complete	0 days	Wed 11/23/11	Wed 11/23/11
179	**Task 6 Feasibility Study Report**	**90 days**	**Thu 10/13/11**	**Wed 2/15/12**
180	Prepare Draft FS Report	5 wks	Thu 10/13/11	Wed 11/16/11
181	USACE Review	2 wks	Thu 11/17/11	Wed 11/30/11
182	Prepare Draft Final FS Report	4 wks	Thu 12/1/11	Wed 12/28/11
183	USACE Back Check	2 wks	Thu 12/29/11	Wed 1/11/12
184	Regulator Review	4 wks	Thu 1/12/12	Wed 2/8/12
185	Prepare Final FS Report	1 wk	Thu 2/9/12	Wed 2/15/12
186	FS Report Complete	0 days	Wed 2/15/12	Wed 2/15/12
187	**Task 7 Proposed Plan**	**75 days**	**Thu 2/16/12**	**Wed 5/30/12**
188	Prepare Draft Proposed Plan	4 wks	Thu 2/16/12	Wed 3/14/12
189	USACE Review	2 wks	Thu 3/15/12	Wed 3/28/12
190	Prepare Draft Final Proposed Plan	2 wks	Thu 3/29/12	Wed 4/11/12
191	USACE Back Check	2 wks	Thu 4/12/12	Wed 4/25/12
192	Regulator Review	4 wks	Thu 4/26/12	Wed 5/23/12
193	Prepare Final Proposed Plan	1 wk	Thu 5/24/12	Wed 5/30/12
194	Proposed Plan Complete	0 days	Wed 5/30/12	Wed 5/30/12
195	**Task 8 Decision Document**	**75 days**	**Thu 5/31/12**	**Wed 9/12/12**
196	Prepare Draft Decision Document	4 wks	Thu 5/31/12	Wed 6/27/12
197	USACE Review	2 wks	Thu 6/28/12	Wed 7/11/12
198	Prepare Draft Final Decision Document	2 wks	Thu 7/12/12	Wed 7/25/12
199	USACE Back Check	2 wks	Thu 7/26/12	Wed 8/8/12
200	Regulator Review	4 wks	Thu 8/9/12	Wed 9/5/12
201	Prepare Final Decision Document	1 wk	Thu 9/6/12	Wed 9/12/12
202	Decision Document Complete	0 days	Wed 9/12/12	Wed 9/12/12
203	**Task 9 Community Relations Support**	**691 days**	**Thu 1/21/10**	**Thu 9/27/12**
204	Public Participation Meeting #1	2 days	Tue 8/17/10	Wed 8/18/10
205	Prepare PP Meeting #1 Transcripts	1 wk	Thu 8/19/10	Wed 8/25/10
206	Public Participation Meeting #2	2 days	Thu 11/24/11	Fri 11/25/11
207	Prepare PP Meeting #2 Transcripts	1 wk	Mon 11/28/11	Fri 12/2/11
208	Public Participation Meeting #3	2 days	Thu 6/28/12	Fri 6/29/12
209	Prepare PP Meeting #3 Transcripts	1 wk	Mon 7/2/12	Fri 7/6/12
210	Maintain Website	1 day	Thu 1/21/10	Thu 1/21/10
211	Community Relations Complete	0 days	Thu 9/27/12	Thu 9/27/12
212	**Task 10 Public Involvement Plan**	**85 days**	**Fri 4/16/10**	**Thu 8/12/10**
213	Prepare Draft Public Involvement Plan	8 wks	Fri 4/16/10	Thu 6/10/10
214	USACE Review	7 wks	Fri 6/11/10	Thu 7/29/10
215	Prepare Final Public Involvement Plan	2 wks	Fri 7/30/10	Thu 8/12/10
216	Public Involvement Plan Complete	0 days	Thu 8/12/10	Thu 8/12/10
217	**Task 11 Administrative Record**	**637 days**	**Fri 4/2/10**	**Mon 9/24/12**

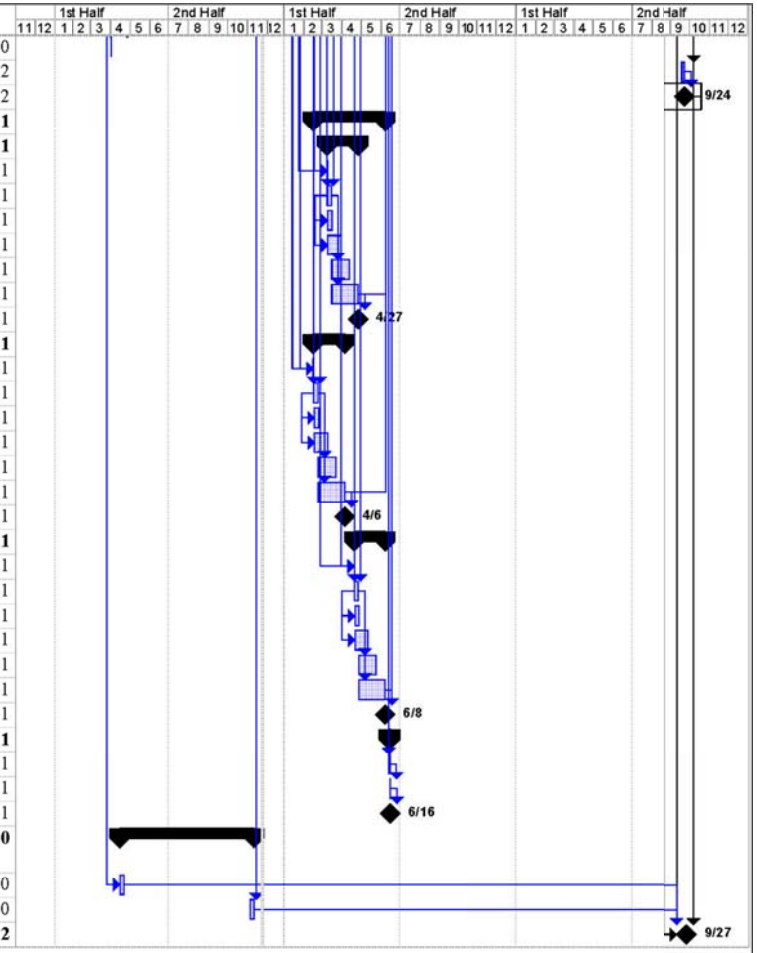


Project: Martha's Vineyard Proposed S
Date: Tue 11/23/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Page 5

ID	Task Name	Duration	Start	Finish
218	Maintain Administrative Record	1 day	Fri 4/2/10	Fri 4/2/10
219	Prepare Final Administrative Record	3 days	Thu 9/20/12	Mon 9/24/12
220	Administrative Record Complete	0 days	Mon 9/24/12	Mon 9/24/12
221	**Task 12 Environmental Sampling & Analysis**	**81 days**	**Wed 2/16/11**	**Wed 6/8/11**
222	**Task 12a Cape Poge**	**35 days**	**Thu 3/10/11**	**Wed 4/27/11**
223	Pre/Post BIP Sampling	1 day	Thu 3/10/11	Thu 3/10/11
224	Sample Collection/Prep/Ship	1 wk	Thu 3/10/11	Wed 3/16/11
225	Daily QC for Sampling	1 wk	Fri 3/11/11	Thu 3/17/11
226	Laboratory Analysis	3 wks	Fri 3/11/11	Thu 3/31/11
227	Analytical Q/A Submittal	1 mon	Thu 3/17/11	Wed 4/13/11
228	Electronic Laboratoty Data Deliverables	6 wks	Thu 3/17/11	Wed 4/27/11
229	Task 12a Complete	0 days	Wed 4/27/11	Wed 4/27/11
230	**Task 12b South Beach**	**36 days**	**Wed 2/16/11**	**Wed 4/6/11**
231	Pre/Post BIP Sampling	1 day	Wed 2/16/11	Wed 2/16/11
232	Sample Collection/Prep/Ship	1 wk	Thu 2/17/11	Wed 2/23/11
233	Daily QC for Sampling	1 wk	Fri 2/18/11	Thu 2/24/11
234	Laboratory Analysis	3 wks	Fri 2/18/11	Thu 3/10/11
235	Analytical Q/A Submittal	1 mon	Thu 2/24/11	Wed 3/23/11
236	Electronic Laboratoty Data Deliverables	6 wks	Thu 2/24/11	Wed 4/6/11
237	Task 12 b Complete	0 days	Wed 4/6/11	Wed 4/6/11
238	**Task 12c Tisbury Great Pond**	**35 days**	**Thu 4/21/11**	**Wed 6/8/11**
239	Pre/Post BIP Sampling	1 day	Thu 4/21/11	Thu 4/21/11
240	Sample Collection	1 wk	Thu 4/21/11	Wed 4/27/11
241	Daily QC for Sampling	1 wk	Fri 4/22/11	Thu 4/28/11
242	Laboratory Analysis	3 wks	Fri 4/22/11	Thu 5/12/11
243	Analytical Q/A Submittal	1 mon	Thu 4/28/11	Wed 5/25/11
244	Electronic Laboratoty Data Deliverables	6 wks	Thu 4/28/11	Wed 6/8/11
245	Task 12 c Complete	0 days	Wed 6/8/11	Wed 6/8/11
246	**Task 13 Employee Awareness Training**	**3 days**	**Tue 6/14/11**	**Thu 6/16/11**
247	Employee Awareness Field Training	2 days	Tue 6/14/11	Wed 6/15/11
248	Optional Training Video	1 day	Thu 6/16/11	Thu 6/16/11
249	Employee Awareness Training Complete	0 days	Thu 6/16/11	Thu 6/16/11
250	**Task 14 Optional Environmental and Cultural Compliance Support**	**150 days**	**Fri 4/16/10**	**Thu 11/11/10**
251	Trip 1	1 wk	Fri 4/16/10	Thu 4/22/10
252	Trip 2	1 wk	Fri 11/5/10	Thu 11/11/10
253	**Project Completed**	**0 days**	**Thu 9/27/12**	**Thu 9/27/12**



Project: Martha's Vineyard Proposed S
Date: Tue 11/23/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External Milestone | Deadline

Page 6

This Page Intentionally Left Blank

3. FIELD INVESTIGATION PLAN

3.1. OVERALL APPROACH TO MUNITIONS RESPONSE ACTIVITIES

3.1.1. Site Characterization Goals

3.1.1.1. Collect sufficient geophysical, visual, and analytical data to adequately characterize nature and extent of MEC and MC in order to determine future response actions at each MRS, and

3.1.1.2. Eliminate from further consideration those releases that pose no significant threat to public health or the environment.

3.1.2. Project Data Quality Objectives

3.1.2.1. The Data Quality Objective (DQO) process is a series of logical steps that are used to establish performance and acceptance criteria, which serve as the basis for designing a plan for collecting data of sufficient quality and quantity to support the goals of the study (EPA, 2000). The DQO process for this RI Work Plan consists of seven iterative steps that are documented below.

3.1.2.1.1. **Step 1: State the Problem.** Each MRS has a potential to contain MEC, and therefore, occupational, recreational, and residential receptors may potentially encounter MEC contamination.

3.1.2.1.2. **Step 2: Identify the Goal of the Study.** The goal of the geophysical and anomaly investigations is to determine nature and extent of MEC and MD.

3.1.2.1.3. **Step 3: Identify Information Inputs.** Both Digital Geophysical Mapping (DGM) and Analog Geophysical Mapping (AGM) methods will be used to identify anomalies at and below the ground surface. This information will be used to determine the nature and extent of MEC in each MRS.

3.1.2.1.4. **Step 4: Define the Boundaries of the Study.** The spatial boundaries of the current investigation areas are shown in **Figure 1-2**.

3.1.2.1.5. **Step 5: Develop the Geophysical Approach.** The survey will be conducted using a two-phase approach. The first phase includes using geophysical recon surveys to determine aerial extent of the MEC or MD. The second phase includes using geophysical and intrusive methods to characterize the nature of MEC and MD.

3.1.2.1.6. **Step 6: Specify Performance or Acceptance Criteria.** Performance and acceptance criteria of the geophysical survey data will follow the QC procedures outlined in Sections 3.3 and 4.0.

3.1.2.1.7. **Step 7: Develop a Plan for Obtaining Data.** The Geophysical Investigation Plan is detailed in Section 3.3 of this RI Work Plan. The Geophysical Investigation Plan summarizes procedures for both DGM and AGM data collection, identifies project specific constraints, and provides a rationale for the transect placement and coverage that will meet the project DQOs.

3.1.2.2. The DQO process outlined above is specific to MEC potentially located within each MRS. Due to the amount of information within Section 3.0, the DQO Process for the MC sampling is included in the Uniform Federal Policy-Quality Assurance Project Plan (UFP-QAPP), an attachment to the MC Sampling and Analysis Plan (SAP), located in Appendix E.

3.1.2.3. The MC investigation for the Former Cape Poge Little Neck Bomb Target MRS, the Former Moving Target Machine Gun Range at South Beach MRS, and the Tisbury Great Pond MRS will be conducted after the geophysical and intrusive investigations are completed and reviewed by the Project Team. Details such as sample locations, depths, and numbers will be provided to the Project Team as a supplement to the MC Sampling and Analysis Plan (Appendix E) prior to sample collection.

3.1.3. Data Incorporation into the RI/FS

3.1.3.1. Data collected from each MRS during previous investigations discussed in Section 1.6, additional historical record information, current discoveries of MEC or MD on Martha's Vineyard not related to the RI, ESTCP demonstration data, and RI data will be incorporated into the RI Report to develop a detailed CSM for each MRS. An initial CSM for each MRS has been included in this Work Plan in Section 1.7.

3.1.4. MEC Exposure Analysis

3.1.4.1. **Figures 1-7, 1-8**, and **1-9** illustrate MEC exposure pathways and receptors for Former Cape Poge Little Neck Bomb Target MRS, Former Moving Target Machine Gun Range at South Beach MRS, and Tisbury Great Pond MRS, respectively. Currently, potential for MEC exposure to the public exists at each MRS.

3.1.4.2. At the completion of the RI, a MEC Hazard Assessment (HA) will be conducted in accordance with the Interim MEC HA Methodology (U.S. EPA 2008) to evaluate the explosive hazards at each MRS. The following types of information (input factors) will be collected during the RI in order to adequately perform the MEC HA that will be presented in the RI Report:

3.1.4.2.1. Energetic Material Type,

3.1.4.2.2. Location of Additional Human Receptor,

3.1.4.2.3. Site Accessibility,

3.1.4.2.4. Potential Contact Hours,

3.1.4.2.5. Amount of MEC Minimum MEC Depth Relative to the Maximum Receptor Intrusive Depth,

3.1.4.2.6. Migration Potential,

3.1.4.2.7. MEC Classification, and

3.1.4.2.8. MEC Size.

3.1.5. MC Investigation Planning

3.1.5.1. The objective of the MC investigation is to determine the nature and extent of chemical constituents of potential concern at each MRS. The MC investigation will include sampling of soil, sediment, surface water, and groundwater following the sampling decision logic presented in Appendix E. In order to adequately develop DQOs for MC, sample locations and specific analytes related to the munitions identified during the geophysical and anomaly investigations will be determined based on previous investigations. MC sampling rationale is included in Appendix E. Appendix E, the MC SAP, includes the MC Field Sample Plan and the UFP-QAPP to cover the MC investigation information.

3.1.5.2. This RI follows the CERCLA process and NCP with State laws/regulations as ARARs. Under FUDS, risk assessments will be conducted using risk-based remediation goals to determine if unacceptable risks exist. A screening level Human Health Risk Assessment (HHRA) and a screening level Ecological Risk Assessment was conducted for the Tisbury Great Pond MRS as reported in the Final Site Inspection Report by Alion (September 2008). However, screening level risk assessments have not been conducted at the former Cape Poge Little Neck Bomb Target MRS or the fomer Moving Target Machine Gun Range at South Beach MRS. Therefore, the MC soil, sediment, surface water, and groundwater (if required) results will be used to conduct both a screening level HH and ERA. The human health and ecological screening criteria for soil, sediment, surface water, and groundwater to be used for this project are presented in Worksheet # 15 of the UFP-QAPP in Appendix E. If any of the constituents exceed the applicable regulatory criterion, they will be further evaluated in a baseline HHRA following the United States Environmental Protection Agency (USEPA) risk assessment guidance (USEPA, 1989) and ERA in accordance with current guidance including the 2001 EPA Supplemental Guidance to RAGS, Region 4 Bulletins, Ecological Risk Assessment (USEPA, 2001).The results of the risk assessments will be documented in the RI Report.

3.1.6. Use of Time Critical Removal Actions (TCRA) during the RI

3.1.6.1. During the course of the RI, the geophysical and anomaly investigation data will be provided by UXB to the CENAE PM and the USAESCH PM on a regular basis. The CENAE PM and/or USAESCH PM may decide a TCRA is necessary to protect human health and the environment, based on the findings of the RI. If that is the case, they will initiate that action under the CERCLA process.

3.1.7. Follow-on Activities

3.1.7.1. Follow-on activities at any of the MRSs investigated during the RI will be discussed in the FS. The FS will be included with the RI Report.

3.2. IDENTIFICATION OF AREAS OF CONCERN

3.2.1. Between 1943 and 1944, the Department of the Navy acquired the leases to the properties of the former ranges at Cape Poge Little Neck, South Beach, and Tisbury Great Pond. The sites were used to provide training for the 1st Naval District, whose flight operations were based at Naval Air Station Quonset Point, Rhode Island, and the Naval Auxiliary Air Station Martha's Vineyard located on Martha's Vineyard, Massachusetts. The leases for Cape Poge were held until 1945, and the leases for Little Neck, South Beach and Tisbury Great Pond were held until 1947.

3.2.2. For this investigation the following definitions will be used to describe the land and water environments:

3.2.2.1. Beach – Beach is defined as the land adjacent to either marine or fresh water;

3.2.2.2. Land – Land is defined as the land excluding beach and dunes;

3.2.2.3. Inland Water – Inland Water is defined as protected marine or fresh water environments, such as coves or ponds; and,

3.2.2.4. Ocean – Ocean will be defined as those waters directly associated with the Atlantic Ocean, Vineyard Sound or Nantucket Sound.

3.2.3. Former Cape Poge Little Neck Bomb Target MRS

3.2.3.1. The Former Cape Poge Little Neck Bomb Target MRS is comprised of approximately 800 acres. It includes the former Little Neck Bomb Target Range, (83 acres) and a small northern portion of the former Cape Poge Beach Calibration Range. The former Little Neck Bomb Target Range was used for aerial bombing practice.

3.2.3.2. Military practice ordnance used at the Little Neck Bomb Target range included:

3.2.3.2.1. MK 4 mods 3&4 signal practice bomb

3.2.3.2.2. MK 5 3 lb practice bomb

3.2.3.2.3. AN-MK 5 mod 1 practice bomb

3.2.3.2.4. MK 6 mod 0 signal practice bomb

3.2.3.2.5. MK 15 100 lb practice bomb

3.2.3.2.6. AN MK 23 3 lb practice bomb

3.2.3.2.7. MK26 & AN-MK26 parachute flare

3.2.3.2.8. AN MK 43 practice bomb

3.2.3.2.9. M26 & AN MK26 aircraft parachute flare

3.2.3.2.10. Practice bombs and related scrap have been observed on the property.

3.2.3.3. The areas within the MRS to be investigated include 153 acres of land, 83 acres of beach, 500 acres of inland water, and 64 acres of ocean.

3.2.4. Former Moving Target Machine Gun Range at South Beach MRS

3.2.4.1. The Former Moving Target Machine Gun Range at South Beach MRS consists of approximately 478 acres.

3.2.4.2. Military ordnance used at the Former Moving Target Machine Gun Range at South Beach included:

3.2.4.2.1. 0.30 caliber ammunition (at the Moving Target Machine Gun Range)

3.2.4.2.2. 0.50 caliber ammunition (at the Moving Target Machine Gun Range)

3.2.4.2.3. MK 1 rocket (at the Katama Rocket Range)

3.2.4.2.4. 2.25 to 6 inch rockets w/warheads (at the Katama Rocket Range)

3.2.4.3. Bombs, bomb fragments, and rockets with warheads have been observed on the property. Two 100 – lb HE bombs have been discovered on the Former Moving Target Range at at South Beach MRS at Wasque Point. The determination that they were HE filled was made by Navy EOD personnel after the demolition. The HE bombs appear to have been washed up on shore from another location and do not necessarily represent items used at the site.

3.2.4.4. The areas within the MRS to be investigated include 19 acres of land, 183 acres of beach, 103 acres of inland water, and 173 acres of ocean.

3.2.5. Tisbury Great Pond MRS

3.2.5.1. The Tisbury Great Pond MRS consists of approximately 760 acres. Military ordnance used at the former Tisbury Great Pond Range included: 0.30 and 0.50

caliber ammunition, MK 5, MK15, MK 21, MK 23, MK 43, and general purpose 300-lb bomb bodies which were not loaded with high explosives. Practice bombs and bomb fragments have been observed on the property.

3.2.5.2. The areas within the MRS to be investigated include 138 acres of land, 62 acres of beach, 508 acres of inland water, and 52 acres of ocean.

3.3. GEOPHYSICAL INVESTIGATION PLAN

3.3.1. The objective of the geophysical investigation is to delineate the nature and extent of surface and subsurface metal by measuring variations (anomalies) in local magnetic (Mag) and electromagnetic (EM) fields. The geophysical survey will be conducted in two phases. The first phase objective will be to delineate the spatial extent of geophysical anomalies. This objective will be realized through the acquisition of geophysical data along linear, recon transects crossing each of the MRSs. Recon transects may be supplemented with an airborne magnetometry survey; the airborne magenetometry survey work plan will be added as an addendum to this RI work plan once funding and contract are in place to perform the work. The second phase objective will be to characterize the nature of the source of geophysical anomalies. This objective will be realized by either Digital Geophysical Mapping (DGM) over two-dimensional "grids" and intrusively investigating all geophysical anomalies that meet or exceed selection criteria for MEC identified within the grid boundaries, or reacquiring and intrusively investigating geophysical anomalies located along the transects installed under Phase I.

3.3.2. Geophysical investigations will be completed at each of the three MRSs included in this RI Work Plan. Although the specific geophysical design parameters are different for each MRS, the overall approach is the same. The scope of the geophysical investigations at each of the MRSs is summarized in **Figures 3-1, 3-2,** and **3-3.**

3.3.3. The geophysical surveys for the Martha's Vineyard MRSs were designed using two computer software geophysical design applications: Visual Sample Plan" (VSP) and "UXO Estimator." VSP was the principal design application with "UXO Estimator" being used as an auxiliary application to ensure that the VSP design would ensure at least a 95 percent confidence of detecting an area of increased geophysical anomalies. Input parameters for VSP were developed using information from the SI and aerial photography. Input parameters to VSP included estimates of the lateral size and aspect-ratio of all anticipated high-density geophysical anomaly areas as well as estimates of the number of geophysical anomalies expected at "background" levels and the statistical characteristics of the "target areas" specifically probability type (usually bivariate normal population distributions) and peak or average target

anomaly densities. These input parameters were estimated separately for each MRS. This approach was adopted for the geophysical design so that variations in conceptual site models applicable to each MRS would be accurately represented in the design and would ensure that at least a 95 percent confidence of detection would be reached. **Figures 3-1, 3-2,** and **3-3** show the placement of analog and DGM recon transects for each of the three MRSs. Follow-up DGM grids and/or additional transects will be located based on results from the recon transect data.

3.3.4. Geophysical Investigation Transect Layouts: Former Cape Poge Little Neck Bomb Target MRS

3.3.4.1. Each MRS has been subdivided into subarea types according to sub-area geomorphology. The four subareas are: "Land," "Beach," "Inland Water," and "Ocean." The geophysical investigation is designed such that the type of geophysical methods and instrumentation proposed is appropriately matched to the unique character of the sub-area. For instance, linear and (roughly) parallel analog transects will be completed in land and ocean areas, where-as beach and inland water areas will be investigated using digital EM methods and instrumentation. The analog transect survey spacing will be approximately 100 meters except along the beach areas, where the transect spacing will be determined according to the degree of beach erosion or accretion.

3.3.4.2. DGM grids will be surveyed within the MRS boundary as a follow-up activity to the analog transects. The DGM survey objective is to characterize the nature of MEC contamination, if any, based on "judgment-sampling" location of the grids as biased according to the findings from the analog transects. The grids will either be rectangular or square in shape to facilitate data collection and mapping, with the size of the grid based on relative anomaly density (low density – larger grid size; high density, smaller grid size).

3.3.4.3. **Figure 3-1** presents the locations of all geophysical investigation transects in both graphical and tabular formats. Grid acreage is presented in tabular format only. Grid placement will be finalized based on geophysical transect results.

3.3.5. Geophysical Investigation Transect Layouts: Former Moving Target Machine Gun Range Site at South Beach MRS

3.3.5.1. As for the Former Cape Poge Little Neck Bomb Target MRS, the South Beach analog transect survey spacing will be approximately 100 meters except along beach areas where the transect spacing will be determined according to the degree of beach erosion or accretion.

3.3.5.2. DGM grids will be as described in Section 3.3.4.2 above.

3.3.5.3. **Figure 3-2** presents the locations of all geophysical investigation transects in both graphical and tabular formats. Grid acreage is presented in tabular format only. Grid placement will be finalized based on geophysical transect results.

3.3.6. Geophysical Investigation Transect Layouts: Tisbury Great Pond MRS

3.3.6.1. As for the Former Cape Poge Little Neck Bomb Target and South Beach MRSs, the Tisbury Great Pond analog transect survey spacing will be approximately 100 meters except along beach areas where the transect spacing will be determined according to the degree of beach erosion or accretion.

3.3.6.2. DGM grids will be as described in Section 3.3.4.2 above.

3.3.6.3. **Figure 3-3** presents the locations of all geophysical investigation transects in both graphical and tabular formats. Grid acreage is presented in tabular format only. Grid placement will be finalized based on geophysical transect results.

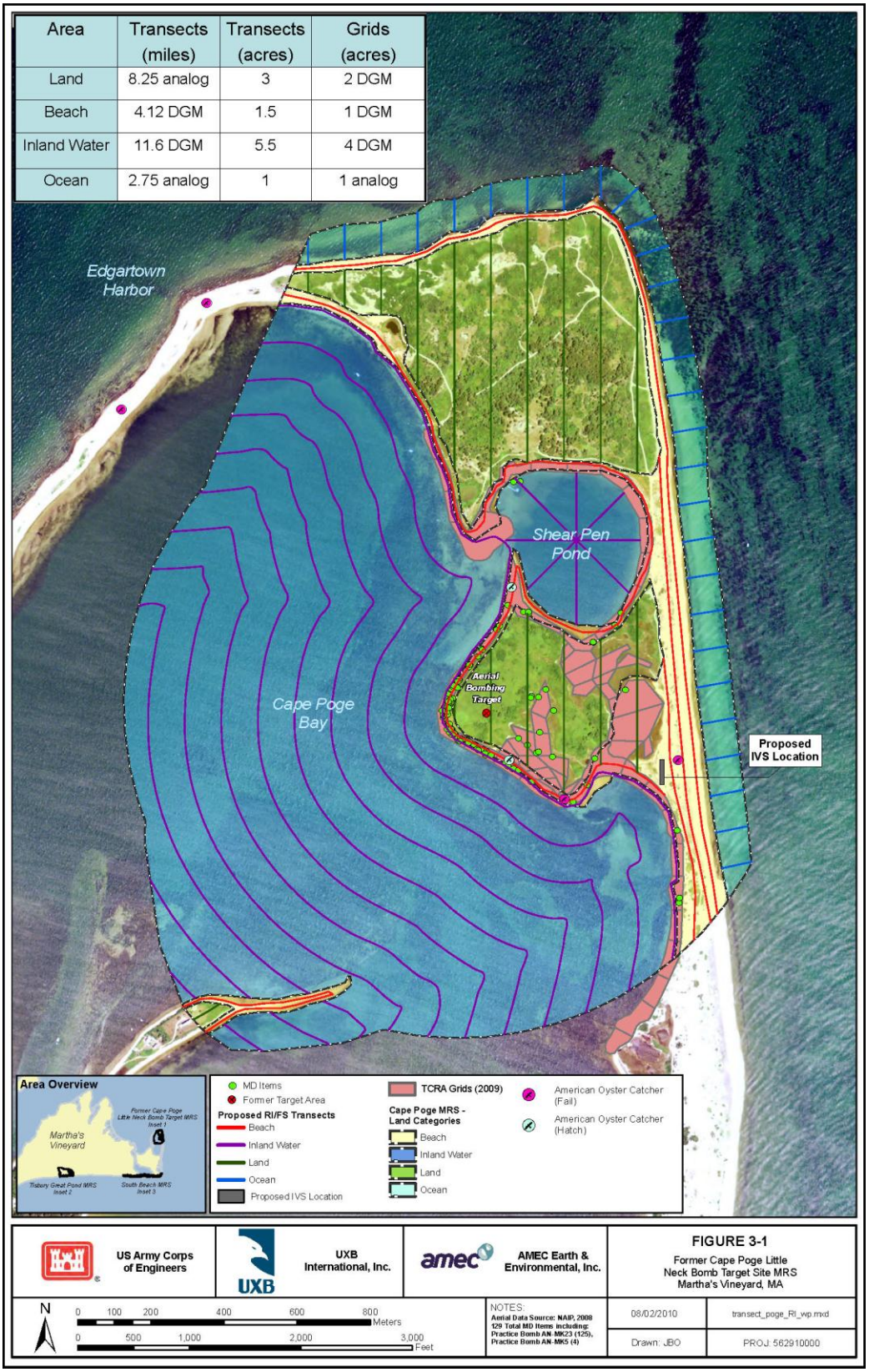
3.3.7. Geophysical Data Quality Objectives

3.3.7.1. Geophysical Data Quality Objectives (DQOs) were developed for this RI Work Plan to clarify study objectives, define the type of data needed, and specify the tolerable levels of potential decision errors.

3.3.7.2. A DQO is used as the basis for establishing the type, quality, and quantity of data needed to support the decisions that will be made (EM 1110-1-4009). For this Geophysical Investigation Plan, Geophysical DQOs have been developed for each of the MRSs so that their unique characterization requirements will be specifically and completely addressed. Because DQOs are specific statements about all significant aspects and phases of geophysical investigation, a simple list of all-encompassing DQOs that might be applied to all the Martha's Vineyard MRSs is impractical. In this Geophysical Investigation Plan, each section to follow will include a specific Geophysical DQO statement that applies specifically to the topic at hand.

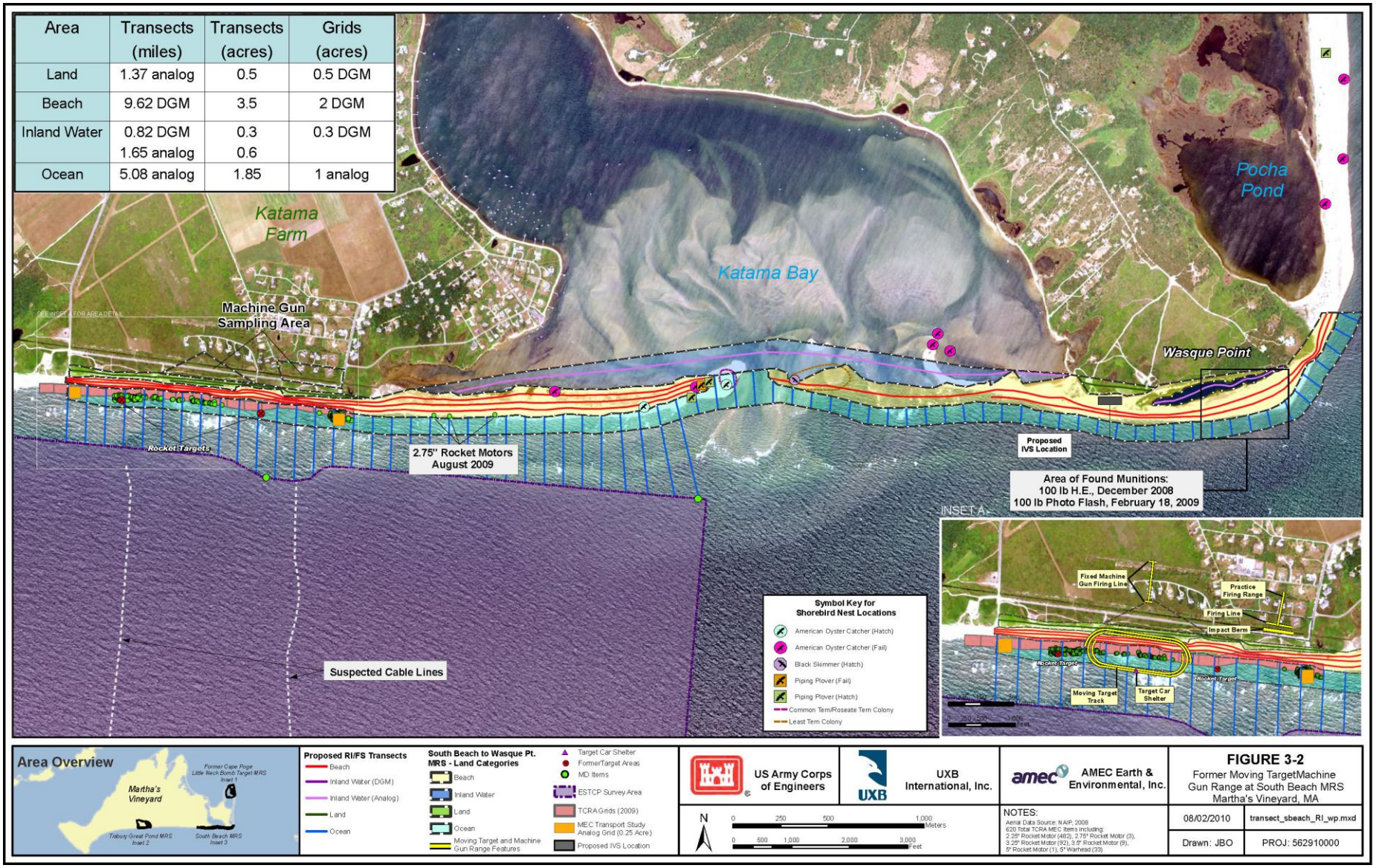
3.3.7.3. Some general Geophysical DQOs can be identified "up front," or more specifically, at all Martha's Vineyard MRSs where geophysical investigation is proposed:

Figure 3-1: Former Cape Poge Little Neck Bomb Target Site MRS



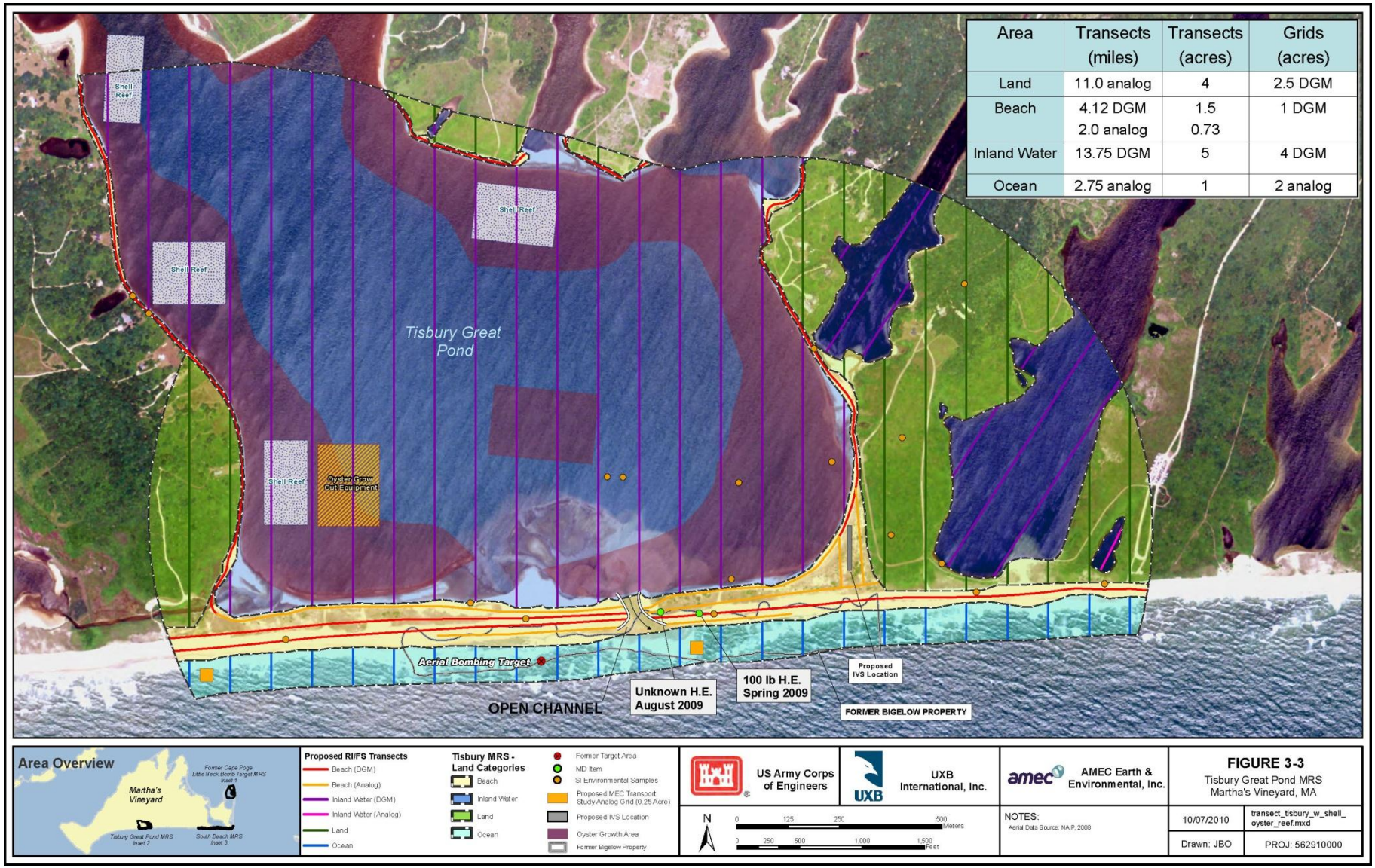
Area	Transects (miles)	Transects (acres)	Grids (acres)
Land	8.25 analog	3	2 DGM
Beach	4.12 DGM	1.5	1 DGM
Inland Water	11.6 DGM	5.5	4 DGM
Ocean	2.75 analog	1	1 analog

Figure 3-2: Former Moving Target Machine Gun Range at South Beach MRS



Area	Transects (miles)	Transects (acres)	Grids (acres)
Land	1.37 analog	0.5	0.5 DGM
Beach	9.62 DGM	3.5	2 DGM
Inland Water	0.82 DGM 1.65 analog	0.3 0.6	0.3 DGM
Ocean	5.08 analog	1.85	1 analog

Figure 3-3: Tisbury Great Pond MRS



3.3.7.3.1. The first of two principal RI objectives is the spatial delineation of the extent of MEC at the site (laterally and as a function of depth). The DQO associated with this key RI objective is that the MEC "footprint" be adequately defined, such that a sufficiently accurate boundary of MEC contamination can be discerned. This generally requires that geophysical data (analog or digital) is collected along recon transects that cross the MRS in order to identify variations in MEC density. The DQO for this is a quantitative statement (MRS specific) that is based upon historical records accounting of potential MEC present, their type, size, likely distribution (e.g. firing fan pattern), source loading history (i.e. duration and intensity of MEC related activities), etc. An example of an appropriate DQO to specify the tolerable levels of potential decision errors associated with delineating the MEC footprint might be to specify how many transect must cross the actual high-density anomaly areas in order for the areas boundary to be adequately defined.

3.3.7.3.2. The second of the two principal objectives is the characterization of the nature of the MEC. This is accomplished through a phased approach of acquiring geophysical data, processing it, interpreting it, developing a "Dig Sheet" and intrusively investigating and resolving the source of any geophysical anomalies identified. Again, the DQO associated with this principal RI objective is that the MEC present be uniquely identified as to type, disposition, condition, orientation, etc. This generally requires that digital geophysical mapping be conducted over pre-determined areal "grids" commonly sized at 100 feet by 100 feet square although the grids can be any simple geometric shape. The total acreage of areal grid coverage is dependent upon the MRS total acreage. An example of a DQO for this objective would be that the total geophysical acreage surveyed be between 0.75 and 1.5 percent of the total MRS acreage for a statistically valid survey to result (EM 1110-1-4009). The Digital Geophysical Map (DGM) produced for each grid presents, in graphical form, the location and signal intensity of all anomalous measurements. In order to identify variations in MEC density, the DQOs for this objective are quantitative statements also derived from the historical records accounting of potential MEC present, their type, size, likely distribution (e.g. firing fan pattern), source loading history (i.e. duration and intensity of MEC related activities), etc. An example of an appropriate DQO to specify the tolerable levels of potential decision errors associated with delineating the nature of the MEC items might be to specify how many anomalies in any one grid will be intrusively investigated and what the specific decision criteria will be

to determine this ratio of digs per acre. This is MRS specific. These geophysical DQOs will be called out in the appropriate sections to follow.

3.3.8. Geophysical System Verification

3.3.8.1. The initial phase of the investigation to locate MEC as well as non-MEC metallic items in the subsurface will be the verification of the proposed geophysical system using the Geophysical System Verification (GSV) process. The GSV process is two-fold:

3.3.8.1.1. **Instrument Verification Strip (IVS):** The objective is to verify that the geophysical detection system is operating properly. The IVS will contain a handful of Industry Standard Objects (ISOs), inert simulants representing munitions used at the sites and/or actual inert items reccoverd durint the TCRA to facilitate comparison of responses in the collected data with both historical measurements and physics-based model predictions.

3.3.8.1.2. **Blind Seeding Program:** The grids for intrusive investigation will be seeded with inert items as described in Section 3.3.8.1 at surveyed locations that are blind to the data collection and processing teams. The objective of the seed program is to provide ongoing monitoring of the quality of the geophysical data collection and target selection process as it is performed in the production survey throughout the project. The blind seeds will be numerous enough to be encountered on a daily basis, selected as potential targets and their responses consistent with both historical measurements and physics-based model predictions. All blind seed items will be uniquely marked/numbered for easy identification and tracking. Blind seeding will not be performed on any transects.

3.3.8.1.3. **Industry Standard Objects (ISO):** The ISO (see **Figure 3-4**) to be used in the IVS are 1 inch (2.54 cm) by 4 inches (10.16 cm) steel pipes (part number 44615K466) from the McMaster-Carr on-line catalog (http://www.mcmaster.com/):

3.3.8.1.3.1. Shape: Straight nipple, threaded both ends

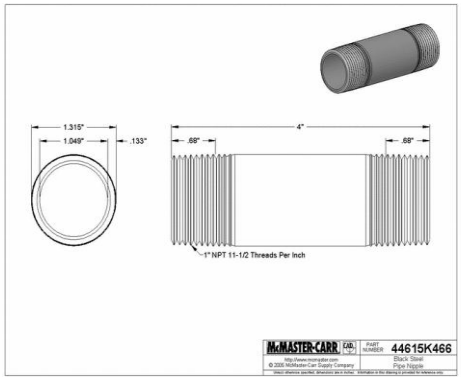
3.3.8.1.3.2. Schedule: 40

3.3.8.1.3.3. Pipe Size: 1 inch (1.315-inch outer diameter)

3.3.8.1.3.4. Length: 4 inches

3.3.8.1.3.5. Finish: Black welded steel

Figure 3-4: Industry Standard Object



3.3.8.2. Land-Based IVS

3.3.8.2.1. Testing in the IVS area will demonstrate the ability of the system to achieve the specific DQOs outlined in the following sections. The system will not be used for site surveys until it is able to meet the DQOs or until the project team agrees on reasoning behind a DQO not being met and an appropriate revised geophysical DQO is prepared. The same system and equipment that will be used to collect the geophysical site data will be deployed over the IVS.

3.3.8.2.2. The land-based geophysical IVS process is outlined in the following steps.

3.3.8.2.2.1. The IVS will be placed in a convenient location found to be relatively clear of subsurface metal and will provide for daily calibration tests. **Figures 3-1, 3-2,** and **3-3** show preliminary estimates of the land-based IVS locations. If the preliminary locations are found unsuitable for any reason, an alternative location will be proposed and the IVS will be set appropriately.

3.3.8.2.2.2. Site Preparation and Limited Metal Debris Removal: If necessary, vegetation will be cleared from the IVS area to the same extent as anticipated for the field areas. The actual location of the test line will be checked using an EM61-MK2 prior to the burial of any seed items to ensure that other metallic contaminants are not present. In order to reduce the level of interference of non-munitions related metal debris during the geophysical investigation, removal of surface debris will be removed through a surface visual sweep ahead of the geophysical survey team. Metallic debris will be moved to the side of the sweep area at least six feet away to keep it from interfering with the instrument.

3.3.8.2.2.3. A “background” DGM survey will be performed with the instrumentation to be validated over the IVS. This step will allow background geophysical

conditions to be recorded, will help determine the appropriateness of the location (for example, few existing anomalies), and will verify that ISOs are not seeded near existing anomalies. The data will be post-processed and provided for evaluation.

3.3.8.2.2.4. Following verification that the IVS area is clear of subsurface anomalies (or that existing anomalies can be avoided during seeding), at least four ISOs will be buried in a vertical orientation at a depth of 6 inches to the center of the object. NAEVA personnel will bury the ISOs using shovels to dig the holes to the appropriate depths for burial. The background survey data and anomaly avoidance techniques will be used to ensure that corner stakes and ISOs are not placed on top of or near existing anomalies. Personnel will emplace ISOs and record the emplacement data (depth, orientation, and azimuth).

3.3.8.2.2.5. NAEVA will use Real-Time Kinematic (RTK) GPS equipment to record ISO locations to a horizontal accuracy of 3 cm, providing an easting and northing in NAD83 Universal Transverse Mercator (UTM) Zone 18N coordinates, meters, for the center of the targets. The location of the endpoints of the IVS will also be recorded.

3.3.8.2.2.6. A DGM survey will be performed by NAEVA over the IVS as specified in the *Geophysical System* Verification *(GSV): A Physics-Based Alternative to Geophysical Prove-Outs for Munitions Response*, July 2009. The data will be processed and interpreted by NAEVA. Data packages will be provided to UXB for evaluation.

3.3.8.2.2.7. If the initial geophysical DQOs, described in the Geophysical Investigation Plan, have not been met, NAEVA will discuss with UXB whether modifications to instrumentation or procedures can be made to the DGM system in order to meet the geophysical DQOs.

3.3.8.2.2.8. Once the surveys have been performed and the system has been found to meet the initial (or modified) geophysical DQOs, the IVS will be complete.

3.3.8.2.2.9. The Final Geophysical Report will contain documentation of all IVS field activities, data processing procedures, and results.

3.3.8.2.2.10. All geophysical activities associated with the IVS will conform to the methods and procedures outlined in the remainder of the Geophysical Investigation Plan.

3.3.8.3. Land-Based Blind Seeding

3.3.8.3.1. The blind seeding program of the production site is an integral part of the GSV process. The seeds provide an opportunity for ongoing monitoring to build confidence that all the steps leading to the product from which targets are selected are working. The failure to detect a seed target will allow the project team to recognize that problems exist and provide a means to identify root causes and undertake corrective action while still in the field.

3.3.8.3.2. Known objects will be buried at surveyed locations that are blind to the survey and data processing teams at a sufficient frequency (2 to 4 per acre) so that they can be used for daily quality checks. The purpose of the seeds is to provide ongoing verification that known objects produce signals that are expected. The seeds will be planted within the expected detectable range of the sensors, so that if there is a failure to detect any seed it will be a meaningful indication that there is a quality failure. Since it would be hard to interpret missing an item if it is not expected to be detected 100% of the time, the seeds will be placed such that they should all be detected.

3.3.8.4. Variations to the GSV for Water-Based Geophysical Investigations

3.3.8.4.1. <u>GSV Variations for Water-based IVS:</u> Testing in the water-based IVS areas will conform to the same standards as the land-based IVS areas; however, some variations are required to accommodate the unique characteristics of the ocean or inland water environments. Due to the very dynamic conditions of the ocean areas where analog geophysical investigations are proposed, no IVS will be installed for the ocean portions of the investigations. The inland water-based geophysical IVS process is outlined in the following steps.

3.3.8.4.1.1. The water-based IVS (2) will be placed in convenient inland water locations found to be relatively clear of subsurface metal and will provide for daily calibration tests. Two water-based IVS locations will be established for the three MRSs. If the preliminary locations are found unsuitable for any reason, an alternative location will be proposed and the IVS will be set appropriately.

3.3.8.4.1.2. Site Preparation and Limited Metal Debris Removal: The actual location of the test line will be checked prior to the burial of any seed items to ensure that other metallic contaminants are not present. In order to reduce the level of interference of non-munitions related metal debris during the geophysical investigation, removal of surface debris is planned.

3.3.8.4.1.3. A "background" DGM survey will be performed with the instrumentation to be validated over the IVS. This step will allow background geophysical conditions to be recorded, will help determine the appropriateness of the location (for example, few existing anomalies), and will verify that MEC simulants are not emplaced near existing anomalies. The data will be post-processed and provided for evaluation.

3.3.8.4.1.4. Following verification that the IVS area is clear of subsurface anomalies (or that existing anomalies can be avoided), at least four MEC simulants will be emplaced. The background survey data and anomaly avoidance techniques will be used to ensure that stakes and simulants are not placed on top of or near existing anomalies. Personnel will emplace simulants and record the emplacement data (depth, orientation, and azimuth).

3.3.8.4.1.5. VRH and AquaSurvey will use RTK GPS equipment to record ISO locations to a horizontal accuracy of 3 cm, providing an easting and northing in NAD83 UTM Zone 18N coordinates, meters, for the center of the targets. The location of the endpoints of the IVS will also be recorded.

3.3.8.4.1.6. A DGM survey will be performed over the IVS by VRH in cooperation with AquaSurvey. The data will be processed and interpreted by AquaSurvey. Data packages will be provided to UXB for evaluation.

3.3.8.4.1.7. If the initial geophysical DQOs, described in the Geophysical Investigation Plan, have not been met, AquaSurvey will discuss with UXB whether modifications to instrumentation or procedures can be made to the DGM system in order to meet the geophysical DQOs.

3.3.8.4.1.8. Once the surveys have been performed and the system has been found to meet the initial (or modified) geophysical DQOs, the IVS will be complete.

3.3.8.4.1.9. The Final Geophysical Report will contain documentation of all IVS field activities, data processing procedures, and results.

3.3.8.4.1.10. All geophysical activities associated with the IVS will conform to the methods and procedures outlined in the remainder of the Geophysical Investigation Plan.

3.3.8.4.2. <u>GSV Variations for Water-Based Blind Seeding:</u> Blind Seeding will not be conducted for the ocean areas as all investigation will be mag/dig transects. Blind seeding will be conducted for DGM grid investigation for inland water-based geophysical investigations as outlined in Section 3.3.8.3. .

3.3.8.5. Corrective Measures

3.3.8.5.1. Any QC failures shall be identified and the corrective action that is being taken shall be described. Out of parameter failures will be addressed by documented root cause analysis.

3.3.9. Geophysical Survey Types

3.3.9.1. The geophysical surveys designed for the three MRSs are of similar "types" which were selected and customized to meet the unique conditions of each MRS, specifically the combination of the Conceptual Site Model and the geophysical conditions at each site (described above).

3.3.9.2. The selection of geophysical methodology is the first stage of a robust geophysical survey design. At Martha's Vineyard MRSs, the objectives require the geophysical methodology to be able to detect and locate land-based surface and/or subsurface MEC and water-based bottom or sub-bottom MEC.

3.3.9.3. The key geophysical DQO for this objective is that the selected instruments be able to detect MEC containing significant quantities of iron or other metals.

3.3.9.4. Accordingly, the geophysical methodologies capable of meeting this geophysical DQO include analog (man-portable) magnetometry (to detect ferromagnetic objects), analog (man-portable) Frequency-Domain Electromagnetic (FDEM) "All-metal" Detectors, and Time-Domain Electromagnetic (EM) Digital Geophysical Mapping (DGM) (for the detection of both ferromagnetic and non-ferromagnetic metal objects).

3.3.9.5. For the Martha's Vineyard MRSs, both ferromagnetic and non-ferromagnetic MEC and/or MD may potentially be encountered. Thus, the geophysical survey designed for these MRSs include utilizing both magnetometry and electromagnetic techniques.

3.3.9.6. The instruments will be deployed along parallel transects to define the lateral extent of MEC (magnetometry for land areas, man-portable, electromagnetic for ocean areas, and boat- or man-towed electromagnetic methods for inland water areas). Rectangular or square grids will be used to characterize the aerial distribution of geophysical anomalies (electromagnetic Digital Geophysical Mapping). This will lay the groundwork for developing Dig Sheets for intrusive investigations.

3.3.9.7. Man-Made Features Potentially Affecting Geophysical Investigation

3.3.9.7.1. Man-made features can perturb local geophysical fields and degrade the quality of geophysical investigation data.

3.3.9.7.2. Above Ground Man-Made Interferences: These can be interference caused by nearby metal objects, such as utilities, sheet pile, overhead power lines, automobiles (both parked and mobile), buildings, and fences. Stray radio frequency (RF) signals can cause interference to geophysical equipment. Even seemingly innocuous items such as jewelry, pocket knives, steel toed shoes, cell phones, or metal implants in the possession of operators and personnel can have a negative effect on geophysical data collection. Above ground man-made interference features that negatively impact the positioning system for the geophysical equipment by extension will negatively impact the data. For example, metal objects such as road signs, chain link fences, metal siding on buildings, and nearby microwave sources can cause multipath disturbances to GPS positioning and cause non-negligible positioning errors.

3.3.9.7.3. Below ground man-made interferences: Buried utilities, current or abandoned infrastructure, or unknown intentionally buried or back-filled materials cause interference and is a great impediment to the geophysical detection of MEC. Some common examples on active military installations and FUDS sites are Marston matting, concertina, barbed wire, fence pickets, sheet pile, reinforced concrete rubble, abandoned corrugated metal culverts, and tactical communications wire.

3.3.9.7.4. The transect lines shown in the maps are for planning purposes only. Actual transects locations will be made in the field. Areas of man-made structures and other natural obstructions will be avoided to minimize interference.

3.3.9.8. Site-Specific Dynamic Events

3.3.9.8.1. The most common problem caused by site specific dynamic events is transient anomalies caused by movement of metal objects during and after a geophysical survey. This normally happens inadvertently, but is a predictable source of error (false positives) which can be avoided with some attention and documentation. A common example is the movement of an automobile near a geophysical instrument while it is in operation. The effects of the car show up in the data, but in a subsequent pass close or at the same location there is no anomaly in the data. The same phenomena can happen with tools, metal beverage cans, lawn furniture etc. Avoidance of transient anomalies requires attention to scheduling of various site activities. For example, surface clearance of metallic objects, or cultural debris should take place before the geophysical survey on any given part of the site. Once the geophysical survey has commenced for that part of the site, no

metallic surface objects should be removed until it is documented during the intrusive investigation phase.

3.3.10. Geophysics Field Equipment and Procedures

3.3.10.1. The geophysical surveys designed for MRSs at Martha's Vineyard will be completed, in part, using man-portable instruments; specifically, either Fluxgate magnetometers and/or water-proof man-portable Frequency-Domain Electromagnetic induction "all-metal" detectors.

3.3.10.2. **Fluxgate magnetometers** detect perturbations in the Earth's ambient magnetic field produced by the nearby presence of ferromagnetic materials. These instruments register the proximity of the item through the use of an operator-audible signal. "Fluxgate magnetometers are inexpensive, reliable, rugged, and have low energy consumption. Fluxgate magnetometers have long been a standard of Explosive Ordnance Disposal (EOD) units as a quick, inexpensive field reconnaissance tool" (EM 1110-1-4009). For the Martha's Vineyard MRS geophysical investigations, the analog fluxgate magnetometers will be appropriately-featured models produced by one of the following recognized manufacturers: Schonstedt, Foerster, Ebinger, or Vallon.

3.3.10.3. **Time-Domain Electromagnetic Transmitter-Receiver (EM) System** will be used to acquire all of the digital geophysical data for the Digital Geophysical Mapping of the grids for subsequent intrusive investigaton. EM systems detect the nearby presence of metallic objects (including, but not limited to ferromagnetic objects) by producing a "known" local electromagnetic field that induces a secondary EM field in the nearby metal object. This secondary field perturbs the known transmitted EM field, thus producing an EM "anomaly" in the return signal. EM instruments generate the known EM field via a transmitting antenna, sometimes referred to as a transmitter coil, and detect the secondarily induced perturbations via an EM receiver antenna or Receiver coil. In Time-Domain EM systems, an EM pulse is transmitted and the decay of the secondary field is measured. The decay of the secondary field is measured during four "time gates" or windows. The decay parameters are recorded for subsequent processing and interpretation. For the Martha's Vineyard geophysical investigations, the selected Digital EM All-metal detector will be Geonics, Ltd. EM61 MK II transmitter-Receiver Systems.

3.3.10.4. The EM61 MK II detects both ferrous and non-ferrous objects with excellent spatial resolution. Target response is a single, sharply defined peak, facilitating quick and accurate location. A single 200 liter (55 gal.) drum can be detected at depths greater

than 3 meters. Modification for increased power to increase both the sensitivity to smaller targets and depth of exploration is available.

3.3.10.5. Data from multiple time gates - three or four, user selectable - are recorded to provide a more complete measurement of the response decay rate for improved target characterization. Early time gates improve the detection of smaller, as well as deeper targets; a mid-range time gate, at the same position as the original EM-61, offers comparison with, and continuation of original EM-61 data sets.

3.3.10.6. Sub-Area Specific Equipment Specifications

3.3.10.6.1. For beach DGM and land-based DGM grids, NAEVA will use an EM61-MK2. The EM61 MK2 is a 1.0 x 0.5 meter coil operated on manufacturer-supplied wheels. The arrangement of coils is such that there is a vertical separation of 40 cm from the ground surface to the coil. A survey-grade Real-Time Kinematic (RTK) Global Positioning System (GPS) will be used to position the data. Survey data for the grids will be collected along lines spaced no more than 2.5 feet apart. This line spacing is appropriate for the detection of munitions of concern. Geophysical data collected using the EM61-MK2 will be recorded at a rate of 15 readings per second. The EM61-MK2 will be operated on wheels or in stretcher mode (coil mounted on fiberglass poles) with the coils oriented with the 1-meter axis perpendicular to line direction. The geophysical and positional data will be logged and stored together in one file. All geodetic coordinates will later be converted to WGS84 UTM Zone 19N coordinates during post processing. A Trimble 5700, R7, or R8 RTK GPS will be used to position all data. In areas that are not accessible with the GPS due to tree coverage, the traditional method of fiducials will be used for the data positioning. Line and fiducial methods use a procedure wherein a measuring device (for example, wheel-based, thread-feeding) determines the distance traveled along a linear line. Using this approach, a series of survey lanes are established over a grid. Flags or ropes perpendicular to the direction of travel are placed at the beginning and end of each lane, and at equal distances along the line at an average distance of 10 meters with a maximum distance of 15 meters. An operator walks down the lane while sensor readings are collected when triggered by the odometer system at a pre-defined interval (for example, every 10 cm). As the operator walks past the starting and ending points in the survey lane, the operator starts and stops the data collection. In addition the operator presses a button on the data logger that places a fiducial time mark in the data stream every time the instrument crosses a “fiducial line.” By assuming the operator walked in a straight line, the total distance recorded by the odometer

system is compared to the known distance travel, and the down-line position for each of the data points is adjusted accordingly.

3.3.10.6.2. Data will be transferred from field data loggers to a field computer to assess data quality and perform initial editing. Data will then be transferred to NAEVA's Virginia office for further processing and analysis using Geosoft's Oasis Montaj software.

3.3.10.6.3. The inland water will be investigated using a new hybrid system designed by Aqua Survey, Inc. (ASI). The ASI hybrid system combines an Aqua Survey-modified EM-61 high-powered transmitter and receiver coils with Aqua Survey underwater monitors and Geonics' EM-61 consoles and precision positioning/ tracking equipment to complete underwater transects and DGM grids. This EM Diver Sled™ was designed to be diver-propelled by a single technician. The system is tethered to topside with an electronic cable. The sled is heavy enough to track on the bottom and light enough for a diver to lift it to hover over obstructions such as coral mounds. The system can be used to provide new survey information or to reacquire targets of interest identified with a vessel-towed EM sled. The diver system can be deployed from a dive boat or from shoreline. ASI, in conjunction with VRH conducting dive support, will collect the digital EM data for the inland water areas of all three MRSs.

3.3.10.7. General Procedures

3.3.10.7.1. Analog transect data will be acquired by a UXB International (land) or VRH (water) UXO technician operating the equipment and walking along roughly parallel transects across the MRS. The team will consist of a UXO Technician II and a UXO Technician I. The technician will also employ a camera and a hand-held, WAAS-enabled Global Positioning System (GPS) receiver to capture the locations of all surface MEC or MD items, all anomalies not associated with surface items (and presumed to be causal to the presence of subsurface objects), or the location of any other forensic evidence of MEC usage such as evidence of open burn/open detonation activities. After the completion of the analog transect surveys, all collected data will be thoroughly reviewed and evaluated by the Senior Geophysicist and used to ascertain the boundaries of MEC contamination (if any) and to identify optimal locations for subsequent DGM grid surveying.

3.3.10.7.2. Land-based DGM data acquisition will be completed using a Geonics, Ltd. EM61 MK II (EM) man-towed or vehicle-towed Transmitter-Receiver System equipped with an integrated RTK-DGPS. If GPS satellite signals cannot be obtained during the land-based portions of the survey, fiducial lines will be established within the

grid and the wheel-odometer mode will be used for positioning instead. For water-based DGM, data acquisition will be completed using a modified Geonics, Ltd. EM61 MK II (EM) man-towed or boat-towed Transmitter-Receiver System. Water-based geospatial positioning data will be acquired with either RTK-DGPS on a mast (shallow water environments), or using LinkQuest, Inc. Broadband Acoustic Spread-Spectrum positioning system (BASS) (deeper water environments). Depending upon the length of the water-based EM transects or Grid dimensions, one of two LinkQuest positioning system configurations will be deployed. For lines less than approximately one-mile long LinkQuest Inc. PinPoint Long Baseline (LBL) Acoustic Positioning System will be used. For boat-towed, water-based transects of lengths greater than approximately one-mile, LinkQuest Inc. Ultra Short Baseline (USBL) BASS system may be used in place of the LBL system if it provides better quality positioning.

3.3.10.7.3. All DGM data will be processed off-site with an approximate three day turn around and the digital mapping of grids will be transmitted back to the site for use in reacquiring the target anomalies for intrusive investigation by UXB land-based UXO team or by the VRH water-based UXO dive team. The collected DGM data will be used to characterize the distribution of subsurface anomaly location and, after intrusive investigation, MEC nature, including type, depth, orientation, condition, and spatial distribution and densities. A UXO Technician II will support all DGM activities

3.3.10.7.4. Geophysical equipment will be approved upon successful completion of the Instrument Verification Process and submission and acceptance of the letter report as outlined in DID MR 005-05.01. NAEVA Geophysics, VRH, and Aqua Survey will deploy the Geonics EM61 MK II EM instrument or ASI EM Diver Sled to digitally map portions of the MRSs. Schonstedt GA 52Cx magnetometers will be used in the prove-out grid to test the effectiveness as analog detectors to be used in the areas of the MRSs that are inaccessible to the EM61 MK II or are deemed impractical for its use.

3.3.10.8. Sub-Area Specific General Procedures

3.3.10.8.1. For analog data collection, all anlog instruments and operators will undergo functionality testing at least twice per day at the IVS. The Team Leader (UXO Tech III IAW DDESB TP-18) will ensure the testing for each member of the team is conducted IAW approved project plans. The UXOQC Supervisor will monitor all testing and QC function tests and processes.

3.3.10.8.2. In the event known items are not detected, the instrument will be re-tested for functionality. If the instrument fails to function, the batteries will be replaced. If the instrument still does not function, the instrument will be tagged, taken out of service for repair, and replaced. The replacement instrument will then undergo functionality as noted above.

3.3.10.8.3. If the instrument functions properly, the team member will re-run the IVS. If the known item is still not detected, the team member will be re-trained on proper instrument operation and/or re-assigned for that shift. The team member will be retested in a subsequent shift, and upon successful testing, will be reassigned to analog instrument operations.

3.3.10.9. For beach and land-based DGM Grids, NAEVA will complete the following procedures during each work day of geophysical investigations:

3.3.10.9.1. Equipment set-up and warm-up (The EM61-MK2 will be warmed up for at least 15 minutes before use);

3.3.10.9.2. Morning Function Checks;

3.3.10.9.3. Acquire morning survey data;

3.3.10.9.4. Download morning survey data with AM function checks and lunch;

3.3.10.9.5. Change batteries as required;

3.3.10.9.6. The EM61-MK2 will be warmed up for at least 15 minutes following lunch;

3.3.10.9.7. Acquire afternoon survey data;

3.3.10.9.8. Acquire afternoon function checks;

3.3.10.9.9. Download afternoon data with PM function checks; and

3.3.10.9.10. Equipment disassembly.

3.3.10.9.11. Geophysical instruments will be field tested daily to ensure that they are operating properly. If the standard response cannot be attained, the instrument will be re-calibrated, repaired, or replaced. The following procedures will be conducted during the course of the project:

3.3.10.9.11.1. Warm-up time (a minimum of 5 minutes) each time the sensor is turned on.

3.3.10.9.11.2. Differential GPS will be checked at a known point once a day (reoccupation test) with day-to-day location offsets within +/- 4 inches (10 cm) of the known location (i.e., hub or other surveyed point).

3.3.10.9.11.3. A static background and static spike test will be conducted at the beginning and end of each day, during which readings will be collected for no less than 3 minutes. The data from the static test will be evaluated for consistency and repeatability. A standard response test will then be performed using an ISO. This response test entails the placing of the metallic item in the center of the EM61-MK2 coil. Static background data will be monitored for increases in noise levels, and the response to the known target does not exceed +/- 10 percent after background correction.

3.3.10.9.11.4. Personnel Tests will be conducted each time the sensor is assembled, typically at the beginning of the day. Response variation in the Personnel Tests will be monitored.

3.3.10.9.11.5. Cable Shake tests will be performed on each time the sensor is assembled, typically at the beginning of the day, and any time that a cable is replaced. Sensor signals will primarily be monitored for shake-induced data spikes. If data spikes are evident, a root cause analysis will be conducted by the geophysical subcontractor. Once the problem has been identified and corrected, the cable shake test will be repeated. Once the problem has been verified to have been corrected, geophysical operations may resume.

3.3.10.9.11.6. Data will be collected over the IVS test strip in multiple passes at the beginning of the project and after any equipment change. Daily a single line over the buried seed items will be collected. Sensor response amplitude variations will generally repeat and positional variations will not exceed +/- 25 cm. This data will also be used to evaluate dynamic positioning repeatability and dynamic detection repeatability.

3.3.10.9.11.7. Repeat Data. This test is performed to verify general repeatability of the data and will be performed after the initial survey over an area. At least 2 percent of the survey lines will be repeated

3.3.10.9.12. Initial evaluation of digital geophysical data will be performed in the field by the geophysical team using Geonics software for downloading and viewing of profile lines. Data will be reviewed for complete coverage and good data quality. Data will then be exported to an ASCII format to allow contouring and final processing. Once the data has been prepared and evaluated to ensure its integrity, it will be electronically transferred to NAEVA's Virginia office for final processing and function test evaluations.

3.3.10.9.13. For water-based digital transects and DGM Grids, ASI will complete the following procedures during each work day of geophysical investigations:

3.3.10.9.13.1. A morning safety/project meeting will be conducted daily.

3.3.10.9.13.2. Equipment and data collection system will be validated at one of the water-based IVSs, as appropriate.

3.3.10.9.13.3. Transects:

3.3.10.9.13.3.1. After the EM Sled has passed the IVS it will be brought to the beginning of the first transect.

3.3.10.9.13.3.2. Transects will be predetermined and programmed into EM System for positioning and tracking.

3.3.10.9.13.3.3. Transects will be conducted with a vessel towed sled or a diver pushed coil depending on water depth (<4' Diver Coil, >4' Towed Sled). Diver Coil will be diver propelled and the Towed sled will pulled behind a vessel. Both will use DGPS for navigation.

3.3.10.9.13.3.4. Grids: After the EM Diver Coil has passed the IVS it will be brought to the beginning of the grid. Grids will be predetermined and programmed into EM System for positioning and tracking.

3.3.10.9.14. Grids will be conducted with a diver pushed coil. Diver Coil will be diver propelled and will use DGPS for navigation.

3.3.10.9.15. Ocean transects will be conducted by a diver using a handheld analog magnetometer. Once dressed out the diver will conduct a function test of the Schonstedt in the Heck Housing to ensure that the tone can be heard in the helmet and the instrument is detecting a known ferrous object. The diver will enter the water with an anchor attached to a line and place the anchor perpendicular to the beach. The diver will return to the beach, retrieve the Schonstedt, conduct another function test and sweep down the guide line. If a contact is located, that contact will be excavated utilizing the airlift or water jet. If the contact is MEC it will be dealt with in accordance with the ESP. If the item is cultural debris it will be left in place. The location of the item will be noted by measuring the distance from a known point on the beach. Upon reaching the end of the sweep, the diver will retrieve the anchor and return to the beach.

3.3.11. Data Processing

3.3.11.1. Due to the ordnance items expected on site, the anomaly selection criteria will be established at or slightly above background noise levels to allow for detection of all

possible ordnance items. These values will be established on site. Upon completion of each incremental unit of data collection (be it grid, morning period, afternoon period, or the entire days' data), the first office task will be to back up the collected data, so that from that time forward, the original data will always exist in (at least) two different places, on the same or different media. The second step shall be to duplicate the data to read only media (CD-R/DVD).

3.3.11.2. Then (and only then), preliminary processing steps will start (which will be considered the first edits to the original data). These procedures shall apply to ALL electronic field-collected data including Access database updates in team hand-held data loggers. Field data manually collected using EM61 wheel-mode will go through preliminary processing in DAT61MK2 Windows as a preliminary processing step.

3.3.11.3. Once the raw data is duplicated and archived and passed through preliminary processing, standard and advanced geophysical processing will commence using Geosoft's Oasis Montaj scientific software application suite. A Geosoft Oasis Montaj Project file will be established for each of the MRSs. All digital EM data will be electronically imported into the appropriate Oasis Montaj project file and stored in an Oasis Montaj geodatabase. All EM digital data will then be processed using standard data analysis procedures and, when necessary, advanced data processing as well.

3.3.11.4. Standard Data Analysis

3.3.11.4.1. The Oasis Montaj geodatabase will contain the standard database structure of one "worksheet" for each transect, with multiple channels recorded for each of the four available EM time-gates. Additional channels will contain the geospatial locations of each set of digital EM measurements. All channels will be "leveled" to remove static offsets. Instrument drift, if any, will also be removed based on the results of the periodic static variation measurements conducted at the Instrument Verification Strip (IVS).

3.3.11.4.2. All digital transect and channel data will be examined and corrected for transient data spikes that exhibit characteristics of system or external noise rather than MEC-related signals. Once all corrections have been applied, the data will be spatially normalized such that all transects have synchronous fiducial sampling rates based upon the highest density transect. For grids and closely spaced transects (such as in beach areas), all transects will be numerically "re-sampled" to match fiducial sampling rates. For transects and grids were this is applicable, the data will be interpolated to a spatially-discritized virtual grid using a minimum-curvature gridding algorithm. The resulting gridded data will be plotted using a color-scale contouring graphical display to indicate spatial

distribution of EM signal strength. EM anomalies will be initially identified utilizing Geosoft's Oasis Montaj UX-Detect Automatic picking algorithm. Auto-picked targets will be manually spot-checked to verify the veracity of the selections and to remove duplicates or false selections. The auto-picked anomaly inventory will be expanded (if appropriate) using manual picks selected by the project senior geophysicist. All corrections and processing steps will be documented in accordance with DID MR 005-05.01.

3.3.11.5. Sub-Area Specific Standard Processing Procedures

3.3.11.5.1. For beach and land-based DGM Grids, Geosoft Oasis montaj data processing software with the UX-Detect module will be used. Geophysical data processing will include the following standard data processing procedures:

3.3.11.5.1.1. Conversion to UTM Coordinates if needed

3.3.11.5.1.2. Normalization or leveling (removal of background)

3.3.11.5.1.3. Lag corrections

3.3.11.5.1.4. Gridding of data

3.3.11.5.1.5. Digital filtering and enhancement if applicable

3.3.11.5.1.6. Selection of target picks (above the established mV threshold)

3.3.11.5.1.7. Preparation of geophysical maps and target lists

3.3.11.5.2. For water-based digital transects and DGM Grids, ASI will complete the following standard data processing procedures:

3.3.11.5.2.1. Conversion to UTM Coordinates, as necessary

3.3.11.5.2.2. Normalization or leveling (removal of background)

3.3.11.5.2.3. Lag corrections

3.3.11.5.2.4. Gridding of data (Grids only)

3.3.11.5.2.5. Selection of target picks (above the established mV threshold)

3.3.11.5.2.6. Preparation of geophysical maps and target lists

3.3.11.6. Advanced Data Processing, Digital Filtering, and Enhancement

3.3.11.6.1. Advanced processed data is defined as Final Processed data that has been subjected to additional advanced processing such as noise filtering techniques or upward or downward continuation digital signal processing enhancements. For

the Martha's Vineyard MRS geophysical investigations, advanced processing techniques will be kept to a minimum except when:

3.3.11.6.1.1. Preliminary Anomaly Target Selection is completed using Threshold Analysis and the analysis would be optimized with the application of a digital smoothing filter. One example of a smoothing filter applies a Hanning window to the gridded data so that low amplitude targets will not be picked. For example, Geosoft Oasis Montaj makes available a 9-point (3x3) Hanning smoothing filter if smoothing is required prior to auto-picking.

3.3.11.6.1.2. Where EM interference can be effectively reduced and the Signal-to-Noise Ratio improved significantly through the use of digital filtering methodologies.

3.3.11.6.2. Any advanced processing techniques that are deemed necessary will be thoroughly described, documented and recorded in the geodatabase metadata files.

3.3.12. Anomaly Selection and Decision Criteria

3.3.12.1. Analog and digital geophysical anomaly selection and decision criteria will be applied to the survey results in accordance with Section 8-6 of the U.S. Army Corps of Engineers Engineering Manual for Military Munitions Response Actions EM-1110-1-4009.

3.3.12.2. Digital (and analog) signal characteristics are used to distinguish whether the characteristic values for one measurement or a group of two or more contiguous measurements are distinguishable from other surrounding measurements (EM-1110-1-4009). Some of the relevant signal characteristics that may be used to select a preliminary set of anomalies as potential Dig Sheet targets include:

3.3.12.2.1. Relative lateral size and relative audible signal character and intensity (analog instruments only)

3.3.12.2.2. Digital anomaly peak response

3.3.12.2.3. Digital anomaly lateral extent above background measurements

3.3.12.2.4. Digital anomaly estimated target depth

3.3.12.2.5. Digital anomaly Signal-to-Noise Ratio (SNR)

3.3.12.2.6. Digital anomaly estimated time-constant and related decay-curve characteristics

3.3.12.2.7. Digital anomaly estimated shape parameters

3.3.12.3. A preliminary anomaly target list for gridded digital geophysical survey data will be generated automatically using Geosoft's Oasis Montaj auto-picking algorithm "GRIDPEAK" which is based on the Blakely Method of Threshold analysis (Blakely and Simpson, 1986). This algorithm uses the Blakely method to find peaks in a grid. For each grid cell to be considered, the algorithm compares its value with values of eight (8) nearest grid cells in four directions (along the row, column, and both diagonals). There are four levels to determine whether a grid cell can be selected as a peak:

Normal (4)	Grid values in all nearest grid cells are lower.
More peaks (3)	Grid values in any three directions are lower.
Even more peaks (2)	Grid values in any two directions are lower.
All ridge peaks (1)	Grid values in one direction are lower

(Geosoft Oasis Montaj, 2010).

3.3.12.4. After developing the preliminary target list using the auto-picking algorithm, the target list will be refined and expanded by an in-depth analysis of anomalies by the project geophysicist. All anomalies above background that are indicative of target will be selected for intrusive investigation.

3.3.13. Anomaly Reacquisition and Resolution Procedures

3.3.13.1. Anomaly Dig Sheet decision criteria for all MRS digital and analog geophysical anomalies will be based on an anomaly prioritization protocol in accordance with EM 1110-1-4009. The prioritization protocol will be a phased approach to first detect above-background measurements and then quantify one or more anomaly characteristics to select anomalies onto dig lists based on multiple criteria.

3.3.13.2. The principal goal of the anomaly prioritization protocol is differentiating anomalies associated with MEC from those not associated with MEC, for instance small pieces of munitions debris. Some of the most relevant information that will be used in the anomaly prioritization protocol will include anomaly shape and intensity characteristics, anomaly statistical information, anomaly dig results, previous investigation data, and available historical information.

3.3.13.3. Due to the ordnance items expected on site, the anomaly selection criteria will be established at or slightly above background noise levels to allow for detection of all possible ordnance items. Targets will be selected initially by running the data through Geosoft's UX-Detect module. Each of the anomalies selected by Geosoft as a target will be analyzed by trained geophysicists, and evaluated as to its validity and position. Targets found to be invalid or incorrectly located will be removed or

adjusted. Additionally, anomalies that were not selected by the UX-Detect module, yet deemed to represent a potential target, will be manually selected.

3.3.13.4. The criteria for selecting and locating anomalies for the target list include the following items:

3.3.13.4.1. The maximum amplitude of the response with respect to local background conditions.

3.3.13.4.2. The lateral extent (width) of the response (downline only for transect data).

3.3.13.4.3. The 3-dimensional shape of the response (downline only for transect data).

3.3.13.4.4. The location of the response with respect to the edge of the survey area, unsurveyable areas, land features, cultural features, or utilities within or adjacent to the survey area.

3.3.13.4.5. Anomaly decay curve.

3.3.13.5. Dig Sheet Development

3.3.13.5.1. Dig sheet development (format) will be in accordance with the Access database shown as Attachment B to DID MR 005-05.01. Variations to this format are not likely to conform to the stringent requirements of this database.

3.3.13.5.2. Dig sheets (as processed using the procedures outlined above will be printed). Electronic versions shall have fixed values for existing entries such as XY and EM channels locked for editing. This will prevent corruption of the database when updated by reacquisition and intrusive investigation entries. Either printed or electronic dig sheets will be disseminated to the reacquisition /instructive team in a readable format. If paper is to be used, adequate space must be provided for the hand-written entry of all of the information required by the Access database.

3.3.13.6. Feedback Process

3.3.13.6.1. Feedback of dig results is an important element of a successful intrusive investigation of digitally, geophysically mapped MRS. The results of the first day’s digs shall be immediately compared against the anomalies picked from the geophysics to ensure a logical picking procedure is working. All subsequent day’s data will be compared similarly. If gross differences occur in areas such as relative size, depth or positional displacement between the geophysical anomaly and the recovered material from the excavation, further intrusive activities should cease until the source of the problem is found.

3.4. GEOSPATIAL INFORMATION AND ELECTRONIC SUBMITTALS

3.4.1. Records management will be performed in such a way as to meet all reporting requirements in a timely fashion and to meet the format and archival requirements according to DID MR 005-05.01 and EM 1110-1-4009.

3.4.2. Survey

3.4.2.1. Control points will be used to develop repeatable survey results and to tie into the prescribed coordinate system. All data collected during this Remedial investigation (RI) will be placed into the Spatial Data Standards for Facilities Infrastructure and Environment (SDSFIE) compliant GIS database, and will be available to all personnel involved in the RI process.

3.4.2.2. All of the control points (survey monuments used) and temporary control points established at the MRSs will be plotted along with geophysical survey data as a quick check for correctly geo-referenced data. Maps will be plotted at appropriate scales.

3.4.3. Mapping/GIS

3.4.3.1. UXB shall furnish all geophysical data, geophysical maps and dig sheets to USAESCH, via internet using FTP, e-mail attachment for small files under 5 MB, CD/DVD, or other approved method for inspection. All geophysical data shall be accompanied by metadata as described in Section 4. The delivery schedule shall be in accordance with Attachment C of DID MR 005-05.01, unless otherwise established by the PDT. The Contractor shall also provide a digital planimetric map in ESRI ArcView, Geosoft, or other approved format, and coincident with the location of the geophysical survey, so that each day's geophysical data set can be registered within the original mission plan survey map. Each data submittal shall include the Attachment B of DID MR 005-05.01 tables to identify the quality of the data and whether it is meeting project objectives. Any QC failures shall be identified and the corrective action that is being taken shall be described. The final report deliverable shall include two copies on CD/DVD of all project data.

3.4.3.2. For submittals, UXB shall provide maps in editable form if available (e.g. Geosoft.map) and map images in a common image format (e.g. JPEG) for viewing without the software used to produce the maps. Maps will include all the following basic map features in addition to any other necessary site information.

3.4.3.2.1. General: All selected anomalies and known features shall be marked with symbols on the map. Map scales should be even multiples of the base units presented in the map. Map sizes should be designed to fit standard printer or plotter sizes. Grid ticks or grid lines should be visible and labeled.

3.4.3.2.2. Title block: Include figure number, the map title and sub-title (e.g. instrument and type/component) and the location of the information being presented (e.g. site/area name and property/grid ID).

3.4.3.2.3. Legend: All objects/symbols shown on the map should be identified in the legend. Map scale bar, coordinate system and north arrow shall be included. Color scale bars should use a color scheme that clearly differentiates between anomalies and background readings. Background values should be plotted in white or gray, so as not to distract the viewer. A classic "cold to hot" color scale should be used with negative values plotted in blue and high positive values plotted in red/pink. The range of values should be "fixed" so that the same color scale is utilized across the site.

3.4.3.2.4. Additional Project Information: Minimum requirements are to have boxes for the following information: Client, Project, Contractor, Map creator, Map approver, Date created.

3.4.4. Other Submittals

3.4.4.1. All Geospatial and Electronic Submittals will be in accordance with Data Item Description (DID) MR-005-07.

3.5. INTRUSIVE INVESTIGATION

3.5.1. Prior to any intrusive investigations, local utility locating services will be called to detect and mark currently employed utility pipes, cables, conduits, etc. before any intrusive work is done. Similarly, all geophysical data acquired will be examined for linear features that may indicate the presence of past or inactive utility-related items.

3.5.2. General Methodology

3.5.2.1. The methodology differs for land-based and water-based applications. For land-based investigations, and inland water areas, DGM grids will be placed based on analog and DGM transect data. Dig sheets will be developed for the grids, and the selected anomalies reacquired and investigated.

3.5.2.2. For the ocean areas analog transects will be surveyed using mag/dig techniques. All anomalies detected will be investigated immediately due to the dynamic nature of the ocean in these areas. Where grids are to be placed, the same mag/dig techniques will be used.

3.5.3. MEC Accountability and Records Management

3.5.3.1. All MEC discoveries will be recorded into the GIS database that will identify the GPS location, type of MEC and nomenclature, pictures, and final disposition. All MEC

(and all other material recovered) will be recorded in the Access database. Procedures for accountability and records management can be found in the Explosives Management Plan of the Work Plan.

3.5.4. UXO Personnel Qualifications

3.5.4.1. Personnel conducting UXO safety and clearance activities will be trained in accordance with DDESB Technical Paper 18 (TP 18, DDESB, 2004) and USACE Engineer Pamphlet 1110-1-18 (USACE, 2000a). TP 18 enumerates the qualifications of all UXO personnel required for the RI process.

3.5.5. Anomaly Sampling Location

3.5.5.1. For land or inland water areas, UXB personnel will receive electronic data to upload into hand-held GPS data loggers. They will use GPS or conventional survey equipment to reacquire anomaly locations designated for investigation. Anomaly coordinates are based on the surveyed grids and control. UXO Technicians will occupy those known points each day to verify that the reacquisition equipment is operating properly prior to marking any anomalies. The technicians will clearly identify the locations with pin flags and a unique identifier placed directly over the coordinates shown on the dig sheet.

3.5.5.2. The UXO Technicians also will use a Schonstedt Instrument Company model GA 52Cx or EM61 MK2 to verify that the location contains a geophysical anomaly. If no anomaly is detected at the expected location, the technician will scan the area within 1 meter of the expected location, marking and recording the actual anomaly location, if it is different from the expected location. If no anomaly is detected within 1 meter of the expected location, the situation will be noted on the dig sheet and corrective actions will be taken according to the geophysical QC plan.

3.5.5.3. For ocean areas, each anomaly will be investigated as it is found.

3.5.6. Anomaly Sampling Procedures

3.5.6.1. Land-Based Procedures

3.5.6.1.1. Using a differentially corrected GPS or total station equipment, the reacquisition team will begin to relocate and flag each anomaly provided by the geophysicist, for the intrusive investigation team. Each flag will have the anomaly number placed on it, to correspond with the numbers identified on the dig sheet /Access database. The Intrusive investigation team will locate the flag and verify the information on the flag with the dig sheet. When the team leader is satisfied that it is the correct flag, the team will use the EM 61 MK 2 to pinpoint the anomaly.

The flag will be moved to the source location of the signal, if different, and the offsets will be recorded. Once uncovered, the item will be identified as mentioned below. Final clearance of the excavation will be performed using either the Schonstedt magnetometer or the EM 61 MK 2 to ensure that all items have been removed. for subsurface investigations, Enclosure 7 to the APP found in Appendix D of the Work Plan.

3.5.6.1.2. Digging will begin to the side of the anomaly, not on top. Soil will be removed using hand excavation techniques as described in UXB's SOP Using a differentially corrected GPS or total station equipment, the reacquisition team will begin to relocate and flag each anomaly provided by the geophysicist, for the intrusive investigation team. Each flag will have the anomaly number placed on it, to correspond with the numbers identified on the dig sheet /Access database.

3.5.6.1.3. Vegetation removal will be minimized during site activities. If vegetation must be cleared, vegetation will be cut off within six inches of the ground, and set aside, leaving roots intact. Anomalies selected for investigation will be hand dug, and all soil removed during excavation will be replaced immediately after the anomaly has been removed; the site of the excavation will be left bare for natural recolonization.

3.5.6.2. Water-Based Procedures

3.5.6.2.1. Once anomalies have been reacquired, excavation will be conducted in two possible ways; an airlift or a water jet. Due to the nature of the bottom (sandy, clay, mud), excavation will naturally have gently sloped sides so there is no danger of excavation collapse. Divers have successfully excavated to depths greater than six feet on Martha's Vineyard. Due to the dynamic nature of the ocean, these excavations are filled in through natural sea/current action and return to the steady state depth in a few hours. Statistics collected during ongoing operations by VRHabilis divers indicate that excavation time varies widely depending on sea state, depth of item (under sand) and number of items in dig.

3.5.6.2.2. Airlift - The airlift is the least invasive and fastest means of excavating sand and gravel, making it the preferred method of underwater excavation. Excavation is accomplished by placing the working end of the lift on the bottom and allowing air pressure to cause a vacuum and pull sand from the bottom. The sand is discharge immediately behind the diver.

3.5.6.2.3. Water Jet - The water jet is a self-digging apparatus utilizing pressurized water to "wash" overburden away from buried anomalies. The water jet is an excellent

option if the diver is unable to operate the airlift due to excessive debris on the bottom, or if the bottom is of a more compact material such as clay.

3.5.6.3. For ocean areas, the anomalies will be investigated in a mag/dig fashion. The excavation procedures are as described above.

3.5.6.4. All DGM anomalies will be reacquired via navigation and marked with either no-ferrous pin flags (land) or anchored float (inland water). The anomaly will bhen be confirmed using a hand-held EM all metal detector, and if confirmed, intrusively excavated as described above. In the event of a "no-find", the anomaly will be added to a list of location to be re-checked using an EM-61 Mk II at the end of the data block.

3.5.6.5. Anomaly excavation reporting will be accomplished using an electronic data logger in the field, operated by the dig team leader or his designee. Data input will be in a format directly compatible with an Access database referenced in DID MR-005-05.01. Each anomaly excavated will be identified as cultural debris (wire, nails, pipe, rebar, etc.), MD or MEC etc. The item will be notated in the data logger as to the depth of the item. The MEC will be identified by military nomenclature, type of fusing, attitude in which it was found and a picture taken of each MEC item. The information will be entered electronically into a SDSFIE compliant GIS database for use in final reporting and deliverables.

3.5.7. Identification of Munitions with Greatest Fragmentation Distance (MGFD)

3.5.7.1. Ordnance documented as used used during past training, as well as items removed during the TCRA and items recently removed by the Massachusetts Stat Police Bomb Squad are identified in Section 3.2 for each MRS.

3.5.7.2. MGFD is outlined in Chapter 5 and in the ESP, Chapter 6.

3.5.8. Minimum Separation Distances

3.5.8.1. The Minimum Separation Distances for each MRS are identified in the ESP, Chapter 6.

3.5.9. Anomaly Identification

3.5.9.1. Each MEC item shall be positively identified and all required data (geophysical data and dig sheets will be provided to USAESCH) that can be safely collected will be collected prior to any disposal operation. The required data elements that will be collected as a minimum on MEC items are as follows:

3.5.9.1.1. Date of intrusive sampling;

3.5.9.1.2. Grid/transect identification number;

3.5.9.1.3. UTM coordinates;

3.5.9.1.4. Depth of water;

3.5.9.1.5. Accuracy of anomaly reacquisition (distance, direction)

3.5.9.1.6. Length, width, and depth of final excavation;

3.5.9.1.7. Orientation;

3.5.9.1.8. Condition of rotating band, if present;

3.5.9.1.9. MEC or MD +Classification (e.g., UXO, DMM, MC presenting an explosives hazard) including model/mark number; and

3.5.9.1.10. Photograph of anomaly.

3.5.10. MEC Removal

3.5.10.1. Land-Based MEC Removal

3.5.10.1.1. The UXO Technician II will dig using hand methods, to the side of the anomaly uncovering until a positive identification of the anomaly can be made, looking at size, shape, and external fittings such as fuzing and bomb lugs. Items will not be moved during the inspection/identification until the fuze condition can be ascertained. If an excavated anomaly is identified as MEC, the Team leader shall notify the SUXOS, who will then notify the USACE Safety Specialist if on site. MEC will not be moved by personnel unless it is acceptable to do so. Movement of MEC is authorized only after positive identification and a determination by the UXO Technician III and then authorized by the SUXOS (with concurrence from the USAESCH Safety Specialist) that the Items will not be moved during the inspection/identification until the fuze condition can be ascertained. If the condition is questionable, consider the fuze to be armed. The fuze is considered the most hazardous component of a MEC item, regardless of type or condition. The SUXOS will make the final determination for disposition of the item prior to implementing any disposal operations. All MEC disposal operations will be IAW the ESP, Chapter 6. Pre-detonation samples will be composite samples located as near to the identified MEC to be detonated as is safe and feasible. Pre-detonation samples are used for comparison with post-detonation samples to determine whether any residual MC is due to existing contamination or contamination left due to the detonation. Post-detonation samples will be biased composite samples representing the area of potential impact from the detonation.

3.5.10.1.2. The USAESCH Safety Specialist will notify the USAESCH Coordinator of all upcoming explosive demolition operations. Transportation of MEC over public roads is not authorized for this project.

3.5.10.2. Water-Based MEC Removal

3.5.10.2.1. The UXO Technician II/Diver or above will carefully remove enough soil using Airlift, without disturbing the MEC, to facilitate positive identification or to obtain its identification features. UXO Technicians II/Diver and above will make every effort to identify MEC through visual examination of the item for markings and other identifying features such as shape, size, and external fittings.

3.5.10.2.2. If an excavated anomaly is identified as MEC, the Dive Supervisor shall notify the SUXOS, who will then notify the USACE Safety Specialist if on site. UXOSO will determine if an item is MEC through a combination of underwater video/photos, or description from the diver. If an excavated anomaly is identified as MEC, the Dive Supervisor shall notify the SUXOS, who will then notify the USACE Safety Specialist if on site.

3.5.10.2.3. Items will not be moved during the inspection/identification until the fuze condition can be ascertained. If the condition is questionable, consider the fuze to be armed. The fuze is considered the most hazardous component of a MEC item, regardless of type or condition. The SUXOS will make the final determination for disposition of the item prior to implementing any disposal operations.

3.5.10.2.4. All MEC disposal operations will be IAW the ESP, Chapter 6.

3.5.10.2.5. The USAESCH Safety Specialist will notify the USAESCH Coordinator of all upcoming explosive demolition operations.

3.5.10.2.6. Transportation of MEC over public roads is not authorized for this project.

3.5.11. MEC Storage

3.5.11.1. No MEC will be removed from the grid in which it was found to a storage facility. All MEC found within a land grid will be disposed of in that grid. Underwater MEC will be carried on shore and disposed of by the UXO Technicians clearing the land grids.

3.5.12. MEC Disposal Procedures

3.5.12.1. In general, a projectile containing a Base Detonating (BD) fuze is to be considered armed if the projectile has been fired.

3.5.12.2. Arming wires and pop-out pins on unarmed fuzes should be secured by taping in place.

3.5.12.3. Do not rely on the color-coding of MEC for positive identification.

3.5.12.4. Avoid the area in front of MEC items until it can be determined the item does not contain a shaped charge explosive or forward ejecting charge.

3.5.12.5. Do not move UXO without concurrence of the SUXOS or Dive Supervisor for underwater operations.

3.5.12.6. Do not subject MEC to heat shock or friction.

3.5.12.7. Land-Based Demolition

3.5.12.7.1. For land-based demolition, the Demolition Supervisor will conduct a safety briefing to the members of the demolition team prior to conducting disposal operations – reviewing at a minimum phases of the operation, review of explosive handling and Electromagnetic Radiation (EMR) precautions, location of safe area, emergency notification procedures, site specific characteristics, type of UXO being destroyed, placement and quantity of counter charge, misfire procedures, post-detonation clean-up of range, care and handling of explosive materials, personal hygiene, two person rule, potential trip/fall hazards, location of range vehicle, wind direction (toxic fumes), and the location of the first aid kit and fire extinguisher.

3.5.12.7.2. Upon determining that a BIP is required, Local Law Enforcement will be notified. Prior to placing initiators (electric/non-electric blasting caps) into explosives, the area will be secured as required to insure no unauthorized personnel can enter the area. Initiators will not be introduced into the explosives firing chain prior to the area being secure. In the event that unauthorized personnel refuse to leave the area, Local Law Enforcement will be requested to escort them from the area. When all unauthorized personnel are at a safe distance, (Maximum Hazard Fragmentation -Horizontal (MFD-H) for the item being disposed, the BIP charge will be primed (initiators placed into the explosive charge) and initiated.

3.5.12.8. Underwater Demolition

3.5.12.8.1. For underwater demolition, UXB will enlist the support of the Edgartown harbor master in posting daily “Notice to Mariners” identifying the areas being worked. The south shore of Martha’s Vineyard is extremely lightly travelled by public boating and is well away from established shipping lanes and fishing grounds. Due to hazardous navigation (shifting sand, cross currents, wave action), this is

particularly true of the operations area. Since the likelihood of any traffic being in the area is small, security should be easy to establish.

3.5.12.8.2. Upon determining that a BIP is required, Coast Guard and Local Law Enforcement will be notified. Prior to capping in to the explosives, the area will be secured with a minimum of two boats. If there are any public boats in the area they will be advised to stand clear via bridge to bridge radio. Capping in will not occur prior to the area being secure. In the event that a boat refuses to leave the area, Local Law Enforcement and or the Coast Guard will be requested to escort the boat clear. Once all boats are at a safe distance, the BIP charge will be primed and initiated.

3.5.12.9. Secure access to roads by erecting barriers or barricades.

3.5.12.10. Ensure exclusion zone or minimum separation distance is void of non-essential personnel.

3.5.12.11. Range vehicle engine will be started prior to initiating priming procedures and kept running, and remain in the area during demolition operations.

3.5.12.12. Telephone or radio communication will be established with emergency response personnel. No radio or cellular telephone transmissions will take place in the vicinity during the positioning or connecting of electrical initiating devices.

3.5.12.13. Electrical Demolition Operations

3.5.12.13.1. The following safety precautions shall be followed when performing electrical demolition operations:

3.5.12.13.1.1. Do not wear static producing clothing -- nylon, silk, or synthetic hair – when working with electric blasting caps or other electro-explosive devices.

3.5.12.13.1.2. Conduct a continuity test of the firing circuit prior to making connection with the electric blasting cap.

3.5.12.13.1.3. Do not connect electric blasting caps to the firing circuit before connection to the main initiation charge.

3.5.12.13.1.4. Do not use electric blasting caps of different manufacturers or types in the same system.

3.5.12.13.1.5. Do not remove the shunt from the lead wires until the individual performing the operation has been grounded.

3.5.12.13.1.6. Test electric blasting caps for continuity with a galvanometer at least 50 feet downwind from any explosives prior to connecting them to the firing circuit.

Upon completion of testing, the lead wires will be short-circuited by twisting the bare ends of the wires together. The lead wires will remain shunted until ready to connect to the firing circuit.

3.5.12.13.1.7. Do not pull on electrical lead wires of electric blasting caps, detonators, or other electro-explosive devices; a detonation may occur.

3.5.12.13.1.8. Unroll the lead wires so that the cap is as far as possible from the operator and pointing away from him.

3.5.12.13.1.9. Place the blasting cap in a hole or behind a barricade before removing the shunt and testing for continuity. Make sure the cap does not point toward other personnel or explosives.

3.5.12.13.1.10. Use only authorized and serviceable testing equipment.

3.5.12.13.1.11. Do not connect the blasting machine to the firing wires until all pre-firing tests have been completed and until ready in all respects to fire the charge.

3.5.12.13.1.12. Do not hold the blasting cap directly in the hand when uncoiling lead wires. Hold the wires approximately 6 inches from the cap. This will minimize injury should the cap explode. The lead wires should be straightened by hand and not thrown, waved, or snapped to loosen the coils.

3.5.12.13.1.13. Do not remove the shunt from the lead wires of blasting caps except for testing for continuity or actual connection into the firing circuit. The individual removing the shunts should ground himself prior to this operation to prevent accumulated static electricity from firing the blasting cap.

3.5.12.13.1.14. Keep both ends of the firing wires shorted or twisted together except for testing or firing. Do not connect the blasting caps to the firing circuit unless the power ends of the firing circuit leads are shorted.

3.5.12.13.1.15. Keep all parts of the firing circuit insulated from the ground or other conductors such as bare wires, rails, pipes, or other paths of stray current.

3.5.12.13.1.16. Use caution when performing demolition operations using electric blasting caps in areas around or near overhead or buried power lines, radio transmission antennas, or RADAR antennas. Refer to 6055.9 STD for safe operating distances from these energy sources or ensure the power has been shut down.

3.5.12.13.1.17. Do not perform demolition operations during lightning storms.

3.5.12.14. Electrical Preparation and Priming

3.5.12.14.1. An electric firing system is one in which electricity is used to fire the primary initiating element. An electric impulse supplied from a power source, usually an electric blasting machine, travels through the firing wire and lead wires to fire an electric blasting cap. The chief components of the system are the electric blasting cap/electric squibs, firing wire, and the blasting machine. The preparation of the explosive charge for detonation by electrical means is called electric priming.

3.5.12.14.2. Static electricity is an increased hazard when operating in an extremely cold climate or area of low humidity. Care must be taken to reduce the possibility of premature detonation of electric blasting caps and other electro-explosive devices.

3.5.12.14.3. The following procedures will be followed when preparing and priming an electrical detonation:

3.5.12.14.3.1. Prepare and place all explosive charges.

3.5.12.14.3.2. After locating a firing position a safe distance away from the charges, lay out the firing wire. (Do not drag firing wire over sand, which may generate a static charge.)

3.5.12.14.3.3. Test the firing wire by using a blasting galvanometer or test set, after ensuring the testing equipment is functional, and after the firing wire has been unreeled. Ensure ends are twisted together when not testing.

3.5.12.14.3.4. Separate firing wire conductors at both ends, and touch those at one end of the galvanometer/test set posts. Needle should not move or lamp glow; if either occurs; the firing wire has a short circuit.

3.5.12.14.3.5. Twist wires together at one end and touch those at other end to galvanometer/test set posts. This should cause a wide deflection of the needle or the lamp to glow. No movement of the needle indicates a break; a slight movement indicates a point of high resistance that may be caused by a dirty wire, loose wire connections, or wires with several strands broken off at connections.

3.5.12.14.3.6. Ground yourself. Test the blasting caps by removing the short circuit shunt from the lead wires. Touch one lead wire to one post and the other lead wire to the other post. If galvanometer's needle deflects slightly less than it did when the instrument was tested, the blasting cap is satisfactory; if not, the cap is defective and should not be used. Ensure cap lead wires are twisted together when not testing.

3.5.12.14.3.7. Ensure you have positive control of the positive block that prevents inadvertent functioning of the electrical firing device. (Key, Handle).

3.5.12.14.3.8. Request permission to prime from the Demolition Supervisor. DO NOT PROCEED UNTIL PERMISSION IS GRANTED!

3.5.12.14.3.9. Ground yourself. Ensure the two electric blasting cap lead wires are shunted and the firing cable is shunted at both ends.

3.5.12.14.3.10. Extend the lead wires of one electrical blasting cap to its full length keeping the outward end of the blasting cap pointed away from yourself, your assistant, and the donor charge.

3.5.12.14.3.11. Un-shunt the blasting cap lead wires and the firing wire.

3.5.12.14.3.12. Connect one lead wire from the blasting cap to one of the firing wires.

3.5.12.14.3.13. Connect the second lead wire from the blasting cap to the remaining unconnected firing wire.

3.5.12.14.3.14. Repeat process 3.5.12.14.3.10 through 3.5.12.14.3.13 for second blasting cap.

3.5.12.14.3.15. Using electrical tape or other non-electrically conductive materials, insulate each of the two electrical connections to prevent shorting the two leads.

3.5.12.14.3.16. Insert caps into donor charge. Depart to firing point.

3.5.12.14.3.17. Take cover.

3.5.12.14.3.18. Obtain a head count and conduct a visual scan of area for unauthorized personnel.

3.5.12.14.3.19. Ground yourself. Test entire circuit after inserting caps into the charges and connecting charges with the firing wires and moving to firing position. Touch free ends of firing wire to test instrument posts. This should cause a wide deflection of needle or lamp to glow. If the firing circuit is defective, shunt wire. Then go down-range and recheck circuits. If the splice is found defective, replace wires. If the cap is found defective, replace it. Retest the entire circuit again to make sure that all breaks have been located before attempting to fire.

3.5.12.14.3.20. Exercise the blasting machine several times before attaching the firing wire. Untwist ends of the firing wire and fasten them to the posts of the blasting machine.

3.5.12.14.3.21. Yell, **“Fire in the Hole”** three times and initiate charge.

3.5.12.14.3.22. Observe a 5-minute wait time after the detonation. Based on observation of the detonation, the Demolition Supervisor may waive this wait time.

3.5.12.14.3.23. Remain in designated safe area until Demolition Supervisor announces **"All Clear."**

3.5.12.15. Electrical Misfires

3.5.12.15.1. In order to prevent misfires, insure that all blasting caps are included in the firing circuit; all connections between blasting cap wires, connecting wires, and firing wires are properly made; short circuits are avoided; grounds are avoided; and number of blasting caps in any circuit does not exceed the rated capacity of the power source on hand.

3.5.12.15.2. Common causes of electric misfires include an inoperative or weak blasting machine or power source; improperly operated blasting machine or power source; defective and damaged connections, causing either a short circuit, a break in the circuit, or high resistance with resulting low current; faulty blasting caps; the use in the same circuit of blasting caps made by different manufacturers or of different design; and the use of more blasting caps than the power source rating permits.

3.5.12.15.3. The following procedures shall be used for clearing electric misfires:

3.5.12.15.3.1. Make several successive attempts to fire.

3.5.12.15.3.2. Check firing wire connections to blasting machine terminals to be sure that the connections are good.

3.5.12.15.3.3. Make two or three more attempts to fire charge.

3.5.12.15.3.4. Disconnect blasting machine and short firing wire.

3.5.12.15.3.5. Allow a minimum of 30 minutes to elapse before starting to investigate.

3.5.12.15.3.6. Test firing circuit with circuit tester for breaks and short circuits, and correct any defects discovered.

3.5.12.15.3.7. Remove blasting caps from donor charge and place in a direction away from personnel and the donor charge. Disconnect caps from firing wire and shunt lead wires. Dispose of the old blasting caps by placing them on the next demolition shot.

3.5.12.15.3.8. Connect wires of new blasting cap(s) to firing circuit and re-prime the charge.

3.5.12.15.3.9. Reconnect firing wire ends to blasting machine and fire charge(s).

3.5.12.16. Non-Electrical Demolition Procedures

3.5.12.16.1. Underwater demolition will be accomplished using standard underwater demolition team techniques. Firing will be non-electric using a dual capped firing board on the surface. Detonating cord will be used to complete the firing circuit to the main charge. A tattle-tale strand of detonation cord will be attached to a float on the surface to give clear indication that all charges detonated as designed.

3.5.12.17. Non Electric Misfires

3.5.12.17.1. If shock tube initiation is used, the wait time shall be 1 hour prior to beginning any underwater or surface investigation. If non electric fuse is used, the wait time will be 1 hour plus the burn time of the fuse.

3.5.12.18. Post Demolition Operations

3.5.12.18.1. Do not approach a smoking hole; do not allow personnel out of the designated safe area until cleared to do so with the **"All Clear"** signal.

3.5.12.18.2. Prior to giving the **"All Clear"** signal, check pit for 'low orders' or 'kick outs.' Intact ordnance items that failed to detonate will be counter-charged and blown in place. Explosive residue will be collected and detonated.

3.5.12.18.3. Using a magnetometer, sweep pit and remove any fragmentation; metal fragments will be examined to ensure complete detonation of the explosive material.

3.5.12.18.4. Back fill hole and reseed as necessary.

3.5.12.18.5. Police up all equipment.

3.5.12.18.6. Notify police, fire, etc. that the operation is complete.

3.5.12.19. Engineering Controls

3.5.12.19.1. Any occupied buildings or public roadways/waterways in the minimum safety distance (MSD) areas during MEC operations will be evacuated and/or roadways/waterways blocked to prevent non-essential personnel from entering during the conduct of MEC operations. Alternatively, engineering controls may be used as follows: Miniature Open Front Barricade (MOFB) or Open Front Barricade (OFB) for intrusive operations, the Buried Explosion Module (BEM) (see DDESB Technical Paper 16), Sandbag Mitigation or Water Mitigation for disposal operations. The appropriate reports will be available on site for all engineering controls used.

3.5.12.19.2. During underwater demolition activities (underwater BIP), all vessels and personnel shall be outside of the Blast Withdrawal Distances as calculated in the BEM calculation sheets located in Appendix B of the ESP.

3.5.12.19.3. It is possible, however, that engineering controls may be required in the event that MEC items are discovered that are unacceptable to move and require detonation. In such cases, the use of engineering controls is intended to limit fragmentation to acceptable distances.

3.5.12.20. Materials Potentially Presenting an Explosive Hazard (MPPEH) Responsibilities and Procedures

3.5.12.20.1. UXB will comply with the following procedures for processing MPPEH for final disposition. The objective of these procedures is to ensure that an inspection procedure of the exterior and interior surfaces of all recovered MPPEH is in place to ensure these items do not present an explosive hazard. These responsibilities and procedures are as follows:

3.5.12.20.2. UXO Technician III will perform a 100% inspection of each item as it is recovered and determine the following:

3.5.12.20.2.1. Is the item a UXO, MD, or range related debris?

3.5.12.20.2.2. Does the item contain explosives hazards or other dangerous fillers?

3.5.12.20.2.3. Does the item require detonation?

3.5.12.20.2.4. Does the item require demilitarization (demil) or venting to expose dangerous fillers?

3.5.12.20.2.5. Does the item require draining of engine fluids, illuminating dials and other visible liquid hazardous, toxic or radiological waste (HTRW) materials?

3.5.12.20.2.6. Segregate items requiring demil or venting procedures from Material Determined as Safe (MDAS); items ready for certification.

3.5.12.20.2.7. Items found to contain hazards or other dangerous fillers will be processed in accordance with applicable procedures.

3.5.12.20.3. UXO Technician III will:

3.5.12.20.3.1. Perform a 100% re-inspection of all recovered items to determine if free of explosives hazards or other dangerous fillers and engine fluids, illuminating dials and other visible liquid HTRW materials.

3.5.12.20.3.2. Supervise detonation of items found to contain explosive hazards or other dangerous fillers and venting/demil procedures.

3.5.12.20.3.3. Supervise the consolidation of MDAS for containerization and sealing. Munitions Debris and Range-related Debris will be segregated.

3.5.12.20.4. UXO Quality Control (QC) Specialist will:

3.5.12.20.4.1. Conduct daily audits of the procedures used by UXO teams and individuals for processing MPPEH.

3.5.12.20.4.2. Perform and document random sampling (by pieces, volume or area) of all MPPEH collected from the various teams to ensure no items with explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials are identified as munitions debris or range-related debris as required for completion of the Requisition and Turn-in Document, DD Form 1348-1A.

3.5.12.20.5. UXO Site Safety Officer (UXOSO) will:

3.5.12.20.5.1. Ensure the specific procedures and responsibilities for processing MPPEH for certification as munitions debris or range-related debris specified in the work plan are being followed.

3.5.12.20.5.2. All procedures for processing MPPEH are being performed safely and consistent with applicable regulations.

3.5.12.20.6. Senior UXO Supervisor will:

3.5.12.20.6.1. Be responsible for ensuring work and Quality Control (QC) Plans specify the procedures and responsibilities for processing MPPEH for final disposition as munitions debris or range-related debris.

3.5.12.20.6.2. Ensure a Requisition and Turn-in Document, DD Form 1348-1A is completed for all munitions debris and range-related debris to be transferred for final disposition.

3.5.12.20.6.3. Perform random checks to satisfy that the munitions debris and range -related debris is free from explosive hazards necessary to complete the Form, DD 1348-1A.

3.5.12.20.6.4. Certify all munitions debris and range-related debris as free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials.

3.5.12.20.6.5. Be responsible for ensuring that inspected debris is secured in a closed, labeled and sealed container and documented as follows:

3.5.12.20.6.5.1. The container will be closed and clearly labeled on the outside with the following information: The first container will be labeled with a unique

identification that will start with USACE/Installation Name/Contractor's Name/0001/Seal's unique identification and continue sequentially.

3.5.12.20.6.5.2. The container will be closed in such a manner that a seal must be broken in order to open the container. A seal will bear the same unique identification number as the container or the container will be clearly marked with the seal's identification if different from the container.

3.5.12.20.6.5.3. A documented description of the container will be provided by the contractor with the following information for each container; contents, weight of container; location where munitions or range-related debris was obtained; name of contractor, names of certifying and verifying individuals; unique container identification; and seal identification, if required. The contractor in a separate section of the final report will also provide these documents.

3.5.12.21. MD Certification and Verification

3.5.12.21.1. UXB will ensure that MD is properly inspected in accordance with the procedures identified above. Only personnel who are qualified UXO personnel will perform these inspections. The Senior UXO Supervisor will certify and the USACE OE Safety Specialist will verify that the debris is free of explosive hazards.

3.5.12.21.2. DD form 1348-1A will be used as certification/verification documentation. All DD 1348-1A must clearly show the typed or printed names of the contractor's Senior UXO Supervisor and the USACE OE Safety Specialist, organization, signature, and contractor's home office and field office phone number(s) of the persons certifying and verifying the debris as free of explosive hazards.

3.5.12.21.3. Local directives and agreements may supplement these procedures. Coordination with local concerns will identify any desired or requested supplementation to these procedures

3.5.12.21.4. In addition to the data elements required and any locally agreed to directives, the DD 1348-1A must clearly indicate the following for scrap metal:

3.5.12.21.4.1. Basic material content (Type of metal; e.g., steel or mixed);

3.5.12.21.4.2. Estimated weight;

3.5.12.21.4.3. Unique identification of each of the containers and seals stated as being turned over;

3.5.12.21.4.4. Location where munitions debris or range-related debris was obtained; and

3.5.12.21.4.5. Seal identification, if different from the unique identification of the sealed container

3.5.12.21.5. The following certification/verification will be entered on each 1348-1A for turnover of MD or range related debris and will be signed by the Senior UXO Supervisor and the USACE OE Safety Specialist. This statement will be used on any ranges where Range Related Debris is being processed: *"This certifies that the material listed has been 100 percent properly inspected and, to the best of our knowledge and belief, are free of explosive hazards, engine fluids, illuminating dials and other visible liquid HTRW materials."*

3.5.12.21.6. The following certification/verification will be entered on each 1348-1A for turnover of munitions debris and will be signed by the Senior UXO Supervisor on properties where only munitions debris is being processed: *"This certifies and verifies that the material listed has been 100% inspected and to the best of our knowledge and belief, are inert and/or free of explosives or related materials."*

3.5.12.22. Maintaining Chain of Custody and Final Disposition

3.5.12.22.1. UXB, in coordination with the Corps of Engineers, will arrange for maintaining the chain of custody and final disposition of the certified and verified materials.

3.5.12.22.2. The certified and verified material will only be released to an organization that will:

3.5.12.22.2.1. Upon receiving the unopened labeled containers each with its unique identified and unbroken seal ensuring a continued chained of custody, and after reviewing and concurring with all the provided supporting documentation, sign for having received and agreeing with the provided documentation that the sealed containers contained no explosive hazards when received. This will be signed on company letterhead and stating that the contents of these sealed containers will not be sold, traded, or otherwise given to another party until the contents have been smelted and are only identifiable by their basic content.

3.5.12.22.2.2. Send notification and supporting documentation to the sealed container-generating contractor documenting the seal containers have been smelted and are now only identifiable by their basic content.

3.5.12.22.2.3. This document will be incorporated by the contractor into the final report as documentation for supporting the final disposition of munitions debris and range-related debris.

3.5.12.22.3. If the chain of custody is broken, the affected MD must undergo a second 100 percent inspection, a second 100 percent re-inspection, and be documented to verify its explosives safety status (identified as either munitions debris or range related debris).

3.5.12.22.4. Material that has been documented as safe is no longer considered MPPEH as long as the chain of custody remains intact. A legible copy of inspection, re-inspection, and documentation must accompany the material through final disposition and be maintained for a period of 3 years thereafter.

3.5.12.22.5. Material that is still MPPEH after inspection will be released only to a qualified receiver. The following will be accomplished prior to release of the property:

3.5.12.22.5.1. Ensure that MPPEH that has been documented as hazardous is only transferred or released to those entities that:

3.5.12.22.5.2. Have the licenses and permits required to receive, manage, or process the materials.

3.5.12.22.5.3. Have technical experts about the known or suspected explosive hazards associated with the MPPEH.

3.5.12.22.5.4. Are qualified to receive, manage, and process MPPEH in accordance with DoD Instruction 4140.62.

3.5.12.22.5.5. Have personnel who are:

3.5.12.22.5.5.1. Experienced in the management and processing of hazardous materials equivalent to the MPPEH.

3.5.12.22.5.5.2. Trained and experienced in the identification and safe handling of used and unused military and/or any potential explosive hazards that may be associated with the specific MPPEH.

3.5.12.22.5.5.3. The receiver must be advised of all of the potential hazards associated with the MPPEH and agree to receive and process the material in accordance with with DoD Instruction 4141.62.

3.5.12.22.5.5.4. All MPPEH shipments over public transportation routes must comply with DoD guidance that implements hazardous material transportation regulations.

3.5.12.22.5.5.5. Ensure that chain of custody and accountability records are maintained through final disposition of MPPEH. A legible copy of inspection, re-

inspection, and documentation must accompany MPPEH through final disposition and be maintained for a period of 3 years thereafter.

3.5.12.23. Transfer of Items

3.5.12.23.1. USACE personnel may request transfer of certified inert ordnance items to be used for Government QA seeding and testing efforts. These items shall be appropriately labeled and include the properly completed 1348-1A from as noted above.

3.5.13. DGM System Positioning

3.5.13.1. The geophysical DQO for DGM systems positioning is that the coordinates being obtained from the positioning system are of sufficient accuracy to allow for appropriate relocation of MEC items for intrusive investigation. The measurement performance criterion for this is that the positional error at known monuments will not exceed ±10.2 cm (4 inches). This will be evaluated through the GSV process and monitored on a daily basis that the positioning system in use passes Function Test #2 (Record Sensor Positions), as outlined in Quality Control Tests/Procedure Section

3.5.14. Downline Data Density

3.5.14.1. The geophysical DQO for downline (along the survey transect) data density is to have sufficient data collected along each line to detect munitions items. The measurement performance criterion is that at least 98 percent of possible sensor readings are captured along each transect at 0.25 meter or lesser spacing between points. In addition, any transect containing a data gap of 0.61 meter (2 feet) or greater does not meet the geophysical DQO. This will be evaluated through the GSV process by verifying that all seed items are detected and that all the DGM data collected meet this standard throughout the project

3.5.15. Survey Coverage (Across Line Applicable Only to Grids)

3.5.15.1. The geophysical DQO for lane spacing is to maintain appropriate lane spacing to provide greater than 90% coverage at project line spacing (2.5 feet). This is monitored throughout the project to verify that all of the DGM data collected and used for anomaly selection meets this standard.

3.5.16. Dynamic Detection Repeatability

3.5.16.1. The geophysical DQO for dynamic detection repeatability is that anomaly characteristics (peak response and downline width) will be repeatable to greater than or equal to 65% of expected minimum value. This value will be determined prior to the start of the project. This will be evaluated daily on the IVS.

3.5.17. Dynamic Positioning Repeatability

3.5.17.1. The geophysical DQO for dynamic positioning repeatability is that anomaly characteristics (peak response and downline width) will be repeatable within 0.73 meters of original location for data positioned with GPS and 0.88 meters of the original location. This will be evaluated daily on the IVS.

3.5.18. DGM System Data Repeatability

3.5.18.1. The geophysical DQO for DGM system data repeatability is that the system responds consistently from the beginning to the end of an operation. The measurement performance criterion is that the response to a standardized item will not vary more than ±10 percent. This will be evaluated during the GSV by ensuring that, on a daily basis, the geophysical system being used passes Function Test #3 (Static Background and Static Spike), as outlined in Quality Control Tests/Procedure section.

3.5.19. Speed

3.5.19.1. Not applicable because all transects will contain seeded items.

3.6. INVESTIGATION DERIVED WASTE (IDW) PLAN

3.6.1. No IDW will be generated during the geophysical investigation of the RI field work. However, IDW will be generated during the MC sampling portion of the RI field work. Procedures for handling, storage, and characterization of IDW generated during MC sampling activities in detailed in Appendix E.

3.7. RISK CHARACTERIZATION AND ANALYSIS

3.7.1. A CSM was developed for each of the MRSs to achieve a better understanding of the facility, physical, release, land use, and ecological profiles at each MRS. This information is used to better understand human health and ecological risks associated with MEC and MC which could potentially be found within the MRSs. Summary tables and exposure pathway models for each MRS are presented in Section 1.7.

3.8. TRANSPORT STUDY

3.8.1. Periodically, MEC items will wash up on South Beach and the barrier beach at Tisbury Great Pond causing a risk to the public. In order to understand the movement of items from the ocean to the beach, a transport study will be conducted at the South Beach and Tisbury Great Pond Ocean Areas to track the movement of MEC / MD items in the ocean.

3.8.2. South Beach Grids

3.8.2.1. At South Beach, two one-acre grids areas will be established in areas previously cleared as part of the TCRA (Figure 3-2). An anomaly density/location survey will be performed to monitor any potential migration of ordnance items as follows:

3.8.2.1.1. A baseline survey will be conducted to locate any anomalies within the grid; all anomalies detected will be located horizontally within the grid(s)

3.8.2.1.2. A follow-up survey will be conducted after a major storm event to monitor the change in anomaly density/location

3.8.2.1.3. A close-out survey will be conducted at the conclusion of field operation, and include a mag/dig transect through the grid.

3.8.2.2. In addition, rocket simulants with pingers will be emplaced as follows:

3.8.2.2.1. Transport Study grid 5/6 – two items will be buried within the grid in the sand toward the beach side of the grid; the item will be placed in the excavation of an anomaly dug from the grid. Two additional items will be placed on the surface out from the grid biased toward the south west corner, with one placed a distance of 450 feet from shore, or max distance possible with the current dive umbilical's. The physical placement locations will be recorded.

3.8.2.2.2. Transport Study grid 18/19 - two items will be buried within the grid in the sand toward the beach side of the grid; the items will be placed in the excavation of an anomaly dug from the grid. Two additional items will be placed on the surface within the grid biased toward the south west corner. The physical placement locations will be recorded.

3.8.3. Tisbury Great Pond Grids

3.8.3.1. UXB will characterize offshore marine transport of potential MEC/MD using 4-Dimensional (Northing, Easting, depth and time) survey at two pre-seeded 1/4-acre grids outside the cut at Tisbury Great Pond (Figure 3-3).

3.8.3.2. Prior to establishing the grids, a baseline survey will be conducted to locate any existing anomalies. If any anomalies are found, they will be located horizontally and the positons recorded.

3.8.3.3. Each 1/4-acre grid will then be seeded with at least 4 seed items – two simulating 100 pound practice bombs and two simulating practice bomb spotting charge canisters. The seed items will originally be emplaced using a "+" layout such that the spatio-temporal variation in the transport geometry can be clearly discriminated. Variations in orientation of the seed items will be made possible by painting the items with four

unique color stripes and annotating the color-coded orientation during each temporal survey pass. To mazimize potential movement over a relatively short time, all of the items will be laid proud on the bottom.

3.8.4. Acoustic pingers of unique frequency will be attached to all seed items to enhance tracking tracking of any migration or movement.

3.8.5. For both the Tisbury Great Pond and South beach Areas, each grid will be surveyed a minimum of three times; once at the time of seeding, once at the end of the South Beach-Wasque Point working period and once mid-period. Should the initial three survey passes indicate that the seed items will likely be transported outside of the test-acres before the final survey pass, a fourth pass will be added to determine the "last location observed".

3.8.6. All geophysical location data will be acquired, recorded, geospatially located, and interpreted using the same quality protocols used to obtain the regular (non-transport) results. All relevant meta-data will be recorded and archived in the geospatial database. The seeded items will be reacquired during the last investigation and removed. UXB will initiate the Transport Study immediately after the ESTCP IVS is established. All dive operations associated with the Transport Study will be performed in accordance with the approved Dive Plan, Appendix D. Any surficial MEC/MD discovered, or any items discuverd as part of intrusive investigation during the Transport study will be disposed of as described in the ESP, Chapter 6.

4 QUALITY CONTROL PLAN

4.1 The purpose of quality assurance and quality control (QA/QC) is to plan and implement a comprehensive set of controls and systematic procedures to ensure that the data acquired is of a quality necessary to fulfill the project data quality objectives (DQOs). UXB's Corporate QA/QC policy requires several levels of internal interdisciplinary reviews for all project related data and text deliverables prior to submittal.

4.2 The QA/QC process allows each project team member to understand the quality expected and encourage positive communication amongst the project team. QC is conducted using a three-phase process (i.e., preparatory, initial, and follow-up inspections/audits). This ensures that procedures are being followed and opportunities for improving processes are documented and appropriate changes implemented.

4.3 DATA MANAGEMENT

4.3.1 Collect sufficient geophysical, visual, and analytical data to adequately characterize nature and extent of MEC and MC in order to determine future response actions at each MRS.

4.3.2 Data management involves the collection of required data elements that will be used by others to make downstream decisions. In this regard, clear, complete, and defensible geophysical and intrusive investigation data and documentation are critical deliverables for this RI. The UXB Project Geophysicist will have overall responsibility for geophysical data management while the UXB SUXOS will have overall responsibility for intrusive investigation operations and data management.

4.3.3 Intrusive investigation results will be hand-entered to the field log forms (Appendix F) and then transferred into digital format by the SUXOS at the project office; keeping the original for backup and archival purposes. UXB's senior Geophysicist will review all geophysical data collected for this project while the UXB SUXOS will review all intrusive investigation data collected for this project.

4.3.4 Photographic records of MEC, MD, or significant cultural metallic item locations will be generated using a digital camera and a portable whiteboard to provide visual verification of the intrusive investigation results.

4.4 QC DUTIES

4.4.1 UXB's Senior Geophysicist will conduct the following actions to ensure the data collected meets the requirements of the DQOs:

4.4.1.1 Review a random sample of geophysical data for completeness and conformance to data protocols;

4.4.1.2 Review the accompanying photographic records for visual verification of a representative proportion of the field log forms;

4.4.2 For land-based intrusive investigations, the UXB SUXOS will review a random sampling of the completed electronic forms and field forms to ensure the field data was correctly transferred.

4.4.3 For underwater intrusive investigations, the Dive Supervisor will be responsible for the overall quality of the collected data and photographs;

4.4.4 The Quality Control Specialist will utilize UXB's Daily Quality Control Inspection (QCI) checklist developed by the Project Manager to evaluate all phases of the project. The QCI is located in Appendix F.

4.5 EQUIPMENT CALIBRATIONS/PROVE OUT

4.5.1 UXB and each of its contractors will be responsible for completing all manufacturer's specified instrument calibration protocols as well as ensuring that all of their respective geophysical tools and technicians (i.e. geophysical instrumentation operators and all of their geophysical equipment) be evaluated on a regular and recurring schedule using the Geophysical System Verification (GSV) process described in Section 3 of this Work Plan.

4.5.2 UXB will utilize the same instruments for QC and final confirmation as used by the clearance team. The clearance team will be using the Schonstedt GA 52Cx magnetometer for ferrous anomalies and the Fischer Electromagnetic (all-metals locator) for nonmagnetic anomalies to conduct the remedial investigation. The instruments used by UXB will be factory calibrated in accordance to the manufacturer's schedule.

4.5.3 Record of calibrations will be kept on-site and included in the final report. UXB will perform a daily prove-out of the Schonstedt and Fischer instruments in a designated Instrument Verification Strip (IVS). Each instrument that is used during the daily activities will be turned on and used to detect a known target within the test plot. The instrument's visual and audio output against the known target will be recorded within the Supervisor's Log. Instruments that do not pass the daily prove out will not be used until repaired and rechecked to assure adequate performance. The procedures above will be repeated after a battery change, or if the instrument is suspected of any malfunction or improper operation. At the end of each work shift, the Schonstedt and Fischer instruments used during the daily activities will again be tested in the Functional Test Area to ensure that the instrument has remained working within acceptable parameters throughout the work shift. The instrument's visual and audio

output against the known target will be recorded within the Supervisor's Log. If an instrument fails the end of shift testing, areas swept that shift using the failed instrument will be re-swept.

4.6 ANOMALY INVESTIGATION

4.6.1 All anomaly investigations will be accomplished by either UXB (for land-based investigations) or by VRHabilis (VRH) from aboard their vessel (for water-based investigations). In order to provide a complete and accurate MEC site investigation, UXB/VRH's anomaly investigation process must be implemented in a way that ensures that each anomaly location is investigated completely and the source of each anomaly is determined. The DQO for this task is to clear each anomaly location of metal objects large enough to have been detected during the geophysical investigation and surface sweep.

4.6.2 To achieve this DQO, UXB or VRH will use magnetometers or hand-held all-metal detectors (water-proofed Schonstedt magnetometers for the water-based investigations) for pinpointing the surface location of the anomaly around the re-acquired point identified on the Dig Sheet. After anomaly excavation is complete, the Team Leader will then use the reacquisition instrument to verify that the excavation is clear. The dig teams will remove metal debris from the excavation until no additional metal can be detected by the instrument.

4.6.3 Upon completion of the excavation, dig results will be recorded.

4.7 QUALITY CONTROL PROCESS

4.7.1 The QC Process employed by UXB consists of a multi-step process that is designed to identify, isolate, and correct conditions that may have an adverse impact upon the ability to achieve the DQOs. UXB's QC Process is discussed in greater detail in the following Sections.

4.8 PREPARATORY PHASE INSPECTIONS

4.8.1 A preparatory phase inspection will be performed prior to beginning each definable feature of work. The purpose of this inspection will be to review applicable specifications and verify that the necessary resources, conditions, and controls are in place and compliant before the start of work activities.

4.8.2 The personnel responsible for the work activity are responsible for verifying that the following QC actions are performed for each preparatory phase inspection:

4.8.2.1 Appropriate plans and procedures are developed, approved, and are available on-site;

4.8.2.2 Personnel required for the activity are identified, available, meet the qualifications for the position, and positions are filled;

4.8.2.3 Training and medical requirements are identified and complete;

4.8.2.4 Preliminary work and coordination has been completed; and

4.8.2.5 Equipment required to perform the work has been identified, is available, functional, and appropriate for the job; and quality issues have been addressed and agreed upon.

4.8.3 The specific QC activities performed during the preparatory phase and the results of those activities will be documented on the Project Kickoff Checklist (Appendix F), and in the QC field log book.

4.8.4 Discrepancies between existing conditions and approved plans/procedures will be resolved and corrective actions taken for unsatisfactory and nonconforming conditions identified during a preparatory phase inspection.

4.9 INITIAL PHASE INSPECTION

4.9.1 An initial phase inspection will be performed the first time a definable feature of work is performed. The purpose of the inspection will be to check the preliminary work for compliance with procedures and contract specifications. It also establishes the acceptable level of workmanship, checks safety compliance, reviews the preparatory phase inspection, checks for omissions, and resolves differences of interpretation. The following will be performed for each definable feature of work:

4.9.1.1 Requirements of quality of workmanship will be established;

4.9.1.2 Completion of readiness review actions verified;

4.9.1.3 Conflicts resolved;

4.9.1.4 Work Plan and applicable documents reviewed to ensure that the requirements are being met; and

4.9.1.5 Performance of work will be observed and adequacy of work verified.

4.9.2 Discrepancies between site practices and approved plans/procedures will be resolved. Corrective actions for unsatisfactory conditions or practices will be verified by the UXO Safety Officer (UXOSO)/Quality Control Specialist (QCS), the Senior Geophysicist or appropriate UXOSO/QCS or geophysicist designee, prior to granting approval to proceed. The specified QC activities performed during the initial phase, and results of those activities will be documented on the Quality Control Inspection (QCI) Report (Appendix F) of this Work Plan, and the QC field log book.

4.10 FOLLOW-UP PHASE INSPECTION (SURVEILLANCE)

4.10.1 The follow-up phase inspection is performed on both a scheduled and unscheduled basis. The purpose of the inspection is to ensure a level of continuous compliance and workmanship. The SUXOS, QCS, Senior Geophysicist, and Dive Supervisor are responsible for on-site monitoring of the practices and operations taking place and verification of continued compliance with the specifications and requirements of the SOW, approved Standard Operating Procedures (SOPs), and the approved Dive Plan. The following will be performed for each definable feature of work:

4.10.1.1 Inspections/surveillance to ensure that the work is in compliance with the SOW and Work Plans;

4.10.1.2 Inspections/surveillance to ensure the required level of workmanship is maintained;

4.10.1.3 Inspections/surveillance to ensure each project log book is properly filled out and maintained;

4.10.1.4 Inspections/surveillance to ensure the data management system is properly tracked and backed up; and

4.10.1.5 Inspections/surveillance to check the “false positive” anomalies.

4.10.2 Follow-up results, either negative or positive, will be documented on the QCI Report contained in Appendix F of this Work Plan, in the QC field log book, reported to the Project Manager, and summarized in the Final Report.

4.11 DEFICIENCIES AND NONCONFORMANCE

4.11.1 All equipment deficiencies or nonconformance conditions discovered during inspection or other QC functions will be documented by UXB or its respective contractors and provided to the USACEH PM

4.12 ROOT CAUSE ANALYSIS

4.12.1 Any deficiencies or nonconformance of instrumentation, equipment or procedures will be documented by UXB or its respective contractors and a root cause analysis of a deficiency or nonconformance will be conducted as part of the QC process. Root cause analysis is the responsibility of the Project Manager or his/her designee with the assistance of the UXO Quality Control Specialist (UXOQCS) and/or Senior Geophysicist. Criteria considered in the analysis will include staff qualifications and training, adequacy of procedures, adequacy of equipment, and adequacy of QC measures.

4.12.2 Input will be obtained as necessary from field personnel and technical advisors in order to identify the factors which led to the problem. The root cause is always "upstream" from where the problem was detected. Two strategies that will be employed for determining the root cause of a deficiency or nonconformance for this project are; tracing the problem back to the source; and evaluating the cause using basic questions such as who, what, when, where, why, and how.

4.12.3 "Why" is probably the most beneficial question to ask when attempting to arrive at a root cause. This question may need to be asked multiple times before the cause is identified. For example, "Why did A happen?" Answer: "Because of B," "Why did B happen?" Answer: "Because of C." This process is carried on until the real cause is identified.

4.13 CORRECTIVE ACTION

4.13.1 Following the root cause analysis, the PM will perform analysis of potential solutions (corrective actions) to determine which remedy is most effective in correcting the problem. The process will include all appropriate personnel and will be documented via meeting notes and information listed in the QC field log book. Potential remedies considered may include supplemental personnel training, changes of equipment or modification of equipment currently in use, acquisition of supplemental equipment, implementation of new procedures or modification of existing procedures, and changes in QC procedures.

4.13.2 The decision to implement appropriate corrective action is the responsibility of the PM, however, all parties involved prior to implementation should agree on this decision.

4.14 QC DOCUMENTATION

4.14.1 All QC records and documentation will be kept on-site and made available for Government inspection upon request.

4.15 DAILY QC REPORT

4.15.1 The Daily QC Report will be completed by the UXB field investigation team (for land-based analog geophysical investigations and for intrusive investigations) or the appropriate UXB contractor (for land- or water-based geophysical investigations or for water-based intrusive investigations) with a copy provided to UXB's QC Manager. The Daily QC for diving will be done by the Dive Supervisor after each day of diving.

4.16 MONTHLY QC REPORT

4.16.1 The Monthly QC Report is used to summarize, record, and track progress of QC activities that have occurred within the previous month. This form will be completed by the Corporate QC Manager on the first business day of a new month.

4.17 LESSONS LEARNED

4.17.1 The Lessons Learned Form (Appendix F) affords the UXOQCS the opportunity to formally record new techniques or methods that were implemented on a project and share them with other projects for evaluation and inclusion at those sites. This form is completed as new lessons learned arise. All lessons learned will be consolidated and presented in the RI Report.

This Page Intentionally Left Blank

5 EXPLOSIVES MANAGEMENT PLAN

5.1 GENERAL

5.1.1 This Explosives Management Plan details the procedures for managing explosives in accordance with applicable regulations. It is written in accordance with the following policies and federal, state, and local laws and regulations:

5.1.1.1 UXB Corporate Explosives Management Plan;

5.1.1.2 Bureau of Alcohol, Tobacco, Firearms, and Explosives (BATFE) Publication 5400.7 (ATF - Explosives Law and Regulations);

5.1.1.3 DoD 6055.9-STD (DOD Ammunition and Explosives Safety Standards);

5.1.1.4 Department of Transportation (DOT) Regulations (49 CFR Parts 107, 171-180, and 390-397); and

5.1.1.5 AR 190-11 (Physical Security of Arms, Ammunition, and Explosives).

5.2 LICENSES/PERMITS

5.2.1 UXB will maintain a copy of the following documents on-site. These documents will be made available (upon request) to any authorized federal, state, or local authority. They are included as attachments at the end of this Chapter.

5.2.1.1 BATFE User of High Explosives License. License Number 1-VA-121-33-7K-11586

5.2.1.2 BATFE Notice of Clearance For Individuals Transporting, Shipping, Receiving or Possessing Explosive Materials for License Number 1-VA-121-33-7K-11586

5.3 ACQUISITION

5.3.1 Description and Estimated Quantity of Explosives

5.3.1.1 UXB strives to minimize the quantity of explosives on-hand throughout the conduct of operations under this task order (TO). Accordingly, it is our intention to purchase only the minimum amount of explosives that is likely to be consumed during the course of this Task Order.

5.3.1.2 Explosives will be maintained in a BATFE Type II explosive magazine sited in the same location as that used for the TCRA Explosives will be used for disposal of UXO recovered during RI intrusive investigation, as well asfor emergency recovery/disposal of UXO at Martha’s Vineyard.

5.3.1.3 **Table 5-1** lists the anticipated supply of explosives that will be procured and stored in the magazine for this operation.

Table 5-1: Anticipated Explosives Requirements

Units	Item	Size	Phasing	JRCp/n	Charge Name	Explosive Load	DOT	UN #	Total NEW (lbs)
500	Shape Charge	3-1/8"	90	100010848	3-1/8" GSC 4 SPF RDX DP Shape Charge	10.5 grams RDX	0441	0441	13.23
2000	Detotec	80		101001677	Detonating Cord	80 grain PETN	1.1D*	0289	22
100	Rock Star Dets		Electric all fire amps .8	101205299	Rock Star Detonators	RDX .001 kilograms	1.4B	0255	.22

(*) CFR 173.63 shipping exemption as 1.4D if NEW ≤ 99 lbs (UN0289)

Blasting Cap Magazine = 0.13 lbs NEW

Explosive Magazine =16.7 lbs NEW

5.3.2 Acquisition Source

5.3.2.1 UXB will acquire the explosives identified in **Table 5-1** from Jet Research, Alvarado, Texas.

5.4 INITIAL RECEIPT

5.4.1 Procedures for Receipt of Explosives

5.4.1.1 The SUXOS will designate a Demolition Supervisor to maintain all explosives documentation. The Demolition Supervisor shall have the minimum qualifications of a UXO Technician III. The Demolition Supervisor will also be listed on the UXB BATFE Notice of Clearance as being cleared to receive, use, and possess explosives. **Figure 5-1** illustrates the procedures to be followed for receiving explosives.

5.4.1.2 Upon receipt of the initial explosives, the Demolition Supervisor will:

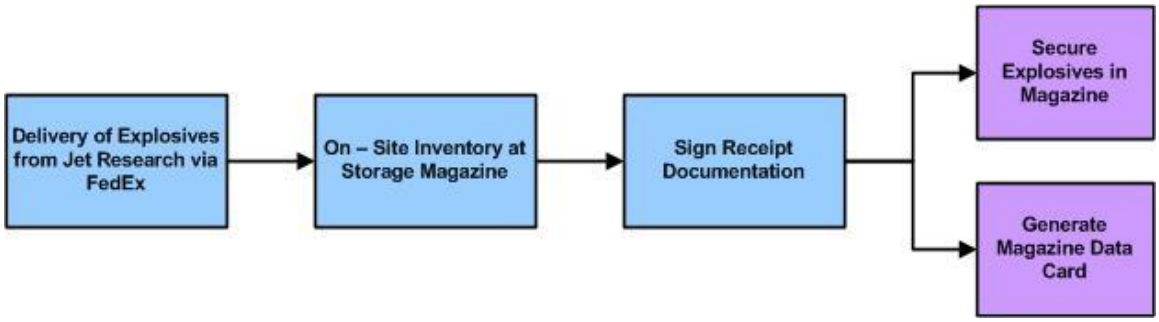
5.4.1.2.1 Conduct a 100% inventory of the shipment to ensure that the explosives delivered match the explosives listed on the receipt documentation. When conducting a 100% inventory, each box will be opened and each item will be counted to verify that the number of items received match the number of items noted on the receipt documentation.

5.4.1.2.2 Sign the receipt documents and assume responsibility for the explosives.

5.4.1.2.3 Complete Magazine Data Cards to document the initial inventory of each explosive material. Two duplicate sets of magazine data cards will be maintained – the Demolition Supervisor will be responsible for ensuring that both sets are

current and up-to-date. One set will be placed in the Magazine; the SUXOS will maintain the second set when explosives are drawn and placed into the day box.

Figure 5-1: Procedures for Receipt of Explosives



5.4.2 Reconciling Discrepancies in Quantities Shipped and Received

5.4.2.1 If the quantities annotated on the receipt documentation do not match the quantities reflected in the inventory, the SUXOS will contact the originator of the receipt documentation. UXB personnel will only sign for the actual quantity of material received, and the actual quantities received shall be properly annotated on the shipping documentation prior to UXB accepting delivery.

5.5 STORAGE

5.5.1 Explosives Storage Facility

5.5.1.1 Explosive demolition materials will be stored in an unbarricaded ATF Type II explosives storage magazine. The magazine location is IAW the ESP, Chapter 6.. The total maximum net explosive weight (NEW) stored in the magazine will not exceed 100 pounds. These commercial explosives will have assigned DOD hazard division/storage compatibility groups (HD/SCG) and will be stored in accordance with DOD 6055.09-STD, DA Pam 385-64 and any state and local regulations.

5.6 TRANSPORTATION

5.6.1 Safety is the primary concern when transporting explosive materials. The most obvious requirements are to protect personnel, the general public, and the environment from fire, blast, noise, fragmentation, and toxic releases.

5.6.2 From Storage Facility to Disposal Locations

5.6.2.1 UXB will segregate the material identified for transport by type and load it into a vehicle meeting the regulations of 49 CFR and applicable state laws. UXB personnel will block and brace (as required) the explosives material.

5.6.2.2 Prior to movement, the driver will visually inspect the explosive laden vehicle to ensure the load is properly secured and acceptable-to-move; the Demolition Supervisor will oversee the loading. The driver will check the explosives containers to ensure they are loaded, blocked, braced, tied-down, or otherwise secured to the vehicle body to prevent movement.

5.6.2.3 The Demolition Supervisor will ensure that the following general safety precautions are observed:

5.6.2.3.1 Blasting caps and high explosives will be separated at all times. Transport the items in separate vehicles, or if transporting in one vehicle, use a container specifically designed for transporting blasting caps (such as an IME22 or MK663).

5.6.2.3.2 If the closed container is not waterproof, explosives will be covered at all times with a flame resistant tarpaulin (or in a waterproof or spark proof container), except when loading or unloading.

5.6.2.3.3 Explosives will not be transported in the passenger compartment of a vehicle.

5.6.2.3.4 The cargo compartment must be lined with a non-metallic material in any portion that comes in contact with the load.

5.6.2.3.5 Vehicle must be equipped with a fire extinguisher having an Underwriters' Laboratories rating of 10 B-C or more.

5.6.2.3.6 Explosive laden vehicles will not be left unattended.

5.6.2.3.7 No person is permitted to ride on or in the cargo compartment.

5.6.2.3.8 Smoking is prohibited in and around vehicles transporting explosives.

5.6.2.3.9 Refuel vehicles only when there is no explosive cargo.

5.6.2.3.10 Vehicles will not exceed the posted speed limit. If a prudent speed is less than the posted speed limit, the operator may not exceed a safe and reasonable speed.

5.6.2.3.11 Transportation of explosives over public roads is not authorized unless all Department of Transportation (DOT) requirements are met to include manifest, proper UN approved packaging, proper labeling and placards.

5.6.3 Vehicle Requirements

5.6.3.1 Vehicles will be designated and inspected to determine that they are suitable and properly equipped to transport explosives. Prior to transporting explosives, the

vehicle will be inspected utilizing DD Form 626 (Motor Vehicle Inspection Form for transporting hazardous material).

5.7 RECEIPT PROCEDURES

5.7.1 This section applies to the on-site receipt of explosives from the vendor. Explosives that are stored at the vendor's facility will remain property of the vendor until received by UXB staff in accordance with the procedures of this chapter.

5.7.2 Accounting for Each Explosive Item

5.7.2.1 Upon receipt of explosives, the Demolition Supervisor will conduct a 100% inventory of the shipment to ensure the quantities noted on the shipment papers mirror those actually received. The Demolition Supervisor will then generate Magazine Data Cards for each explosive type.

5.7.2.2 The Demolition Supervisor and SUXOS are the only personnel authorized to draw explosives from storage. When explosives are required for on-site demolitions, the Demolition Supervisor or SUXOS will issue explosives to the Demolition Team. The Demolition Supervisor will annotate the appropriate set of Magazine Data Cards to reflect the quantities used and remaining. Both sets of Magazine Data Cards will be updated each time explosives are issued/received, and each time an inventory is conducted.

5.7.3 Authorized Individuals

5.7.3.1 A UXB-authorized official (as determined in UXB's Corporate Explosive Management Plan) will designate in writing the BATFE UXB personnel who are authorized to receive, store, issue, transport, and use explosives; a copy of the BATFE letter will be maintained on-site.

5.7.3.2 Other personnel (such as the UXO Safety Officer, UXO Quality Control Specialist, or USAESCH Safety Specialist) will only be granted escorted access in order to perform their respective duties.

5.8 INVENTORY

5.8.1 The following inventory requirements apply for all explosive demolition material owned by UXB. UXB will only own explosives after they have been delivered to the site and will be stored in UXB-controlled magazines for same day use.

5.8.2 Physical Inventory of the Explosives in the Explosives Storage Facility

5.8.2.1 The Demolition Supervisor will perform a physical inventory of the explosives to reconcile the actual quantities with the quantities annotated on the Magazine Data Cards. The physical inventory requires a 100% count of all explosive items.

5.8.3 Reconciliation of Discrepancies

5.8.3.1 Any discrepancies will be immediately reported to UXB's SUXOS, who will initiate an audit to determine the source of the discrepancy. During the audit, the SUXOS will inventory 100% of the explosives storage facilities and review and reconcile all documentation – receipts, Magazine Data Cards, Demolition Supervisor's Log, Quality Control Specialist's Log

5.8.3.2 If the discrepancy cannot be clarified, the SUXOS will immediately notify UXB's Director of Explosives Management and will proceed with the authority notifications as outlined in Section 5.8.4 below.

5.8.4 Lost, Stolen, or Unauthorized Use of Explosives

5.8.4.1 In the event of any lost, stolen, or unauthorized use of explosives, the SUXOS will notify the:

5.8.4.1.1 USAESCH Contracting Officer, UXB's PM, and UXB's President -- immediately via telephone; and within 24-hours via written report.

5.8.4.1.2 BATFE within 24-hours of discovery at **1-800-461-8841** during normal working hours, or **1-888-283-2662** after hours or weekends**;** and in writing by completing an **ATF Form 5400.5** (Figure 5-2) and transmitting it to the ATF Bomb Data Center Fax: **1-866-927-4570.**

5.8.4.1.3 U.S. Army Engineering and Support Center, Huntsville, (in writing) within 24 hours of discovery

5.8.4.1.4 **Local Law Enforcement within 24 hours of discovery to obtain a police report.**

Failure to make notification to the BATFE within 24 hours of discovery of lost or stolen explosives is a felony punishable with fines of up to $1,000, imprisonment up to 1 year, or both.

5.8.5 Disposing of Any Explosives Remaining at the End of Site Activities

5.8.5.1 As operations progress and near completion, UXB will closely monitor the inventory of explosives to minimize the explosives inventory on-hand at the completion of the demolition activities at the end of day.

5.8.5.2 At the end of site activities, UXB will make a decision whether to dispose of the remaining explosives through one or more “clean up shots” or to transfer the unused stock to VRHabilis for continued use in emergency response activities on Martha’s Vineyard. Such a decision will be based on the cost/savings of transferring stocks vs. disposing the remaining explosives through detonation.

Figure 5-2: ATF Form 5400.5

U.S. Department of Justice
Bureau of Alcohol, Tobacco, Firearms and Explosives

OMB No. 1140-0026 (01/31/2009)

Report of Theft or Loss - Explosive Materials

For ATF Use Only

Date Received	Time Received	Unique Identifier

Upon discovery of any theft or loss of any of your explosive materials:
- First, contact ATF toll free at 1-800-461-8841 between 8:00 a.m. - 5:00 p.m. EST (or after hours and weekends contact ATF at 1-888-283-2662) or at 202-648-9040 to report the theft or loss;
- Second, contact your local law enforcement office to report the theft or loss to obtain a police report; and
- Third, complete this form and attach any additional reports, sheets or invoices necessary to provide the required information, and fax the form with additional material(s) to the ATF U.S. Bomb Data Center (USBDC).

To Be Completed By Person Making Report

1. Date

2. Type of Report *(Check one)*: **Theft** ☐ **Loss** ☐

3. Full Name of Person Making the Report *(Last, First, Middle)*

4. Corporate or Business Name *(If applicable)*

5a. Office Address *(Street Address, City, State, and Zip Code)*

5b. Telephone Number

6. Actual Location of Theft or Loss *(if different from item 5a)*

7. Theft or Loss	Date	Time
a. Discovered		
b. Occurred *(Show approximate if exact not known)*		
c. Reported to ATF by Telephone		
d. Reported to Local Authorities		

8. Name of Local Law Enforcement Officer to Whom Reported

9. Agency Name and Address of Local Authority to Whom Reported

10. Telephone Number

11. Police Report Number

12. Explosive Materials Lost or Stolen *(Attach invoices or additional sheets, if necessary)*

a. Manufacturer	b. Brand Name	c. Date Shift Code	d. Size	e. Quantity *(Pounds of Explosives, Number of Dets)*	f. Type and Description *(Dynamite, Blasting Agents, Detonators, etc. Include for each type, size, MS delay or length of legwire, as applicable)*

13. Theft or Loss Occurred From *(Check applicable box)*

Permanent Magazine ☐ Portable Magazine ☐ Truck ☐ Work Site ☐ Other *(Explain)* ☐ _____

ATF E-Form 5400.5
Revised January 2006

14. Method of Entry *(Complete if applicable)*				15. Hood Defeated *(If yes, check the applicable box below)* Yes ☐ No ☐	
Locks Cut	☐	Inside Help	☐	Broken	☐
Locks Picked	☐	Wall Entry	☐	Cut	☐
Door Unlocked	☐	Key Stolen/ Used	☐	Removed	☐
Door Blown Open	☐			Inadequate for Lock Used	☐

16. Other Information Pertinent to the Theft or Loss

17. Signature and Title of Person Making Report	18. Federal Explosives License or Permit Number

Reporting Instructions

Fax this completed form to the ATF address listed below or call if no fax is available:

Bureau of Alcohol, Tobacco, Firearms and Explosives
U.S. Bomb Data Center
P.O. Box #50980
Washington, DC 20091
Toll Free Fax: 1-866-927-4570

Questions regarding the completion of this form should be referred to the U.S. Bomb Data Center toll free at 1-800-461-8841.

Privacy Act Information

The following information is provided pursuant to section 3 of the Privacy Act of 1974 (5 U.S.C. § 522a(e)(3))

1. **Authority.** Solicitation of this information is made pursuant to Title XI of the Organized Crime Control Act of 1970 (18 U.S.C. Chapter 40). Disclosure of a theft or loss of explosive materials is mandatory pursuant to 18 U.S.C. § 842(k) for any person who has knowledge of such theft or loss from his stock.

2. **Purpose.** The purpose for the collection of this information is to give ATF notice of the theft or loss of explosive materials, and to furnish ATF with the pertinent facts surrounding such theft or loss. In addition, the information is used to confirm and verify prior notification of this theft or loss of explosive materials.

3. **Routine Uses.** The information will be used by ATF to aid in the administration of laws within its jurisdiction concerning the regulation of explosive materials and other related areas. In addition, the information may be disclosed to other Federal, State, foreign, and local law enforcement of laws within their jurisdiction.

4. **Effects of not supplying information requested.** 18 U.S.C. § 842(k) makes it unlawful for any person, who has knowledge of the theft or loss of explosive materials from his stock, to fail to report such theft or loss within twenty-four hours of discovery thereof, to the Secretary and to appropriate local authorities. The penalty for violation of this section is a fine of not more than $1,000 or imprisonment for not more than one year, or both. 18 U.S.C. § 844(b)

Paperwork Reduction Act Notice

This request in accordance with the Paperwork Reduction Act of 1995. The purpose of this information collection is to report the theft or loss of explosive materials. The information is used for investigative purposes by ATF officials. This information is mandatory by statute. (18 U.S.C. § 842)

The estimated average burden associated with this collection of information is 1 hour and 48 minutes per respondent or recordkeeper, depending on individual circumstances. Comments concerning the accuracy of this burden estimate and suggestions for reducing this burden should be addressed to Reports Management Officer, Document Services Branch, Bureau of Alcohol, Tobacco, Firearms and Explosives, Washington, DC 20226.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

ATF E-Form 5400.5
Revised January 2006

Attachment 5-1: BATFE User of High Explosives License

DEPARTMENT OF THE TREASURY - BUREAU OF ALCOHOL, TOBACCO AND FIREARMS

LICENSE/PERMIT (18 U.S.C. CHAPTER 40, EXPLOSIVES)

In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 555) you may engage in the activity specified in this license/permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. See "WARNING" and "NOTICES" on back.

DIRECT ATF CORRESPONDENCE TO
Christopher R. Reeves
Chief, Federal Explosives Licensing Center (FELC)
Bureau of Alcohol, Tobacco, Firearms and Explosives
244 Needy Road
Martinsburg, West Virginia 25405
Telephone: 1-877-283-3352 Fax: 1-304-616-4401

LICENSE/PERMIT NUMBER: 1-VA-121-33-3K-11586

EXPIRATION DATE: October 1, 2013

NAME
UXB INTERNATIONAL INC

Premises Address CHANGES? You must notify the FELC at least 10 days before the move.
2020 KRAFT DRIVE STE 2100
BLACKSBURG, VA 24060-

TYPE OF LICENSE OR PERMIT
33-USER OF HIGH EXPLOSIVES

CHIEF, FEDERAL EXPLOSIVES LICENSING CENTER (FELC)
Christopher R. Reeves
Christopher R. Reeves

PURCHASING CERTIFICATION
I certify that this is a true copy of a license/permit issued to me to engage in the activity specified.

(SIGNATURE OF LICENSEE/PERMITTEE)

Mailing Address CHANGES? You must notify the FELC at least 10 days before the change.
UXB INTERNATIONAL INC
2020 KRAFT DR STE 2100 ATTN STACY LUCAS
BLACKSBURG, VA 24060-

The licensee/permittee named herein shall use a reproduction of this license/permit to assist a transferor of explosives to verify the identity and status of the licensee/permittee as provided in 27 CFR Part 555. The signature on each reproduction must be an ORIGINAL signature.

ATF F 5400.14/5400.15, Part 1 (8/89)

Attachment 5-2: BATFE Notice of Clearance for Individuals Transporting, Shipping, Receiving, or Possessing Explosive Materials

Bureau of Alcohol, Tobacco, Firearms and Explosives
Federal Explosives Licensing Center (FELC)
www.atf.gov

244 Needy Road
Martinsburg, West Virginia 25405
telephone: (877)283-3352 fax: (304)616-4401

10/01/2010

NOTICE OF CLEARANCE
for individuals transporting, shipping, receiving, or possessing explosive materials.

ISSUED TO: UXB INTERNATIONAL INC
NOTICE DATE: 10/01/2010

Federal Explosives license/permit no.: 1-VA-121-33-3K-11586
Expiration Date: **October 1, 2013**
Explosives License/Permit Type: 33-USER OF HIGH EXPLOSIVES

EXPIRATION DATE: This Notice expires when superseded by a newer Notice which will list all current responsible persons and employee possessors, or when the license or permit expires - whichever comes first.

1. **WARNING. Only those individuals listed below as RESPONSIBLE PERSONS and EMPLOYEE POSSESSORS with a background clearance status of "CLEARED" or "PENDING" are authorized to transport, ship, receive, or possess explosive materials in the course of employment with you.**
2. **"DENIED" STATUS. If an employee possessor has a background clearance status of "DENIED", you MUST take immediate steps to remove the employee from a position requiring the transporting, shipping, receiving, or possessing of explosive materials. Also, if the employee has been listed as a person authorized to accept delivery of explosive materials, you MUST remove the employee from such list and immediately, and in no event later than the second business day after such change, notify distributors of such change, as stated in 27 CFR 555.33(a).**
3. **CHANGE IN RESPONSIBLE PERSONS. You MUST report any change in responsible persons to the Chief, Federal Explosives Licensing Center, within 30 days of the change and new responsible persons MUST include "appropriate identifying information" as defined in 27 CFR 555.11. Fingerprints and photos are NOT required, however they will be required upon renewal of the license or permit.**
4. **CHANGE OF EMPLOYEES. You MUST report any change of employee/possessors to the Chief, FELC, within 30 days. Reports relating to newly hired employees must be submitted on ATF Form 5400.28 for EACH employee.**

Premises Address: 2020 KRAFT DRIVE STE 2100
BLACKSBURG, VA 24060

Mailing Address:
UXB INTERNATIONAL INC
2020 KRAFT DR STE 2100 ATTN STACY LUCAS
BLACKSBURG, VA 24060

This 'Notice of Clearance' is provided to you as required by 18 U.S.C. 843(h) and MUST be retained as part of your permanent records and be made available for examination or inspection by ATF officers as required by 27 CFR 555.121. If you receive a Notice subsequent to this Notice, this Notice will no longer be valid.

In accordance with 27 CFR 555.33, Background Checks and Clearances, and 27 CFR 555.57, Change of Control, Change in Responsible Persons, and Change of Employees, ATF's Federal Explosives Licensing Center (FELC) has conducted background checks on the individual(s) you identified as a responsible person(s) and an employee/possessor(s) on your application, or reported after the issuance of your license/permit.

The following is a SUMMARY of the results of the background checks conducted on the individuals you reported as responsible persons and employee/possessors. ATF will be notifying ALL individuals listed on this document of their respective status by separate letter mailed to their residence address.

PLEASE BE ADVISED THAT IT IS UNLAWFUL FOR ANY PERSON REFLECTING A STATUS OF "DENIED" TO TRANSPORT, SHIP, RECEIVE, OR POSSESS EXPLOSIVE MATERIALS.

Please carefully review this Notice to ensure that all the information is accurate. If this Notice is incorrect, please return the Notice to the Chief, FELC, with a statement showing the nature of the error(s). The Chief, FELC, shall correct the error, and return a corrected Notice.

Number of RESPONSIBLE PERSON(S) : 7
Number of EMPLOYEE POSSESSOR(S): 4

LAST NAME, First Name, Middle Name	Clearance Status
RESPONSIBLE PERSONS:	**7**
0001 DUGGER, RICHMOND H III	Cleared
0002 DUGGER, RICHMOND H IV	Cleared
0003 FOGLESON, PATRICK KELLY	Cleared
0004 HEATON, HARLEY LOWRY III	Cleared
0005 KIEREPKA, JOHN JOSEPH	Cleared
0006 STINE, JOHN JACOB	Cleared
0007 TOMIKO, JAMES MATTHEW	Cleared

continued

LAST NAME, First Name, Middle Name	Clearance Status
EMPLOYEE POSSESSORS:	**4**
0001 HAMEL, JAMES ERIC	Cleared
0002 HUNTER, JEFFREY GEORGE	Cleared
0003 KAMPER, GEORGE ARTHUR	Cleared
0004 MILLER, MARK ALAN	Cleared

page 1 of 1

This Page Intentionally Left Blank

Explosive Site Plan

Correction 1

REMEDIAL INVESTIGATION/FEASIBILITY STUDY

Former Cape Poge Little Neck Bomb Target Site
Former Moving Target Machine Gun Range
Tisbury Great Pond

Martha's Vineyard, Massachusetts

D01MA0595

September 2010

Prepared by

U.S. Army and Engineering Center, Huntsville

TABLE OF CONTENTS

ection Page

0 SITE **1**

0 ANTICIPATED DATES **1**

0 PURPOSE **1**

0 SITE BACKGROUND AND CURRENT CONDITIONS **1**

0 EXECUTING AGENCIES **3**

0 SCOPE OF INVESTIGATIVE ACTION **3**

0 SAFETY CRITERIA **4**

0 METHODS OF DISPOSAL **6**

PPENDIX A – MAPS **A1**

PPENDIX B – CALCULATION SHEETS **B1**

(Please See Appendix G for the Calculation Sheets)

1. **Site:**
   - **a.** Name: Chappaquiddick Island, Dukes County
   - **b.** State: Massachusetts
   - **c.** This remedial investigation (RI) is being performed under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and is part of the overall Remedial Action Process. Subsequent removal responses may be dictated in the future during the remainder of the remedial response process, as determined by action memoranda or other decision documents. Based on the results of this characterization and subsequent decision document, an Explosives Safety Submission (ESS) will be submitted in accordance with DoD 6055.09-STD.

2. **Anticipated Dates:**
   - **a.** Start: June 21, 2010

3. **Purpose:**
   - **a**. Munitions Response Site (MRS) remedial investigation and characterization to collect the information needed to design the required munitions response and to prepare, as appropriate, an ESS for the selected response.
   - **b**. Clarifies that qualified UXB International personnel will perform all munitions and explosives of concern (MEC) related operations at the site.

4. **Site Background and Current Conditions:**
   - **a.** The Former Cape Poge Little Neck Bomb Target Site consists of approximately 141 acres on Little Neck and Cape Poge Beach on Chappaquiddick Island in the Town of Edgartown, Massachusetts on Martha's Vineyard. The site is part of the Cape Poge Wildlife Refuge.
     - **1)** The United States Navy acquired four leasehold land interests for approximately 141 acres beginning in July 1944. The leases were acquired by the Department of the Navy for the purpose of a bombing target. One lease was terminated on 31 March 1946 and the other three terminated on 18 May 1947. By 1959, most of Cape Poge had been donated to the Trustees of Reservations. The Refuge is open to the public for recreational use.
     - **2)** The Inventory Project Report (INPR) for the former Cape Poge Little Neck Bomb Target Site was completed in May 2008 and established the eligibility of this site as a Formerly Used Defense Site (FUDS).

3) The USAESCH performed initial geophysical studies in the former Cape Poge Little Neck Bomb Target Site on 7 August 2008. In addition, the St. Louis District developed the Preliminary Assessment for this project site on 25 February 2009.

4) Military practice ordnance, including Mk23 practice bombs, have been observed on the property.

b. The former Moving Target Machine Gun Range at South Beach was located along the southern shore of Martha's Vineyard, south of Edgartown, Massachusetts. Due to the beach erosion the former range is now approximately 150 yards off South Beach. South Beach is managed by the Commonwealth of Massachusetts, Department of Resource and Conservation (MassDRC) and managed by Edgartown Parks and Recreation Department from May 1 through Labor Day of each year.

1) The Department of the Navy leased approximately 264.3 acres for military training at South Beach. The gunnery range was used by Naval Air Station Quonset Point, Rhode Island for aerial machine gun and rocket firing practice. A Target Car Shelter, an oval shaped target, and other support features were constructed within a few yards of the ocean. A large portion of the beach has eroded since 1947.

2) During 1988-1989, a removal of unexploded ordnance was performed on the beach and dunes of South Beach. No removal was performed in the water. The former Moving Target Machine Gun Range at South Beach INPR was amended in July 2008 to include adjoining lands east to Norton Point and Wasque Point.

3) During the 2009 Time-Critical Removal Action (TCRA) at South Beach, approximately 700 MEC items were located. Forty-two MEC items were perforated and determined to be inert. Based on the findings of the TCRA, the MEC items of interest at South Beach include, but may not be limited to Mk 1 5-inch rockets, 3.5-inch rockets, and 3.25-inch rockets.

c. Tisbury Great Pond is comprised of approximately 500 acres, the majority of which is within tidal waters. The site was used as a dive-bombing and strafing range between August 1943 and July 1947. It is located in Dukes County, Martha's Vineyard and is almost evenly divided between the towns of West Tisbury and Chilmark. The Archive Search Report (ASR) and the 2008 Site Inspection (SI) Report indicate that the type of munitions used on this range were conventional. Since military use of the FUDS ceased, numerous reports of practice bombs have been reported by local residents, wildlife refuge officials, and USACE personnel. No MEC or MD were observed during the 2008 SI field reconnaissance. Munitions documented as being used include: small arms (30

and 50 Cal. Ammunition), Practice Bombs (AN-Mk 5, AN-Mk 23, AN Mk 43, Mk 15 and Mk 21 Practice Bombs).

d. Figure 4-1 in Appendix A depicts the locations of all sites covered under this ESP.

5. Executing Agencies:

a. US Army Corps of Engineers, New England District

b. US Army Corps of Engineers, Huntsville Center

c. Contractor, UXB International, Inc.

6. Scope of Investigative/Characterization Action:

a. Each MRS at this FUDS has areas of land, beach, inland water, and ocean.

b. A surface and subsurface (to depth of detection) investigative action in all areas is to be conducted to fully characterize the site to determine the extent and boundaries of contamination, MEC and Munitions Constituents (MC), and identify possible future remedial actions. MC soil borings will be done using anomaly avoidance.

c. Ocean Area Surveys

1) Analog transects will be conducted outward to approximately 100 yards into the ocean, with the potential of going further out if anomalies are still being encountered in order to delineate the nature and extent of MEC contamination that may have extended beyond the MRS boundaries. Transects will be conducted primarily from shore, although boat dives are also anticipated. If the RI/FS is required outside of the MRS boundaries, an Amendment to this ESP will be submitted.

2) Water depth data from the NOAA maritime charts of the area surrounding Martha's Vineyard and Chappaquiddick reveal that the maximum water depth expected to be encountered is less than 45 feet dependent on the tide. No depths will be investigated deeper than 100 feet unless a manned recompression chamber is available for diver use (in accordance with EM 385-1-1).

3) Analog 100'X100' grids will be conducted based on the analog transect results.

4) Only one dive team will conduct activities in the ocean area at a time.

d. Inland Water Area Surveys

1) An EM Diver Sled™ (new hybrid system developed by Aqua Survey, Inc.) will be used to perform DGM transects and grids. Transects will be pre-

determined and programmed into EM System for positioning and Tracking. Transects will be conducted with a vessel towed sled or a diver pushed coil depending on water depth (<4' Diver Coil, >4' Towed Sled). Diver Coil will be diver propelled and the Towed sled will be pulled behind a vessel.

2) Only one dive team will conduct activities in the inland water area at a time.

e. The investigative action will identify possible future remedial action areas for this site.

f. Land and Beach Areas: UXO-qualified personnel will manually complete anomaly investigations by digging by hand or mechanical excavation. Earth-moving machinery (EMM) may be used to assist in excavation efforts unless site constraints or accessibility restrict or prohibit such use. EMM will not be used to excavate within 12 inches of an anomaly. When an anomaly excavation gets within approximately 12 inches of an anomaly, manual excavation must be used to complete the excavation.

g. Inland Water and Ocean Areas: Anomalies will be reacquired with GPS and an underwater magnetometer. Underwater excavation of anomalies will be performed by UXO-qualified personnel using one of two possible methods: an airlift or a water jet, both diver-operated. Both technologies are considered to be "low output" devices. The anomaly is located by use of magnetometer, and the water jet and/or airlift is used to remove the overburden. Both means of excavating are extremely safe since the item is not touched or disturbed until a positive identification and determination of condition is made. Excavations of over ten feet are not unusual utilizing these methods thus allowing investigation to "Depth of Detection" for most ordnance.

1) The airlift is a non-intrusive suction device that siphons sand and gravel from the bottom through a pressurized air tube away from the anomaly (the sand and gravel is released through a tube behind the diver). No screen is used on the 7.5 diameter airlift in order to allow rocks exposed during excavation to pass through the system. The MMPEH expected to be encountered during operations is generally too large to be removed with the airlift. Once the item is partially exposed, the UXO technician will complete the removal of overburden manually with hand removal.

2) A water jet is a non-intrusive self-digging device that utilizes pressurized water that "washes away" or removes overburden from the anomaly. The water jet nozzle is operated by the diver and consists of one small thin stream of water with several smaller jets pointing in the opposite direction to

counter the thrust of the main nozzle. The diver removes overburden by using the water stream to push overburden away from the area of excavation.

h. Table 6-1 identifies the different Munitions Response Sites (MRS) to be investigated within this project location.

Workplan Table 6-1

Area	Type of Investigation	Total acreage of Site	Acreage to be Investigated
Former Cape Poge Little Neck Bomb Target Site	Ocean and Inland Water Surveys, Surface and Subsurface investigation	64.1	3
	Surface & Subsurface Remedial Investigation	236.3	7.5
Former Moving Target Machine Gun Range at South Beach	Ocean and Inland Water Surveys, Surface and Subsurface investigation	268.7	10
	Surface & Subsurface Remedial Investigation	201.4	6.5
Tisbury Great Pond	Ocean Water Surveys, Surface and Subsurface investigation	52.4	5
	Inland Water Surveys, Surface and Subsurface investigation	456.3	13
	Surface & Subsurface Remedial Investigation	259.6	12.5

7. Safety Criteria:

a. The munitions with the greatest fragmentation distance (MGFD) at the site are identified in Table 7-1. During the course of this investigation, if a MEC item with a greater fragmentation distance is encountered, the MSD will be adjusted in accordance with DDESB Technical Paper 16, operations will continue, and an amendment to this ESP submitted expeditiously for approval. The Quantity-Distance (Q-D) Arcs for all MRSs are shown in Appendix A, Figures 7-1 through 7-3.

b. See Appendix B for Fragmentation Data Sheets and Buried Explosion Module (BEM) Calculations.

c. See Table 7-1 for Minimum Separation Distances.

d. Any occupied buildings or public roadways/waterways in the MSD areas during MEC operations will be evacuated and/or roadways/waterways blocked to prevent non-essential personnel from entering during the conduct of MEC operations. Alternatively, engineering controls may be used as follows: Miniature

Open Front Barricade (MOFB) or Open Front Barricade (OFB) for intrusive operations, the Buried Explosion Module (BEM) (see DDESB Technical Paper 16), Sandbag Mitigation or Water Mitigation for disposal operations (see notes in Table 7-1 for appropriate reports governing the use of these engineering controls). The appropriate reports will be available on site for all engineering controls used.

e. During underwater demolition activities (underwater BIP), all vessels and personnel shall be outside of the Blast Withdrawal Distances as calculated in the BEM calculation sheets located in Appendix B. Table 7-2 below provides these minimum distances.

f. All Material Potentially Presenting an Explosive Hazard (MPPEH) and MD will be inspected, certified, verified and disposed of in accordance with DOD Instruction 4140.62, *Management and Disposition of MPPEH* and EM 1110-1-4009, *Military Munitions Response Actions* and Errata Sheet No. 2. This inspection will be certified and verified on DD Form 1348-1 as follows:

"This certifies and verifies that the Material Documented as Safe (MDAS) listed has been 100 percent properly inspected and, to the best of our knowledge and belief, is free of explosive hazards."

Workplan Table 6-2

Table 7-1

Minimum Separation Distances (MSD)

MRS	MEC	MSD (ft)[1]					
		For Unintentional Detonations			For Intentional Detonations		
		Team Separation Distance (K40)	Hazardous Fragment Distance (HFD)	To Sides and Rear using MOFB or OFB	Without Engineering Controls	Using Sandbag Mitigation	Using Water Mitigation (on land/beach)[3]
Cape Poge Little Neck Target Site	3 lb Mk 23 Practice Bomb	6	6 [4]	NA	48 [5]	NA	NA
Former Moving Target Maching Gun Range at South Beach	5-inch Mk 1 Rocket	87	398 [4]	NA	2100	220	275
Tisbury Great Pond	100lb Practice Bomb Mk 15 Mod 3 w/ Mk 7 Spotting Signal	32	32 [4]	NA	257 [5]	NA	NA

Notes:

[1]See Appendix B for calculation sheets documenting MSD.

[2]A = OFB - Open Front Barricade (HNC-ED-CS-S-98-8) ; B = MOFB - Miniature Open Front Barricade (HNC-ED-CS-S-99-1).

[3]See App. B for required sandbag thickness (HNC-ED-CS-S-98-7) and water containment system (HNC-ED-CS-S-00-3).

[4] This is a non-fragment producing item. The K40 will be the MSD during unintentional detonations

[5] This is a non-fragment producing item. The K328 will be the MSD for intentional detonations. In order to reduce the K328 distances, tamping (single or multiple items) may be used in accordance with DDESB Technical Paper 16 and the Buried Explosion Module. These reports will be available on site for all mitigation methods used.

Table 7-2
Vessel and Personnel Withdrawal Distances
Based on the 5-inch Mk 1 Rocket

Workplan Table 6-3

Depth (ft)	Blast Withdrawal Distance (ft)*
5	170
10	77
15	49
20	36
25	28
30	23
35 or greater	19

*BEM Calculation sheets are located in Appendix B. These distances are based off of the largest items expected to be encountered (5-inch Mk 1 Rocket); Therefore, using these distances for the other MRSs is safety conservative.

8. Methods of Disposal:

a. If disposal activities are required, they will be performed by qualified UXB personnel. MEC items that have been determined to be acceptable-to-move by the SUXOS and UXOSO may be moved within the boundaries of the MRS (as required) for disposal operations. The MSDs for intentional detonations are shown in Table 7-1 and Q-D Arcs are shown on Figures 7-1 through 7-3.

b. Items deemed unacceptable to move may be blown-in-place (BIP) during underwater operations. In addition, if determined that an underwater BIP for acceptable to move items is a better option than that of transporting the item to the shore, it may be BIP. The BEM distances at specified depths in Table 7-2 will apply for vessel and personnel withdrawal in the event that an item is BIP underwater.

c. As an additional option (than that stated in section 8.c) for underwater items that do not exceed the MSDs and are deemed unacceptable to move, a remote pull technique may be used to relocate the item to the nearest beach for disposal operations. In this method, a line will be attached to the item. The length of the pull line will exceed the MSD distance for the item to be recovered, and no personnel will be located within that distance. In addition, no personnel will approach the item until it has been dragged clear of the water and the towline detached. Any item located in less than 5 feet of water will be remotely moved on shore.

d. Sandbags (HNC-ED-CS-S-98-7) or water mitigation (HNC-ED-CS-S-00-3) may be used to reduce the intentional detonation MSD as shown in Table 7-1. Sandbag mitigation or water mitigation are approved for disposal of single munitions. Tamping (single or multiple items) may be used in accordance with DDESB Technical Paper 16 and the Buried Explosion Module. These reports will be available on site for all mitigation methods used.

e. Collection points are those areas used to temporarily accumulate MEC pending destruction at the end of the day using consolidated shots. MEC items at collection points must be laid out as shown in “Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites”. The maximum net explosive weight (NEW) at a collection point will be limited such that the K40 overpressure distance for the total NEW does not exceed the HFD for the area.

f. Consolidating multiple MEC is anticipated for this project, US Army Engineering and Support Center, Huntsville (USAESCH) publication “Procedures for Demolition of Multiple Rounds (Consolidated Shots) on Ordnance and Explosives (OE) Sites”, dated March 2000 will be used and a copy of this report will be available on site. The maximum net explosive weight (NEW) for a

consolidated shot will be limited such that the K328 overpressure distance for the total NEW (including donor charges) does not exceed the MSD for the intentional detonation."

g. MEC will be marked and guarded, if necessary, until disposal is accomplished. For all underwater activities, MEC will be marked using a small buoy anchored by a small weight in close proximity to the item.

h. All explosive operations will follow the procedures outlined in TM 60A-1-1-31 and EM 385-1-97, Explosives Safety and Health Requirements Manual, demolition operations will be performed daily or items properly secured until operations can be conducted.

i. One magazine (Figure 8-1) with attached cap box will be located at the designated explosives storage facility location (WGS84 Decimal Degrees: -70.583655, 41.395536). The magazine will be an unbarricaded ATF Type II magazine. The total maximum net explosive weight (NEW) stored in the magazine will not exceed 100 pounds. These commercial explosives will have assigned DOD hazard division/storage compatibility groups (HD/SCG) and will be stored in accordance with DOD 6055.09-STD, DA Pam 385-64 and any local regulations. The magazine will be positioned in accordance with EP 1110-1-18 and Section 55.206 of ATFP 5400.7, Alcohol, Tobacco, and Firearms (ATF) Explosives Law and Regulations.

DA PAM 385-64, Chapter 5-5 states that the inhabited building distance (IBD) for a NEW of 100 pounds or less is 670 feet for magazines that are not earth-covered. The closest building is over 700 feet, and is not inhabited. The traffic for the area is less than 400 car/rail passengers per day, and less than 80 ship passengers per day. Therefore, no Minimum Fragment Distance (MFD) is required (DA PAM 385-64 Section 5-5, and DoD 6055.09-STD Section C9.4.1.2.1.1.5.3). The Public Traffic Route Distance for a NEW of 100 lbs or less is 111 feet, as calculated using DoD 6055.09-STD, Table C2.T1.

The magazine location chosen for this effort does not have controlled access during daylight hours. However, after daylight, all gates are locked. The roads at this location are unimproved dirt roads, and the number of pedestrians walking through the area during the daylight hours is on average of 2 people or less per week. Warning signs will be posted in accordance with MA regulations.

The nearest inhabited building is 0.48 miles away, the end of the runway at Martha’s Vineyard Airport is 1.14 miles away, and the nearest improved public road is 0.43 miles away.

APPENDIX A
MAPS

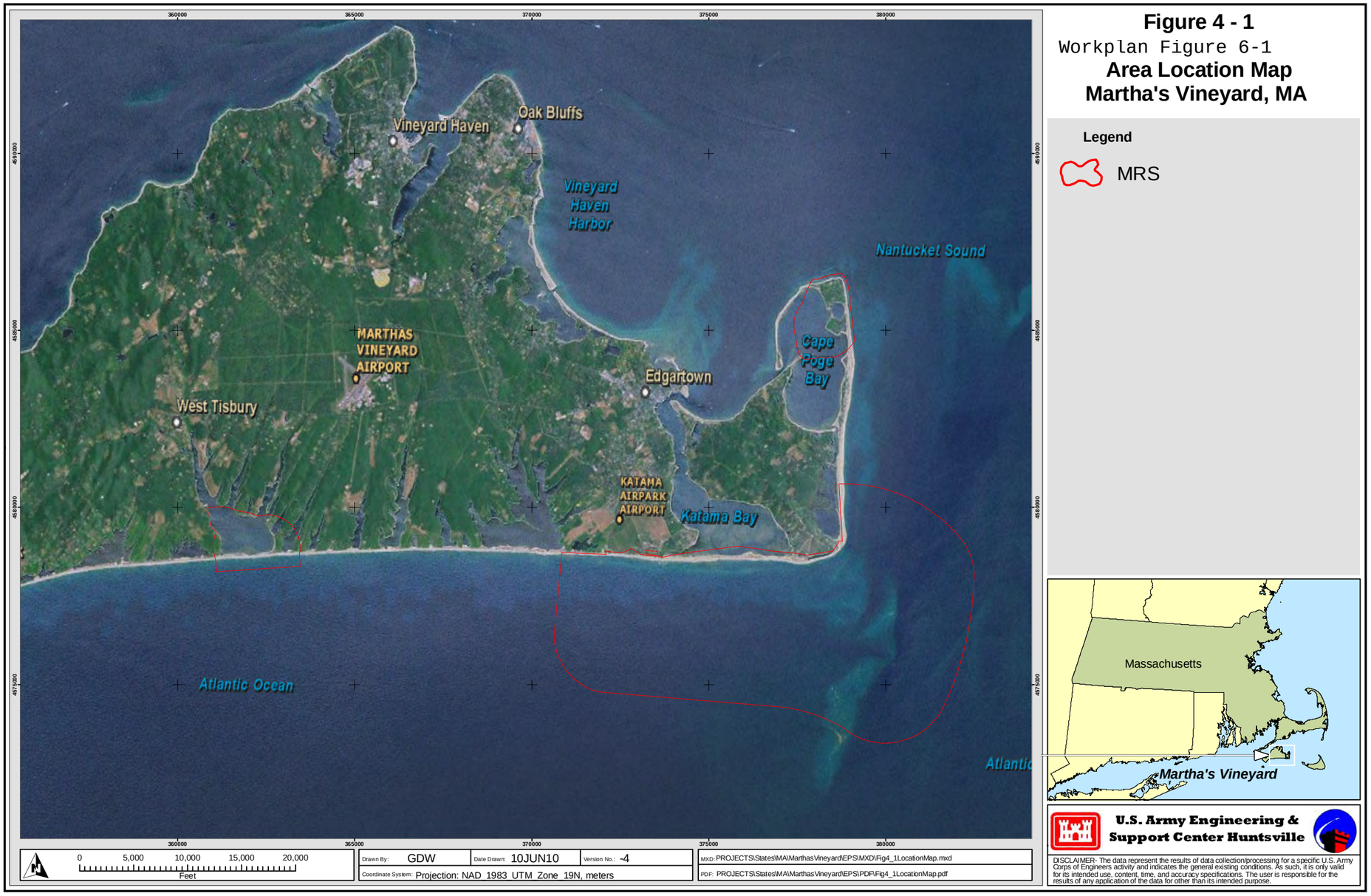


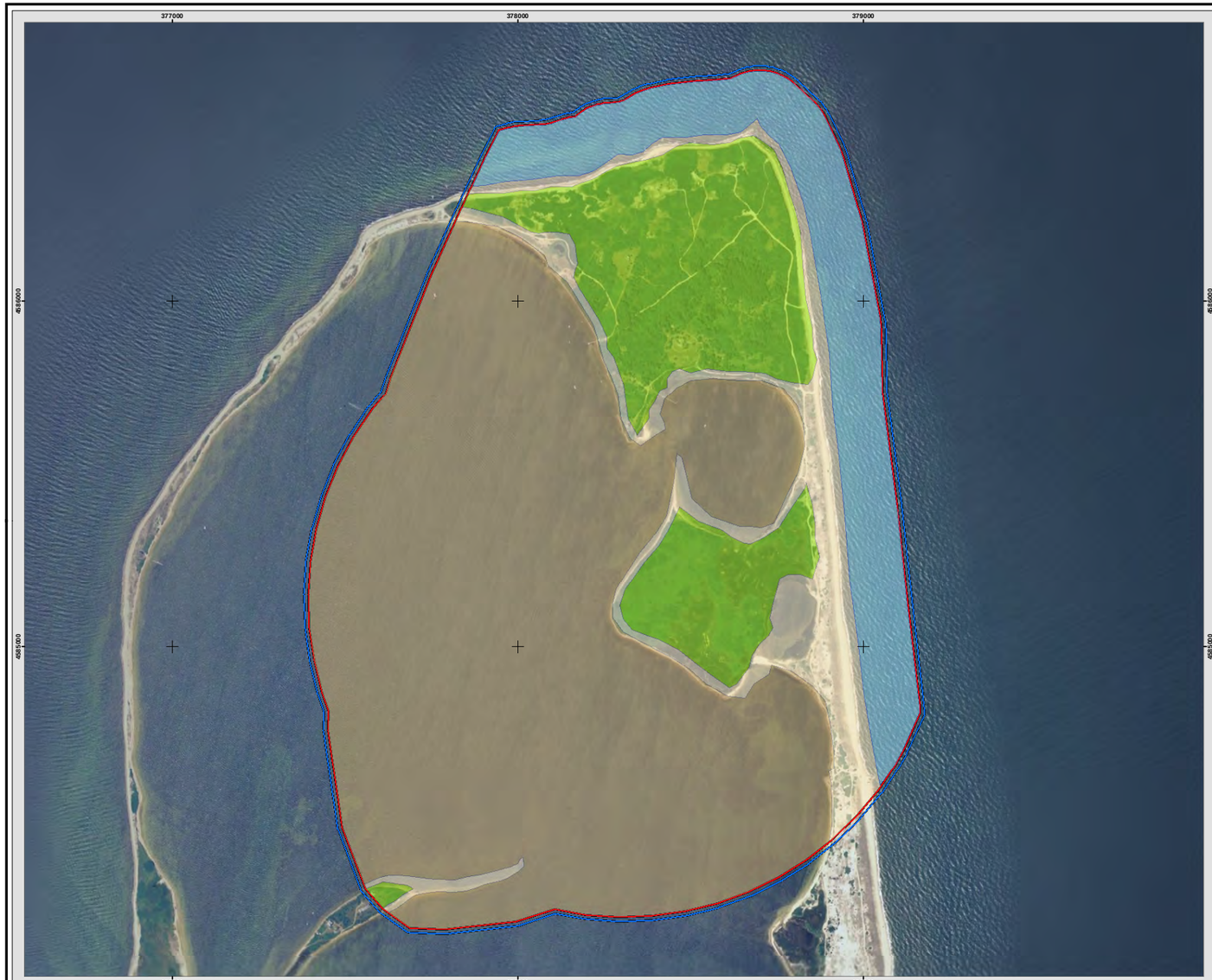
Figure 4 - 1

Workplan Figure 6-1

Area Location Map
Martha's Vineyard, MA

Legend

MRS



Drawn By: GDW | Date Drawn: 10JUN10 | Version No.: -4
Coordinate System: Projection: NAD_1983_UTM_Zone_19N, meters
MXD: PROJECTS\States\MA\MarthasVineyard\EPS\MXD\Fig7_1Pouge.mxd
PDF: PROJECTS\States\MA\MarthasVineyard\EPS\PDF\Fig7_1Pouge.pdf

Figure 7 - 1

Workplan Figure 6-2

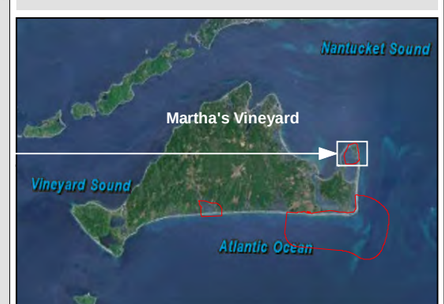
Cape Poge Little Neck Target Site Q - D Arcs

Legend

- Beach, 83.41 Acres
- Inlandwater, 500.15 Acres
- Land, 152.86 Acres
- Ocean, 106.34 Acres

Q - D Arcs

- K40, 6 ft
- 328, 48 ft



U.S. Army Engineering & Support Center Huntsville

DISCLAIMER- The data represent the results of data collection/processing for a specific U.S. Army Corps of Engineers activity and indicates the general existing conditions. As such, it is only valid for its intended use, content, time, and accuracy specifications. The user is responsible for the results of any application of the data for other than its intended purpose.

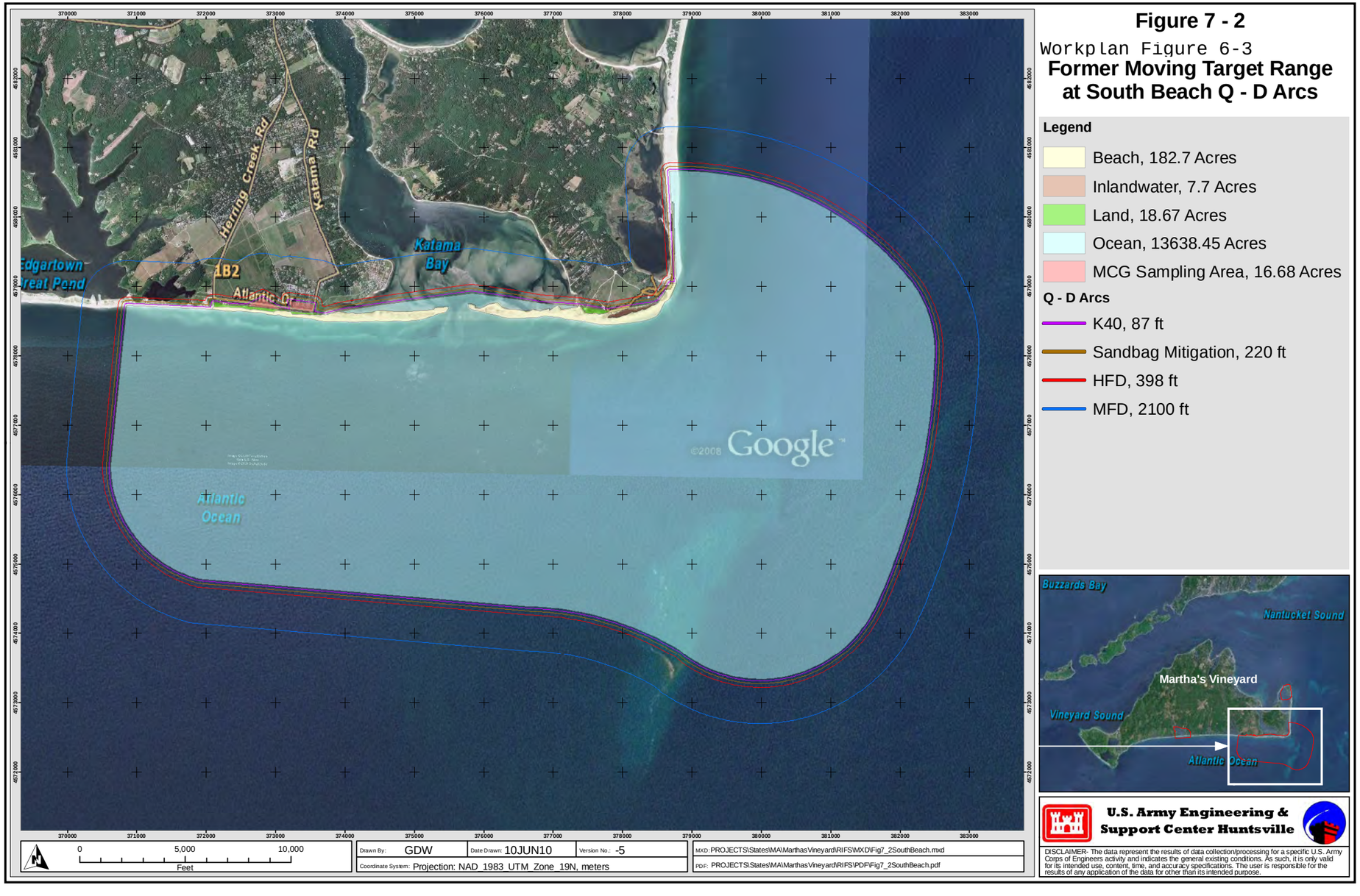


Figure 7 - 2
Workplan Figure 6-3
Former Moving Target Range at South Beach Q - D Arcs
Legend
Beach, 182.7 Acres
Inlandwater, 7.7 Acres
Land, 18.67 Acres
Ocean, 13638.45 Acres
MCG Sampling Area, 16.68 Acres
Q - D Arcs
K40, 87 ft
Sandbag Mitigation, 220 ft
HFD, 398 ft
MFD, 2100 ft
Herring Creek Rd
Katama Rd
Katama Bay
Edgartown Great Pond
1B2
Atlantic Dr
Atlantic Ocean
©2008 Google
Buzzards Bay
Nantucket Sound
Martha's Vineyard
Vineyard Sound
Atlantic Ocean
0
5,000
10,000
Feet
Drawn By: GDW
Date Drawn: 10JUN10
Version No.: -5
Coordinate System: Projection: NAD_1983_UTM_Zone_19N, meters
MXD: PROJECTS\States\MA\MarthasVineyard\RIFS\MXD\Fig7_2SouthBeach.mxd
PDF: PROJECTS\States\MA\MarthasVineyard\RIFS\PDF\Fig7_2SouthBeach.pdf
U.S. Army Engineering & Support Center Huntsville
DISCLAIMER- The data represent the results of data collection/processing for a specific U.S. Army Corps of Engineers activity and indicates the general existing conditions. As such, it is only valid for its intended use, content, time, and accuracy specifications. The user is responsible for the results of any application of the data for other than its intended purpose.

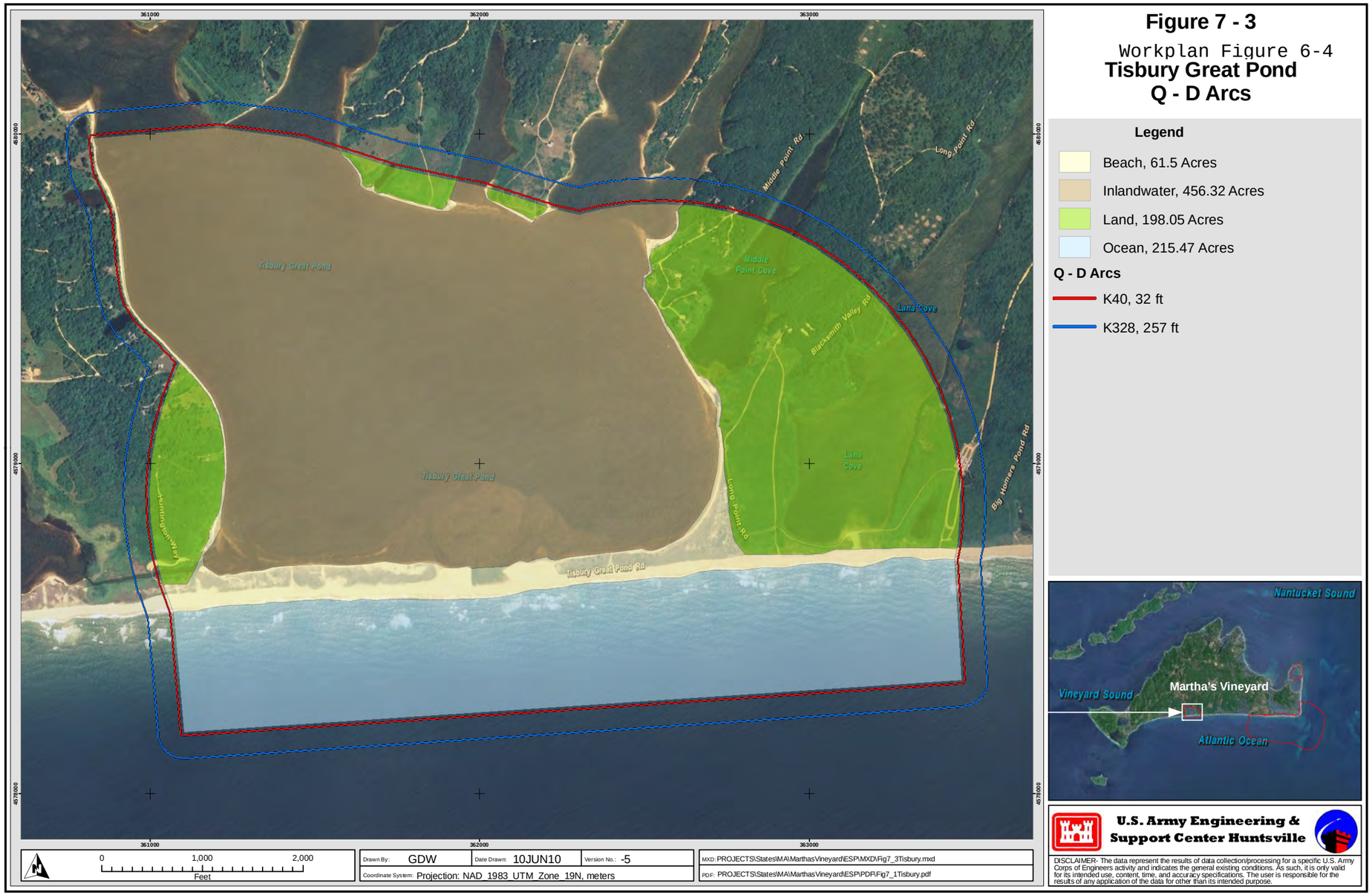


Figure 7 - 3
Workplan Figure 6-4
Tisbury Great Pond
Q - D Arcs
Legend
Beach, 61.5 Acres
Inlandwater, 456.32 Acres
Land, 198.05 Acres
Ocean, 215.47 Acres
Q - D Arcs
K40, 32 ft
K328, 257 ft
361000
362000
363000
4580000
4579000
4578000
Tisbury Great Pond
Middle Point Cove
Lana Cove
Land Cove
Middle Point Rd
Long Point Rd
Blacksmith Valley Rd
Big Homers Pond Rd
Huntington Way
Tisbury Great Pond Rd
Nantucket Sound
Vineyard Sound
Martha's Vineyard
Atlantic Ocean
0
1,000
2,000
Feet
Drawn By: GDW
Date Drawn: 10JUN10
Version No.: -5
Coordinate System: Projection: NAD_1983_UTM_Zone_19N, meters
MXD: PROJECTS\States\MA\MarthasVineyard\ESP\MXD\Fig7_3Tisbury.mxd
PDF: PROJECTS\States\MA\MarthasVineyard\ESP\PDF\Fig7_1Tisbury.pdf
U.S. Army Engineering & Support Center Huntsville
DISCLAIMER- The data represent the results of data collection/processing for a specific U.S. Army Corps of Engineers activity and indicates the general existing conditions. As such, it is only valid for its intended use, content, time, and accuracy specifications. The user is responsible for the results of any application of the data for other than its intended purpose.

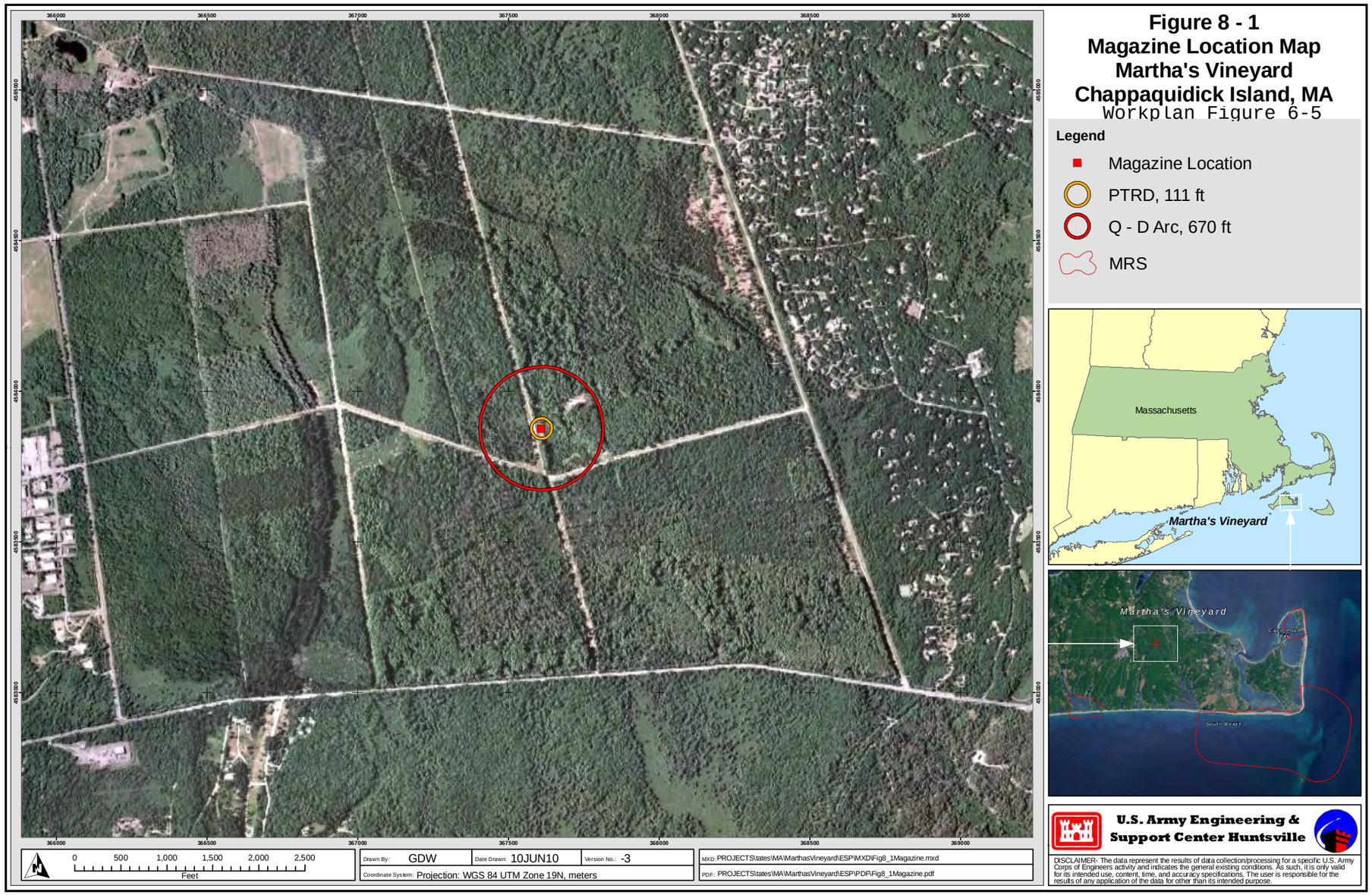


Figure 8 - 1
Magazine Location Map
Martha's Vineyard
Chappaquidick Island, MA
Workplan Figure 6-5
Legend
Magazine Location
PTRD, 111 ft
Q - D Arc, 670 ft
MRS
Massachusetts
Martha's Vineyard
Martha's Vineyard
South Beach
0 500 1,000 1,500 2,000 2,500
Feet
Drawn By: GDW
Date Drawn: 10JUN10
Version No.: -3
Coordinate System: Projection: WGS 84 UTM Zone 19N, meters
MXD: PROJECTS\states\MA\MarthasVineyard\ESP\MXD\Fig8_1Magazine.mxd
PDF: PROJECTS\states\MA\MarthasVineyard\ESP\PDF\Fig8_1Magazine.pdf
U.S. Army Engineering & Support Center Huntsville
DISCLAIMER- The data represent the results of data collection/processing for a specific U.S. Army Corps of Engineers activity and indicates the general existing conditions. As such, it is only valid for its intended use, content, time, and accuracy specifications. The user is responsible for the results of any application of the data for other than its intended purpose.

This Page Intentionally Left Blank

7 ENVIRONMENTAL PROTECTION PLAN

7.1 INTRODUCTION

7.1.1 This Environmental Protection Plan (EPP) has been prepared for the RI to be performed at the following MRSs: 1) Cape Poge Little Neck Bomb Target MRS located on Chappaquiddick Island, within the town of Edgartown, Martha's Vineyard, Massachusetts; 2) Moving Target Machine Gun Range at South Beach MRS, located within the town of Edgartown, Martha's Vineyard, Massachusetts; and 3) Tisbury Great Pond MRS located within the towns of West Tisbury and Chilmark, Martha's Vineyard, Massachusetts. The EPP was prepared in accordance with DID MR-005-12. Procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during site field activities were considered during the design of the RI and are described below in the Natural Resources and Cultural Resource sections, respectively. Natural resources also includes rare, threatened and endangered species and their habitats while cultural resources also includes historical or archaeological sites. The objective of the EPP is to coordinate and consult with the appropriate federal and commonwealth agencies, and stakeholders in advance of commencement of the Remedial Investigation (RI) to obtain their feedback to incorporate adequate natural and/or cultural resource protection measures into the work plan. The purpose of these measures is to avoid, minimize, and/or mitigate potential environmental impacts to the maximum extent practical without compromising the ability to achieve the primary objective of the RI, i.e., to identify and remove munitions and explosives of concern.

7.1.2 All work performed by the USACE as the Lead Agency as part of this RI will be performed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104 and the National Contingency Plan (NCP), Sections 300.120(d) and 300.400(e), and in compliance with applicable federal and commonwealth laws and regulations. CERCLA response actions are exempted by law from the administrative requirement to obtain Federal, State or local permits related to any activities conducted completely on-site. It is the policy of the Department of the Army (and the USEPA and MassDEP) to assure all activities conducted on sites are protective of human health and the environment and to meet (or waive) the substantive provisions of permitting regulations that are applicable or relevant and appropriate requirements (ARARs).

7.2 COORDINATION AND CONSULTATIONS WITH AGENCIES/ORGANIZATIONS/ STAKEHOLDERS

7.2.1 Prior to the start of work, the appropriate Federal, Tribal, State and local natural and cultural resource agencies/organizations, and stakeholders were notified as directed by Ms. Carol A. Charette, the CENAE PM. Federal, Tribal, State and local agencies, organizations and stakeholders that were contacted are presented in **Table 7-1**. Prior to the execution of the Work Plan, regular lines of communications were developed and project coordination and consultations conducted between USACE natural and cultural resources staff under the direction of the USACE PM with the appropriate agencies and stakeholders. Continued coordination and consultation with these organizations as warranted during project execution will ensure environmental protection of all natural and cultural resources at the project sites. Copies of project coordination letters and responses received to date are provided at the end of this section.

Table 7-1: Agencies/Organizations/Stakeholders

Resource	Classification	Agency/Organization/Stakeholder	Former Cape Poge Little Neck Bomb Target MRS	Former Moving Target Machine Gun Range at South Beach MRS	Tisbury Great Pond MRS
Threatened and Endangered Species	State	Massachusetts Natural Heritage and Endangered Species Program 1 Rabbit Hill Rd Westborough, MA 01581 Kristen Black Phone: (508) 389 – 6367 Tim Simmons Phone: (508) 389-6325	✓ 1, 2, 3	✓ 1, 2, 3	✓ 1, 2, 3
	State	Massachusetts Division of Marine Fisheries-Habitat Protection 123 Purchase Street, 3rd Floor New Bedford , MA 02740 Dr. Kathryn Ford Phone: (508) 990-2860 ext. 145 –	✓ 1	✓ 1	✓ 1
	State	Massachusetts Department of Conservation and Recreation 251 Causeway St, Suite 600 Boston, MA 02114-2104 Phone: (617) 626 – 1250 Fax: (617) 626 – 1351 email: mass.parks@state.ma.us		✓ 1	
	Federal	US Fish and Wildlife Service New England Field Office 70 Commercial St, Suite 300 Concord, NH 03301-5087 Susi von Oettingen Phone: (603) 223 – 2541 ext. 22 Fax: (603) 223 – 0104	✓ 1, 2, 3	✓ 1, 2, 3	✓ 1, 2, 3

Resource	Classification	Agency/Organization/Stakeholder	Former Cape Poge Little Neck Bomb Target MRS	Former Moving Target Machine Gun Range at South Beach MRS	Tisbury Great Pond MRS
Threatened and Endangered Species	Federal	National Marine Fisheries Service Northeast Office Protected Resources Division 55 Great Republic Dr Gloucester, MA 01930-2276 Julie Crocker Phone: (978) 281 – 9300 ext. 6530 Fax: (978) 281 – 9333	✓ 1	✓ 1	✓ 1
	Stakeholder	The Trustees of Reservations Christopher P. Kennedy Regional Director, Southeast PO Box 2106 Vineyard Haven, MA 02568 Phone: (508)693-7662 ext .12 email: kennedy@ttor.org	✓ 1, 2, 3	✓ 1, 2, 3	✓ 1, 2, 3
	Stakeholder	Edgartown Conservation Commission Jane Varkonda Town Hall 2nd Floor 70 Main St Edgartown, MA 02539 Phone: (508) 627 – 6165 Fax: (508) 627 – 6183	✓ 1	✓ 1	
	Stakeholder	West Tisbury Conservation Commission Maria McFarland P.O BOX 278 West Tisbury, MA 02575 Phone: (508) 696 – 6404 Fax: (508) 696 – 0103			✓ 1
	Stakeholder	Chilmark Conservation Commission Chuck Hodgekinson 401 Middle Rd Chilmark, MA 02535 Phone: (508) 645 – 2114 Fax: (508) 645 – 2110			✓ 1
	Stakeholder	Kristen Fauteux, Director of Stewardship Sheriffs Meadow Foundation Wakeman Conservation Center 57 David Avenue Vineyard Haven, MA 02568 508-693-5207			1, 2, 3
	Stakeholder	Julie Schaeffer, Ecologist Martha's Vineyard Land Bank Commission 167 Main Street, P.O. Box 2057 Edgartown, Massachusetts 02539 508-627-7141			1, 2, 3

Resource	Classification	Agency/Organization/Stakeholder	Former Cape Poge Little Neck Bomb Target MRS	Former Moving Target Machine Gun Range at South Beach MRS	Tisbury Great Pond MRS
Wetlands/Water Resources Environmental Coordination & Consultation	State	Massachusetts Department of Environmental Protection-Southeast Regional Office 20 Riverside Dr Lakeville, MA 02347 Liz Kouloheras Phone: (508) 946 – 2810 Fax: (508) 947 – 6557	✓ 1	✓ 1	✓ 1
	Stakeholder	Edgartown Conservation Commission	✓ 1	✓ 1	
	Stakeholder	West Tisbury Conservation Commission			✓ 1
	Stakeholder	Chilmark Conservation Commission			✓ 1
Cultural and Archeological Resources	State	Massachusetts Historical Commission Secretary of the Commonwealth 220 Morrissey Blvd Boston, MA 02125-3314 Phone: (617) 727 – 8470 email: mhc@sec.state.ma.us	✓ 1	✓ 1	✓ 1
	State	Massachusetts Board of Underwater Archaeological Resources Victor Mastone, Director 251 Causeway St, Suite 800 Boston, MA 02114-2199 Phone: (617) 626 – 1141 email: victor.mastone@state.ma.us	✓ 1	✓ 1	✓ 1
	State	Massachusetts Department of Conservation and Recreation Ellen Berkland, Archaeologist 251 Causeway Street, Suite 700 Boston, MA 02114-2104		1	
	Local	Martha's Vineyard Historical Society Keith Gorman, Executive Director Martha's Vineyard Museum PO Box 1310 Edgartown, MA 02539	1	1	1
	Stakeholder	The Trustees of Reservation Mark Wilson, Cultural Resources Program Manager Archives and Research Center c/o Moose Hill Farm 396 Moose Hill Farm Sharon, MA 02067	1		1

Resource	Classification	Agency/Organization/Stakeholder	Former Cape Poge Little Neck Bomb Target MRS	Former Moving Target Machine Gun Range at South Beach MRS	Tisbury Great Pond MRS
Cultural and Archeological Resources	Tribal Stakeholder	Wampanoag Tribe of Gay Head Tribal Historic Preservation Officer Bettina Washington 20 Black Brook Rd Aquinnah, MA 02535-1546 Phone: (508) 645 - 9265 ext 175 Fax: (508) 645 – 3790	✓ 1	✓ 1	✓ 1
Natural & Water Resources	State	Massachusetts Division of Marine Fisheries-Habitat Protection	✓ 2	✓ 2	✓ 2
	Federal	US Fish and Wildlife Service	✓ 1	✓ 1	✓ 1
	Federal	National Marine Fisheries Service	✓ 1	✓ 1	✓ 1
	Stakeholder	Massachusetts Department of Conservation and Recreation		✓ 2	
	Stakeholder	The Trustees of Reservations	✓ 1, 2		✓ 1, 2
	Stakeholder	Edgartown Shellfish Constable Paul Bagnall Town Hall 3rd Floor 70 Main St Edgartown, MA 02539 Phone: (508) 627 – 6175 Fax: (508) 627 – 6123	✓ 2	✓ 2	
	Stakeholder	Edgartown Harbormaster Charles Blair Jr. 1 Morse St Edgartown, MA 02539 Phone: (508) 627 – 4746 Fax: (508) 627 – 8439	✓ 2	✓ 2	
	Stakeholder	West Tisbury Shellfish constable Raymond Gale P.O. BOX 287 West Tisbury, MA 02575 Phone: (508) 696 – 0102 Fax: (508) 696 – 0103			✓ 2
	Stakeholder	Chilmark Shellfish Constable Isaiah Scheffer Chilmark Town Hall P.O. BOX 119 401 Middle Rd Chilmark, MA 02535 Phone: (508) 645 - 2100 ext 2145			✓ 2

Resource	Classification	Agency/Organization/Stakeholder	Former Cape Poge Little Neck Bomb Target MRS	Former Moving Target Machine Gun Range at South Beach MRS	Tisbury Great Pond MRS
Natural & Water Resources	Stakeholder	Chilmark Harbormaster Dennis Jason Chilmark Town Hall P.O. BOX 119 401 Middle Rd Chilmark, MA 02535 Phone: (508) 645 - 2100 ext 2846 (Town Hall) Phone: (508) 645 - 2846 (Harbor) Fax: (508) 645 – 2110			✓ 2

Notes: 1 Contact as part of Work Plan preparation; 2 Contact on regular basis during implementation of Work Plan; 3 Contact on regular basis during implementation of Work Plan regarding Threatened and Endangered Species habitat locations

7.3 ENVIRONMENTAL PROTECTION PLAN (EPP) FOR NATURAL RESOURCES PROTECTION

7.3.1 Threatened and Endangered Species and Species of Special Concern

7.3.1.1 Federal/State Listed Plants and Animals

7.3.1.1.1 Federal and Commonwealth (i.e. State) agencies and stakeholders associated with threatened and endangered species and species of special concern listed on **Table 7-1** will have the opportunity to review the Work Plan for the three MRS work areas prior to the commencement of any work. The review will allow the USACE to identify work areas which may potentially contain threatened and endangered species or species of special concern (i.e. protected species), and their habitats. **Figure 7-1** illustrates the areas that are designated in the Massachusetts Natural Heritage Atlas 13th Edition (effective October 1, 2008) by the Natural Heritage & Endangered Species Program, MA Division of Fisheries & Wildlife to be Priority Habitats of Rare Species and Estimated Habitats of Rare Wildlife at all of the MRSs, which essentially covers each MRS in its entirety. There are approximately thirty seven species reported as Federal and /or State listed that could be present on the three sites. The threatened and endangered species and species of special concern which may be encountered within or near the sites are presented in **Table 7-2**. The presence of the listed birds and reptiles is seasonal. Phase 1 and 2 of the RI Work Plan adjusts the implementation of the field schedule to avoid the presence of the listed birds and reptiles.

7.3.1.1.2 Field personnel will be trained on the identification and avoidance of selected threatened, endangered and/or species of special concern where practical. Field personnel will be briefed on the measures in the EPP, as further described in the section on Worker Education Briefing, and also carry an addendum (Worker Field

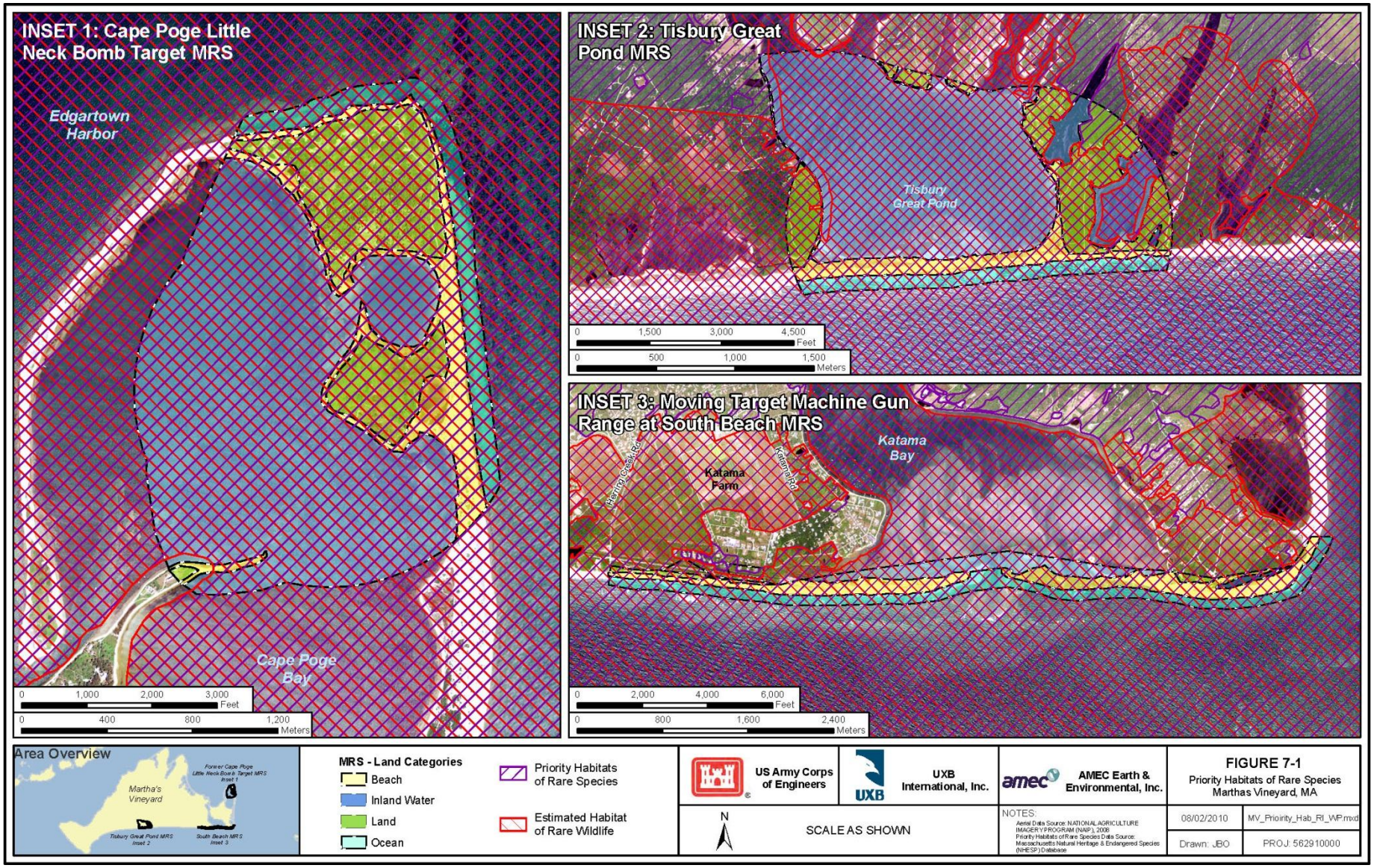
Manual) with additional field information which will include pictures of protected species, habitat information and the months of the year that the seasonal protected species (i.e. shorebirds and Northern harrier) are expected to be present in the investigative or action areas. This information has been summarized in **Table 7-3** "Protected Avian Species No Work Windows" for the three MRSs by each of the four Land Categories (Beach, Inland Water, Land and Ocean) and specific habitats within each of these categories based on TTOR's 2010 avian breeding data, USFWS guidance, and MA Natural Heritage Endangered Species Program data. In addition, if any work is conducted during the shorebird nesting season field teams will receive daily updates as to the presence of threatened and endangered species and species of special concern based on consultations with federal and commonwealth natural resource agencies, and private organizations such as the TTOR.

Table 7-2: Threatened, Endangered and Species of Concern

Type	Name	Listing
Birds	Common Tern (Sterna hirundo)	State Specie of Special Concern
	Least Tern (Sterna antillarum)	State Specie of Special Concern
	Northern Harrier (Circus syneus)	State Threatened Specie
	Piping Plover (Charadrius melodus)	Fed/State Threatened Specie
	Roseate Tern (Sterna dougallii dougallii)	Fed/State Endangered Specie
Reptiles	Green Sea Turtle (Chelonia mydas)	ThreatenedFed/StateSpecie
	Kemp's Ridley Sea Turtle (Lepidochelys kempi)	Fed/StateEndangered Specie
	Leatherback Sea Turtle (Dermochelys coriacea)	Fed/StateEndangered Specie
	Loggerhead Sea Turtle (Caretta caretta)	Fed/StateThreatened Specie
Insects	Chain Dot Geometer (Cingilia catenaria)	State Specie of Special Concern
	Coastal Heathland Cutworm (Abagrotis nefascia)	State Specie of Special Concern
	Gerhard’s Underwing Moth (Catocala Herodias gerhardi)	State Specie of Special Concern
	Faded Grey Geometer (Stenoporpia polygrammaria)	StateThreatened Specie
	Pine Barrens Zale (Zale sp 1 nr lunifera)	State Specie of Special Concern
	Pink Sallow (Psectraglaea carnosa)	State Specie of Special Concern

Type	Name	Listing
Insects	Sandplain Euchlaena (Euchlaena madusaria)	State Specie of Special Concern
	Barrens Buckmoth (Hemileuca maia)	State Specie of Special Concern
	Melsheimer's Sack Bearer (Cicinnus melsheimeri)	State Threatened Specie
	Pine Barrens Lycia (Lycia ypsilon)	State Threatened Specie
	Coastal Swamp Metarranthis Moth (Metarranthis pilosaria)	State Specie of Special Concern
	Slender Clearwing Sphinx Moth (Hemaris gracilis)	State Specie of Special Concern
	Spartina Borer Moth (Spartiniphaga inops)	State Specie of Special Concern
	Imperial Moth (Eacles imperialis)	State Threatened Specie
	Barrens Metarranthis Moth (Metarranthis apiciaria)	State Endangered Specie
	Comet Darner (Anax longipes)	State Specie of Special Concern
	Northeastern Beach Tiger Beetle (Cicindela dorsalis dorsalis)	Endangered Specie
	Purple Tiger Beetle (Cicindela purpurea)	Endangered Specie
	Three-Lined Angle Moth (Digrammia eremiata)	State Threatened Specie
Plants	Bristly Foxtail (Setaria parviflora)	State Specie of Special Concern
	Bushy Rockrose (Crocanthemum dumosum)	State Specie of Special Concern
	Purple Needlegrass (Aristida purpurascens)	StateThreatened Specie
	Sandplain Flax (Linum intercursum)	State Specie of Special Concern
	Nantucket Shadbush (Amelanchier nantucketensis)	State Specie of Special Concern
	Gerardia Sandplain (Agalinus acuta)	StateEndangered Specie
	Saltpond Pennywort (Hydrocotyle verticillata)	State Threatened Specie
	Pygmyweed (Tillaea aquatica)	State Threatened Specie
	Sandplain Blue-eyed Grass (Sisyinchium fuseatum)	State Specie of Special Concern
	Sea-Beach Knotweed (Polygonum glaucum)	State Specie of Special Concern

Figure 7-1: Priority Habitats of Rare Species



7.3.2 Wetlands, Water Resources and Natural Communities

7.3.2.1 To determine the potential for wetlands and water resources within the three project areas, the current MassGIS wetland resources and hydrology layers were obtained for the project areas. **Figure 7-2** illustrates the wetlands and deepwater (i.e. openwater) habitats associated with the Cape Poge Little Neck Bomb Target MRS, the Moving Target Machine Gun Range at South Beach MRS, and the Tisbury Great Pond MRS. All work performed will be in compliance with the substantive requirements of the Commonwealth of Massachusetts Wetland Protection Act, Massachusetts General Law 131 Section 40 as no permit is required for any on-site work. Removal action activities may occur at all sites. Procedures for intrusive investigations are outlined in Chapter 3 of this work plan.

7.3.2.2 Wetlands and Water Resources

7.3.2.2.1 Significant water resource features and their adjacent wetland resource areas encompass Tisbury Great Pond including Big Homer's Pond, portions of Long Cove Pond, Middle Point Cove, Hughe's Thumbs Cove and Deep Bottom Cove, upper reach of Cape Poge Bay including Drunkard's Cove and Shear Pen Pond and South Beach including a portion of Katama Bay and Swan Pond. A primary concern of the remedial investigation relative to the natural resources of the site is "What are the impacts to the local shell fishery?" Tisbury Great Pond and Cape Poge Bay is very important commercial and recreational fishery for oysters, bay scallops, quahogs, and soft shell clams. However, based on coordination to date with all of the three Shellfish Constables no adverse impacts are anticipated. All appropriate parties listed in **Table 7-1** will be notified prior to the start of work. Additionally, the Chilmark, West Tisbury, and Edgartown Shellfish Departments and Shellfish Constables will be contacted daily to coordinate activities as work proceeds in any of the shellfish harvesting areas, including advance notification of any shellfish area closings for safety reasons.

7.3.2.2.2 The investigative and/or removal actions to be conducted at the three MRSs in the Ocean Category in the Atlantic Ocean are planned to extend to about 100 meters offshore from the beach.

7.3.2.3 Natural Communities

7.3.2.3.1 The Cape Poge Little Neck Bomb Target Site, Moving Target Machine Gun Range at South Beach and Tisbury Great Pond MRSs comprise a complex and fragile system of dunes, wetlands and uplands. As evidenced from the previous sections, these diverse habitats support a large number of rare and endangered

plants and animals. The natural communities present on these sites include the following (TTOR 2004):

7.3.2.3.1.1 Coastal Salt Ponds;

7.3.2.3.1.2 Sandplain Grasslands and Heathlands;

7.3.2.3.1.3 Dune complexes;

7.3.2.3.1.4 Maritime Eastern Red Cedar Woodlands;

7.3.2.3.1.5 Barrier Beach Strands;

7.3.2.3.1.6 Maritime Shrublands;

7.3.2.3.1.7 Pitch Pine and Oak Forest;

7.3.2.3.1.8 Fresh Water Pond and Emergent Marsh; and

7.3.2.3.1.9 Salt Marsh.

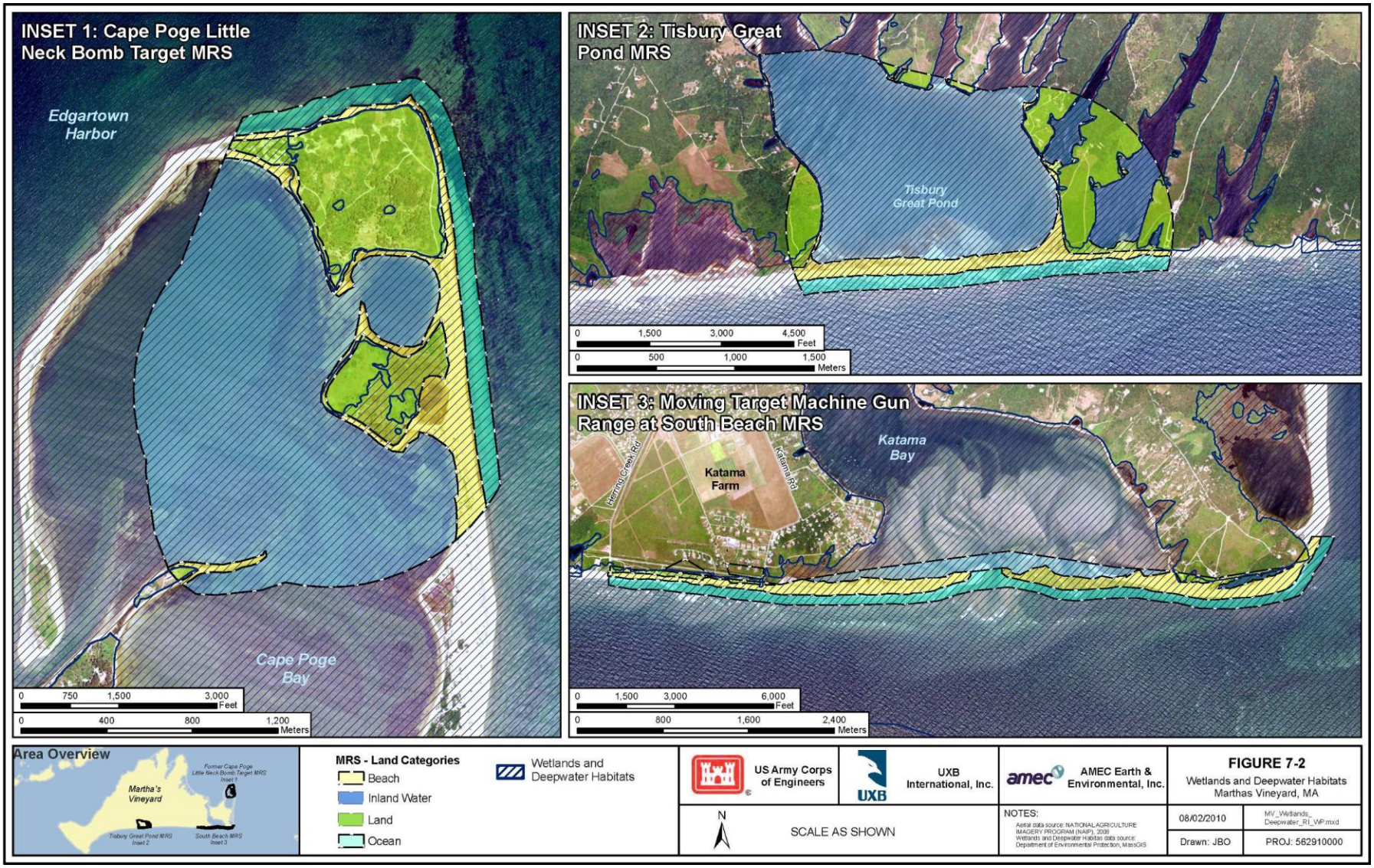
7.3.2.3.2 The various procedures described below to avoid, minimize and/or mitigate potential impacts to protected species and their habitats will also ensure protection of the aforementioned natural communities during execution of the RI.

7.3.3 Measures to Avoid, Minimize, and/or Mitigate Environmental Impacts

7.3.3.1 The procedures outlined in this section will be implemented by UXB to avoid, minimize and/or mitigate environmental effects attributable to the execution of the Task Order. The MEC investigation activities will be implemented in compliance with all applicable federal and state regulations, including those that protect air, water, land, human health and safety, and cultural and biological resources.

7.3.3.2 The collaborative work with the natural resource agencies and stakeholders will not end with the submittal of the Final Work Plan because the EPP is a dynamic living working document that will be updated as needed based on specific field activities in both Phase I, with more consultation and implementation of measures as needed before and during execution of Phase II once the specific locations of the anomalies are determined that need to dug up.

Figure 7-2: Wetlands and Deepwater Habitats



7.3.4 Reasons for Avoidance, Minimization and/or Mitigating Actions

7.3.4.1 Section 9 of the Endangered Species Act prohibits the taking of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Under terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with an incidental take statement.

7.3.5 Worker Education Briefing

7.3.5.1 Before the start of both Phase 1 and Phase 2 RI field activities all on-site personnel will be briefed on health and safety issues and the need for avoiding, minimizing and/or mitigating potential impact on sensitive biological resources based on this Environmental Protection Plan (EPP). A Field Manual for the workers that will summarize all EPP measures is being prepared as an Addendum to the EPP. The Field Manual will list the various measures along with a brief description of the protected animal and/or plant species to provide personnel a general framework for training and for discussion. Methods for avoiding and minimizing the potential impact on the protected species and communities of concern and for the transfer of invasives will be stressed during the on-site training. The UXB SUXOS will coordinate this briefing with UXB team members, including subcontractors, prior to start of work.

7.3.6 Vegetation Clearing for Geophysical Surveys and Acquisition of Selected Anomalies

7.3.6.1 The field crew has great flexibility in obtaining the required linear coverage needed in each land category including the uplands and any other vegetated study area. They do not need to survey and cut the vegetation in straight 3-ft wide paths as depicted on Work Plan **Figures 3-1, 3-2** and **3-3**, since they have flexibility in going around any trees greater than 1 inch dorsal breast height (dbh) and/or other constraints and manmade features by conducting meandering surveys. The following measures will be implemented to minimize the amount of vegetative clearing required and also to control the spread of invasive plant species.

7.3.7 Vegetation Impact Mitigation

7.3.7.1 As needed for the deployment of the appropriate geophysical survey equipment, the vegetation will be cut to a length of six inches above the ground surface to minimize surface disturbance. Therefore, herbaceous vegetation of less than six inches tall will not be cut, and it is also anticipated that many areas with relatively low vegetative cover (e.g. the managed grasslands at Long Point Refuge) will not need to be cut as the pushed survey equipment should be able to roll through these areas. Similarly there is no need to cut any Beach grass or other herbaceous plants during surveys in the vegetated dunes.

7.3.7.2 A narrow three-foot wide corridor will not be cut through the dense vegetation in the uplands on the west side of Tisbury Great Pond as requested by the Sheriff's Meadow Foundation to protect a breeding site of the Northern harrier.

7.3.7.3 Removal of woody vegetation will be limited to specimens with a diameter at breast height (dbh) of less than one inch. Clearing of lower branches of woody vegetation with a dbh greater than 1 inch will be limited to six feet above the ground. All cleared areas of vegetation will be allowed to re-vegetate naturally.

7.3.8 Trees and Shrubs

7.3.8.1 Meandering transect paths are currently planned for the land based portions of this RI. Meandering paths rather than straight line transects will allow the avoidance of most vegetation larger than one inch dbh. Therefore, tree and shrub clearing is not anticipated. If it becomes necessary to remove trees and/or shrubs, the property owner will be notified of the proposed removal prior to any action taken. A protected shrub, the Nantucket shadbush, will survive and recover from cutting based on an active management program being conducted at the Long Point Wildlife Refuge that involves mowing of areas with Nantucket shadbush to maintain sandplain grasslands habitat.

7.3.9 Control/Introduction//Spread of Invasive Plants

7.3.9.1 Island natural communities are protected to a certain degree from the introduction of invasives by their distance from mainland reservoirs of invasive species. On the other hand once invasive species are introduced, the closed, insulated nature of an island facilitates the spread of invasive plant species. The "TTOR Management Plan, 2004, Section 5.8.6, Invasive and Exotic Species" lists Purple Loosestrife (*Lythrum salicaria*), Asiatic bittersweet (*Celastrus orbiculata*), Sea Poppy (*Glaucium flavum*) and *Phragmites* spp. as present at Cape Pogue and Wasque. These plants are listed as invasives in MANHESP's "A Guide to

Invasive Plants in Massachusetts." During a field visit on October 13, 2010 *Phragmites* was located at Swan Pond and an adjacent freshwater marsh. Sea Poppy was located on a gravel berm just inland on the upper beach, slightly west of the former aerial bombing target, south of Shear Pen Pond. Not listed as an invasive in the 2004 TTOR Management Report but visually located just off property boundaries at the Tisbury Great Pond Site and throughout island roadsites is spotted knapweed (*Centaurea maculosa*). Other invasives such as autumn olive (*Elaegnus umbellate*) have been identified as being present on Chappaquiddick ("TTOR 2004").

7.3.9.2 Based on limited field observations and discussions with TTOR and MA Natural Heritage & Endangered Species Program Biologists, the control and limiting of the spread of these and other invasive species within the three sites and to other sites where these invasive species may not be currently present is both a concern and a priority of this mitigation measure.

7.3.9.3 These invasives are spread by the transfer of seeds, fruits and or pieces of the above ground plant or root. For example small, invisible fragments of Phragmites are effective in the propagation of the plant.

7.3.9.4 In Phase 1 and Phase 2 the UXB Team will employ a different array of equipment, depending on habitat to be surveyed and the natural community. The intertidal and offshore habitats offer little if any probability for the transfer of an invasive to these habitats since the plant species listed above will not survive in salt water. However, the equipment used to transport the underwater sled, the tow boat and trailer offers the potential for inter-site and intra-site transfer of invasive plant material.

7.3.9.5 All equipment such as hand held magnetometers and gear such as boots and shovels used in the investigation conducted on/in the terrestrial and fresh water habitats offer the possibility of the transfer of invasive plant material.

7.3.9.6 To avoid the introduction and spread of invasives all equipment will be visually examined and carefully washed with a hand sprayer to remove all plant material and traces of soil/sand prior to the entrance to a site. This includes the boat and trailer used to investigate aquatic/wetland habitats. Maps indicate geophysical investigation will occur in freshwater habitats such as Swan and Long Cove Pond.

7.3.9.7 Included in the worker education briefing training manual provided to the field personnel will be descriptions of the invasive plants that are most likely present on the site. When personnel are working in a site where invasives are known to

be present, such as Cape Poge on the gravel berm to the west of the aerial bomb site, the invasive (Sea Poppy) will be identified and plant material will be removed from the equipment and washed with water to avoid the spread of the species within the site to another area where the invasive is not present.

7.3.9.8 When the equipment is removed from the site to be transported to another site or off island the equipment will be again washed to remove any plant material or soil. If possible to reduce time and effort spent on decontamination, equipment could be left on the site until the investigation in the area was completed. Equipment containing petroleum products should be parked on plastic sheeting to avoid possible leakage of fluids.

7.3.9.9 Field personnel should wear gaiters, rubber boots or other clothing and footwear which reduce the likelihood for seed attachment when working in areas infested with invasive species.

7.3.9.10 Field personnel must inspect, remove, and properly dispose weed seed and plant parts found on clothing in a trash bag and dispose off island.

7.3.9.11 Field personnel must wash with hand sprayer soil from boots/footwear prior to entering the work site and before leaving the site post-completion.

7.3.9.12 This protocol to control invasives is applicable for both Phase 1 and 2 of the RI. Execution of Phase 2 of the RI involves more intrusive activity, such as disturbing the surface of the substrate, and increases the possibility for the introduction/spread of invasives.

7.3.9.13 In Phase 2, it is more likely there will be a need to disturb/dig to remove an anomaly and if there are invasives reported in the immediate area, the equipment used, i.e. trowel or shovel, should be rinsed prior to each use. The soil over the object should be placed on a plastic sheet adjacent to the site. Upon removal of the anomaly, the soil will be replaced over the hole. Any plant cover removed with the soil will be replaced and gently hand tamped in place to ensure successful reestablishment of the cover

7.3.10 Federally-Listed and State-Listed Protected Species (Flora and Fauna)

7.3.10.1 The following species are both Federally-listed and State-listed based on consultations with the USFWS, NMFS and MANHESP:

7.3.10.1.1 Piping plover (*Charadrius melodus*);

7.3.10.1.2 Roseate tern (*Sterna dougalii dougalii*);

7.3.10.1.3 Northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*);

7.3.10.1.4 Sandplain gerardia (*Agalinus acuta*); and

7.3.10.1.5 Sea turtles, including the loggerhead (*Caretta caretta*), Kemp's ridley (*Lepidochelys kempi*), leatherback (*Dermochelys coriacea*), and green (*Chelonia mydas*).

7.3.10.2 Sea turtles occur seasonally off the coast of Martha's Vineyard from June through early November of any year. The action area for the three MRSs includes several types of habitat where sea turtles are extremely unlikely to occur. As the action area is inconsistent with the preferred habitats of sea turtles, it is extremely unlikely that and sea turtles will occur in the action area.

7.3.10.3 While listed whales occur in the offshore waters of Martha's Vineyard, due to the shallow depths and nearshore location of the action area, no listed marine mammals are expected to occur in the action area.

7.3.11 State-Listed Species

7.3.11.1 The State-listed species based on consultations with the MANHESP include the following:

7.3.11.1.1 Common tern (*Sterna hirundo*)

7.3.11.1.2 Least tern (*Sterna antilarum*)

7.3.11.1.3 Northern harrier (*Circus syneus*)

7.3.11.1.4 Chain dot Geometer (*Cingulia catenaria*)

7.3.11.1.5 Coastal Heathland Cutworm (*Abagrotis nefascia*)

7.3.11.1.6 Gerhard’s Underwing Moth (*Catocala Herodias gerhardi*)

7.3.11.1.7 Faded Grey Geometer (*Stenoporpia polygrammaaria*)

7.3.11.1.8 Pine Barrens Zale (*Zale sp l nr lunifera*)

7.3.11.1.9 Pink Sallow Moth (*Psectraglea carnosa*)

7.3.11.1.10 Sandplain Euchaena (*Euchlaena madusaria*)

7.3.11.1.11 Barrens Buckmoth (*Hemileuca maia*)

7.3.11.1.12 Melsheimer’s Sack Bearer (*Cicinus melsheimeri*)

7.3.11.1.13 Pine Barrens Lycia (*Lycia ypsilon*)

7.3.11.1.14 Coastal Swamp Metarranthis Moth (*Metarranthis pilosaria*)

7.3.11.1.15 Slender Clearwing Sphinx Moth (*Hemaris pilosaria*)

7.3.11.1.16 Spartina Borer Moth (*Spartiniphagia inops*)

7.3.11.1.17 Imperial Moth (*Eacles imperialis*)

7.3.11.1.18 Barrens Metarranthis Moth (*Metarranthis apiciaria*)

7.3.11.1.19 Comet Darner (*Anax longippes*)

7.3.11.1.20 Purple Tiger Beetle (*Cicindela purpurea*)

7.3.11.1.21 Three-Lined Angle Moth (*Digrammia eremiata*)

7.3.11.1.22 Bristly Foxtail (*Setaria parviflora*)

7.3.11.1.23 Bushy Rockrose (*Crocanthemum dumosum*)

7.3.11.1.24 Purple needlegrass (*Aristida purpurascens*)

7.3.11.1.25 Sandplain Flax (*Linum intercursum*)

7.3.11.1.26 Saltpond Pennywort (*Hydrocotyle verticellata*)

7.3.11.1.27 Pigmyweed (*Tillacea aquatica*)

7.3.11.1.28 Sandplain Blue-eyed grass (*Sisyinchium fuseatum*)

7.3.11.1.29 Sea-Beach Knotweed (*Polygonum glaucm*)

7.3.11.1.30 Nantucket Shadbush (*Amelanchier nantuckensis*)

7.3.12 Discussion of Federal- & State-Listed Species

7.3.12.1 Avian Protected Species

7.3.12.1.1 There are five listed avian species, piping plover and the terns, roseate, common and least, and the northern harrier. The terns and the piping plover generally breed on beach/dune habitats. The northern harrier breeds in dense vegetation in uplands and marsh habitat. All these species could be present at any or all of the three MRS Sites, however, the avian protection plan is based on the most recent nesting or breeding sites based on TTOR and MANHESP data. Due to the unpredictable nature of the breeding behavior of these species regular communication with TTOR and MA Natural Heritage is required for any field activities during the shorebird nesting season.

7.3.12.1.2 Piping plovers and roseate terns could be present at any or all of the three designated project sites or action area. Their presence is most likely during the breeding and fall migration period of April 1 through September 30. These are ground nesting birds with well-camouflaged nests. The unfledged chicks are

virtually indistinguishable from their sand substrate. As recommended by the USFWS in their September 27, 2010 letter in order to avoid adversely affecting piping plover or roseate terns, they recommend that activities associated with the remedial investigation (transects and sampling) not occur between April 1 and September 30, or be closely coordinated with the organizations managing piping plover and/or terns.

7.3.12.2 Summary of Shorebird Species Nesting Data for 2009 and 2010

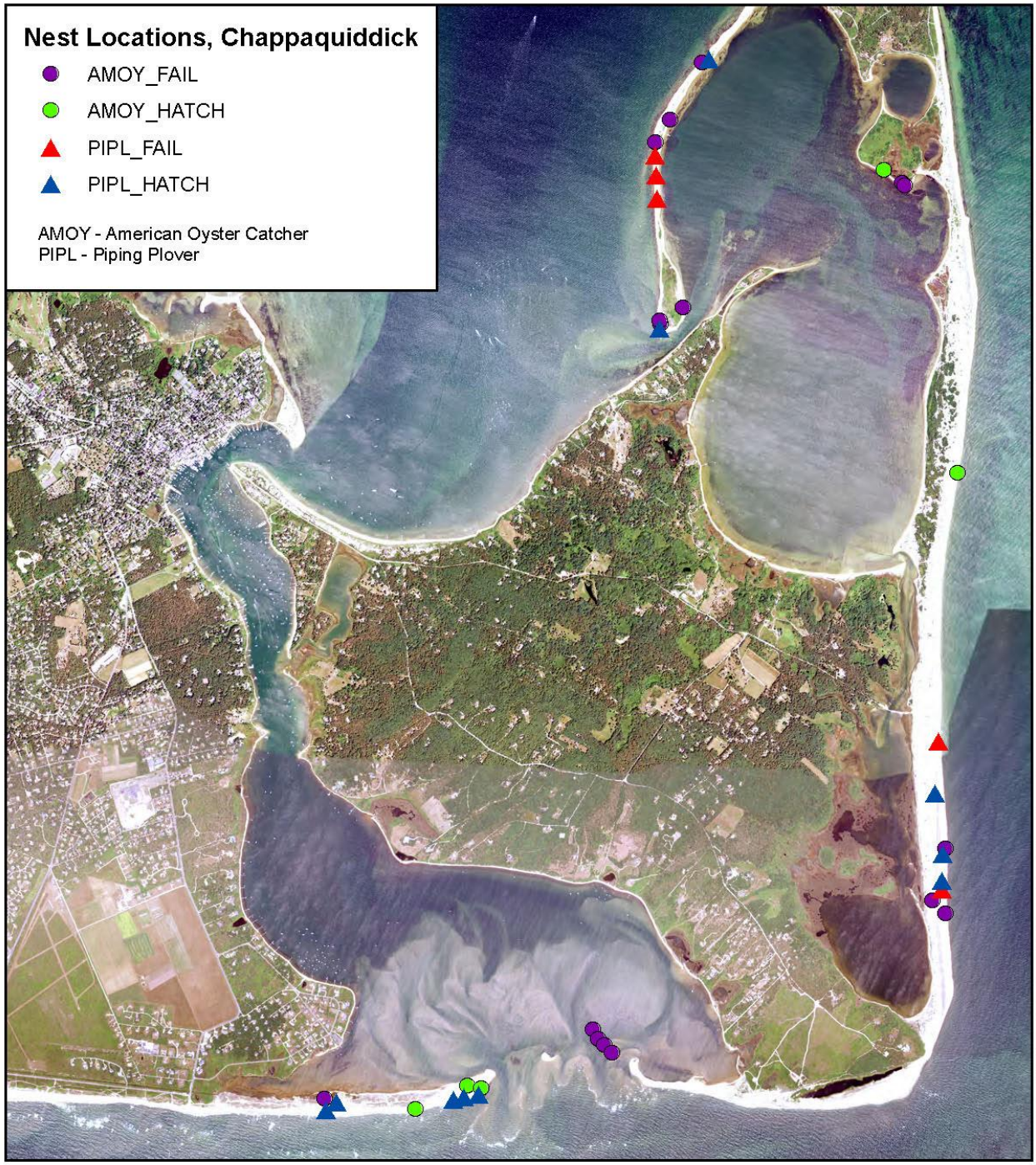
7.3.12.2.1 The following information was provided by TTOR's Ecologists based on their rare species data base for the Cape Poge Refuge and property that they manage (Norton Point Beach). Recent rare species occurrences within our project action areas based on maps prepared by TTOR for 2009 and 2010 are provided as **Figures 7-3** and **7-4**, respectively. This information has been updated with recent communications with both TTOR and MANHESP Biologists. The key to the legend is AMOY, American oystercatcher, PIPL, piping plover, BLSK, black skimmer, LETE, least tern, COTE, common tern and ROST, roseate tern.

7.3.12.2.2 <u>Piping Plover</u>

7.3.12.2.2.1 The following information was excerpted from the After Action Report to the USFWS included in Appendix N1 in the Final TCRA (March 2010). During the 2009 breeding season, 7 pairs of piping plover bred on Cape Poge Refuge and East Beach on Chappaquiddick Island (**Figure 7-3**), and 5 pairs of piping plovers nested at Norton Point Beach in Edgartown (See **Figure 7-3**). Altogether, the piping plover pairs produced 15 nests, 54 eggs, 35 chicks, and 4 fledglings, resulting in 0.27 fledglings produced per breeding pair. Nest failures in 2009 resulted from storm overwash and predation by skunks and crows.

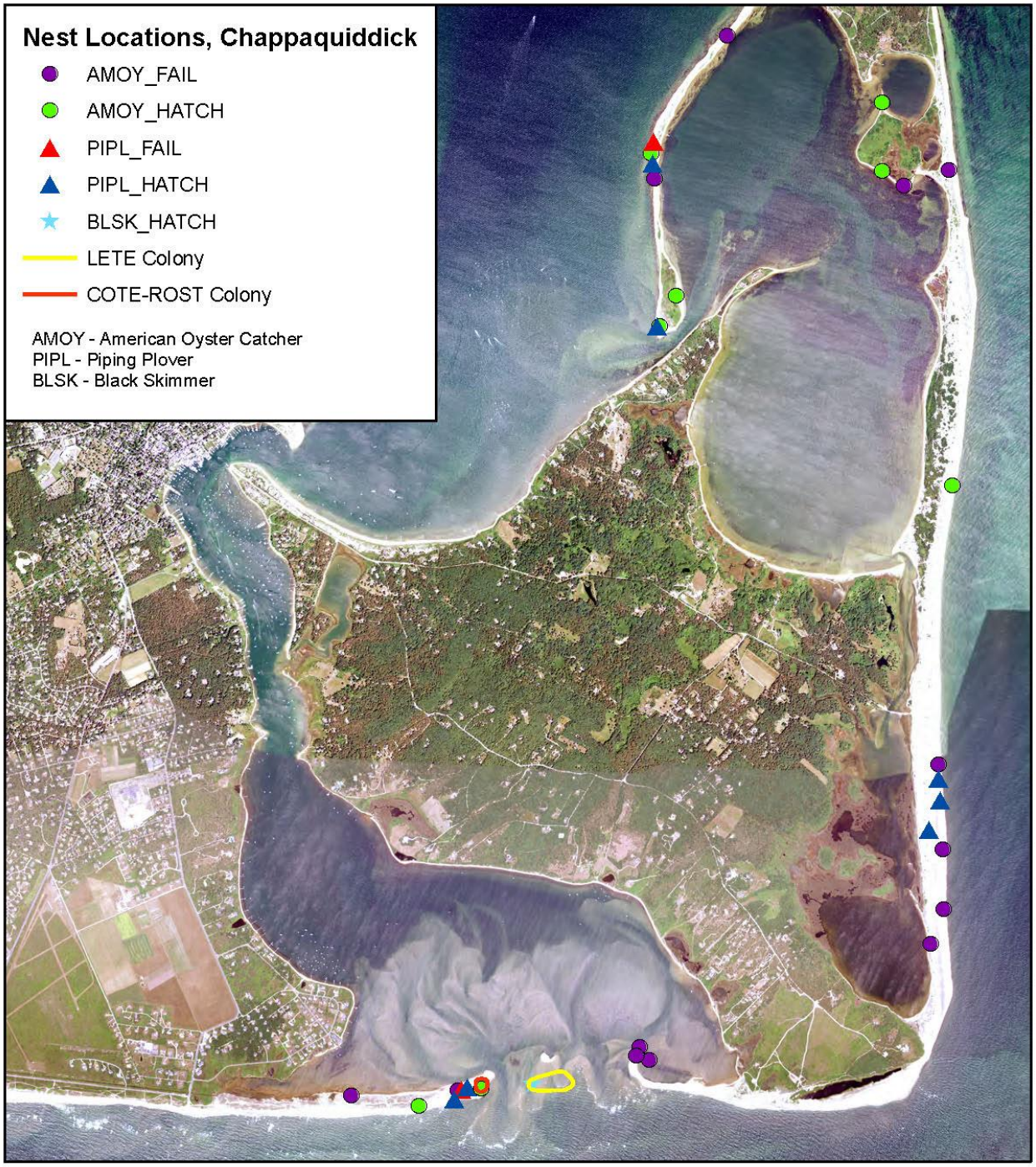
7.3.12.2.2.2 During the TCRA no piping plover nested or foraged within the action area-either within the removal area or along travel corridors accessing the sites. No other Federally-listed species (roseate tern or northeastern beach tiger beetle) were observed within the action area. In addition, northern harrier, a State-listed species did not nest within the action area.

Figure 7-3: 2009 Shorebird Nest Locations



US Army Corps of Engineers	UXB International, Inc.	AMEC Earth & Environmental, Inc.	FIGURE 7-3 2009 Shorebird Nest Locations Martha's Vineyard, MA
N 0 0.5 1 2 Kilometers 0 0.25 0.5 1 1.5 Miles	NOTES:	11/16/2010	MV_Site_Location.mxd
		Drawn: JBO	PROJ: 562910000

Figure 7-4: 2010 Shorebird Nest Locations



US Army Corps of Engineers	UXB International, Inc.	AMEC Earth & Environmental, Inc.	FIGURE 7-4 2010 Shorebird Nest Locations Martha's Vineyard, MA
N 0 0.3 0.6 1.2 Kilometers 0 0.25 0.5 1 1.5 Miles	NOTES:	11/16/2010	MV_Site_Location.mxd
		Drawn: JBO	PROJ: 562910000

7.3.12.2.2.3 Nesting data from 2010 provided by TTOR for the Cape Poge Refuge that include portions of our MRS study or action areas illustrates the dynamic nature of the shorebirds (**Figure 7-4**). Piping plover, least and common tern nesting was recorded at Norton Point Beach, along with Piping plover hatchlings resulting from successful hatches .

7.3.12.2.2.4 Piping Plovers nesting has occurred infrequently along the ocean beaches to the east of the action area: between Aruda's Point and the Jetties. One pair of Piping Plovers nested unsuccessfully north of Aruda's Point in 2008. Dense inter-dune vegetation near Aruda's Point precludes travel of unfledged chicks between Aruda's Point and Cape Poge Bay.

7.3.12.2.2.5 Adult Piping Plovers have been observed foraging along the shoreline of Drunkard's Cove—between Simon's Point and Little Neck. This area is part of The Trustees of Reservations publically accessible vehicle travel corridor.

7.3.12.2.3 <u>Roseate Tern</u>

7.3.12.2.3.1 Roseate Terns (15 pairs) nested along the southern shore of Shear Pen Pond in 1982. The colony was flooded out and the site occupied by nesting gulls in 1984. Roseate Terns have not occupied this site since 1982. Roseate Tern activity was not anticipated during the 2009 breeding season. The TTOR field data from 2010 reports 26 roseate tern present on Chappaquiddick (Email Chris Buelow, TTOR 27 Oct 2010). **Figure 7-3** lists common tern/roseate tern colony in the key, but no colonies were located at the Cape Poge Refuge and Norton Point Beach.

7.3.12.2.3.2 According to TTOR, they have not had shorebirds nest at Long Point since 2005. However, the MANHESP has recorded nesting of protected tern species along the Tisbury Great Pond barrier beach to the west of Long Point extending to the western end on the private properties controlled by the Quansoo Beach Association (Personal communication, Tim Simmons, MANHESP 5 November 2010).

7.3.12.2.4 <u>Common and Least Tern</u>

7.3.12.2.4.1 The above protocols for the protection efforts of the Piping plover and Roseate tern will also provide protection for the Common and Least terns. Should any work activity occur when these avian species are present April 1 through August 31, daily consultation with TTOR and MANHESP will occur to coordinate activities to minimize impact. In 2010 a tern colony, common

and least, were recorded nesting east of the cut in Katama Bay, off Norton Beach and along the beach/dunes of Tisbury Great Pond barrier beach.

7.3.12.2.5 Northern Harrier

7.3.12.2.5.1 The Northern harrier or Marsh hawk nest in wet meadows, grasslands, abandoned fields and coastal/inland marshes. They are particularly vulnerable from March-August during breeding activity. Nests may be in shallow depressions created on the ground, in low vegetation or in shallow water on a pile of vegetation. Nests are built from grasses, water weeds and other selected vegetative material. These northern harrier areas are vulnerable to foot and vehicular traffic. Each of the three MRS sites have upland areas which are potential harrier nesting sites, with the Cape Poge site the most active nesting area. Since the nests are well camouflaged the protection/ minimizing threat is to avoid this upland habitat from March through August. As with other listed avian species, close coordination with TTOR and MA Natural Heritage is required prior to any activity in the upland during this time period to check northern harrier sightings.

7.3.12.2.5.2 Many northern harriers that nest on Cape Cod and the islands migrate south for the winter. Northern harriers that don't migrate south or those that nest to the north of MA may also winter on the islands off the coast of Massachusetts (MANHESP Program Bulletin). Activities related to Phase 1 and 2 should not impact these overwintering birds.

7.3.12.2.5.3 As with the above mentioned Federal- and State-Listed birds, it is recommended that Phase 1 and 2 RI activities shall not be conducted in their nesting habitat during the Northern harrier's breeding season, March 1-August 31. The one reported northern harrier breeding site is in thick vegetation on the western portion of Tisbury Great Pond. This breeding site is on property managed by the Sheriffs Meadow Foundation. (Personal communication, Kristen Fauteux, Sheriffs Meadow Foundation, 5 November 2010).

7.3.12.2.5.4 A specific recommendation for protection of the breeding northern harrier by MA Natural Heritage is to not mow the low, dense vegetation (probably scrub oak). The cutting of the vegetation will disrupt the cover around the nest and provide access to the harrier nest by predators such as skunk and raccoon. Phase 1 survey will occur on foot with the hand held magnetometer. The elimination of cutting vegetation in this area will be in addition to the exclusion of Phase 1 activity from March 1 to August 31.

7.3.12.3 Environmental Requirements and Protocols by TTOR, MANHESP and Others for Protected Avian Shorebird Species

7.3.12.3.1 As stewards of the environment TTOR, MANHESP and other involved stakeholders place symbolic fencing each spring in all potential habitat beginning in April. The fencing is placed from the toe of the dune throughout much of the ocean facing beach. Symbolic fencing is 5-6 ft stakes placed about 15 ft apart. The stakes are inserted to a sufficient depth to support twine tied 4 ft from the ground. Symbolic fencing is placed parallel to the toe of the dune at Tisbury Great Pond Barrier Beach, Norton Point Beach, and any other potential shorebird nesting areas. This fencing will also protect the larval habitat of the Northeastern Beach Tiger Beetle since they are collocated. Motor vehicles are excluded from the beach habitat throughout the nesting season from April 1- August 31. This means the elimination of public vehicles in the vicinity of chicks while there are chicks on the beach and greatly limiting all use of essential TTOR vehicles for their managed properties. Essentially Norton Point Beach was closed for most of the summer in 2010. TTOR also used wire mesh fencing to surround the tern colony on Norton Point Beach in 2010, and electric fencing may be sued in 2011 to protect some nesting areas, especially on Norton Point Beach.

7.3.12.3.2 To lessen impact on these Federal and State -listed avian species all field activities including preparation and staging should occur when these species are not present. Proper field schedule design will alleviate any potential impact on these species by avoidance by working outside of their nesting season. **Table 7-3** Protected Avian Species No Work Windows provides the windows for the shorebirds and Northern harrier by MRS, Land Categories and Habitat.

7.3.12.4 Daily Protocol for Remedial Investigation Field Operations at Little Neck, Cape Poge Wildlife Refuge and at Norton Point Beach During the Shorebird Nesting Season April 1-August 31, 2011

7.3.12.4.1 <u>Nesting Piping Plovers & Other Shorebirds of Concern</u>. Starting on April 1, 2011 by 1000 hours daily, the UXB on-site UXO supervisor will contact Acting Chappaquiddick Superintendent Sarah Trudel (radio call sign: Trustees 11) via VHF radio channel 159.465 MHz or via land line (508-627-7689) for the Cape Poge Wildlife Refuge to discuss the last known location of any Piping plover nests, feeding Piping plover adults or chick locations, and any other protected shorebird species.

Table 7-3: Protected Avian Species No Work Windows

PROTECTED AVIAN SPECIES NO WORK WINDOWS			
MRS Sites	**Land Categories/Habitats**	**Shorebirds April 1-August 31**	**Northern Harrier March 1-August 31**
FMTMGR at South Beach MRS	**Beach**		
	South Beach/Dune	None*	None
	Norton Point Beach/Dune	**Apr 1-Aug 31**	None
	Wasque Point Beach	None*	None
	Inland Water		
	Katama Bay	**Potential Apr 1-Aug 31****	None
	Land		
	Wasque Pt. Upland	None	None
	Ocean		
	Adjacent to South Beach	None*	None
	Adjacent to Norton Point Beach/Dune	**Apr 1-Aug 31**	None
	Adjacent to Wasque Point Beach	None*	None
Cape Poge/Little Neck MRS	**Beach**		
	North-East to Simon Point	None*	None
	Inland Water		
	Cape Poge Bay/Shear Pen Pond	None	None
	Inland Water Beaches	None*	None
	Land		
	Cape Poge Lighthouse/Upland	None	**Mar 1-Aug 31**
	Little Neck/Upland & Salt Marsh	None*	None
	Ocean		
	North-East to Simon Point	None*	None
Tisbury Great Pond MRS	**Beach**		
	Barrier Beach/Dunes	**Apr 1-Aug 31**	None
	Inland Water		
	Tisbury Great Pond	**Potential Apr 1-Aug 31****	None
	Long Point Ponds/Wetlands	None	None
	Land		
	Western Uplands	None	**Mar 1-Aug 31**
	Eastern Uplands	None	None
	Ocean		
	Adjacent to Barrier Beach/Dunes	**Apr 1-Aug 31**	None

Footnotes:

* - None anticipated based on 2010 reported shorebird occurrences and historical data; however, shorebird nesting locations can vary year to year. In accordance with the Environmental Protection Plan, UXB will contact the TTOR Shorebird Technicians daily during the nesting season (April 1 - August 31) for any reported occurrences for properties that they manage or the MANHESP for the private properties.

**- Potential no work window if the Inland Water near shore field activities adjacent to northern side of the barrier beach/dunes will disturb the nesting shorebirds.

7.3.12.4.2 Similarly for the Long Point Wildlife Refuge, the UXB on-site UXO supervisor will contact Superintendent Chris Egan (radio call sign: Trustees 11) via VHF radio channel 159.465 MHz or via land line (508-693-3678).

7.3.12.4.3 Vehicle Travel Restrictions. In the opinion of TTOR Shorebird Technicians, if vehicle access presents potential for adverse impact to shorebird resources they will so notify Acting Superintendent Sarah Trudel for Cape Poge Wildlife Refuge and Chris Egan for Long Point Wildlife Refuge daily by 1000 hours. Acting Superintendent Trudel or Superintendent Egan will take any and all measures necessary to assure vehicle access in these areas will not create situations where nesting Piping plovers or Least terns are impacted from passing vehicles, per the Massachusetts Shorebird Protection Guidelines.

7.3.12.4.4 If unfledged chicks are present in the area, only Essential Vehicles will be allowed into the vehicle exclusion area per Massachusetts or USFWS Shorebird Protection Guidelines. UXB vehicles will be treated as Essential Vehicles and will be required to access the impacted area with a TTOR Shorebird Technician present. Logging into and out of the area is also required per the Guidelines noted herein.

7.3.12.4.5 Unfledged Piping Plovers. UXB will be required to follow the same vehicle guidelines as the general public. If vehicle corridors are open to the public, UXB would also have access. In the event of vehicle closures due to the presence of unfledged Piping Plovers, UXB will follow the state and federal provisions for "essential vehicles." Namely:

7.3.12.4.6 Essential vehicles will travel through chick habitat areas only during daylight hours, and will be guided by a qualified monitor who has first determined the location of all unfledged plover chicks.

7.3.12.4.7 Speed of vehicles will not exceed five miles per hour.

7.3.12.4.8 A log will be maintained by the beach manager of the date, time, vehicle number and operator, and purpose of each trip through areas where unfledged chicks are present. Personnel monitoring plovers will maintain and regularly update a log of the numbers and locations of unfledged plover chicks on each beach. Drivers of essential vehicles will review the log each day to determine the most recent number and location of unfledged chicks.

7.3.12.4.9 Reporting Requirements for Mortality of Piping Plover during TCRA: In the event that a piping plover (or Roseate tern) chick or adult is found dead during the

removal of explosives, the following special agent of the U.S. Fish and Wildlife Office of Law Enforcement should be immediately contacted:

7.3.12.4.9.1 David N. Sykes
Resident Agent in Charge
Office of Law Enforcement
U.S. Fish and Wildlife Service
70 Everett Avenue, Suite 315
Chelsea, MA 02150-2363
Phone: 617-889-6616 x 15
Fax: 617/889-1980

7.3.12.5 Northeastern Beach Tiger Beetle (NEBTB)

7.3.12.5.1 This insect has a full two year life cycle, with dipause/overwintering as a second instar larva. The larva are active through at least November and emerge from diapause in mid-March. Larva live in vertical burrows located in the upper intertidal to high drift zone. Their entire life cycle, adult, egg, larva and emerging adult occur in the foredune portion of the beach. The adults are active predators and will probably not be affected by either Phase 1 or 2 of the Project. Eggs are deposited in the sand on the upper dune. The beetle is most vulnerable in the larval stage while in the burrow. Larvae feed on insects feeding on detritus in the drift line. Their burrows which may be between 4 to 14 inches in the sand with an opening of about 0.5 inches are vulnerable to vehicular traffic. Vehicular traffic and heavy foot traffic on the upper beach just below the level of spring high tide, the drift line and the berm at the base of the dune are responsible for high mortality and their extirpation from much of their range in the Northeast. To limit impact to the beetle, the equipment to be used in Phase 1 on the beach has been modified to include an ATV which will tow the array on the beach. The smaller tires and reduced weight will not impact the beetle

7.3.12.5.2 The Northeastern Beach Tiger Beetle (NEBTB) occurs on the sandy beaches, washover areas and blowouts of the Tisbury Great Pond MRS and possibly other MRS project areas. However, no NEBTB have been observed at the other MRS sites since the 1950's and they have been checked regularly since 1990 (Email Tim Simmons, MANHESP, 27 October 2010). For Phase 1, to minimize impact to the larval stage an ATV towed array will be utilized on the beach. Phase 1 activity will be limited to the hand operated and pushed magnetometer on and in the vegetated dunes.

7.3.12.5.3 Intrusive Phase 2 activity within actual Northeastern Beach Tiger Beetle larval habitat will require additional coordination with the USFWS and the MANHESP.. The location of the NEBTB habitat in our MRS or action area seems to be limited to the Tisbury Great Pond barrier beach to the east by Long Point and to the west of the cut by Quonsoo Beach (personal communication Tim Simmons, MANHESP and Entomologist Paul Goldstein, Ph.D., Vineyard Haven, MA).

7.3.12.5.4 There are two tiger beetle species inhabiting the Atlantic beach, the common hairy collared tiger beetle, *Cicindela hirticollis*, and the northeastern beach tiger beetle, *C. d.dorsalis*. It is not possible to distinguish the larvae of the two species from a photograph. One either needs to probe the burrow with a small skewer to determine the burrow angle or excavate a burrow carefully to examine the larva for diagnostic characteristics. The MANHESP recommended that the project hire someone with the necessary skills to identify tiger beetle larvae when working in the Long Point - Quansoo Beach Association beach areas. When inclement weather arrives or they have recently fed tiger beetle larvae plug their burrows or allow them to be covered by windblown sand. Tiger beetle larvae tend to be concentrated at this time of year (fall-winter) as they retreat landward due to the changing beach profile of the winter beach. It is important to identify larval concentrations before they become dormant or nearly dormant for the winter. Tim Simmons (MANHESP) has excavated larvae in the spring and fall that were 38 inches below the surface.

7.3.12.5.5 When excavating MEC in these areas it may be useful to screen the surrounding sand, retrieve any tiger beetle larvae and restore them to a new burrow in appropriate habitat. This is essentially what the MAHNESP does when translocating larvae for restoration.

7.3.12.6 Sand-plain Gerardia (*Agalinus acuta*)

7.3.12.6.1 An extremely rare, delicate annual herb, averaging 10-20 cm tall, smooth stem with opposite linear leaves. Short lived, bell shaped purple flowers are on 0.5-1.2 inch stalks with 5 petals fused to form a corolla tube. Sandplain gerardia has been located only at the Tisbury Great Pond MRS, east of Long Cove Pond. (USFWS Response Letter, September 27, 2010). Three other species of the genus *Agalinus* could also be present at the site. A description of Sandplain gerardia will be included in the Field manual. The Phase 1 RI investigation will not impact this plant. If Phase 2 requires digging in this habitat to remove an anomaly, the plug of soil and above ground vegetation will be placed on a plastic sheet, the object

removed and the soil with vegetation will be replaced in the hole and gently tamped back in place.

7.3.12.7 State-Listed Insects (Dragonfly, Beetle, Butterflies & Moths)

7.3.12.7.1 There are eighteen State-listed insect species in addition to the NEBTB. These species are the 4th-21st as previously listed in the Section on State Listed Species and include primarily butterflies and moths along with one additional beetle (Purple tiger beetle) and one dragonfly (Comet darner). Many of these organisms have complicated life cycles, with as many as four forms, egg/larva/pupa /adult. Each of these life forms may occupy a different habitat.

7.3.12.7.2 Phase 1 of the MRS is minimally intrusive. Adult forms of the insects are motile, easily avoiding contact with equipment. Larva, caterpillar or maggot-like forms are unlikely to be impacted during the transect surveys, no more than they would be affected by someone walking through the habitat.

7.3.12.7.3 Phase 2 could potentially impact the pupa and larva form of the insect. When anomalies are located, they will be removed from the substrate. The soil and any rooted vegetation will be dug from the surface of the anomaly, placed on a sheet of plastic adjacent to the hole and replaced upon removal of the anomaly.

7.3.13 Protection for State-Listed Plants

7.3.13.1 Phase 1 activities will have minimal impact. For example, Nantucket shadbush growth will be encouraged with cutting. Phase 2 digging activity may impact listed plants, but the probability that an anomaly will be present in an area with a listed plant cover is remote. The removal of the plug of soil over the anomaly and its replacement will limit the potential impact to a State-listed plant.

7.3.14 Manifesting, Transportation, and Disposal of Wastes

7.3.14.1 No hazardous wastes are expected to be generated as a result of site activities. Trash will be bagged and disposed of properly off site. Munitions debris will be placed into containers and transported off site for recycling.

7.3.15 Burning Activities

7.3.15.1 There are no burning activities planned for this project.

7.3.16 Dust and Emission Control

7.3.16.1 Due to the limited amount of disturbed area anticipated during the project and the fact that much of the work will be conducted in wet areas, it is not anticipated that dust or emissions controls will be needed on site.

7.3.17 Spill Control and Prevention

7.3.17.1 There will not be any storage of fuel, oil, paint, or similar materials on sites. In the event of a spill in an area cleared of MEC, shovels will be used to remove any contaminated soils, which will be containerized and properly disposed. If the area has not yet been cleared of MEC, the clearance will be performed before soil removal occurs. A spill kit containing absorbent, rags, shovels, and latex gloves will be available on site.

7.3.18 Storage and Temporary Facilities

7.3.18.1 UXB has obtained a temporary secure space at Edgartown Marine for the storage of equipment. All MPPEH/MEC items will be disposed of in accordance with the ESP. Munitions debris and scrap metal will be removed from the site and stored in a locked container sited at the Edgartown Police Station pending recycling/salvage.

7.3.19 Access Routes

7.3.19.1 Access to the site will be via numerous recognized paved roads as well as well-traveled dirt access roads. Check with **Table 7-3** for specific No Work Windows and restrictions to be certain that access and staging sites will not impact protected species or their habitats. No roads will need to be created for the project. Since spotted knotweed was observed growing on many island roadsides, access areas should be checked prior to being traversed into the three MRS sites. Determine whether the access sites are within shorebird, northern harrier breeding and northeastern beach tiger beetle habitat. For example access at Norton Point Beach may be limited between April 1 and August 31. Boat access to freshwater ponds and wetlands will be in areas to limit impact to emergent vegetation.

7.3.20 Control of Water Run-on and Run-off

7.3.20.1 Due to the limited amount of disturbed area expected on site, run-on and run-off controls are not anticipated.

7.3.21 Decontamination and Disposal of Equipment

7.3.21.1 Decontamination will consist of performing a dry-decon of equipment (including scraping dirt and mud from the equipment) before demobilization. See Section 7.3.9 for measures to be implemented relative to the control of invasive species. Disposal of equipment consumed during the project will include the draining and capturing for disposal of any hazardous materials (such as fuel and oil) within the equipment, and that hazardous material will be disposed of properly.

7.3.22 Minimizing Areas of Disturbance – Phase 2

7.3.22.1 Once potential MEC is located, soil and plants covering the device will be excavated and placed to one side. All detonation holes shall be, to the greatest extent feasible, filled, regarded, and returned to their previous state. The excavated soil and plant material will be placed over the detonation hole. The detonation hole will not be filled with soil from another area to minimize the possibility for the introduction of invasive species. Explosive disposal activities may release vapors or gaseous emissions, but since they are temporary and intermittent in nature, they are not anticipated to be detrimental to the local environment. Given the sites are environmentally sensitive and are highly utilized tourist areas, every effort will be made to minimize the spread of shrapnel during explosive evolutions and a thorough clean-up of any shrapnel will occur prior to departing the MRSs.

7.3.23 Post-Activity Cleanup and Site Restoration

7.3.23.1 At the completion of activities, all equipment and materials brought on site will be removed. After the acquisition of Selected Anomalies in Phase 2 and depending on the degree on surface disturbance and existing habitat, restoration measures include replacing the soil that is removed at the surface along with the vegetated root mass (top six inches) as a transplant measure and/or seeding with the appropriate native seed mixture in addition to leaving the site of the excavation bare for natural recolonization. UXB will conduct a final walk-through with the USAESCH PM to ensure that no remaining clean-up items exist. It is anticipated that the majority of excavation sites will be within sub-tidal and inter-tidal areas, and they will be naturally restored when the substrate caves in as the metal object is removed.

7.3.24 Air Monitoring Plan

7.3.24.1 Not applicable.

7.4 ENVIRONMENTAL PROTECTION PLAN (EPP) FOR CULTURAL RESOURCES PROTECTION

7.4.1 Cultural and Archaeological Resources On-Site

7.4.1.1 Federal and commonwealth agencies and stakeholders associated with cultural and archaeological resources listed on **Table 7-1** will have the opportunity to review the Work Plan and/or work areas prior to the commencement of any work. The review will allow the USACE to identify work areas, which may potentially include cultural or archaeological sites. The MA SHPO, via letter dated October 28, 2010, has concurred with our approach stipulating archaeological monitoring

of all sub-tidal, intertidal and upland areas as specified in correspondence from USACE dated October 19, 2010. All work performed will be in compliance with all federal, commonwealth, and local laws, regulations and statues. In addition, no work will be performed until all applicable "permits" (i.e. the functional equivalent since exempt from administrative requirements under CERCLA) have been obtained regarding cultural and archaeological resources.

7.4.2 Cape Poge Little Neck Bomb Target MRS and the Moving Target Machine Gun Range at South Beach MRS

7.4.2.1 The Cape Poge Little Neck Bomb Target MRS and the Moving Target Machine Gun Range at South Beach MRS may contain cultural and archaeological sites. Anecdotal evidence indicates there are two areas of remnant shell middens and arrowheads in the Little Neck area of Cape Poge Bay. Additionally, there is a reference to a 19th century smallpox hospital in the northern Cape Poge area. The Trustees of Reservation should indicate the location of known shell middens and other cultural resources to the UXO team prior to initiation of work. These areas should be avoided unless necessary for munitions clearance and remediation. In the event human remains are uncovered, all work will cease. The CENAE PM or designee will notify state and/or local police and the Massachusetts Medical Examiner, Wampanoag Tribe’s Historic Preservation Officer, and Massachusetts State Archaeologist in accordance with the State Burial Law.

7.4.3 Discovery of Human Remains

7.4.3.1 If bones are determined to be human and are less than 100 years old, a criminal investigation may be warranted. If greater than 100 years old, the medical examiner then notifies the state archaeologist who conducts an archaeological investigation of the site. If the state archaeologist determines that the remains are Native American, then the Wampanoag Tribe and the Massachusetts Commission on Indian Affairs will be notified. If it is determined that the burial cannot be adequately protected, the state archaeologist can remove the remains. For archaeological sites and/or human remains on DCR-owned property, the DCR Archaeologist listed in **Table 7-1** will also be contacted.

7.4.4 Escort Visiting Parties to Sites

7.4.4.1 A UXB UXO technician will escort any visiting parties inspecting the find(s). Anecdotal evidence also indicates the presence of a World War II (WWII) bunker several hundred yards off South Beach, approximately South of Katama and southeast of the Katama Air Park between Atlantic Drive and Mattakesett Herring

Creek, visible at low tide. The field team should be aware that there might be other sites or features found in conjunction with the target storage building. The CENAE PM will be notified of any additional findings during the course of work.

7.4.5 Underwater Investigations

7.4.5.1 To mitigate impacts to items of cultural interest underwater, a marine archeologist will evaluate the anomaly signatures in the collected data prior to intrusive investigation and compare them to known items of cultural value. If the item is clearly identified as a cultural item, it will not be disturbed. For items not clearly identified as a cultural item that are selected for further investigation, the diver will make an initial determination as to the nature of the item, with ultimate disposition of MEC items as described in the ESP. For non-MEC items, a visual description of the item will be recorded, and if possible, a digital photo taken with the coordinates of the item recorded. These will be provided to the marine archeologist for further analysis, with ultimate disposition by others, with the item returned to the location found, and replaced in the approximate orientation as found. Similar archaeological monitoring and recordation will be conducted for upland areas with the assistance of a terrestrial archaeologist.

Attachment 7-1: Rare, Threatened, & Endangered Species Consultation Request

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

REPLY TO
ATTENTION OF

July 23, 2010

Engineering/Planning Division
Evaluation Branch

Ms. Mary Colligan
National Marine Fisheries Service
Northeast Regional Office
Protected Resources Division
55 Great Republic Drive
Gloucester, Massachusetts 01930

SUBJECT: Rare, Threatened and Endangered Species Consultation for the ESTCP Technology Demonstration & MEC Support Project at the Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Former Moving Target Machine Gun Range at South Beach, and Tisbury Great Pond, Martha's Vineyard, Massachusetts

Dear Ms. Colligan:

The U.S. Army Corps of Engineers (USACE), as the Lead Agency, is providing dive operations support as part of an Environmental Security Technology Certification Program (ESTCP) Technical Demonstration & MEC (Munitions and Explosives of Concern) in the ocean waters off of South Beach, Martha's Vineyard. This ESTCP technical demonstration project is being conducted for the Department of Defense (DoD) by Tetra Tech EC, Inc., with dive support by our contractor, UXB International, Inc. Based on your May 11, 2009 response to our Time Critical Removal Action consultation letter dated April 1, 2009, pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, as amended and recent telephone conversation between Julie Crocker of your staff and Robert W. Davis of my staff, we understand that several species of listed sea turtles occur seasonally off the coast of Martha's Vineyard. We also understand that listed whales also occur in offshore waters of Martha's Vineyard. The USACE anticipates that the limited intrusive work being proposed herein will not adversely affect any species or their habitat if present. We therefore request your concurrence with our determination that the proposed action is not likely to adversely affect any species listed by NOAA's National Marine Fisheries Service (NMFS). This support work is anticipated to continue until September 2010, or perhaps longer depending on the amount of MEC that needs to be investigated.

The Department of Defense (DoD) is responsible for assessment and remediation of munitions and explosives of concern (MEC) impacted areas throughout the United States. An estimated 15 million terrestrial acres of land have been impacted by historical ordnance operations and the underwater acreage may be even greater. There are well-developed methodologies and approaches for assessment of terrestrial MEC; however, there are currently no "standardized" approaches for wide area assessment (WAA) for MEC in the fresh water or

-2-

marine environments. This project is one initial step in development of a more standardized approach for underwater assessments. It will demonstrate the effectiveness of equipment systems combining multiple underwater detections and mapping instruments to effectively discriminate and locate underwater MEC. It will also demonstrate methods for fusion of data from multiple instruments into a seamless data stream that provides multi-faceted information for the evaluation of ordnance-related conditions and physical features that will impact the selection of appropriate and effective removal strategies.

This ESTCP special study is a collaborative joint investigation with limited off shore intrusive work by divers in advance of conducting the full blown Remedial Investigation/Feasibility Study (RI/FS) for Martha's Vineyard that is not scheduled to start until later this fall after coordination with all of the involved stakeholders and regulatory approval of the RI/FS Work Plan. The RI/FS will involve intrusive work on land, beach and near shore waters and as such we plan to complete consultations relative to Federal and State listed rare, threatened and endangered species with you, the US Fish and Wildlife Service (USFWS), the MA Natural Heritage & Endangered Species Program (MANHESP), and other applicable resource agencies.

The work for this proposed action is summarized below as excerpted from the enclosed Final Abbreviated Work Plan, ESTCP Technology Demonstration & MEC Survey Dive Support, Martha's Vineyard, Massachusetts, dated June 2010. Figure 1-1 is the general map of the study area that shows the two ESTCP Survey Areas while Figure 3-4 provides detailed bathymetry along with the proposed transects. I have also enclosed a larger full size color plan of Figure 3-4.

UXB International, Inc. (UXB) has been contracted by the US Army Engineering and Support Center, Huntsville (USAESCH) under contract W912DY-04-D-0019, Task Order (TO) DO 0007 to perform a Remedial Investigation/Feasibility Study (RI/FS) at the Former Cape Poge Little Neck Bomb Target Site Chappaquiddick Island, Dukes County, Massachusetts, FUDS D01MA0595, Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts, FUDS D01MA0486 and Tisbury Great Pond, FUDS D01MA0453. In addition to the RI/FS, UXB and its subcontractor, VRHabilis, will provide dive operations support as part of an Environmental Security Technology Certification Program (ESTCP) Technical Demonstration in the ocean waters off of South Beach. Diving support activities include establishing an underwater instrument verification strip (IVS) and investigating underwater anomalies identified by the principal investigator, Tetra Tech. In addition, UXB will conduct a Munitions and Explosives of Concern (MEC) transport study in the ocean off South Beach and Tisbury Great Pond. This abbreviated Work Plan (WP) describes the goals, methods, procedures, and personnel used for field activities associated with the ESTCP Demonstration and the MEC Transport Study. The areas where work will be performed are located in the Atlantic Ocean adjacent to Tisbury Great Pond and South Beach, and within Edgartown Harbor.

MEC are a safety hazard and may constitute an imminent and substantial endangerment to site personnel and the local populace. The work associated with the activities covered in the work plan shall be performed in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 104, and the National Contingency Plan (NCP), Sections 300.120 (d) and 300.400(e). All MEC encountered during this munitions

-3-

response shall be destroyed on-site. Applicable provisions of Chapter 29 of the Code of Federal Regulations (CFR) 1910.120 apply. All activities involving work in areas potentially containing MEC hazards shall be conducted in full compliance with United States Army Corps of Engineers (USACE), USAESCH, Department of the Army (DA), state and local requirements regarding personnel, equipment and procedures, and Department of Defense (DOD) Standard Operating Procedures (SOPs), safety regulations and Department of Navy Dive Standards. Due to the inherent risk in this type of operation, Unexploded Ordnance (UXO) personnel shall be limited to 40-hours per week on MEC related tasks, exclusively during sunlight hours.

CERCLA response actions are exempted by law from the requirement to obtain Federal, State or local permits related to any activities conducted completely on-site. It is the policy of the USEPA, MassDEP and the DA to assure all activities conducted on sites are protective of human health and the environment and to meet (or waive) the substantive provisions of permitting regulations that are applicable or relevant and appropriate requirements (ARARs). The ESTCP project is also being closely coordinated with the Massachusetts Department of Environmental Protection (MassDEP) and the U.S. Environmental Protection Agency (USEPA) and other stakeholders such as the Edgartown Conservation Commission. The final work plan, when available, will be provided to your office, the town of Edgartown Conservation Commission, the Trustees of Reservations, the MADCR, the Dukes County Manager, the MADEP, and the Wampanoag Tribe.

The USACE anticipates that the limited intrusive work being proposed herein will not adversely affect any species or their habitat if present. Adequate measures to avoid, minimize and/or mitigate potential environmental impacts to the maximum extent practical without compromising our ability to achieve the primary objectives of the ESTCP Demonstration Project, were incorporated into the Environmental Protection Plan, Section 7 in the enclosed Work Plan. Upon completion each impacted removal site (i.e. as impacted for each anomaly or explosive munitions hazard investigated and removed by the divers) will be naturally restored to existing conditions. Since all of these sites will be within sub-tidal and inter-tidal areas they will be naturally restored when the substrate caves-in as the metal object is removed.

We appreciate your timely concurrence to our determination and look forward to continued coordination and consultation with your office as the RI/FS proceeds. If you have any questions and/or need additional information, please contact Mr. Robert W. Davis, Environmental Resources Specialist, at 978-318-8236 (Robert.W.Davis@usace.army.mil).

Sincerely,

Anthony T. Mackos, P.E.
Acting Chief, Engineering/Planning Division

Enclosures

Attachment 7-2: Rare, Threatened & Endangered Species Consultation Response

United States Department of the Interior

FISH AND WILDLIFE SERVICE

New England Field Office
70 Commercial Street, Suite 300
Concord, NH 03301-5087
http://www.fws.gov/newengland

September 27, 2010

Mr. Robert W. Davis, M.S.
Evaluation Branch
Engineering/Planning Division
USACE-New England District
696 Virginia Road
Concord, MA 01742-2751

Dear Mr. Davis:

This responds to your electronic transmission, dated August 17, 2010, requesting that we review the proposed Military Munitions Response Program Remedial Investigation/Feasibility Study (RI/FS) to be conducted on Martha's Vineyard at three munitions response sites, and confirm the presence of federally-endangered or threatened species that were listed in your request. The sites proposed for inclusion in the RI/FS are the former Cape Poge Little Neck Bomb Range Target, the former Moving Target Machine Gun Range at South Beach, and the Tisbury Great Pond munitions response sites (MRS). Our comments are provided in accordance with Section 7 of the Endangered Species Act of 1973 as amended (16 U.S.C. 1531-1533).

Based on information currently available to us, we concur with your assessment that the federally-endangered roseate tern (*Sterna dougalii dougalii*) and sandplain gerardia (*Agalinus acuta*) may be present in the project areas, as well as the federally-threatened piping plover (*Charadrius melodus*) and northeastern beach tiger beetle (*Cicindela dorsalis dorsalis*). There is no federally-designated critical habitat.

Piping plovers and roseate terns could occur on the sandy beaches at all three project areas during the breeding and fall migration period of April 1 through September 30. Sandplain gerardia is located adjacent to the Tisbury Great Pond MRS in the sandy upland east of Long Pond. The Northeastern beach tiger beetle occurs on sandy beaches, washover areas and blowouts of the Tisbury Great Pond MRS and possibly the South Beach MRS.

In order to avoid adversely affecting piping plover or roseate terns, we recommend that activities associated with the remedial investigation (transects, sampling) not occur between April 1 and September 30, or be closely coordinated with the organizations managing piping plover and/or terns. Northeastern beach tiger beetles are present year round and are difficult to detect. Vehicle

Mr. Robert W. Davis, M.S.
September 27, 2010 2

use or other large-scale sand disturbance activities occurring in tiger beetle habitat could cause adverse impacts to larvae and adults. Once specific activities and locations have been identified, we may be able to recommend actions to avoid and/or minimize adverse effects to this species and its habitat.

We are available to assist you in the development of the RI/FS, identification of potential impacts to federally-listed species, and recommendations to avoid and/or minimize adverse effects. Please contact Susi von Oettingen of this office at 603-223-2541, extension 22, if you have any questions or need additional assistance.

Sincerely yours,

Thomas R. Chapman
Supervisor
New England Field Office

Attachment 7-3: Massachusetts Historical Commission Concurrence

DEPARTMENT OF THE ARMY
NEW ENGLAND DISTRICT, CORPS OF ENGINEERS
696 VIRGINIA ROAD
CONCORD, MASSACHUSETTS 01742-2751

RECEIVED
OCT 20 2010
MASS. HIST. COMM
#45470
#2048
#19046

REPLY TO
ATTENTION OF

October 19, 2010

Engineering/Planning Division
Evaluation Branch

Ms. Brona Simon, Executive Director and SHPO
Massachusetts Historical Commission
The Massachusetts State Archives Building
220 Morrissey Boulevard
Boston, Massachusetts 02125

Dear Ms. Simon:

The U.S. Army Corps of Engineers, New England District, is preparing to conduct a Remedial Investigation and Feasibility Study (RI/FS) to investigate Munitions and Explosives of Concern (MEC) and to sample for Munitions Constituents (MC), at the former Cape Poge Little Neck Bomb Target Site, the former Moving Target Machine Gun Range at South Beach, and the Tisbury Great Pond Munitions Response Site (MRS), Chilmark and West Tisbury, all on Martha's Vineyard, Massachusetts (see enclosed figures). We have previously coordinated with your office on a Time Critical Removal Action (TCRA) at South Beach and Cape Poge (see enclosed 2009 correspondence). We would like your comments on the planned RI, in accordance with Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended. The FS will be conducted after completion of the RI.

Between 1943 and 1944, the Department of the Navy acquired the leases to the properties of the former ranges at Cape Poge Little Neck, South Beach, and Tisbury Great Pond. The sites were used to provide training for the 1st Naval District, whose flight operations were based at Naval Air Station Quonset Point, Rhode Island, and the Naval Auxiliary Air Station Martha's Vineyard. The leases for Cape Poge were held until 1945, and the leases for Little Neck, South Beach and Tisbury Great Pond were held until 1947.

The Former Cape Poge Little Neck Bomb Target MRS is located on Chappaquiddick Island, which is located within the Town of Edgartown, Martha's Vineyard, Massachusetts. The site encompasses an area of approximately 800 acres including: 1) approximately 153 acres of land; 2) approximately 83 acres of beach; 3) approximately 500 acres of inland water; and 4) approximately 64 acres of ocean. The Cape Poge Little Neck MRS has become part of the Cape Poge Wildlife Refuge, which is owned and managed by The Trustees of Reservations (TTOR).

The Former Moving Target Machine Gun Range at South Beach is located within the town of Edgartown along the southern shore of Martha's Vineyard, Massachusetts.

The South Beach MRS encompasses approximately 478 acres including: 1) approximately 18.7 acres of land; 2) approximately 182.7 acres of beach; 3) approximately 7.7 acres of inland water; and 4) approximately 268.7 acres of ocean. Due to extensive beach erosion, the former range is now thought to be approximately 150 yards offshore at South Beach. South Beach is owned by the Commonwealth of Massachusetts, Department of Conservation and Recreation (DCR) and managed by the Edgartown Parks and Recreation Department from the first of May through Labor Day of each year.

The Tisbury Great Pond MRS is located within the towns of Chilmark and West Tisbury, Martha's Vineyard, Massachusetts. The site encompasses approximately 768 acres including: 1) approximately 198.1 acres of land; 2) approximately 61.5 acres of beach; 3) approximately 456.3 acres of inland water; and 4) approximately 52.4 acres of ocean. The majority of the site is owned by the Commonwealth of Massachusetts, TTOR, and private landowners. Tisbury Great Pond has elevations that range from sea level to three feet above mean sea level near the coast line in the southern portion of the site to approximately 15 feet in the northern portion. The majority of the area is flat with sand dunes, some of which are approximately 5 to 10 feet high. The shoreline gently slopes downward to the coast. There is a barrier beach separating Tisbury Great Pond from the Atlantic Ocean. Several times each year the barrier beach is manually breached to lower the elevation of the pond, which is brackish water, and to allow the water to flow into the Atlantic Ocean.

The overall objective of the RI is to determine the nature and extent of the MEC along with the MC (i.e. potential chemical contamination from the MEC) at each MRS. The MEC investigation will include sampling of soil, sediment, surface water, and groundwater. Through the collection of sufficient geophysical, visual, and analytical data, it will be possible to adequately characterize the nature and extent of the MEC and MC in order to determine future response actions at each MRS.

The RI study will be conducted in two phases. The first phase will be to conduct and complete the various surveys to delineate the spatial extent of geophysical anomalies through the acquisition of geophysical data along linear, parallel transects crossing each of the MRSs. These geophysical investigations will serve to delineate the nature and extent of surface and subsurface metallic objects. The second phase will consist of the evaluation of the geophysical survey data in order to select those anomalies that are potential MEC that need to be reacquired (i.e. dug up) to confirm the presence or absence of MEC or Munitions Debris (MD). This characterization will be accomplished through the use of Digital Geophysical Mapping (DGM) over two-dimensional grids and intrusively investigating a percentage of the geophysical anomalies identified within the grid boundaries. See enclosed figures for grid locations.

The anomalies to be reacquired will be selected and prioritized based on a variety of factors such as size, signal intensity, and shape characteristics. The prioritization process will also serve to differentiate anomalies associated with MEC from those not associated with MEC such as cultural debris.

- 3 -

Following this process, the reacquisition team will begin to relocate and flag each anomaly for the intrusive investigation team. Once an anomaly has been reacquired, a certified UXO technician will begin by hand excavating the soil in order to acquire the selected anomaly and determine if it is MEC or cultural debris. Water based anomalies will be excavated through use of an air lift or a water jet. If an anomaly is identified as MEC, it will then be determined whether it is safe to move or if it will require to be blown up in place.

Based on informal conversations with Ed Bell of your staff, we have decided that although significant historic properties may be present in the areas of potential effect, these properties may not be adversely impacted by the characterization and removal of MEC. Due to the need to remove all MEC for public safety, the Corps is proposing a conditional "no historic properties affected" (36 CFR 800.5(d) (1)) determination as recommended by Mr. Bell. This determination will be based on the following approach:

The excavation operations will be monitored by a qualified professional archaeologist experienced in the identification and treatment of ancient and historical period resources, including human remains, in the glaciated Northeast. Additionally, a marine archaeologist will be assisting with the characterization of anomalies in the subtidal areas. A memorandum report and MHC inventory forms for any identified sites will be completed by the archaeological monitors and provided to the MHC and other consulting parties. Any significant historic properties identified during the undertaking will be protected to the extent feasible. If no significant resources are found, a letter will be provided to the MHC and other consulting parties.

The Wampanoag Tribe of Aquinnah has requested that they be notified in the event that human remains are uncovered during the remediation. If remains are discovered, further work near burials will be suspended and the appropriate authorities alerted in accordance with state burial law. If human remains are identified, it may be necessary for the munitions specialists to "clear" that particular area of munitions so that the authorities can be allowed to complete their analysis. In all cases, regard for public safety will be the ultimate factor in determining access and the Corps Huntsville ordnance safety specialist will make the final determination.

We would appreciate your concurrence with this conditional "no historic properties affected" determination. If you have any questions, please contact Mr. Marc Paiva, project archaeologist of the Evaluation Branch, at (978) 318-8796.

Sincerely,

Anthony T. Mackos, P.E.
Acting Chief, Engineering/Planning Division

CONCURRENCE: Brona Simon
10/28/10
BRONA SIMON
STATE HISTORIC
PRESERVATION OFFICER
MASSACHUSETTS
HISTORICAL COMMISSION

Enclosures RC.45470
RC.2048
RC.A046

This Page Intentionally Left Blank

8 PROPERTY MANAGEMENT PLAN

(NOT REQUIRED FOR THIS TASK ORDER)

This Page Intentionally Left Blank

9 INTERIM HOLDING FACILITY (RCWM)

(NOT REQUIRED FOR THIS TASK ORDER)

This Page Intentionally Left Blank

10 PHYSICAL SECURITY PLAN (RCWM)

(NOT REQUIRED FOR THIS TASK ORDER)

This Page Intentionally Left Blank

11 REFERENCES

11.1 National Contingency Plan, 40 CFR 300.

11.2 Federal Acquisition Regulation, F.A.R. Clause 52.236-13: Accident Prevention.

11.3 Army Corps of Engineers Safety and Health Requirements Manual, EM-385-1-1, 3 November 2003

11.4 Army Corps of Engineers, ER-385-1-92, Appendix B, Safety and Occupational Health Document Requirements for Hazardous Toxic and Radioactive Waste (HTRW) and Ordnance and Explosive Waste (OE) Activities, 1 Sep 2000.

11.5 Occupational Safety and Health Administration (OSHA) General Industry Standards, 29 SFR 1910 and Construction Industry Standards, 29 CFR 1926; especially 1910. 120/29CFR1926.65-Hazardous Waste Site Operations and Emergency Response.

11.6 NIOSH/OSHA/USCG/EPA, Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities, October 1985. (DHHS(NIOSH) Publication No. 85-95).

11.7 DID MR-001 Type I Work Plan

11.8 DID MR-005-11 Quality Control Plan

11.9 DID MR-005-03 Explosives Management Plan

11.10 DID MR-005-04 Explosives Siting Plan

11.11 DID MR-005-06 Accident Prevention Plan

11.12 DID MR-005-08 Work, Data, and Cost Management Plan

11.13 DID MR-005-12 Environmental Protection Plan

11.14 DID MR-015 Accident Reports

11.15 DID MR-025 Personnel and Work Standards

11.16 DID MR-030 Site Specific Final Report

11.17 DID MR-045 Report/Minutes, Record of Meetings

11.18 DID MR-055 Telephone Conversations/Correspondence Records

11.19 DID MR-080 Monthly Status Report

11.20 DID MR-085 Project Status Report

11.21 EM 200-1-2, 31 Aug 1998

11.22 EM 200-1-3, 1 Feb 01

11.23 EM 200-1-6, 10 October 1997

11.24 EPA 1110-3-8, 1 December 1999

11.25 DOD 4160.21-M-1 Defense Demilitarization Manual

11.26 USACE (US Army Corps of Engineers) EM 1110-1-4009, Engineering and Design: Military Munitions Response Actions, 15 June 2007, http://140.194.76.129/publications/eng-manuals/em1110-1-4009/toc.htm

11.27 DOD Regulation 6055.9 STD DOD Ammunition and Explosive Safety Standards.

11.28 DA Pam and AR 385-64 Ammunition and Explosive Safety Standards.

11.29 ER 1110-1-12 Quality Management, 1 June 1993

11.30 Geosoft Oasis Montaj. 2010. "GRIDPEAK GX" Application notes. Version 7.2 SP 1

11.31 Richard J. Blakely and Robert W. Simpson, 1986, approximating edges of source bodies from magnetic or gravity anomalies: Geophysics, v.51, p.1494-1498.

11.32 ESTCP. 2009. Final Report. Geophysical System Verification (GSV): A Physics-Based Alternative to Geophysical Prove-outs for Munitions Response. Environmental Security Technology Certification Program (ESTCP). July 2009. http://serdpestcp.org/Tools-and-Training/Munitions-Response/Geophysical-System-Verification

11.33 U.S. Environmental Protection Agency (USEPA). 1997. Ecological Risk Assessment Guidance of Superfund, Process for Designing and Conducting Ecological Risk Assessments, EPA/630/R-95/002 F, OSWER 9285.7-25, June 1997.

11.34 U.S. Army Corps of Engineers (USACE, 2003). Data Item Description (DID) MR-001 – Type I Work Plan, 2003.

11.35 The Trustees of the Reservation (TTOR, 2004). Cape Poge & Wasque Management Plan, 2004.

11.36 U.S. Army Corps of Engineers (USACE, 2009). Defense Environmental Restoration Program for Formerly Used Defense Sites, Preliminary Assessment for Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, MA, Draft Report, February, 2009.

11.37 U.S. Army Corps of Engineers (USACE, 2009). Site Inspection Report for Tisbury Great Pond, September, 2009.

11.38 U.S. Army Corps of Engineers (USACE, 1999). Defense Environmental Restoration Program for Formerly Used Defense Sites, Final Archives Search Report for the Former Tisbury Great Pond, MA, 1999.

11.39 U.S. Army Corps of Engineers (USACE, 2004). Defense Environmental Restoration Program for Formerly Used Defense Sites, ASR Supplement for the Former Tisbury Great Pond, West Tisbury, MA, 2004.

11.40 U.S. Army Corps of Engineers, (USACE, 1996). Defense Environmental Restoration Program for Formerly Used Defense Sites, Inventory Project Report for Tisbury Great Pond, West Tisbury, MA, 1996.

11.41 U.S. Army Corps of Engineers, New England District (USACE, 2008). Defense Environmental Restoration Program for Formerly Used Defense Sites, Inventory Project Report for Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, MA, 2008.

11.42 U.S. Army Corps of Engineers, (USACE, 2010). Site Specific Report for the Time Critical Removal Action (TCRA) at Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Dukes County, Massachusetts, and Former Moving Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts, January, 2010.

11.43 Natural Heritage and Endangered Species Program of the MA Division of Fisheries and Wildlife (NHESP, 2009), Letter dated April 15, 2009.

11.44 National Marine Fisheries Service (NMFS, 2009), Letter dated May 11, 2009.

11.45 U.S. Fish and Wildlife Service, New England Field Office, Endangered Species Reviews/Consultations (USFWS), Federally Listed Endangered and Threatened Species in Massachusetts, http://www.fws.gov/newengland/EndangeredSpec-Consultation_Project_Review.htm)

11.46 Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (NHESP, 2008). Massachusetts Natural Heritage Atlas 13th Edition, October 1, 2008.

11.47 Endangered Species Act of 1973. 16 U.S.C. Chapter 35.

11.48 Department of Defense Explosives Safety Board (DDESB, 2004). Technical Paper 16: Methodologies for Calculating Primary Fragment Characteristics, December 2004.

11.49 Department of Defense Explosives Safety Board (DDESB, 2004). Technical Paper 18: Minimum Qualifications for Unexploded Ordnance (UXO) Technicians and Personnel, December 2004.

11.50 U.S. Environmental Protection Agency, Office of Research and Development (USEPA, 1994). Guidance for the Data Quality Objectives Process, EPA/600/R-96/055, September, 1994.

11.51 U.S. Environmental Protection Agency, (USEPA, 2008). Interim Munitions and Explosives of Concern Hazard Assessment Methodology, October, 2008.

11.52 Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup (MADEP, 2009). Massachusetts Contingency Plan. Subpart I, Risk Characterization. 310 CMR 40.0900, 2009.

11.53 Massachusetts Department of Environmental Protection (MADEP, 2002). Freshwater Sediment Screening Benchmarks for Use under Massachusetts Contingency Plan. http://www.epa.gov/reg5rcra/ca/edql.htm., May, 2002.

11.54 U.S. Environmental Protection Agency, (USEPA, 2003). Region 5 Ecological Screening Levels, August, 2003.

11.55 U.S. Environmental Protection Agency (USEPA, 2001). Supplemental guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment, November 30, 2001. http://www.epa.gov/region4/waste/ots/ecolbul.htm

11.56 ESTCP Pilot Program: Classification Approaches in Munitions Response (Camp Sibert, Alabama), November 2008. http://serdp-estcp.org/Tools-and-Training/Munitions-Response/Classification-in-Munitions-Response

11.57 ESTCP Pilot Program: Classification Approaches in Munitions Response (Camp San Luis Obispo, California), July 2010. http://serdp-estcp.org/Tools-and-Training/Munitions-Response / Classification-in-Munitions-Response / ESTCPPilot-Program-Classification-Approaches - in - Munitions - Response - Camp - San - Luis - Obispo - California / ESTCP-Pilot-Program - Classification - Approaches – in – Munitions – Response – Camp – San – Luis – Obispo - California

11.58 EM61-MK2 Response of Standard Munitions Items, NRL/MR/6110—08-9155, October 6, 2008. http://www.dtic.mil/cgibin/GetTRDoc?Location=U2&doc=GetTRDoc.pdf&AD=ADA489224

11.59 Somers, P. et al. 2006. A Guide to Invasive Plants in Massachusetts. Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program.

11.60 The Trustees of Reservations (TTOR), Matkovich,S., Editor. 2004. Management Plan for Cape Poge Wildlife Refuge and Wasque.