

November 2014

FINAL

# FEASIBILITY STUDY

**FORMER CAPE POGE LITTLE NECK BOMB TARGET  
MUNITIONS RESPONSE AREA  
MARTHA'S VINEYARD, MASSACHUSETTS**

**FUDS Property No. D01MA0595**

**Contract No. W912DY-04-D-0019**

**Task Order No. 0006**



**Prepared for:  
U. S. ARMY CORPS OF ENGINEERS  
NEW ENGLAND DISTRICT**

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KEMRON – Project Manager  
Lou Ehrhard, PG, PMP

13 November 2014

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Date



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AMEC – Author  
Catherine McMillen, PE, PMP

13 November 2014

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Date

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## ACRONYMS

3Rs	recognize, retreat and report
AirMag	airborne magnetometry
ARAR	applicable or relevant and appropriate requirements
bgs	below ground surface
BIP	blow-in-place
CENAE	United States Army Corps of Engineers, New England District
CERCLA	Comprehensive Environment Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CMR	Code of Massachusetts Regulations
CSM	conceptual site model
DD	Decision Document
DERP	Defense Environmental Restoration Program
DGM	Digital Geophysical Mapping
DMM	discarded military munitions
DoD	United States Department of Defense
EM	electromagnetic
EMI	electromagnetic induction
EP	Engineering Pamphlet
EPA	U.S. Environmental Protection Agency
FDEMI	Frequency Domain Electromagnetic Induction
FS	Feasibility Study
ft	foot or feet
FUDS	Formerly Used Defense Site
GPS	Global Positioning System
HHRA	Human Health Risk Assessment
IC	institutional control
INPR	Inventory Project Report
LTM	long term management
LUC	land use control
MADEP	Massachusetts Department of Environmental Protection
MA NHESP	Massachusetts Natural Heritage Endangered Species Program
MC	munitions constituents
MD	munitions debris
MDAS	material documented as safe
MEC HA	Interim Munitions and Explosives of Concern Hazard Assessment Methodology
MEC	munitions and explosives of concern
MGFD	munitions with the greatest fragmentation distance
MK	Mark
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSP	Munitions Response Site Prioritization Protocol

MSD	minimum separation distance
msl	mean sea level
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NG	nitroglycerin
OE	ordnance and explosives
O&M	operation and maintenance
PA	Preliminary Assessment
PETN	pentaerythrite tetranitrate
RAO	remedial action objective
RI	Remedial Investigation
SLERA	Screening Level Ecological Risk Assessment
TBC	to be considered
TCRA	Time Critical Removal Action
TDEMI	Time Domain Electromagnetic Induction
TMV	toxicity, mobility and volume
TTOR	The Trustees of Reservations
UCL	upper confidence limit
USACE	United States Army Corps of Engineers
USAESCH	United States Army Engineering Support Center, Huntsville
USC	United States Code
USDA-SCS	United States Department of Agriculture – Soil Conservation Service
UU/UE	unlimited use and unrestricted exposure
UXB	UXB International, Inc.
UXO	unexploded ordnance
VRH	VRHabilis, LLC

## 1.0 EXECUTIVE SUMMARY

The United States Army Corps of Engineers (USACE) is conducting a Feasibility Study (FS) at the 349 acre Former Cape Poge Little Neck Bomb Target Munitions Response Area (MRA), Formerly Used Defense Site (FUDS), Property Number D01MA0595, located on Martha's Vineyard, Massachusetts to address munitions and explosives of concern (MEC) and munitions debris (MD). A Remedial Investigation (RI) was conducted from 2010 - 2011, and the results are presented under separate cover in the *Final Remedial Investigation Report for the Former Cape Poge Little Neck Bomb Target Area of Investigation, Martha's Vineyard, Massachusetts* (UXB, 2014). The data collected and the conclusions drawn in the RI Report were used to develop this FS specifically addressing the Former Cape Poge Little Neck Bomb Target MRA at the FUDS.

Between 1944 and 1947, the MRA was used for day and night practice bombing activities using water-filled bombs, miniature bombs, and flares. Practice bombs were used with signals (also called spotting charges) that would permit pilots to observe bombing accuracy. The signals contained expelling charges and marker charges composed of pyrotechnic mixtures. Upon impact with water or land, the signal would detonate, producing a flash and a large puff of smoke. Since the end of military operations in 1947, practice bombs, primarily consisting of the AN-Mark (MK) 23 containing spotting charges have been identified at the MRA by the public. The practice bombs that remain at the MRA present a potential explosive safety hazard.

A RI was conducted from 2010-2011 to collect data necessary to determine the nature and extent of potential MEC, MD, and munitions constituents (MCs) resulting from historical military activities conducted within the MRA. To achieve the RI goals, various field investigative activities were conducted including: geophysical surveying, intrusive investigations, and environmental sampling for analysis of MCs.

During the intrusive investigation, 88 MEC items and 325 MD items were recovered. Recovered items included intact and expended AN-MK23 3-pound practice bombs and the remnants of a 100-pound practice bomb. Based upon these results, it was recommended that the Cape Poge Little Neck Bomb Target MRA be subdivided into the following three Munitions Response Sites (MRSs):

- Land MRS (62 acres);
- Inland Water MRS (172 acres); and,
- Remaining Land MRS (115 acres).

In the Land MRS, The 83 MEC items and 279 MD items recovered during intrusive investigations during the RI were recovered between 6 inches and 3 feet bgs, with an average depth of recovery observed at 2 ft bgs on land. 100% of the total quantity of MEC and MD recovered was discovered within the subsurface. In the Inland Water MRS, 5 MEC items and 46

MD items recovered during intrusive investigations during the RI between 1 and 3 feet bgs. 100% of the total quantity of MEC and MD recovered was discovered in the subsurface of the inland water. No MD or MEC items were identified during intrusive investigations performed in the Remaining Land MRS.

Analytical results from MC sampling activities conducted during the RI indicated that antimony, lead, and zinc were detected in various samples at concentrations that exceed their respective ecological screening criterion in soil, but below the human health screening criterion. All other detections of metals in soil, sediment, and groundwater were below applicable screening criterion and no explosives were detected in any samples collected within the investigation area. A Human Health Risk Assessment (HHRA) and a Screening-Level Ecological Risk Assessment (SLERA) were performed during the RI, neither of which identified a potential risk to human or ecological receptors associated with MCs.

No action was recommended for the Remaining Land MRS following the RI since no evidence of military munitions-related materials was identified in this MRS during the RI. A Feasibility Study was recommended for the Land MRS and the Inland Water MRS to address the hazards associated with MEC and MD discovered during the RI. No further action was identified associated with MCs since it was determined that no unacceptable risk exists for human health or ecological receptors.

The purpose of this FS is to identify, develop, and perform a detailed analysis of potential remedial alternatives that would meet the remedial action objective (RAO) for MEC so that the decision-makers will have adequate information to select the most appropriate remedial alternative(s) for the Land MRS and the Inland Water MRS.

The following major steps were involved in the development of this FS:

- Identification of RAOs.
- Identification of Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered information (TBCs).
- Identification of general remedial actions.
- Identification and screening of potentially applicable remedial technologies and process options for the general response actions.
- Development and screening of a range of remedial alternatives for the site based on the combinations of the remedial technologies that were retained.
- Performance of a detailed analysis for each of the remedial alternatives using the evaluation criteria required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

- Identification of the most appropriate and viable remedial alternative(s) that meet the RAOs.

This FS evaluates the appropriateness and effectiveness of potential remedial alternatives to achieve the following RAO: to protect recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion.

The RAO facilitated the development of alternatives for both the Land MRS and the Inland Water MRS and focused the comparison of acceptable remedial action alternatives. The RAO also assisted in clarifying an acceptable level of protection for human health and the environment. These objectives are required to meet NCP criteria.

General remedial actions are those actions that will be evaluated to achieve the RAO. General remedial actions that were considered for the Land MRS and the Inland Water MRS include Land Use Controls (LUCs) and MEC clearance activities. In accordance with FUDS program guidance, the term LUCs encompasses physical, legal, or administrative mechanisms that restrict the use of, or limit access to, contaminated property to reduce risks to human health and the environment. MEC clearance activities include technologies used for detection, positioning, removal, disposal, and waste stream treatment (if necessary). The various LUC components and clearance technologies currently available to address MEC were screened for effectiveness, implementability, and cost to assess the viability of each technology at the MRSs and to provide additional information to future decision-makers.

The following remedial alternatives were developed from the general remedial actions identified above and were evaluated for the Land MRS:

- Alternative 1 – No Action: A “no action” alternative is required by the NCP to be developed during a FS to provide a baseline for comparison against other contemplated alternatives. In Alternative 1, the government would take no action with regard to locating, removing, and disposing of any potential MEC present within the Land MRS.
- Alternative 2 – LUCs: The alternative involves the implementation of a LUCs based on public awareness and education components to provide a means to reduce MEC encounters by workers and recreational users and visitors (i.e., unqualified personnel) through behavior modification.
- Alternative 3 – Partial Subsurface Clearance with LUCs: Alternative 3 includes removal of subsurface MEC hazards to 3 feet below ground surface in the open areas of the Land MRS (31 acres) including the dunes along the Land MRS boundary. LUCs would be implemented on the remaining 31 areas that are heavily vegetated.

- Alternative 4 – Subsurface Clearance. Alternative 4 includes clearing the entire 62 acre MRS of subsurface MEC to 3 feet below ground surface.

In accordance with DoDM 4715.20 (DoD, 2012), a minimum of three alternatives for each MRS are required. One alternative must consider no action alternative, a second must consider an action to remediate the site to a condition that allows UU/UE, and a third alternative will consider an action to remediate the site to a protective condition that requires LUCs. For the Land MRS, Alternative 1 meets the requirement for a no action alternative. Alternatives 2 and 3 meet the requirement for an alternative with LUCs, and Alternative 4 meets the requirement for an alternative which will achieve UU/UE.

The following remedial alternatives were developed from the general remedial actions identified above and were evaluated for the Inland Water MRS:

- Alternative 1 – No Action: Same as the no action alternative for the Land MRS.
- Alternative 2 – LUCs: Same description as LUCs for the Land MRS.
- Alternative 3 – Subsurface Clearance: Alternative 3 includes clearing the entire Inland Water MRS of MEC to approximately 3 feet below the inland water floor.

For the Inland Water MRS, Alternative 1 meets the requirement for a no action alternative. Alternative 2 meets the requirement for an alternative with LUCs, and Alternative 3 meets the requirement for an alternative which will achieve UU/UE.

The remedial alternatives were deemed viable for use at the MRSs and were assessed in a detailed evaluation against seven of the nine the criteria described in the NCP, Section 300.430. The nine evaluation criteria are:

1. Overall protectiveness of human health and the environment;
2. Compliance with ARARs;
3. Long-term effectiveness and permanence;
4. Reduction of toxicity, mobility, or volume of contaminants through treatment;
5. Short-term effectiveness;
6. Implementability;
7. Cost;
8. State acceptance; and,
9. Community acceptance.

State acceptance and community acceptance will be evaluated after the Proposed Plan.

1 Based on the detailed analysis of remedial alternatives, the strengths and weaknesses of the  
2 remedial alternatives relative to one another were evaluated with respect to each of the NCP  
3 criteria. The results of this comparative analysis for the MRSs are summarized in Table 1-1.  
4 This approach to analyzing alternatives is designed to provide decision-makers with sufficient  
5 information to adequately compare the alternatives, select an appropriate remedy for the MRSs,  
6 and demonstrate satisfaction of the Comprehensive Environmental Response, Compensation, and  
7 Liability Act (CERCLA) remedy selection requirements in the Decision Document (DD).

8 For both MRSs, subsurface clearance (Alternative 4, Land MRS and Alternative 3, Inland Water  
9 MRS) of the entirety of each MRS most favorably meets all of the evaluated detailed analysis  
10 criteria as compared to other alternatives. While the complete subsurface clearance alternatives  
11 would require the most manpower and time to implement, they would provide the highest level  
12 of protectiveness over the long-term and will achieve the RAO of protecting recreational users,  
13 visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the  
14 top three feet of subsurface soil or sediment during intrusive activities and by dune erosion.

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Table 1-1. Comparative Analysis Summary

Potential Remedial Alternative	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants Through Treatment	Short-Term Effectiveness	Implementability	Cost <sup>1</sup>	State and Community Acceptance <sup>2</sup>
Land MRS								
Alternative 1: No Action	Alternative 1 would not be protective because no action would be taken to reduce exposure to MEC.	There are no ARARs associated with Alternative 1.	Alternative 1 would not be effective or permanent.	Alternative 1 would not reduce the TMV of MEC.	There would be no additional risk to the community or workers because there are no construction or operation activities associated with Alternative 1, and it would require no time to complete.	Alternative 1 is easily implementable.	\$0	TBD
Alternative 2: Land Use Controls (LUCs)	Alternative 2 would be protective through controlling exposure to possible receptors through LUCs.	There are no ARARs associated with Alternative 2.	Alternative 2 would be protective since it controls exposure through LUCs. However, it relies on exposure control rather than removal or treatment.	Alternative 2 would not reduce the TMV of MEC.	There would be no additional risk to workers, residents or the environment because there are no construction intrusive activities associated with Alternative 2. Approximately 6 months would be required to establish LUCs associated with Alternative 2.	Alternative 2 is easily implementable	\$684,000	TBD
Alternative 3: Partial Subsurface Clearance with LUCs	Alternative 3 provides protectiveness through a combination of MEC removal and LUCs controlling exposure to possible receptors.	Alternative 3 would be implemented to comply with ARARs.	Under Alternative 3, all MEC would be destroyed within the accessible portion of the MRS, but would still require LUCs in the long-term.	Alternative 3 would be effective in the reduction of TMV through removal of all MEC within the accessible portion of the MRS (31 acres) and would satisfy the statutory preference for treatment as a principal element of the remedy because MEC would be destroyed.	Implementation of Alternative 3 will increase in risk to workers and the environment since the work involves exposure to potentially explosive items. These risks would be mitigated through use of SOPs for conducting MEC removals. Impacts to local residents and the public may occur, but would be temporary and limited to the immediate work area. Some vegetation clearance is anticipated, therefore impacts to the environment are possible. Procedures for minimizing, reducing or mitigating negative effects would be developed in the Remedial Action Work Plan. It is estimated that partial clearance under Alternative 3 would require approximately 3 months of field work to implement and 6 months would be required to establish LUCs.	Alternative 3 would be easily implemented at the MRS. Removal of MEC within the MRS was implemented effectively during the RI. Coordination with MADEP, MA NHESP and TTOR is required for this alternative.	\$2,353,000	TBD
Alternative 4: Subsurface Clearance	Alternative 4 provides protectiveness by removing the MEC hazard at the MRS.	Alternative 4 would be implemented to comply with all ARARs.	Alternative 4 would remove MEC hazards from within the entirety of the MRSs and would be the most effective and permanent remedial alternative over the long-term because it would eliminate risk regardless of the future use of the property.	Alternative 4 would be the most effective in reducing the TMV of MEC because all detectable MEC throughout the entirety of the MRSs would be destroyed and would satisfy the statutory preference for treatment as a principal element.	Implementation of Alternative 4 will increase in risk to workers and the environment since the work involves exposure to potentially explosive items. These risks would be mitigated through use of SOPs for conducting MEC removals. Impacts to local residents and the public may occur, but would be temporary and limited to the immediate work area. Some vegetation clearance is anticipated, therefore impacts to the environment are possible. Procedures for minimizing, reducing or mitigating negative effects would be developed in the Remedial Action Work Plan. It is estimated that clearance under Alternative 4 would require approximately 5 months of field work.	Alternative 4 would be easily implemented at the MRS. Removal of MEC within the MRS was implemented effectively during the RI. Coordination with MADEP, MA NHESP and TTOR is required for this alternative.	\$3,033,000	TBD

Potential Remedial Alternative	Overall Protectiveness of Human Health and the Environment	Compliance with ARARs	Long-Term Effectiveness and Permanence	Reduction of Toxicity, Mobility, or Volume (TMV) of Contaminants Through Treatment	Short-Term Effectiveness	Implementability	Cost <sup>1</sup>	State and Community Acceptance <sup>2</sup>
Inland Water MRS								
Alternative 1: No Action	Alternative 1 would not be protective because no action would be taken to reduce exposure to MEC.	There are no ARARs associated with Alternative 1.	Alternative 1 would not be effective or permanent.	Alternative 1 would not reduce the TMV of MEC.	There would be no additional risk to the community or workers because there are no construction or operation activities associated with Alternative 1, and it would require no time to complete.	Alternative 1, easily implementable.	\$0	TBD
Alternative 2: Land Use Controls (LUCs)	Alternative 2 would be protective through controlling exposure to possible receptors through LUCs.	There are no ARARs associated with Alternative 2.	Alternative 2 would be protective since it controls exposure through LUCs. However, it relies on exposure control rather than removal or treatment.	Alternative 2 would not reduce the TMV of MEC.	There would be no additional risk to workers, residents or the environment because there are no construction intrusive activities associated with Alternative 2. Approximately 6 months would be required to establish LUCs associated with Alternative 2.	Alternative 2, easily implementable.	\$684,000	TBD
Alternative 3: Subsurface Clearance	Alternative 3 provides protectiveness by removing the MEC hazard at the MRS.	Alternative 3 would be implemented to comply with all ARARs.	Alternative 3 would remove MEC from within the entirety of the MRS and would be the most effective and permanent remedial alternative over the long-term because it would eliminate risk regardless of the future use of the property.	Alternative 3 would be the most effective in reducing the TMV of MEC because all detectable MEC throughout the entirety of the MRSs would be destroyed and would satisfy the statutory preference for treatment as a principal element.	Implementation of Alternative 3 will increase in risk to workers and the environment since the work involves exposure to potentially explosive items. Adverse impacts to eelgrass and shellfish are possible during clearance activities but would be minimized through coordination with MASDEP and MA NHESP. Impacts to local residents and the public may occur, but would be temporary and limited to the immediate work area. Procedures for minimizing, reducing or mitigating negative effects would be developed in the Remedial Action Work Plan. It is estimated that subsurface clearance under Alternative 3 would require approximately 7 months of field work.	Alternative 3 would be easily implemented at the MRS. Removal of MEC within the MRS was implemented effectively during the RI. Coordination with MADEP and MA NHESP is required for this alternative.	\$4,996,000	TBD

1Notes: <sup>1</sup> Costs provided here do not include Five Year Review Costs (\$42,000 per review), which will be conducted for Land MRS Alternatives 2, 3, and 4, and Inland Water Alternatives 2 and 3.

2<sup>2</sup> The modifying criteria will be evaluated after the Proposed Plan following review and input from these parties.

3TBD = to be determined

## 2.0 INTRODUCTION

This report documents the results of a Feasibility Study (FS) conducted within the Former Cape Poge Little Neck Bomb Target Munitions Response Area (MRA), Formerly Used Defense Site (FUDS) Property Number D01MA0595, located on Martha's Vineyard, Massachusetts for munitions and explosives of concern (MEC) (see Figure 2-1). This FS was performed in support of the Department of Defense (DoD) Military Munitions Response Program (MMRP). UXB International, Inc. (UXB) was authorized to conduct the FS through a United States Army Engineering Support Center, Huntsville (USAESCH) Contract, No. W912DY-04-D-0019, Task Order No. 006. The FS was conducted in accordance with the procedures established for managing and executing military munitions response actions in Engineer Pamphlet No. 1110-1-18 (USACE, 2006) and, with respect to Engineer Regulation 200-3-1 (USACE, 2004), which provides the specific policy and guidance for management and execution of the FUDS program.

The remedial alternatives designed and evaluated in detail and comparatively in this FS address two munitions response sites (MRSs) within the Former Cape Poge Little Neck Bomb Target MRA: the Land MRS (62 acres) and the Inland Water MRS (172 acres). The MRS boundaries are depicted on Figure 2-2, which also shows a third MRS (Remaining Land MRS) consisting of 115 acres. No MEC or MD has been discovered in this area and was therefore recommended for no DoD action. The results of the Remedial Investigation (RI) are documented in the *Final Remedial Investigation Report for the Former Cape Poge Little Neck Bomb Target Area of Investigation, Martha's Vineyard, Massachusetts* (UXB, 2014).

The RI/FS process was developed in response to CERCLA, as amended by the Superfund Amendments and Reauthorization Act of 1986. This FS was performed to be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the U.S. Environmental Protection Agency (EPA) document, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA* (EPA, 1988).

### 2.1 Purpose

The purpose of the FS for the Land MRS and Inland Water MRS is to identify, develop, and perform a detailed analysis of potential remedial alternatives that would meet the RAO and thus afford the decision-makers adequate information to select the most appropriate remedial alternative(s) for the MRSs. The selected alternatives are expected to mitigate, reduce, or eliminate unacceptable risks to human health and the environment from MEC at these MRSs, based on the current and intended future use of the property.

Only properties transferred from DoD control before 17 October 1986 are FUDS eligible. The Army is the executive agent for the FUDS program, and USACE is the program's executing

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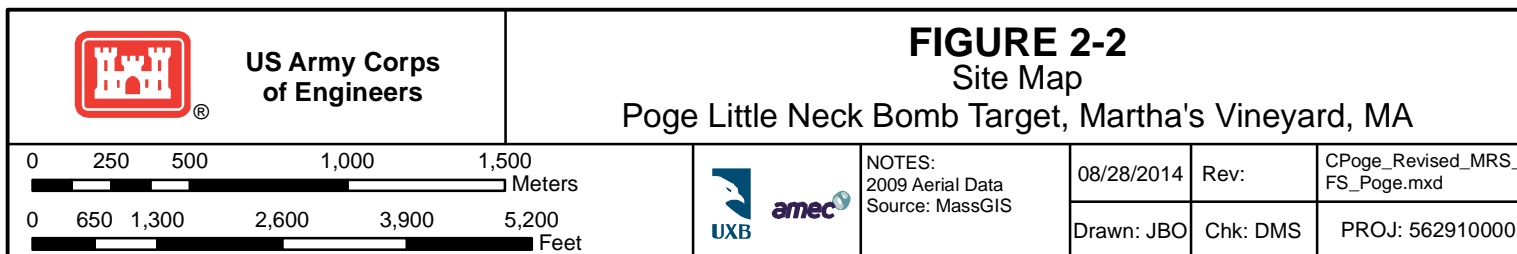


 <b>US Army Corps of Engineers</b>	<b>FIGURE 2-1</b> <b>Site Location - Martha's Vineyard, MA</b>				
0 2.5 5 10 15 Miles 0 5 10 15 20 25 Kilometers			NOTES: Base map data source: ESRI	06/23/2014 Rev:	CPoge_MV_Island_FS_Poge.mxd PROJ: 562910000
			Drawn: JBO	Chk: DMS	

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1 agent. USACE must comply with the Defense Environmental Restoration Program (DERP)  
2 statute (10 United States Code [USC] 2701 et seq.), CERCLA (42 USC § 9601 *et*  
3 *seq.*), Executive Orders 12580 and 13016, the NCP, and all applicable DoD (e.g., EP 1110-1-18,  
4 ER 200-3-1, *Management Guidance for the DERP* [DoD, 2012]) and Army policies in managing  
5 and executing the FUDS program (USACE, 2004). The FUDS program addresses MEC,  
6 including unexploded ordnance (UXO), discarded military munitions (DMM), and MC located  
7 on former defense sites under the MMRP, established by the U.S. Congress under DERP.

8 The RI identified MEC and MD items at two of the three MRSs and an FS was recommended  
9 following the RI to evaluate future response action alternatives with regard to MEC hazards.

10 The following major steps are involved in the development of the FS:

- 11 • Identification of Identification of Applicable or Relevant and Appropriate Requirements  
12 (ARARs) and To Be Considered information (TBCs) (Section 3).
- 13 • Identification of general remedial actions (Section 4).
- 14 • Identification of RAOs (Section 4).
- 15 • Identification and screening of potentially applicable remedial technologies and process  
16 options for the general response actions (Section 4).
- 17 • Development and screening of a range of remedial alternatives for the MRSs based on  
18 combinations of the remedial technologies that were retained (Section 5).
- 19 • Performance of a detailed analysis for each of the remedial alternatives using the  
20 evaluation criteria as required by the NCP (Section 6).
- 21 • Identification of the most appropriate remedial alternative(s) that meet the RAO through  
22 a comparative analysis of all remedial alternatives using the NCP criteria (Section 6).

## 23 2.2 Historical Information

24 The following subsections provide a summary of the MRA background and history and previous  
25 investigations, including the RI, that have been conducted within the MRA.

### 26 2.2.1 Munitions Response Area Background

27 Prior to the U.S. Navy acquiring leases for the Little Neck bomb target site, Chappaquiddick  
28 Island and Cape Poge were used for agricultural purposes and as a summer resort. By March  
29 1944, The U.S. Navy had identified Little Neck as a potential bombing target location. Between  
30 26 June and 4 July 1944, the U.S. Navy constructed a target at the site. Available records do not  
31 specify the precise layout of the target, but the U.S. Navy developed a diagram illustrating the  
32 standard target. The standard target consisted of a 6.5-ft by 6.5-ft pyramid set up at the target

1 center with a 100 ft circular landing zone from the target center. In addition, a 1,500 ft safety  
2 zone was established around the target to protect watercraft and aircraft. The total target area  
3 encompassed approximately 162 acres (USACE, 2009).

4 By 28 February 1945, the Navy had formally executed the leases for all of the properties at Little  
5 Neck with a retroactive start date of 1 July 1944 (USACE, 2009). The leases were acquired for  
6 the purpose of a bombing target for the 1<sup>st</sup> Naval District Flight Training Program at Naval Air  
7 Station Quonset Point, Rhode Island, and the Naval Auxiliary Air Station, Martha's Vineyard,  
8 Massachusetts. The 1<sup>st</sup> Naval District used the site for approximately 2 years before the Chief of  
9 Naval Operations approved the discontinuance of the Little Neck target on 15 March 1947  
10 (USACE, 2009).

11 The First Naval District referenced the site as: L-5-V Little Neck (USACE, 2009). In February  
12 1945, operations began at the L-5-V Little Neck Site. The site was used for day and night  
13 practice bombing activities using water filled bombs, miniature bombs, and flares. The types of  
14 munitions potentially used at the bomb target include:

- 15 • 100-pound practice bombs, MK15-series;
- 16 • Miniature practice bombs, AN-MK5 Mod 1, AN-MK23, AN-MK43;
- 17 • Signal practice bombs, MK4 Mods 3 & 4;
- 18 • Signal practice bombs, MK6 Mod 0; and,
- 19 • Flare, aircraft, parachute, M26 & AN-M26 (USACE, 2009).

20 On 26 August 1946, bombing activities at L-5-V Little Neck were suspended due to citizen  
21 complaints. Although the site remained active, it is not clear whether bombing activities ever  
22 resumed before the U.S. Navy approved the discontinuance of the site on 15 March 1947. The  
23 leases were terminated on 18 May 1947. Records do not indicate that the property was ever used  
24 to store, transport, treat, or dispose of the associated munitions used on property. By 1959, most  
25 of Cape Poge had been donated to The Trustees of Reservations (TTOR) by Charles S. Bird and  
26 Oliver D. Filley (USACE, 2009).

27 Since the end of military operations in 1947, practice bombs, primarily consisting of the AN-  
28 MK23 containing spotting charges of black powder and red phosphorus, have been identified at  
29 the MRA by the public. If spotting charges are discharged, they may cause serious injury.  
30 Therefore, practice bombs that remain at the MRA present a potential explosive safety hazard.

## **2.2.2 Previous Investigations**

Investigations conducted prior to the 2011 RI at the MRA include the following, which are detailed in the following subsections:

- Inventory Project Report (INPR), United States Army Corps of Engineers, New England District (CENAE), 2008;
- Visual Ordnance Sweep, VRHabilis, LLC (VRH), 2008;
- Preliminary Assessment (PA), USACE St. Louis District, 2009;
- Time Critical Removal Action (TCRA), USACE, 2010; and
- Emergency Response, VRH, 2010 and 2010a.

### **2.2.2.1 Inventory Project Report**

In July 2008, the CENAE prepared an INPR in support of the Defense Environmental Restoration Program FUDS. The Findings and Determination of Eligibility for the MRA established the eligibility of 141 acres as a FUDS. An MMRP project was proposed and the INPR identified a MEC category hazard potential. The INPR assigned a Munitions Response Site Prioritization Protocol (MRSP) priority ranking of 5 (CENAE, 2008).

### **2.2.2.2 Visual Ordnance Sweep**

On 6 November 2008, VRH, under contract with the Massachusetts Department of Environmental Protection (MADEP), conducted a visual ordnance sweep at Little Neck with assistance from TTOR. The visual sweep was conducted to:

- Identify immediate public safety hazards;
- Identify and remove non-hazardous ordnance items or related items (fragmentation, AN-MK23 bodies, etc.) and place the items in secure storage; and
- Identify and remove any non-ordnance items which could be construed as an ordnance item resulting in a response by TTOR, VRH, or law enforcement personnel (VRH, 2008).

The visual sweep was conducted on the interior beach beginning at Drunkard's Cove, around Little Neck toward Shear Pen Pond, and then around Shear Pen Pond ending at the beginning of privately owned property. The sweep covered approximately 15,300 linear ft of beach, which was approximately 31 ft wide. A Schonstedt metal detection device was used to augment the visual search, clear flooded blast holes, and help qualify unknown items. The visual sweep resulted in the identification, removal, and storage of 15 AN-MK23 fragments, which were safe to move and did not require demilitarization. Additionally, nine ferrous metal items (aluminum

pieces, lobster pot pieces, aluminum tubing, etc.) were identified, removed, and disposed (VRH, 2008).

### **2.2.2.3 Preliminary Assessment**

In February 2009, the USACE, St. Louis District prepared a Draft PA for the Former Cape Poge Little Neck Bomb Target Site. This report was prepared in coordination with the CENAE and the USAESCH. The PA was compiled through research and analysis of historical text, maps, and photographs at various archives and records holding facilities. Additionally, property visits and interviews were conducted to collect information concerning the subject property. Research efforts were directed toward determining the presence of hazardous substances as a result of historical activities performed by the U.S. Navy. This assessment was performed to obtain information for use in developing recommendations for further action at the subject property (USACE, 2009).

The PA determined that the U.S. Navy utilized practice ordnance at the bomb target. The historical activities at the site included the use of 100-pound water-filled practice bombs with spotting charges, practice miniature bombs with spotting charges, and flares. Visual observations performed during the PA identified residual casings present in surface soil at the site and may be present in subsurface soil. Based on the presence of residual casings, it was determined that detectable levels of casing MCs (antimony, iron, lead, zinc) may be present in soil proximal to the casings. However, the MCs are not expected to result in adverse environmental effects in the aquatic environment. Although pyrotechnic signals were constructed in the practice bombs, these constituents are expected to have been released and no longer present in the environment at detectable levels (USACE, 2009). No evidence was found to indicate that high explosive (demolition) bombs were used at the site.

Based on the findings of the PA, one MRS, L-5-V Little Neck Dive Bombing Target, was confirmed. A MRSP score was developed for the MRS, which resulted in a ranking of 5 indicating a moderate risk for explosive hazards is present for the L-5-V Little Neck Dive Bombing Target Site (USACE, 2009).

### **2.2.2.4 Time Critical Removal Action**

Between 18 April and 25 September 2009, a TCRA was conducted at the Little Neck Dive Bombing Target Site (USACE, 2010). The TCRA was performed primarily to remove MEC, Material Potentially Presenting an Explosive Hazard (MPPEH), and explosive hazards at the site.

The surface removal action was conducted on approximately 46 acres within the MRA. To perform the identification and clearance operations, these 46 acres were subdivided into grids. Within each grid, 5-ft sweep lanes were established for conducting the magnetometer-assisted

clearance operations using a Schonstedt GA-52Cx magnetometer to detect anomalies. All anomalies identified by the magnetometer were investigated and removed using hand tools. MEC, regardless of size, as well as MPPEH, MD, non-MD, and range-related debris equal to or greater than an AN-MK23 practice bomb were removed and disposed. Figure 2-3 presents the locations of MD items that were identified and removed during the TCRA. During clearance operations, 127 MD items and 1,916 pounds of non-MD were removed from the surface. Items identified and removed included scrap items, AN-MK23 practice bombs, and one AN-MK5 practice bomb. The TCRA removed ferrous and non-ferrous items from the top 12 inches of the surface soil. No MEC or MPPEH found at the site contained high explosive filler (USACE, 2010).

#### 2.2.2.5 Emergency Response

Between 20 and 26 April 2010, VRH responded to two emergency calls associated with potential ordnance. The four items discovered were determined to be free of explosive hazard and were removed and secured. The items were subsequently sent to a smelter for final disposition. The details of the emergency responses are presented in Table 2-1.

**Table 2-1. Emergency Responses at the Former Cape Poge Little Neck Bomb Target Area**

Date	Location	Quantity	Ordnance Description	Response Action
21-04-2010	Little Neck	1	An AN-MK23 practice bomb was found under a caution sign at Little Neck. VRH determined that it was free of explosive hazard and was acceptable to move.	The practice bomb was secured in the container at Edgartown Police Headquarters. The item was sent to a smelter for final disposition.
26-04-2010	Little Neck	3	Three AN-MK23 pieces (two AN-MK23 bodies and one fragment) were located on the western edge of Little Neck. VRH determined that they were free of explosive hazard.	The AN-MK23 pieces were removed and secured in the container at Edgartown Police Headquarters. The item was sent to a smelter for final disposition.

**Notes:**

The information contained in this table was obtained from VRH Emergency Response Reports (VRH, 2010 and 2010a).

**MK** – Mark

**VRH** - VRHabilis, LLC

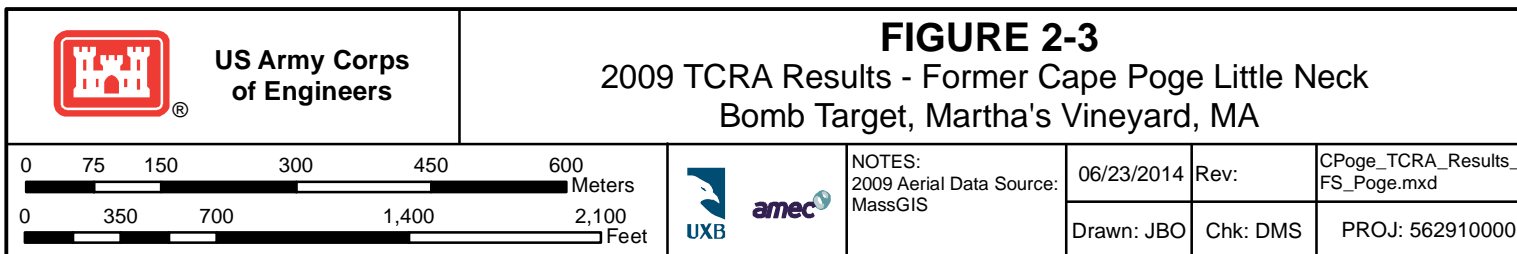
### 2.3 Summary of Remedial Investigation Results

This section provides a summary of the results of the RI conducted to characterize the MRSs and determine the nature and extent of MEC hazards and MC risks. Field activities were conducted at the MRSs to achieve the project Data Quality Objectives established in the Final Remedial Investigation Work Plan (UXB, 2011), and to determine if further action is required under the CERCLA process.

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### 2.3.1 Nature and Extent of MEC

To characterize the nature and extent of MEC, various field investigative activities were conducted including geophysical surveying and intrusive investigations. A wide area assessment was initially performed to help identify high density areas of geophysical anomalies that might be indicative of an area previously used as a military target, aid in determining the extent of potential MEC contamination, and focus subsequent detailed intrusive investigations. The wide area assessment consisted of:

- Analog density transects in the upland areas using hand-held analog instruments to minimize the amount of brush clearing;
- Digital Geophysical Mapping (DGM) transects on the beach area where no vegetation clearing was required;
- Underwater DGM in the inland water areas; and,
- Analog mag and dig ocean transects.

This work was supplemented with an airborne magnetometry (AirMag) survey performed using a magnetometer array mounted to a helicopter. The AirMag was flown over portions of the land, beach, and shallow inland water (surf zone) at 3 to 10 feet (ft) above the surface.

Data collected during the wide area assessment was subsequently used to identify site grids for additional DGM surveying and intrusive investigation within inland water, land, and beach areas. Based upon the results of the wide area assessment, anomalies were identified, mapped using ESRI ArcGIS, and analyzed to identify high-density anomaly areas. The grids were sited in areas of high, medium, and low anomaly densities to refine the extent, and establish the nature of MEC contamination through subsequent intrusive investigations. High-density anomaly areas were then used to determine the size and location of grids over which additional DGM data would be collected. Thirty-eight land DGM and 11 inland DGM water grids were located within the investigation area. Geophysical data were collected in the grids by towing the electromagnetic (EM) sensor system by hand (land grids) or by boat (inland water grids) across the surface. DGM data collected within the grids were evaluated and a list of anomalies to be intrusively investigated was generated.

The intrusive investigation was conducted by reacquiring the anomaly locations selected for intrusive investigation and excavating the locations to identify the source of the anomaly. Excavation of land and beach locations were conducted by UXO technicians and excavation of inland water locations were conducted by UXO divers. Once identified, debris was classified as non-MD, cultural artifacts, MD, or MEC. During the intrusive investigation, 88 MEC items and 325 MD items were recovered (Figure 2-4). Recovered items included intact and expended AN-MK23 3-pound practice bombs and the remnants of a 100-pound practice bomb. Recovered

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MEC and MD items were concentrated on Little Neck around the historic bomb target location. MD and MEC items discovered during the intrusive investigation were removed, demilitarized, and properly disposed.

Due to the dynamic nature of the ocean surf zone, a “Mag and Dig” technique was used for ocean transects. Divers identified anomalies on transects using an underwater hand-held analog instrument, and subsequently excavated each anomaly as it was found. This methodology provided both wide area assessment and intrusive investigation to provide nature and extent data.

No MD or MEC items were identified during intrusive investigations performed in the Remaining Land MRS. Cultural artifacts from a shipwreck were identified within the Remaining Land MRS. No shipwreck debris was identified within the Land and Inland Water MRSs.

In the Land MRS, The 83 MEC items and 279 MD items recovered during intrusive investigations during the RI were recovered between 6 inches and 3 feet bgs, with an average depth of recovery observed at 2 ft bgs on land. 100% of the total quantity of MEC and MD recovered was discovered within the subsurface.

In the Inland Water MRS, 5 MEC items and 46 MD items recovered during intrusive investigations during the RI between 1 and 3 feet bgs. 100% of the total quantity of MEC and MD recovered was discovered in the subsurface of the inland water.

### **2.3.2 Munitions Constituents**

Between 13 October and 2 November 2011, environmental sampling for MCs was conducted at the MRA. Sampling included incremental and discrete, biased soil samples as well as sediment and groundwater samples. Based upon the composition of the munitions items identified within the MRA, samples were collected and sent to an off-site laboratory for analysis of antimony, copper, lead, nickel, and zinc and explosive compounds, including pentacrythrite tetranitrate (PETN) and nitroglycerin (NG). Analytical results indicated that antimony, lead, and zinc were detected in various samples at concentrations that exceed their respective ecological screening criterion in soil, but below the human health screening criterion. All other detections of metals in soil, sediment, and groundwater were below applicable screening criterion. No explosives were detected in any samples collected within the MRSs.

A HHRA and a SLERA were performed for the MRA. The HHRA was conducted to provide a comprehensive assessment of potential risks to individuals that may be exposed to hazardous constituents at the MRA. Because no chemicals of potential concern were identified, only an exposure analysis was conducted. The HHRA concluded that there is no unacceptable risk to human health from MC at the MRA.

1 A SLERA was performed as part of the RI to evaluate risks posed to ecological receptors (plants,  
2 invertebrates, herbivores, predators, and marine receptors) due to exposures to residual MCs.  
3 This assessment evaluated potential risk by 1) comparing analytical results to the applicable  
4 ecological screening criterion, 2) comparing constituent concentrations that exceeded ecological  
5 screening criteria with the 50th percentile background values and 95 percent upper confidence  
6 Limit (UCL), and 3) based on site data, refined the ecological screening level for lead using less  
7 conservative exposure assumptions. Based upon the results of the SLERA, none of the MCs  
8 evaluated pose a potential for risk to ecological receptors.

### 9 **2.3.3 Munitions Response Site Prioritization Plan**

10 The Munitions Response Site Prioritization Protocol (MRSP) ranking was revised for the MRA  
11 during the RI to assign a relative risk for the individual MRSs. This ranking system uses scores  
12 of 1 through 8, 1 indicating the highest potential hazard and 8 indicating the lowest potential  
13 hazard, to determine a relative priority for response activities. Based on the results of scoring,  
14 each MRS is assigned one of eight priorities, where Priority 1 indicates the highest potential  
15 hazard and Priority 8 indicates the lowest potential hazard. The priorities do not have specific  
16 assigned actions. In other words, Priority 1 does not indicate the need for an immediate remedial  
17 action nor does Priority 8 indicate that no action is required. Ultimately, the MRA/MRS Priority  
18 is used to determine the future funding sequence of MRSs for further munitions response action.

19 Both the Land MRS and the Inland Water MRS received a MRSP priority or rating of 5. The  
20 MRSP score for the Remaining Land MRS received a priority or rating of no known of  
21 suspected hazard.

### 22 **2.3.4 Munitions and Explosives of Concern Hazard Assessment**

23 In October 2008, the Technical Working Group for Hazard Assessment, which included  
24 representatives from the DoD, Department of the Interior, EPA, and other officials, made  
25 available the technical reference document, *Interim Munitions and Explosives of Concern*  
26 *Hazard Assessment Methodology* (MEC HA) (EPA, 2008). This document is designed to be used  
27 as the CERCLA hazard assessment methodology for MRSs where there is an explosive hazard  
28 from the known or suspected presence of MEC.

29 The MRA was characterized using the MEC HA method based on the results of the RI, and the  
30 historical information available from prior studies and removal actions. The results of these  
31 MEC HAs are summarized in Table 2-2. Under current conditions, the MRA received a hazard  
32 level category of 2, indicating high potential explosive hazard conditions are present at the MRA.  
33 This information will provide the baseline for any assessment of response alternatives to be

conducted. Note that the total MEC HA score and the associated hazard level are *qualitative references only* and should not be interpreted as quantitative measures of explosive hazard.

**Table 2-2. MEC HA Scoring Summary for the Former Cape Poge Little Neck Bomb Target MRA**

Scoring Summary		
<b>Site ID:</b>	FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)	a. Scoring Summary for Current Use Activities
<b>Date:</b>	4/30/2012	Response Action Cleanup: No Response Action
Input Factor	Input Factor Category	Score
Energetic Material Type		40
Location of Additional Human Receptors	Inside the Munitions Response Site or inside the Explosives Safety Quantity Distance arc	30
Site Accessibility	Full Accessibility	80
Potential Contact Hours	100,000 to 999,999 receptor hours per year	70
Amount of munitions and explosives of concern (MEC)	Target Area	180
Minimum MEC Depth Relative to Maximum Intrusive Depth	Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC	240
Migration Potential	Possible	30
MEC Classification	Unexploded Ordnance	110
MEC Size	Small	40
<b>Total Score</b>		<b>820</b>
<b>Hazard Level Category</b>		<b>2</b>

### 2.3.5 Environmental Setting

#### 2.3.5.1 Climate

Martha's Vineyard has a temperate marine climate. Although Martha's Vineyard's weather is typically moderate, there are occasions where the island experiences extreme weather conditions such as blizzards and hurricanes. Martha's Vineyard's generally experiences a delayed spring season, being surrounded by an ocean that is still cold from the winter; however, it is also known for an exceptionally mild fall season, due to the ocean remaining warm from the summer. The highest temperature ever recorded on Martha's Vineyard was 99 degrees Fahrenheit in 1948, and the lowest temperature ever was -9 degrees Fahrenheit in 1961 (USACE, 2009).

Precipitation on Martha's Vineyard and the islands of Cape Cod and Nantucket is the lowest in the New England region, averaging slightly less than 40 inches per year. This is due to storm systems that move across western areas, building up in mountainous regions, and dissipating before reaching the coast (USACE, 2009).

#### **2.3.5.2 Geology**

The MRA and the island of Martha's Vineyard are relics 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 (USACE, 2009).

The geological deposits that make up the site 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 (USACE, 2009). These deposits overlie solid bedrock and range from approximately 500 ft thick on the north shore of Martha's Vineyard to 900 ft thick on the south shore. The bedrock consists of metamorphic rocks, such as schist and gneiss, and igneous rocks (USACE, 2009).

#### **2.3.5.3 Topography**

The topography of the MRA can generally be described as relatively flat with elevations ranging from 0 to approximately 24 ft above mean sea level (msl). Interdunal swales are found in small depressions in the upland areas. The swales are ephemeral and form when winds scour sand until the water table is reached (USACE, 2009).

#### **2.3.5.4 Soils**

The soils within the MRA include the upland soils, Udipsamments and Carver loamy coarse sand, and the marsh area soils, Pawcatuck and Matunuck mucky peats. The upland soils are found on sand dunes, outwash plains, and terminal moraines. These soils are coarse textured, very deep, and excessively drained. These soils have rapid to very rapid permeability and depth to seasonal high water tables are greater than 6 ft. The marsh area soils are very deep, poorly drained soils in tidal areas subject to daily inundation. These soils are typically adjacent to shore areas and brackish ponds and have a surface layer that is approximately 2 ft thick consisting of an organic peat. Under the organic layer is a substratum consisting of coarse sand that is greater than 5 ft thick. The permeability of these soils is moderate to rapid in the organic material and very rapid in the substratum. The daily tidal flooding limits these soils for most uses other than wetlands (United States Department of Agriculture – Soil Conservation Service [USDA-SCS], 1986).



#### 2.3.5.5 Surface Water Hydrology

Soils in the upland areas and on the beaches are excessively drained and have very high permeability (USDA-SCS, 1986). Due to these properties, there is very little to no surface water runoff in these areas. In low-lying areas, such as marshes, the soils are poorly drained and inundated due to tidal changes on a daily basis (USDA-SCS, 1986). Surface water in these areas drains into larger bodies of water, such as Shear Pen Pond, Cape Poge Bay, and the Atlantic Ocean.

#### 2.3.5.6 Groundwater Hydrology

The principal aquifers on Martha's Vineyard are moraines and outwash deposits, which derive their water from local precipitation. Bedrock is much less permeable than the overlying sediments, commonly contains seawater, and is not considered part of the aquifers of Martha's Vineyard (USACE, 2009).

On Cape Poge, the water table generally mimics topography and is influenced by tidal fluctuations. Groundwater quality studies indicate that salt-water intrusion occurs along the coastline and to a lesser degree throughout the interior of the island. Depth to groundwater ranges from greater than 6 ft below ground surface (bgs) in upland soils to near ground surface in lower areas near shorelines and marshes (USACE, 2009). The shallow freshwater aquifer is underlain by brackish water that is unsuitable for human consumption. There is no freshwater underlying the historic target area at Little Neck.

#### 2.3.5.7 Sensitive Species, Environments, and Environmental Resources

The MRA includes two habitat types: upland habitat and inland water. These areas provide habitat to a variety of plants, invertebrates, herbivores, predators, and marine receptors. On 17 March 2011, a botanist conducted a sensitive plant survey of the upland target area of Little Neck prior to its sampling (AMEC, 2011). No rare or endangered plants were observed during the survey. The lowest, intertidal estuarine areas were found to be dominated by salt-meadow cordgrass (*Spartina patens*), salt-marsh cordgrass (*S. alterniflora*), salt grass (*Distichlis spicata*), and glasswort (*Salicornia* sp.). Above these areas was an estuarine, broad-leaved deciduous scrub shrub vegetation dominated by groundsel-bush (*Baccharis halimifolia*), which was found in dense thickets throughout Little Neck. Also present in the vegetation were northern bayberry (*Myrica pennsylvanica*), poison sumac (*Toxicodendron vernix*), poison ivy (*Toxicodendron radicans*), Virginia rose (*Rosa virginiana*), grape (*Vitis* sp.), and Oriental bittersweet (*Celastrus orbiculata*). Maritime marsh-elder (*Iva frutescens*) formed a fringe around these estuarine wetlands. Above these areas (in the driest parts of Little Neck upland habitat), eastern red cedar (*Juniperus virginiana*) was the most common species, with a few individuals of scrub oak

(*Quercus ilicifolia*) along with Virginia creeper (*Parthenocissus quinquefolia*) common yarrow (*Achillea millefolium*), and switch grass (*Panicum virgatum*).

The waters surrounding Cape Poge are known for an abundance of wildlife, fishing and shellfishing. Striped Bass (*Morone saxatilis*), Bluefish (*Pomatomus saltatrix*), and False Albacore (*Euthynnus alletteratus*) are known to congregate in the waters of Cape Poge Bay (where the Inland Water MRS is located) during the spring, summer and fall. The eelgrass (*Vallisneria Americana*) beds of Cape Poge Bay support a high-quality bay scallop population, which are typically harvested in the fall. The MRA contains significant ecological resources and is potential habitat for threatened, endangered, or other sensitive or protected species. The MRA is mapped as "Core Habitat" and "Critical Natural Landscape" by the Massachusetts Natural Heritage Endangered Species Program (MA NHESP) BioMap2 town report for Edgartown (MA NHESP, 2012). Core habitat identifies areas that are critical to long-term persistence of rare species in Massachusetts. Critical Natural Landscape encompasses habitat used by wide ranging species (e.g. tern), large areas of contiguous habitat, and buffer habitat. The MRA is within Core Habitat area 102 and Critical Natural Landscape area 45.

The MRA has been designated as a Priority Habitat of Rare Species and Estimated Habitats of Rare Wildlife in the Massachusetts Natural Heritage Atlas 13th Edition (effective October 1, 2008). Habitat alteration within areas mapped as Priority Habitats (PH) may result in a take of a state-listed species, and is subject to regulatory review by the Natural Heritage & Endangered Species Program. Priority habitat maps are based on known occurrence of rare species and habitat considerations. The MRA is mapped as PH 15. Based upon coordination with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and Massachusetts Natural Heritage and Endangered Species Program; there are approximately 37 federal and state threatened, endangered, and special concern species that have been observed on Martha's Vineyard (Table 2-3). Table 2-4 summarizes the observed species found within the MRA. These include piping plover (*Charadrius melodus*) a federally threatened species which utilizes beach and nearby upland habitat, and the federally endangered roseate tern (*Sterna dougallii*). State listed species include many insect and plant species which utilize upland coastal sandplain habitat.

**Table 2-3. Endangered, Threatened, and Special Concern Species  
Former Cape Poge Little Neck Bomb Target Munitions Response Area**

Common Name	Scientific Name	State Status	Federal Status
<b>Birds</b>			
Common Tern	<i>Sterna hirundo</i>	Special Concern	--
Roseate Tern	<i>Sterna dougallii</i>	Endangered	Endangered
Least Tern	<i>Sterna antillarum</i>	Special Concern	--
Northern Harrier	<i>Circus syneus</i>	Threatened	--
Piping Plover	<i>Charadrius melodus</i>	Threatened	Threatened

Common Name	Scientific Name	State Status	Federal Status
<b>Reptiles</b>			
Green Sea Turtle	<i>Chelonia mydas</i>	Threatened	Threatened
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	Endangered	Endangered
Loggerhead Sea Turtle	<i>Caretta caretta</i>	Threatened	Threatened
Kemp's Ridley Sea Turtle	<i>Lepidochelys kemp</i>	Endangered	Endangered
<b>Insects</b>			
Northeastern beach tiger beetle	<i>Cicindela dorsalis dorsalis</i>	Endangered	Threatened
Chain dot Geometer	<i>Cingulia cateraria</i>	Special Concern	--
Coastal Heathland Cutworm	<i>Abagrotis nefascia</i>	Special Concern	--
Gerhard's Underwing Moth	<i>Catocala Herodias gerhardi</i>	Special Concern	--
Faded Grey Geometer	<i>Stenoporpia Polygrammaaria</i>	Threatened	--
Pine Barrens Zale	<i>Zale sp l nr lunifera</i>	Special Concern	--
Pink Sallow Moth	<i>Psectraglea carnosa</i>	Special Concern	--
Sandplain Euchaena	<i>Euchlaena madusaria</i>	Special Concern	--
Barrens Buckmoth	<i>Hemileuca maia</i>	Special Concern	--
Melsheimer's Sack Bearer	<i>Cicinus Melsheimeri</i>	Threatened	--
Pine Barrens Lycia	<i>Lycia ypsilon</i>	Threatened	--
Coastal Swamp Metarranthis Moth	<i>Metarranthis pilosaria</i>	Special Concern	--
Slender Clearwing Sphinx Moth	<i>Henaris pilosaria</i>	Special Concern	--
Spartina Borer Moth	<i>Spartiniphagia inops</i>	Special Concern	--
Imperial Moth	<i>Eacles imperialis</i>	Threatened	--
Barrens Metarranthis Moth	<i>Metarranthis apiciaria</i>	Endangered	--
Comet Darner	<i>Anax longippes</i>	Special Concern	--
Purple Tiger Beetle	<i>Cicindela purpurea</i>	Endangered	--
Three-Lined Angle Moth	<i>Digrammia eremiata</i>	Threatened	--
<b>Plants</b>			
Sandplain gerardia	<i>Agalinus acuta</i>	Endangered	Endangered
Bristly Foxtail	<i>Setaria parviflora</i>	Special Concern	--
Bushy Rockrose	<i>Crocanthemum dumosum</i>	Special Concern	--
Purple Needlegrass	<i>Aristida purpurascens</i>	Threatened	--
Sandplain Flax	<i>Linum intercursum</i>	Special Concern	--
Saltpond Pennywort	<i>Hydrocotyle verticellata</i>	Threatened	--
Pygmyweed	<i>Tillacea aquatica</i>	Threatened	--
Sandplain Blue-eyed grass	<i>Sisinchium fuseatum</i>	Special Concern	--
Nantucket Shadbush	<i>Amelanchier nantuckensis</i>	Special Concern	--
Sea-Breach Knotweed	<i>Polygonum glaucum</i>	Special Concern	--

**Note:**

This list was obtained from the RI Work Plan (UXB, 2011).

-- Stuts not listed

**Table 2-4. Observed Species within Former Cape Poge Little Neck Bomb Target MRA**

Species	Federal Threatened and Endangered Species?	Massachusetts Threatened and Endangered Species?	Found Within FUDS MRS?	Found On Martha's Vineyard?	Comment	Reference
Piping plover (Charadrius melodus)	Yes	Yes	Yes	Yes	During the 2009 breeding season, 7 pairs of piping plover bred on Cape Poge Refuge	Final TCRA After Action Report (March 2010)
Roseate Tern (Sterna dougallii)	Yes	Yes	Yes	Yes	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.	Email Chris Buelow, TTOR (27 Oct 2010)

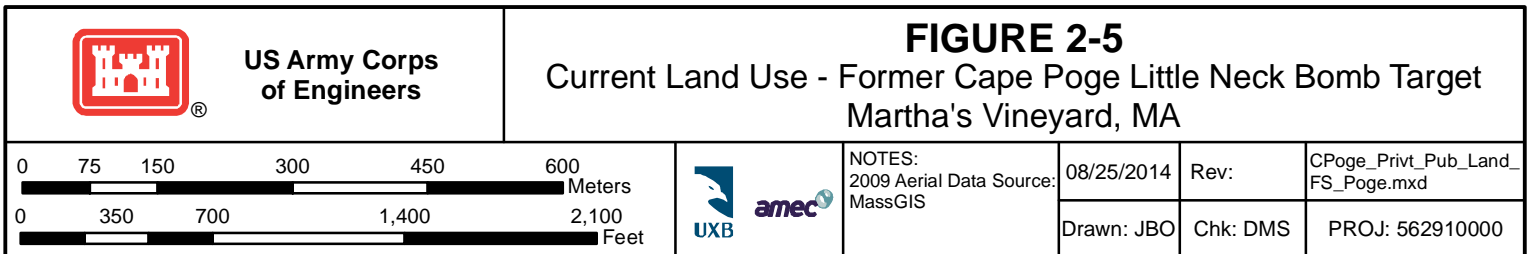
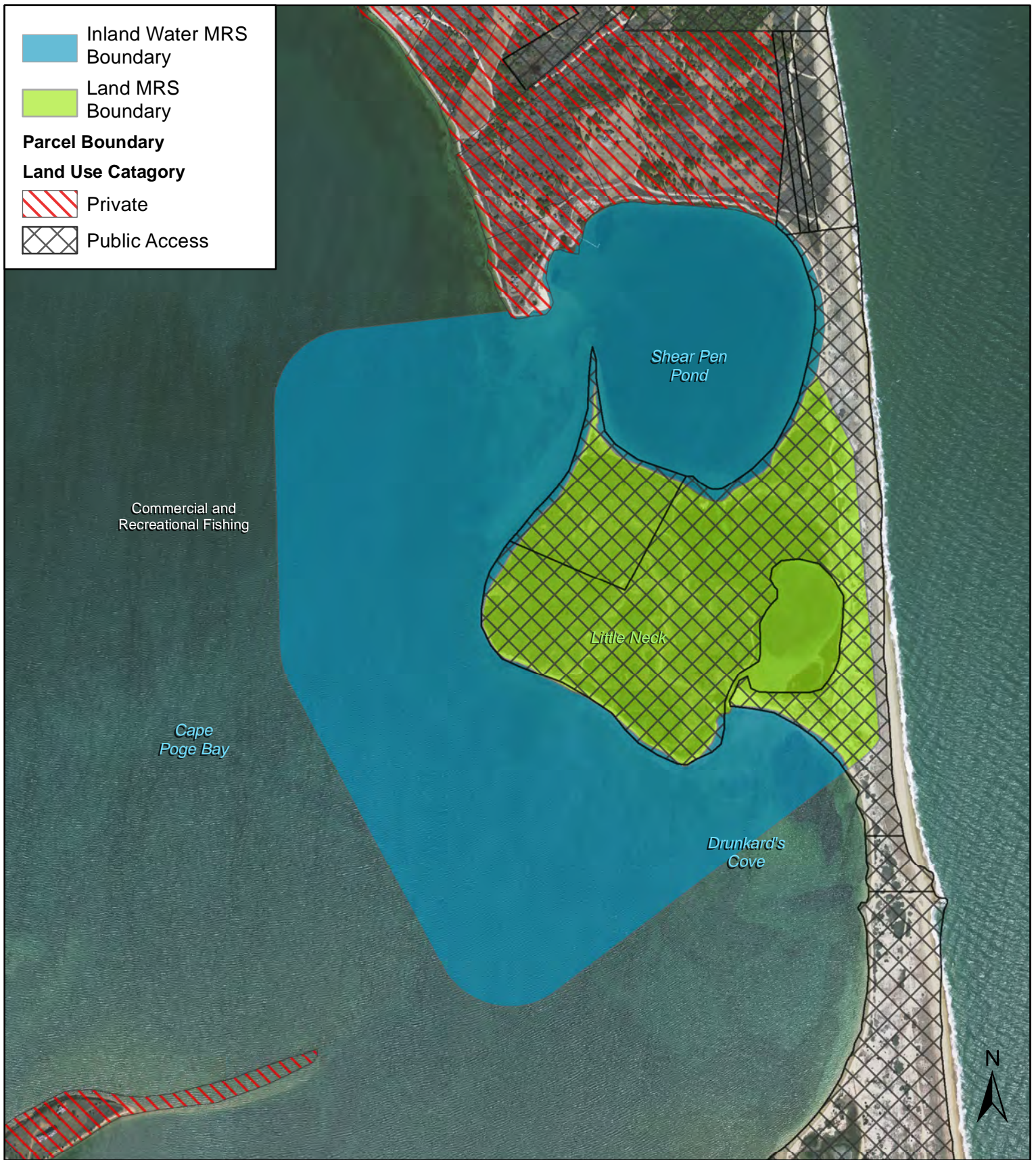
#### 2.3.5.8 Demographics

The MRSs are located on Chappaquiddick Island, which is within the Town of Edgartown, Martha's Vineyard, Massachusetts. According to the 2010 Census, census tract 2003 (approximately 27 square mile area) has a population of 4,067 and contains 5,220 total housing units, of which 1,794 houses are occupied by year-round residents, 3,258 are seasonal or occasional use, and the remaining 168 houses are unoccupied. Due to seasonal occupancy, the population within the census tract may significantly increase. According to the Martha's Vineyard Chamber of Commerce, the population of Martha's Vineyard increases from 16,535 in non-summer months to more than 125,000 in the summer months (Martha's Vineyard Chamber of Commerce, 2012).

#### 2.3.5.9 Current and Future Land Use

Currently, the land MRS is owned by TTOR and the Inland Water MRS is owned by the Commonwealth of Massachusetts. Figure 2-5 illustrates the current land use. The area remains mostly undeveloped with several residential properties scattered throughout Cape Poge, north of Shear Pen Pond and outside of the MRA. Common property activities include, but are not limited to, sunbathing, swimming, four-wheel driving, picnicking, hiking, camping, commercial and recreational fishing, clamming, scalloping, crabbing, and visiting the lighthouse. It is anticipated that the future land use will remain the same (USACE, 2009).





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#### 2.3.5.10 Remedial Investigation Conclusions

The objective of the RI, to delineate the nature and extent of MEC and MCs impacted from historic training activities conducted at the Former Cape Poge Little Neck Bomb Target MRA, has been achieved. RI activities including geophysical surveying, intrusive investigations, and environmental sampling for analysis of MCs was conducted within land, beach, inland water, and ocean sub-areas.

Key findings of the RI include:

- The target area was confirmed through geophysical and intrusive investigations.
- During the RI, a total of 88 MEC items (practice bombs with spotting charges) and 325 MD items were identified.
  - 83 MEC items and 279 MD items were identified within the Land MRS subsurface
  - 5 MEC items and 46 MD items were recovered from the subsurface of the Inland Water MRS.
- MEC and MD items were concentrated on Little Neck around the historic bomb target location.
- MEC and MD were not identified in the residential area north of Shear Pen Pond.
- The beach and ocean areas do not contain MEC or MD.
- A human health risk assessment was completed and all MCs detected were below human health screening levels. Therefore, there is no human health risk related to MCs detected at this investigation area.
- Zinc occurs in soil at concentrations below the corresponding 50th percentiles of natural background and does not exceed the corresponding ecological soil screening levels. Therefore, it is likely to be within the range of natural background levels, which do not pose a risk to ecological receptors resources.
- Antimony and lead show evidence of potential site-related release, however, the potential for risk was found to be negligible based on the 95 percent UCL concentrations and (in the case of lead) a refinement of the ecological soil screening level based on less conservative exposure assumptions.
- Under current conditions, the MEC HA assigned a hazard level category of 2 indicating high potential explosive hazard conditions based upon the spotting charge within the AN-MK23.

Based upon the RI results, it was recommended that the Cape Poge Little Neck Bomb Target MRA be subdivided into three MRSs, comprising the land MRS (62 acres), the inland water MRS (172 acres), and the remaining land MRS (115 acres) (Figure 2-2). An FS was

- 1 recommended to evaluate future response action alternatives with regard to MEC hazards at the
- 2 Inland Water MRS and the Land Area MRS.
- 3 No action was recommended for the remaining 115 acres, delineated as the Remaining Land
- 4 MRS, as no MEC have been confirmed within this area based on data and information collected
- 5 to date for the FUDS.



**3.0 Applicable or Relevant and Appropriate Requirements and To Be Considered Criteria**

Pursuant to 40 Code of Federal Regulations (CFR) Part 300.400(g) of the NCP, a list of ARARs and other TBC information has been developed for a site or sites to identify the requirements that may apply to a removal or remedial action. CERCLA Section 121 (d)(2)(A) requires that remedial actions meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. CERCLA Section 121 (d)(2)(A)(ii) requires state ARARs to be met if they are more stringent than federal requirements. In addition, the NCP, published in 40 CFR Part 300.400(g)(3), states that TBC criteria may be listed. TBC are local ordinances, unpromulgated criteria, advisories, or guidance that do not meet the definition of ARARs but that may assist in the development of remedial objectives.

ARARs are defined as follows:

- Applicable requirements - Those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be applicable.
- Relevant and appropriate requirements - Those cleanup standards, standards of control, and other substantive requirements, criteria, or limitations promulgated under federal environmental or state environmental or facility siting laws that, while not “applicable” to a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. Only those state standards that are identified by a state in a timely manner and that are more stringent than federal requirements may be relevant and appropriate.

There are three types of ARARs:

- Chemical-specific requirements, which define acceptable exposure concentrations or water quality standards.
- Location-specific requirements, which may restrict remediation activities at sensitive or hazard-prone locations such as active fault zones, wildlife habitats, and floodplains.
- Action-specific requirements, which may control activities and technology.

1 It is first determined whether an ARAR is applicable for the site. If it is not applicable, then it is  
2 determined whether the ARAR is relevant and appropriate. The procedure for determining  
3 whether a requirement is relevant and appropriate is a two-step process. First, to determine  
4 relevance, it is evaluated whether the requirement addresses problems or situations sufficiently  
5 similar to the circumstances of the proposed response action. Second, for appropriateness, the  
6 determination must be made about whether the requirement would also be well-suited to the  
7 conditions of the site. In some cases, only a portion of a requirement would be both relevant and  
8 appropriate. Once a requirement is deemed relevant and appropriate, it must be attained (or  
9 waived). If a requirement is not both relevant and appropriate, it is not an ARAR.

10 “Applicable requirements” and “relevant and appropriate requirements” are considered to have  
11 the same weight under CERCLA. Section 121(d) of CERCLA, as amended by SARA, requires  
12 attainment of federal ARARs and of state ARARs in state environmental or facility siting laws  
13 where the state requirements are promulgated, more stringent than federal laws, and identified by  
14 the state in a timely manner.

15 CERCLA and the NCP also recognize the TBC category, which includes non-promulgated  
16 federal and state criteria, strategies, advisories, and guidance documents. The TBC information  
17 do not have the same status as ARARs; but, if no ARAR exists for a substance or particular  
18 situation, TBCs may be used to ensure that a remedy is protective.

19 ARARs identified during the remedial investigation are evaluated and potentially eliminated  
20 during the FS and finalized prior to issuance of the Decision Document (DD) For a remedial  
21 alternatives to pass into the detailed analysis stage of the FS and thus become eligible for  
22 selection, it must comply with its ARARs or a waiver should be identified and the justification  
23 provided for invoking it. An alternative that cannot comply with ARARs, or for which a waiver  
24 cannot be justified, should be eliminated from consideration for further discussion as a potential  
25 alternative. Updates to ARARs are made as details of remedial alternatives become known.  
26 Thus, potential ARARs that are initially identified on a fairly broad basis, are refined to specific  
27 requirements during the subsequent stages of the remedial process, and are finalized upon  
28 signature of the ROD/DD.

29 Table 3-1 lists the two ARARs for the Land and Inland Water MRSs that are being carried  
30 forward to this FS. No TBC criteria were identified. Primary consideration will be given to  
31 remedial alternatives that attain or exceed the requirements of its ARARs. ARARs will be  
32 evaluated for each alternative in Section 6.0, Detailed Analysis.

**Table 3-1. Identification of Applicable or Relevant and Appropriate Requirements for the Feasibility Study**

Standard, Requirement, or Criteria	Citation	Description of Requirement	Comment
<i>Action-Specific</i>			
Resource Conservation and Recovery Act, Miscellaneous Units	40 CFR 264.601	Establishes requirements under RCRA 40 CFR 264 subpart X applicable to operators of open burning or open detonation of explosive waste, including military munitions and explosive wastes. Specifically, 40 CFR 264.601 requires that miscellaneous units be located, designed, constructed, operated, maintained, monitored and closed in a manner that will ensure protection of human health and the environment. Only substantive portions are appropriate.	Appropriate : For any future remedial alternatives that address MEC disposal using technologies or disposal means classified as "miscellaneous units" under Subpart X, including consolidated detonation areas
<i>Location-Specific</i>			
Federal Endangered Species Regulations	16 U.S.C. §1538(a)(1)	With respect to any endangered species of fish or wildlife listed pursuant to Section 1533 of Title 16 (Conservation), it is unlawful for any person subject to the jurisdiction of the U.S. to take any such species within the U.S. or the territorial sea of the U.S.	Appropriate: For any future response actions that may impact listed species

Notes:

RCRA – Resource Conservation and Recovery Act

CFR – Code of Federal Regulation

U.S.C – United States Code

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## 4.0 Identification and Screening of Technologies

This section establishes the RAO for the FS and identifies general response actions and potential MEC detection and removal technologies for the Land MRS and Inland Water MRS. An initial screening is performed for effectiveness, implementability, and cost to evaluate viability for use at the MRSs. The general response actions and viable technologies identified in this section are assembled into process options that can achieve the RAO in the Development and Screening of Alternatives (Section 5) and are further evaluated in the Detailed Analysis of Alternatives (Section 6) of this report.

### 4.1 Remedial Action Objectives

The NCP CFR 300.430(e)(2)(i) specifies that RAOs be developed to address: (1) contaminants of concern, (2) media of concern, (3) potential exposure pathways, and (4) preliminary remediation goals. RAOs are: defined to determine the effectiveness of the remedial actions; developed for MEC based on the MRS requirements and exposure pathways; and, focused on limiting or removing exposure pathways for MEC (USAEC, 2009). The RAO for the Land MRS and Inland Water MRS addresses the overall goal of managing risk and protecting human health based on the results of the RI.

MEC were found during the RI field work and the revised MEC conceptual site model (CSM) identifies potential exposure pathways for all receptors with access to the Land and Inland Water MRSs based on current and future anticipated land use. See Appendix A. MEC were found within the subsurface of the Land MRS and the Inland Water MRS at depths between 6 inches and 3 ft bgs, with the majority of the items found at approximately 2 feet bgs in both MRSs. Due to the volume of MEC estimated to remain within subsurface soil in the Land MRS and within the Inland Water MRS, workers, visitors, and recreational users may encounter MEC while engaging in surface and intrusive activities. Therefore, the RAO for the MRSs is:

- to protect recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion.

### 4.2 General Response Actions

General response actions are those actions that support the development of remedial alternatives that will achieve the RAO. The following general response actions are considered for the Land MRS:

- **Risk Management** - Risk Management, which is considered a “limited” action alternative by EPA, includes various land use control (LUC) options that rely on legal

mechanisms, engineering controls, or administrative functions to control access or modify human behavior and provide long-term management of risk.

- **Subsurface Remedial Action** – MEC can be detected and removed from below the ground surface. Alternatives for clearance include technologies for detection, positioning for the detection technologies, removal, and disposal.

### **4.3 Evaluation of Technologies**

Various technologies and approaches exist to manage risks associated with MEC. Risk management can be accomplished through a variety of engineering or LUC components (i.e., institutional controls [ICs]) designed for implementation based on MRS-specific conditions. Clearance activities include three steps: detection, removal, and disposal. A description of the technologies used in each step is presented in the following subsections. At the end of each subsection, the technologies are screened against the three screening criteria to determine their viability for use at the Land MRS and Inland Water MRS.

#### **4.3.1 Screening Criteria**

Potential remedial technologies are first evaluated against the three general categories of effectiveness, implementability, and cost described below. The purpose of this initial screening is to ensure that the technologies meet the minimum standards of the criteria within each category in the FS process and can be used to assemble viable remedial alternatives to achieve the RAO. The three general categories are described in the following sections.

##### **4.3.1.1 Effectiveness**

In accordance with EPA guidance (EPA, 1988), technologies or alternatives that have been identified should be evaluated further based on their effectiveness relative to other processes within the same technology or alternative type. This evaluation should focus on: (1) the potential effectiveness of technology or alternative options in handling the estimated areas or volumes of media and meeting the RAO; (2) the potential impacts to human health and the environment during the removal or implementation phase; and, (3) how proven and reliable the technology or alternative is with respect to the MEC and conditions at the site.

##### **4.3.1.2 Implementability**

Implementability, as a measure of both the technical and administrative feasibility of constructing, operating, and maintaining a remedial action alternative, is used during screening to evaluate the combinations of technology or alternative options with respect to conditions at a specific site. Technical feasibility refers to the ability to construct and reliably operate, a

1 technology or alternative option until a remedial action is complete. It also includes operation,  
2 maintenance, replacement, and monitoring of technical components of a technology or  
3 alternative, if required, into the future after the remedial action is complete. Administrative  
4 feasibility refers to the ability to obtain approvals from other offices and agencies; the  
5 availability of treatment, storage, and disposal services and capacity; and the requirements for,  
6 and availability of, specific equipment and technical specialists (EPA, 1988).

7 The determination that a technology or alternative is not technically feasible will usually  
8 preclude it from further consideration unless steps can be taken to change the conditions  
9 responsible for the determination. Typically, this type of "fatal flaw" will be identified during  
10 technology screening, and an alternative consisting of an infeasible technology will not be  
11 retained. Negative factors affecting administrative feasibility will normally involve coordination  
12 steps to lessen the negative aspects of the technology or alternative but will not necessarily  
13 eliminate a technology or alternative from consideration (EPA, 1988).

#### 14 **4.3.1.3 Cost**

15 Typically, technologies and alternatives are defined sufficiently prior to screening so that  
16 estimates of cost are available for developing comparisons among technologies and alternatives.  
17 However, because uncertainties associated with the definition of technologies and alternatives  
18 often remain, it may not be practicable to define the costs of technologies and alternatives with  
19 the accuracy desired for the detailed analysis [(i.e., +50% to -30%) (EPA, 1988)].

20 According to EPA guidance, a high level of accuracy in cost estimates during screening is not  
21 required. The focus should be to make comparative estimates for technologies and alternatives  
22 with relative accuracy so that cost decisions among technologies and alternatives will be  
23 sustained as the accuracy of cost estimates improves beyond the screening process (EPA, 1988).

#### 24 **4.3.2 Land Use Controls**

25 In accordance with the FUDS program guidance, the term LUCs encompasses physical, legal, or  
26 administrative mechanisms that restrict the use of, or limit access to, contaminated property to  
27 reduce risk to human health and the environment. Physical mechanisms encompass a variety of  
28 engineered remedies to contain or reduce contamination and physical barriers to limit access to  
29 property, such as fences or signs. The legal mechanisms are generally the same as those used for  
30 ICs as discussed in the NCP. ICs are a subset of LUCs and are primarily legal mechanisms  
31 imposed to ensure the continued effectiveness of land use restrictions imposed as part of a  
32 remedial decision. Legal mechanisms include restrictive covenants, negative easements,  
33 equitable servitudes, and deed notices. Administrative mechanisms, which can also be ICs,  
34 include notices, adopted local land use plans and ordinances, educational programs, construction

1 permitting, or other existing land use management systems that may be used to ensure  
2 compliance with use restrictions (USACE, 2004). Educational programs can include a variety of  
3 types of information dissemination and training that can be tailored to specifically address an  
4 identified hazard and exposed populations.

5 Development of LUC components considered for the MRSs referred to the USACE guidance  
6 Engineering Pamphlet (EP) 1110-1-24 for Establishing and Maintaining Institutional Controls  
7 for Ordnance and Explosive (OE) Projects (USACE, 2000). The main objective is to design  
8 controls that rely on legal mechanisms, physical barriers or warnings, or administrative  
9 mechanisms such as construction support or educational components to restrict access or modify  
10 human behavior to reduce exposure risks. LUCs should be managed and maintained at the local  
11 level whenever possible. For FUDS properties, property owners or state and local government  
12 agencies with appropriate authorities (i.e., zoning boards) are often the best candidates for LUC  
13 management and enforcement (USACE, 2004).

14 Effectiveness of LUCs is dependent on coordination and willingness to participate in  
15 maintenance and enforcement by all stakeholders for the duration that the specific control applies  
16 to the MRS. When LUCs are established, the ability to perform periodic inspections and  
17 measure effectiveness is critical to attaining remedial objectives. Land use controls to guide  
18 human behavior and manage risk are described and screened against the three criteria of  
19 effectiveness, implementability, and cost for use at both the Land MRS and Inland Water MRS  
20 in Table 4-1.

21 To facilitate development and evaluation of LUC options and viability for use at the Land MRS  
22 and Inland Water MRS, an Institutional Analysis was performed for the MRSs to support the FS  
23 and is provided as Appendix B.

#### 24 **4.3.3 MEC Detection**

25 Detection technologies include those methods and instruments used to locate surface and  
26 subsurface MEC for clearance, which are the same as those used for MEC as the properties of  
27 the munitions are the same that would be detected. The best detection method is selected based  
28 on the MEC properties such as the depth and size of the suspected items, and the physical  
29 characteristics of the site (i.e., soil type, topography, vegetation, and local geology for the Land  
30 MRS and soil and sediment littoral characteristics and underwater topography for the Inland  
31 Water MRS).



Table 4-1. Land Use Controls

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRSs/Status of Retention
<b>Legal Mechanisms:</b> Institutional controls such as deed restrictions	Land	<b>High:</b> When imposed and enforced, legal restrictions can effectively limit or prevent exposure risks to a known hazard and can be evaluated for effectiveness via periodic inspection.	<b>Very Difficult:</b> Because any legal mechanisms would need to be established by the property owners (non-DoD entities); to implement this type of control the Army can only assist in a coordination capacity with the landowner to guide implementation in an effective manner.	<b>Low:</b> Costs are variable based on level of effort.	Administrative	The MRSs are a non-DoD property managed under FUDS without the ability for the Army to impose legal restrictions. Any legal mechanisms would need to be established by the property owners.	<b>Low/Not Retained:</b> Because the MRS is a FUDS, the Army cannot impose legal restrictions on the non-DoD land included within the MRS boundaries.
	Inland Water						
<b>Physical Mechanisms:</b> Engineered barriers or physical structures designed to prevent access such as fencing or guard posts. Physical mechanisms also include the installation or construction of signs designed to provide information on the potential hazards at a site.	Land	<b>Low:</b> Fencing or guards to restrict access is not anticipated to be very effective at the MRSs as the delineated MEC is present in the subsurface and the MRSs are recreational areas intended for public use, and installing barriers around these is impracticable due to their location on or adjacent to open water.  <b>High:</b> The installation of signs could be very effective at the MRSs in warning users of potential risks due to remaining MEC.	<b>Easy:</b> Although fencing and guards are would be impracticable at the MRSs, the installation of signs would be relatively easy to implement.	<b>Low:</b> Low costs associated with physical mechanisms	Signs	Long-term effectiveness is expected to require periodic inspection and sign maintenance within the MRSs.	<b>High/Retained:</b> The installation of signs containing information on the potential remaining hazards at the MRSs could be used to guide behavior and reduce the probability of MEC being handled.
	Inland Water						
<b>Administrative Mechanisms:</b> Educational programs including public information dissemination and advisories (e.g., written protocol or guidance, brochures, fact sheets, training programs, etc.); management through permitting requirements.	Land	<b>High:</b> Educational components work very well when tailored to the specific populations at risk of exposure through behavior modification. Multiple formats are available for use to convey information to target groups, and periodic inspections can be used to verify effectiveness in the future at both MRSs.	<b>Easy:</b> Easily implementable for MRSs where the nature and extent of hazards are known, and baseline risks have been established for all complete source/interaction/receptors pathways that are present. Execution is limited to primarily administrative functions. Based on data collected through the RI for the MRSs, the nature and extent of munitions-related hazards has been fully characterized.	<b>Low:</b> Costs are variable based on level of effort.	Administrative to produce informational materials and provide training materials.	Landowners are aware of the history of the MRSs, have been part of (or invited to participate) meetings regarding the results of MRS investigations and decision making, and are anticipated to continue to be receptive to informational materials provided in the future.	<b>High/Retained:</b> Institutional controls consisting of education programs tailored to the individuals most likely to be exposed to MEC present within the MRS could be used to guide behavior and reduce the probability of MEC being handled by unqualified individuals.
	Inland Water						



#### 4.3.3.1 Land MRS

On land, there are two basic forms of MEC detection. The first, visual searching, has been successfully used at a number of sites where MEC is located on the ground surface. When performing a visual search of a site, the area to be searched is typically divided into 5-foot lanes that are systematically inspected for MEC. A metal detector is sometimes used to supplement the visual search in areas where ground vegetation may conceal surface munitions. Typically, any MEC found during these searches is flagged or marked for immediate disposal.

The second form of detection, geophysics, includes various detection instruments designed to locate subsurface MEC and is integrated with the equipment and methods used for location positioning. Each piece of equipment has its own inherent advantages and disadvantages based on its operating characteristics. Thus, selecting the appropriate type of geophysical instrument is critical to the survey success. The instruments designed to locate subsurface MEC include magnetometers and electromagnetic instruments. Positioning technologies include various equipment and instruments that establish geo-referenced positions for subsurface anomalies detected using MEC detection technologies. The viability of positioning technologies is affected by site conditions, including terrain, tree canopy, and vegetation density.

#### 4.3.3.2 Inland Water MRS

Underwater detection technologies include geophysical sensors, bathymetric technologies, and sediment bottom imaging technologies. Underwater geophysical electromagnetic induction (EMI) and magnetometer technologies are largely the same as those used for land investigations; however, underwater investigations present more challenges. Geophysical sensors unique to the marine environment include sonar technologies. While sonar technologies are primarily used for bathymetric and sediment bottom imaging, there are some that can also aid in MEC detection.

The MEC detection technologies and positioning technologies are described and screened against the three criteria of effectiveness, implementability, and cost for use at the Land MRS and Inland Water MRS in Table 4-2 and Table 4-3, respectively. Site-specific performance results for equipment tested and employed during the RI at these MRSs is incorporated into the technology screening to the extent possible.

#### 4.3.4 MEC Clearance

Clearance operations for MEC can take the form of a surface-only clearance, an intrusive (subsurface) clearance, or a combination of the two methods. The decision on the appropriate level of clearance operation is based on the nature and extent of the hazards as well as the current land use and intended future land use of the site.

1 For a surface clearance operation, exposed MEC items are identified during the detection phase.  
2 The MEC items are then inspected, identified, collected (if possible), and transported to a  
3 designated area for cataloging and eventual disposal. If it is determined during the inspection that  
4 the risk of moving an item is unacceptable, then it may be necessary to destroy the item in place.

5 Potential subsurface MEC identified by a geophysical survey or other detection methods requires  
6 excavation for clearance. Because the actual nature of the buried item cannot be determined  
7 without it being uncovered, the evacuation of nonessential personnel is necessary within a  
8 predetermined minimum separation distance (MSD). The MSD is based on the munition with the  
9 greatest fragmentation distance (MGFD) that may be present within the MRSs. All non-essential  
10 personnel and the general public must be evacuated from and maintain their distance beyond the  
11 MSD during the intrusive operations. The MSD may be reduced if sufficient mitigation  
12 techniques are implemented. Excavation takes place with either hand tools or mechanical  
13 equipment, depending on the suspected depth of the object. Once an item has been exposed, it is  
14 then inspected, identified, collected (if possible), and transported to a designated area for  
15 cataloging and disposal. If it is determined during the inspection that the item is MEC and the  
16 risk of moving the item is unacceptable, then it may be necessary to destroy the item in place.  
17 For intentional detonations, all personnel must observe the MSD. The MSD may be increased or  
18 decreased based on the actual item identified. Removal technologies applicable to clearance of  
19 MEC delineated at the Land MRS and the Inland Water MRS are described in Table 4-4 and are  
20 screened against the three criteria of effectiveness, implementability, and cost.

#### 21 **4.3.5 MEC Disposal**

22 Munitions response procedures that would be followed during a clearance will require provisions  
23 to handle MEC. Table 4-5 provides a description and evaluation of MEC disposal technology  
24 options including blow-in-place (BIP), consolidated shot, laser initiation, and contained  
25 detonation chambers.

Table 4-2. Detection Technologies

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/Status of Retention
Visual Searching	Land	<b>Low:</b> Effective for surface clearance in open areas with little ground cover. However, no surface MEC was identified during the RI. Not appropriate for subsurface clearance.	<b>Easy:</b> Easily implemented by qualified UXO Technicians and sweep personnel. Minimal to no impacts to cultural or natural resources.	Low	NA	Typically supported with magnetometer or metal detectors	<b>Low/Not Retained:</b> Visual detection of MEC as a standalone technology would not be effective since the risk for exposure is subsurface.
	Inland Water	Technically impracticable in water.					<b>Not Retained</b>
Flux-Gate Magnetometers: Flux-gate magnetometers measure the vertical component of the geomagnetic field along the axis of the sensor and not the total intensity of the geomagnetic field.	Land	<b>Low:</b> Flux-gate magnetometers have been used as the primary detector in traditional mag & dig operations. There is a high industry familiarization. However, this technology only detects ferrous objects, and any potential non-ferrous items would remain onsite (AN-MK5s).	<b>Easy:</b> Light and compact. Can be used in any traversable terrain. Costs, transportation, and logistics requirements are equal to or less than other systems. Widely available from a variety of sources. Minimal to no impacts to cultural or natural resources.	<b>Moderate:</b> A number of flux-gate magnetometers have a low cost for purchase and operation compared to other detection systems. However, labor costs can be significant.	Schonstedt GA-52Cx Schonstedt GA-72Cd Foerster FEREX 4.032	Analog output not usually co-registered with navigational data.	<b>Low/ Not Retained:</b> Magnetometers only detect ferrous items and would are not effective in detecting non-ferrous items (such as zinc MK-5s) previously identified at the MR.
	Inland Water				Schonstedt GAU-30 Vallon V XV4		
Proton Precession Magnetometers: Proton precession magnetometers measure the total intensity of the geomagnetic field. Multiple sensors are sometimes arranged in proximity to measure horizontal and vertical gradients of the geomagnetic field.	Land	<b>Low:</b> Proton precession systems have similar sensitivities as flux-gate systems, but with a relatively slow sampling rate. There is a high industry familiarization. Detects ferrous objects only.	<b>Moderate:</b> Generally is heavier and requires more battery power than flux-gate sensors. Sampling rate is low. Can be used in any traversable terrain. Is widely available from a variety of sources. Minor impacts to cultural or natural resources based on clearing of areas for data collection.	<b>Moderate:</b> Costs are higher than flux-gate systems because proton precession systems often acquire digital data.	Geometrics G-856AX GEM Systems GSM-19T		<b>Low/Not Retained:</b> Proton precession systems are not viable options as a standalone detection system at the MRSs because of low effectiveness.
	Inland Water				Fishers Proton 4		
Optically Pumped Magnetometers: This technology is based on the theory of optical pumping and operates at the atomic level as opposed to the nuclear level (as in proton precession magnetometers).	Land	<b>Low:</b> This is the industry standard technology to detect MEC using magnetic data analysis. There is a high industry familiarization. However, this technology only detects ferrous objects, and any potential non-ferrous items would remain onsite (AN-MK5s).	<b>Moderate to Difficult:</b> Equipment is digital, rugged, and weather resistant. Common systems weigh more than most flux-gate systems and are affected by heading error. Can be used in most traversable terrain. Widely available from a variety of sources. Processing and interpretation requires trained specialists. Detection capabilities are negatively influenced by iron-bearing soils, which are present in the MRS based on RI findings and known geology. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>Moderate – High:</b> Has high purchase cost compared to other technologies. Lower costs in labor can be realized when using arrays of multiple detector sensors.	Geometrics G-858 GEM Systems GSMP-40 Scientrex Smart Mag	Digital signal should be co-registered with navigational data for best results.	<b>Low/ Not Retained:</b> Magnetometers only detect ferrous items and would are not effective in detecting non-ferrous items (such as zinc MK-5s)..
	Inland Water				Geometrics G-882 Marine		
Time-Domain Electromagnetic Induction (TDEMI) Metal Detectors: TDEMI is a technology used to induce a pulsed magnetic field beneath the Earth’s surface with a transmitter coil, which in turn causes a secondary magnetic field to emanate from nearby objects that have conductive properties.	Land	<b>High:</b> TDEMI technology is the industry standard for MEC detection using electromagnetic data analysis. There is a high industry familiarization. Detects both ferrous and non-ferrous metallic objects.	<b>Easy - Moderate:</b> Sensors are typically larger than digital magnetometers. Can be used in most traversable terrain. Most commonly used instrument and is widely available. Processing and interpretation are relatively straightforward. Anomaly classification possibilities exist for multi-channel systems. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>Moderate – High:</b> Has higher purchase cost compared to other technologies. Lower costs can be realized when using arrays of multiple detector sensors which reduces labor time.	Geonics EM61-MK2, -MK2A, -HH, EM63 G-tek/GAP TM5-EMU Schiebel AN PSS-12	Digital signal should be co-registered with navigational data for best results.	<b>High/Retained:</b> This technology was proven effective within both MRSs during the RI and was relatively easy to implement.
	Inland Water				Geonics EM61-MK2 (with custom improvements)		

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/Status of Retention
<b>Advanced Electromagnetic Induction (EMI) Sensors and Anomaly Classification:</b> Advanced sensors have the ability to precisely capture measurements from enough locations to sample all principal axis responses of an anomaly of interest. This provides the necessary information for analysis and classification of hazardous and non-hazardous items.	Land	<b>Low :</b> Some sensors may be used in production mode, but most require target locations from previous DGM survey to navigate to for static measurements. Greatest ability of all sensors for the classification of anomalies as either MEC or non-hazardous items. Detects both ferrous and non-ferrous metallic objects.  The MEC and MD found during the RI were non-fragmenting items. Therefore, this technology would not differentiate between MEC and MD. In addition, the amount of non-MD found during the RI was approximately 10% of the total number of MEC. MD and non-MD items. Therefore, the effectiveness of using advanced classification to differentiate between MEC/MD and non-MD at this site is low.	<b>Moderate:</b>  Most require the use of a vehicle to tow the sensor to the location of an anomaly, although some smaller, man-portable systems are in development. One-meter-wide coil width (or greater) limits accessibility in heavily vegetated areas. Advanced analysis is required to effectively use the data acquired by the sensors and accurately classify detected anomalies as MEC or non-hazardous material that will not be removed.	<b>High:</b>  Use of the advanced systems often represents additional surveying and processing costs, which may be offset by the decrease in the intrusive investigation costs. In addition, the cost benefits advanced classification typically brings will not be seen at this site since it will not be highly effective at differentiating between MEC, MD and non-MD.	ALLTEM  Berkeley UXO Discriminator (BUD)  BUD Handheld  Geometrics MetalMapper (MM)  TEMTADS 2x2  Man Portable Vector (MPV)	Sensors have limited industry availability. Requires advanced training for operation, data processing, and analysis. Government standards for use not yet finalized.	<b>Low /Not Retained:</b>  The MEC and MD at the site are non-fragmenting, which would not allow for MEC and MD differentiation through advanced classification.
	Inland Water	The MM and TEMTADS are in demonstration phases of underwater applications. Factors to address include instrument response to water and lower accuracy positional data.					<b>Not Retained</b>
<b>Frequency-Domain Electromagnetic Induction (FDEMI) Metal Detectors:</b> FDEMI sensors generate one or more defined frequencies in a continuous mode of operation.	Land	<b>Moderate - High:</b>  Some digital units have been used as the primary detector in highly ranked systems. Demonstrates capability for detecting small items using handheld units. Is not optimum for detecting deeply buried objects. Detects both ferrous and non-ferrous metallic objects.	<b>Easy:</b>  Hand-held detectors are generally light and compact. Can be used in any traversable terrain. Most are handheld systems. Widely available from a variety of sources. Minimal to no impacts to cultural or natural resources.	<b>Low:</b>  Instruments are slow and can detect very small items. Common handheld detectors are much lower cost than digital systems.	White's All Metals Detector Fisher 1266X Foerster Minex 2FD Minelabs Explorer II Vallon VMH3		<b>Moderate – High/Retained:</b>  FDEMI detects all metals, instead of only ferrous items. The White’s All-Metals Detector was proven effective during the RI at the MRS.
	Inland Water		<b>Moderate:</b>  Minimal to no impacts to cultural or natural resources. Underwater use requires divers that are trained in the use of FDEMI technology. Difficult to use in deeper water since diver is required.		DetectorPro Headhunter Diver Fisher 1280-X Underwater	Analog output not usually co-registered with navigational data. Digital output should be co-registered with navigational data	<b>Moderate/Not-Retained:</b>  FDEMI detects all metals, instead of only ferrous items and the associated costs can be much higher than other technologies based on the required divers bottom time.
<b>Sub Audio Magnetics (SAM):</b> SAM is a patented methodology by which a total field magnetic sensor is used to simultaneously acquire both magnetic and electromagnetic response of subsurface conductive items.	Land	<b>Low:</b>  Detects both ferrous and non-ferrous metallic objects. Capable tool for detection of deep MEC. Low industry familiarization. System has seen limited application.	<b>Difficult:</b>  High data processing requirements. Available from a few sources. High power requirements. Has longer than average setup times. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>High:</b>  Has higher than average operating costs and low availability.	G-tek/GAP SAM	Not commercially available. No established track record.	<b>Low/Not Retained:</b>  Difficult to implement, no proven track record, and not commercially available.
	Inland Water	Technically impracticable in water.					<b>Not Retained</b>



Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/Status of Retention
<b>Magnetometer-Electromagnetic Detection Dual Sensor Systems:</b> These dual sensor systems are expected to be effective in detecting MEC as magnetometers respond to large, deep ferrous targets and TDEMI sensors respond to nonferrous metallic targets.	Land	<b>High:</b>  Collects co-located magnetic and electromagnetic data to differentiate between ferrous and non-ferrous metallic objects. Has medium industry familiarization.	<b>Moderate - Difficult:</b>  Increased data processing requirements. Similar terrain constraints to time-domain electromagnetic systems. Available from few sources. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>High:</b> Initial purchase price is high. Labor costs can be reduced when using a towed array platform. Limited availability.	MSEMS (man-portable EM61-hh & G-822)  VSEMS (vehicular EM61-hh & G-822)	Only available from a few sources.	<b>Low/Not Retained:</b>  Difficult to implement and not readily available equipment (only available from a few sources).
	Inland Water				USEMS (underwater)		
<b>Airborne Synthetic Aperture Radar (SAR):</b> This airborne method uses strength and travel time of microwave signals that are emitted by a radar antenna and reflected off a distant surface object.	Land	<b>Low:</b>  Detects both metallic and non-metallic objects. Only detects largest MEC on or near ground surface. Low industry familiarization. Effectiveness increases when used for wide area assessment in conjunction with other airborne technologies.	<b>Difficult:</b>  Requires aircraft and an experienced pilot. Substantial data processing and management requirements. Available from few sources. Minimal to no impacts to cultural or natural resources.	<b>High:</b>  Aircraft and maintenance costs must be included. Processing costs are higher than other methods.	Intermap Technologies Corp., (STAR systems)	Typically not applied to detect MEC.	<b>Low/Not Retained:</b>  Low effectiveness in subsurface clearance activities.
	Inland Water						Technically impracticable in water.
<b>Airborne Laser and Infrared (IR) Sensors:</b> IR and laser technologies can be used to identify objects by measuring their thermal energy signatures, or distance through light detection and ranging (laser pulse). UXO or DMM on or near the soil surface possess different heat capacities than the surrounding soil, and this temperature difference can be detected and used to identify MEC.	Land	<b>Low:</b>  Detects both metallic and non-metallic objects. Low industry familiarization. Effectiveness increases when used for wide area assessment in conjunction with other airborne technologies.	<b>Difficult:</b>  Requires aircraft and an experienced pilot. Substantial data processing and management requirements. Available from few sources. Minimal to no impacts to cultural or natural resources.	<b>High:</b>  Aircraft and maintenance costs must be included. Processing costs are higher than other methods.	Riegl LMS-Q560, Leica ALS 50-II / ALS 60/ALS 70  FLIR Systems StarSAFIRE 230-HD	Typically not applied to detect MEC.	<b>Low/Not Retained:</b>  Difficult to implement and not readily available equipment (only available from a few sources).
	Inland Water						Technically impracticable in water.
<b>Synthetic Aperture Sonar (SAS):</b> SAS uses multiple pulses to create a large synthetic array. SAS uses a small sonar array to synthesize a much larger array. SAS uses a lower operating frequencies, increasing the range of the sonar signal without affecting the performance. SAS systems also have a wider field of view, resulting in a larger angular response from objects.	Land	Technically impracticable on land.					<b>Not Retained</b>
	Inland Water	<b>Moderate:</b>  SAS technology is still relatively new. Munitions detection capability versus proud targets is promising, but limited demonstrations. Low-frequency prototype SAS has demonstrated detection of partially buried objects.	<b>Moderate:</b>  Synthetic aperture sonar moves sonar along a line and illuminates the same spot on the seafloor with several pings.	<b>Moderate</b>	Kongsberg HISAS 1030	Relatively new and not widely used.	<b>Low/Not Retained:</b>  Effectiveness as detection technology is not yet proven.
<b>BOSS:</b> BOSS is wideband sonar that generates three-dimensional imagery of buried, partially buried, and proud targets. It is a type of SAS system that uses hydrophone receiver arrays to transmit an omnidirectional acoustic pulse and to record the energy backscatter from both the sediment surface and sediment layers.	Land	Technically impracticable on land.					<b>Not Retained</b>
	Inland Water	<b>Moderate:</b>  Known systems are still experimental; currently demonstrated detection capabilities show very consistent detection through 30 cm of sand. Classification capabilities unknown.	<b>Moderate:</b>  BOSS generates images of objects buried in underwater sediments.	<b>Moderate:</b>	CHIRP Lab SAS 40 Channel  CHIRP Lab 252 Channel	Not widely used and validation studies have been performed.	<b>Low/Not Retained:</b>  Effectiveness as detection technology is not yet proven.

Table 4-3. Positioning Technologies

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/Status of Retention
<b>Differential Global Positioning System (DGPS):</b> Global Positioning System (GPS) is a worldwide positioning and navigation system that uses a constellation of 29 satellites orbiting the Earth. GPS uses these satellites as reference points to calculate positions on the Earth’s surface. Advanced forms of GPS, like DGPS, can provide locations to centimeter accuracy.	Land	<b>High:</b>  Very effective in open areas for both digital mapping and reacquiring anomalies. Very accurate when differentially corrected. Commonly achieves accuracy to a few centimeters, but degrades when minimum satellites are available.	<b>Easy:</b>  Easy to operate and set up. Available from a number of vendors. Better systems are typically rugged and very durable. However, significant work time can be lost when insufficient satellites are available because of topography and tree canopy. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>Moderate:</b>  Requires rover and base station units. Survey control points required for high accuracy results.	Leica GPS 1200  Trimble GeoXT  Thales Ashtech Series 6500	Recommended in open areas.	<b>High/Retained:</b>  Was used due4ring the RI in both the Land and Inland Water MRSs effectively.
	Inland Water				May be paired with Ultra Short Baseline acoustic positioning for underwater towed sensors		
<b>Robotic Total Station (RTS):</b> RTS is a laser-based survey station that derives its position from survey methodology and includes a servo-operated mechanism that tracks a prism mounted on the geophysical sensor.	Land	<b>High:</b>  Effective in open areas for both digital mapping and reacquiring anomalies. Effective around buildings and sparse trees. Commonly achieves accuracy to a few centimeters.	<b>Difficult:</b>  Relatively easy to operate with trained personnel. Requires existing control and must maintain constant line of sight between single-point to roving prism. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>Moderate:</b>  Operates as a stand-alone unit. Typically requires survey control points but can be used in a relative coordinate system.	Leica RTS 1100  Trimble Model 5600	Recommended in open areas and in moderately wooded areas. Typically used with TDEMI metal detectors (like Geonics EM61-MK2) and digital magnetometers (like Geometrics G-858).	<b>Moderate/Not Retained:</b>  This technology is more difficult to implement than DGPS and requires constant line of site between single-point and roving prism.  .
	Inland Water	Technically impracticable in water.					<b>Not Retained</b>
<b>Fiducial Method:</b> The fiducial method consists of digitally marking a data string with an indicator of a known position. Typically, markers are placed on the ground at known positions (e.g., 25 feet).	Land	<b>High:</b>  Moderate to high effectiveness when performed by experienced personnel. Low effectiveness when used by inexperienced personnel. Commonly achieved accuracy is 15 to 30 centimeters.	<b>Moderate - Difficult:</b>  Application requires a constant pace and detailed field notes. Can be used anywhere, with varying degrees of complexity in the operational setup. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection. Requires “back end” data processing and takes more time than DGPS.	<b>Moderate:</b>  Minimal direct costs associated with this method; however, poor results may negatively impact costs associated with target resolution.	NA	Requires very capable operators. Useful method if digital positioning systems are unavailable.	<b>Low/Not Retained:</b>  Because of the dense vegetation located within portions of the MRS, the fiducial method could not be used as a positioning technology for the entire MRS.
	Inland Water	Technically impracticable in water.					<b>Not Retained</b>
<b>Odometer Method:</b> This method utilizes an odometer that physically measures the distance traveled.	Land	<b>Moderate:</b>  Moderate to high effectiveness when performed by experienced personnel. Low effectiveness when used by inexperienced personnel.  Commonly achieved accuracy is 15 to 30 centimeters in line and 20 to 80 centimeters on laterals.	<b>Moderate - Difficult:</b>  Setup and operation affected by terrain. Requires detailed field notes and setup times can be lengthy. Can be used anywhere, with varying degrees of complexity in the operational setup. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>Low:</b>  Minimal direct costs associated with this method; however, poor results may negatively impact costs associated with target resolution.	NA	Requires very capable operators. Useful method if digital positioning systems are unavailable.	<b>Low/Not Retained:</b>  This method is impractical for use given the anticipated need for accurate anomaly resolution during a future response action.
	Inland Water	Technically impracticable in water.					<b>Not Retained</b>

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/Status of Retention
<b>Acoustic Method:</b> This navigation system utilizes ultrasonic techniques to determine the location of a geophysical instrument each second. It consists of three basic elements: a data pack, up to 15 stationary receivers, and a master control center.	Land	<b>Low-Moderate:</b>  Not very efficient in open areas because of substantial calibration and setup time. Effective in wooded areas although less accurate than other methods. Commonly achieves accuracy of 20 to 50 centimeters.	<b>Difficult:</b>  Difficult to set up and setup requirements are complex. (However, more easily set up and used by trained personnel.) Very little available support. Negatively affected by certain aspects of the environment. Transponders have very limited range, on the order of 75 to 150 feet. Minor impacts to cultural or natural resources based on clearing of areas for high quality data collection.	<b>High:</b>  Lengthy setup time can be reduced by using trained personnel. Requires more than one operator. Is expensive to purchase or rent.	USRADS	Requires trained operators. Has been used extensively in wooded areas with success.	<b>Low/Not Retained:</b>  This technology is difficult to implement and not effective.
	Inland Water	High:  Underwater acoustical systems determine the position of a vehicle or diver by acoustically measuring the distance from a vehicle or diver interrogator to three or more seafloor deployed baseline transponders. These techniques result in very high positioning accuracy and position stability that is independent of water depth. It is generally better than 1-meter and can reach a few centimeters accuracy	<b>Difficult:</b>  Difficult to set up and setup requirements are complex. (However, more easily set up and used by trained personnel.)	<b>High:</b>  Lengthy setup time can be reduced by using trained personnel. Requires more than one operator.	Long-baseline (LBL) systems  Ultra-short-baseline (USBL) systems  Short-baseline (SBL) systems		<b>Low/Not Retained:</b>  This technology is difficult to implement
<b>Jackstays:</b> Jackstay is an underwater grid system. Accurate positioning if the corners are easily done. A line (moveable) is attached to lines connected to the corners. The divers search along the movable line changing its position after each pass until the end points are researched. When a diver finds a suspect items, a float is released to mark the positions. The surface support boat then marks the float with GPS.	Land	Technically impracticable on land.					<b>Not Retained</b>
	Inland Water	<b>Highly effective:</b>  Once set up, this system is effective underwater, especially in shallower depths. The effectiveness of jack stays can be dependent on currents and waves. However, the Inland Water MRS is relatively stable and currents and waves are not anticipated to inhibit the use of jackstays.	<b>Easy to Moderate:</b>  This technology can be easily implemented underwater at shallower depth. The set up is sometimes tedious depending on how rough the water is.	<b>Moderate:</b>  Since this technology requires both divers and support crew, it can be moderately expensive in field labor. However, the equipment is low in cost.		Requires trained UXO divers and boat support crew.	<b>High/Retained:</b>  This technology is proven and is highly effective underwater where visibility is limited.

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Table 4-4. Removal Technology

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/ Status of Retention
<b>Hand Excavation:</b> Technique includes digging individual anomalies using commonly available hand tools.	Land	<b>High:</b>  This is the industry standard for munitions removal. It can be very thorough and provides an excellent means of data collection. For surface removals, this method would be highly effective. For subsurface removals, as depth and extent of removal increases the labor and time duration required for hand excavation also increases.	<b>Easy - Moderate:</b>  Hand excavation can be accomplished in almost any terrain and climate. Limited only by the number of people available. Minimal to no impacts to cultural or natural resources.	<b>Average:</b>  Is the standard by which all others are measured.	Probe, trowel, shovel, pick axe.	Locally available and easily replaced tools.	<b>High/Retained:</b>  This technology was successfully used during the RI and the depth at which MEC were detected during the RI are suitable for this technology.
	Inland Water						
<b>Mechanical Excavation of Individual Anomalies:</b> This method uses commonly available mechanical excavating equipment to support hand excavations.	Land	<b>High:</b>  Used in conjunction with hand excavation when soil is too hard, excavation depths are deep and addressing areas with higher densities of munitions causing time delays, or safety concerns during hand excavation. Method works well for the excavation of deep single anomalies to remove overburden.	<b>Difficult:</b>  Equipment can be rented, is easy to operate, and allows excavation of anomalies in hard soil. However, mobilization of large equipment would be difficult due to the soft nature of the soils in parts of the MRS.. Restoration required for disturbed areas.	<b>Moderate:</b>  The costs associated with this technology would be increased at the Land and Inland Water MRSs because of the difficulty associated with mobilization of equipment to the sites.	Tracked mini-excavator or wheeled backhoe. Multiple manufacturers.	Once onsite, equipment is easy to operate.	<b>Moderate / Not Retained:</b>  For deep subsurface anomalies not easily accessible by hand excavation.
	Inland Water				Excavator with floatation tracks such as a marsh buggy,		<b>Moderate / Retained:</b>  Would be effective at digging anomalies on the inland water floor and will minimize diver time spent hand digging.
<b>Mass Excavation and Sifting:</b> Armored excavation and transportation equipment to protect the operator and equipment from unintentional detonation. Once soil has been excavated and transported to the processing area, it is then processed through a series of screening devices and conveyors to segregate MEC from soil.	Land	<b>Moderate:</b>  Process works very well in heavily contaminated areas. Can separate several different sizes of material, allowing for large quantities of soil to be returned with minimal screening for munitions.	<b>Difficult:</b>  Earth moving equipment is readily available; however, armoring is not as widely available. Equipment is harder to maintain and may require trained heavy equipment operators. Not feasible for heavily vegetated areas within the Land MRS.. Restoration required for disturbed areas. Major impacts to cultural and natural resources because roadways, stockpiles, and material laydown areas would need to be established.	<b>High:</b>  Mass earth moving equipment is expensive to rent and insure and has the added expense of high maintenance and restoration costs.	Many brands of heavy earth moving equipment, including excavators, off-road dump trucks, and front-end loaders.	Can be rented and armor can be installed, and equipment delivered almost anywhere. Significant maintenance costs.	<b>Low / Not Retained:</b>  Since high densities of MEC are not anticipated, mass excavation and sifting are not viable options.
	Inland Water				Trommel, shaker, rotary screen from varying manufacturers.		
<b>Magnetically Assisted Removal:</b> Magnets are used to separate conductive material from soils.	Land	<b>Moderate:</b>  Primarily used in conjunction with mass excavation and sifting operations. Can help remove metal from separated soils, but does not work well enough to eliminate the need to inspect the smaller size soil spoils. Magnetic systems are also potentially useful to help with surface removal of MEC and surface debris, but the size of MEC characterized during the RI would be unlikely to be picked up by manually-operated rollers. Mechanical systems would be required to assist with surface removal operations.	<b>Difficult:</b>  Magnetic separators are easily obtained from sifting equipment distributors and are designed to work with their equipment. Major impacts to cultural and natural resources because roadways, stockpiles and material laydown areas would need to be established for both earthmoving and sifting equipment that support magnetic operations.	<b>Low:</b>  This method adds very little cost to the already expensive sifting operation.	Magnetic rollers or magnetic conveyors are limited in availability but can be procured for use on standard readily available sifting equipment noted above.	Installed by sifting equipment owner.	<b>Low/Not Retained:</b>  Primarily used in conjunction with mass excavation and sifting operations. The amount of MEC at the MRSs and the relatively large area does not require mass excavation.
	Inland Water						

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/ Status of Retention
<b>Remotely Operated Removal Equipment:</b> this equipment has additional control equipment that allows the equipment to be operated remotely.	Land	<b>Low:</b>  Remotely operated equipment reduces productivity and capability of the equipment. Method is not widely used and is not yet proven to be an efficient means of munitions removal.	<b>Difficult:</b>  Uses earth moving equipment, both mini-excavator type and heavier off-road earth moving equipment. Machinery is rigged with hydraulic or electrical controls to be operated remotely. Not feasible for the heavily vegetated areas within the Land MRS. Restoration required for disturbed areas. Major impacts to natural resources because roadways, stockpiles, and material laydown areas would need to be established for earth moving equipment.	<b>High:</b>  Has a combined cost of the base equipment plus the remote operating equipment and an operator. Remote operation protects the operator, but can create high equipment damage costs.	Many tracked excavators, dozers, loaders, and other equipment types have been outfitted with robotic remote controls.	Explosive Ordnance Disposal (EOD) robots are almost exclusively used for military and law enforcement reconnaissance and render-safe operations. They were not evaluated for MEC applications.	<b>Low/Not Retained:</b>  This technology has a low viability at the MRS because of low effectiveness and difficult implementation. Remotely operated removal equipment requires the same earth moving equipment used in mass excavation with the same low implementability in areas of the heavily vegetated terrain.
	Inland Water						<b>Low/Not Retained:</b>  This technology has a low viability at the MRS because of low effectiveness and difficult implementation.



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Table 4-5. MEC Disposal Technologies

Technology	MRS	Effectiveness	Implementability	Cost	Representative Systems	Notes	Viability at MRS/ Status of Retention
<b>Blow-in-Place (BIP):</b> BIP is the destruction of MEC for which the risk of movement beyond the immediate vicinity of discovery is not considered acceptable. Normally, this is accomplished by placing an explosive charge alongside the item.	Land	<b>High:</b> Each MEC item is individually destroyed with subsequent results individually verified using quality assurance and quality control. BIP yields unconfined releases of MC and MD, which can be restricted using mitigation techniques.	<b>Moderate to Easy:</b>  Field-proven techniques, transportable tools, and equipment; suited to most environments. Public exposure can limit viability of this option. Mitigation techniques can further improve implementation. Major impacts to cultural and natural resources if item cannot be moved away from sensitive cultural or natural resources. Trees and plants could be moved, but cultural resources would not be movable to mitigate impacts. Mitigation techniques may limit damages to these resources.	<b>Medium:</b>  Manpower intensive. Costs increase in areas of higher population densities or where public access must be monitored and controlled. .	Electric demolition procedures, non-electric demolition procedures.	Disposition of resultant waste streams must be addressed in BIP operations planning.	<b>High/Retained:</b>  Used for items that are deemed unsafe to move. Technology has been proven effective in similar field conditions.
	Inland Water						
<b>Consolidated Shots:</b> Consolidated detonations are the collection, configuration, and subsequent destruction by explosive detonation of MEC for which the risk of movement has been determined to be acceptable.	Land	<b>High:</b>  Limited in use to MEC that are deemed safe to move. BIP yields unconfined releases of MC and MD, which can be restricted using mitigation techniques.. This method was effectively used to consolidate MPPEH for venting at a common location on daily schedule.	<b>Moderate to Easy:</b>  Generally employs the same techniques, tools, and equipment as BIP procedures. Requires larger area and more mitigation.. However, the common location for detonation and ability to schedule events enables better control and management of impacts to the public. Most approved mitigation techniques. are not completely effective or applicable for these operations	<b>Medium:</b>  Manpower intensive, may require materials handling equipment for large-scale operations.	Electric demolition procedures,non-electric demolition procedures, forklifts and cranes.	Disposition of resultant waste streams must be addressed.	<b>Medium/Retained:</b>  Only used for items that are deemed safe to move. Requires an increase in explosive weight over what would be used for a single explosive demolition shot. Proven technology for addressing MEC and allow for disposal as a MDAS waste stream.
	Inland Water						
<b>Laser Initiation:</b> Laser initiation involves portable, vehicle-mounted lasers that may be used to heat surface MEC and induce detonation.	Land	<b>Medium:</b>  Still in development, although currently deployed overseas for testing. Tests show positive results for 81 millimeter (mm) and below, with reported success on munitions up to 155 mm. Produces low order type effect; subsequent debris still requires disposition.	<b>Low:</b>  MEC targets must be exposed and on surface for attack by directed beam. System does require approach and placement of fiber-optic cable at appropriate position of suspected item. Laser systems still addressing power, configuration, transportability, and logistics issues. Potential impacts to natural resources because roadways and staging areas would need to be established for equipment.	<b>Low - Medium:</b>  Greatly reduced manpower; added equipment, transportability and logistics concerns; no explosives required by system.	ZEUS-HLONS GATOR Laser	Disposition of resultant waste streams must be addressed in BIP operations planning and Laser initiation processes are still in the developmental stage and not used commercially.	<b>Low/Not Retained:</b>  This technology is still in the developmental and is not commercially used.
	Inland Water						
<b>Contained detonation chambers (CDCs):</b> CDCs involve destruction of certain types of munitions in a chamber, vessel, or facility designed and constructed specifically for the purpose of containing blast and fragments. CDCs are used to destroy MEC while containing both the blast effects and the secondary waste stream within the closed system and can only be employed for munitions for which the risk of movement has been determined acceptable.	Land	<b>Medium:</b>  CDCs successfully contain hazardous components. Commonly used for fuzes and smaller explosive components. May not be used for larger munitions items found at the MRSs. Limited in use to munitions that are “acceptable to move.”	<b>Low:</b>  Designed to be deployed at the project site. Logistically difficult to mobilize to the site. Could require boat transport since weight of CDC may not allow for transporting over the beach. Potential impacts to natural resources because roadways and staging areas would need to be established for equipment. Service life and maintenance are issues. Requires substantial additional handling and transport of MEC and requires items to be safe to move. Flashing furnaces have low feed rates because of safety concerns. Produces additional hazardous waste streams.	<b>Medium-High:</b>  Possible construction required (e.g., berms and pads). Low feed rates equal more hours on site. Significant requirements for maintenance of system.	Kobe Blast Chamber	CDC use is limited to items that are within the net explosive weight that the system is approved to destroy and that contain fill that the unit is approved to destroy. This includes conventional munitions that contain energetics, WP, riot agents, propellants, and smoke. Air handling and filtration may be required depending on the munitions being detonated.	<b>Low/Not Retained:</b>  Assumed to be very difficult to mobilize to the site and amount and type of MEC anticipated to be identified during removal can be disposed of more easily through other methods (BIP or consolidated shot).
	Inland Water						

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#### 4.4 Viable Technologies for the Land MRS and the Inland Water MRS

The technologies listed in Tables 4-1 to 4-5 that are the most viable options for the Land MRS and the Inland Water MRS are summarized in Table 4-6 and are included in the process options assembled for remedial alternatives in Section 5. Technologies summarized in Table 4-6 are the most viable options, and the majority have been demonstrated to be effective at the MRSs during the RI or at a similar site.

**Table 4-6. Viable Technologies**

Technology		Retained for Land MRS?	Retained for Inland Water MRS?
<b>Land Use Controls</b>	Legal Mechanisms	×	×
	Engineering Controls	×	×
	Administrative Mechanisms	✓	✓
<b>Detection</b>	Visual Searching	×	×
	Flux-Gate Magnetometers	×	×
	Proton Precession Magnetometers	×	×
	Optically Pumped Magnetometers	×	×
	TDEMI Metal Detectors	✓	✓
	Advanced EMI Sensors and Advanced Classification	×	×
	FDEMI Metal Detectors	✓	×
	Sub Audio Magnetics	×	×
	Magnetometer-Electromagnetic Detection Dual Sensor Systems	×	×
	Airborne Synthetic Aperture Radar	×	×
	Airborne Laser and Infrared Sensors	×	×
	Synthetic Aperture Sonar	×	×
	BOSS	×	×
<b>Positioning</b>	Differential Global Positioning System	✓	✓
	Robotic Total Station	✓	✓
	Fiducial Method	×	×
	Odometer Method	×	×
	Acoustic Method	×	×
	Jack Stays	×	✓
<b>Removal</b>	Hand Excavation	✓	✓
	Mechanical Excavation of Individual Anomalies	✓	✓
	Mass Excavation and Sifting	×	×
	Magnetically Assisted Removal	×	×
	Remotely Operated Removal	×	×
<b>Disposal</b>	Blow-in-Place	✓	✓
	Consolidated Shots	✓	✓
	Laser Initiation	×	×
	Contained Detonation Chambers	×	×

Notes: × Not Retained      ✓ Retained



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## **5.0 Development and Screening of Alternatives**

In this section, the technologies deemed viable for use at the Land and Inland Water MRSs (see Section 4) are assembled into remedial alternatives and initially screened against the three criteria of effectiveness, implementability, and cost in a similar manner to the technology screening presented in Section 4. The remedial alternatives described and determined viable during the initial screening are further evaluated against the NCP criteria independently in a detailed analysis and against each other in a comparative analysis presented in Section 6 of this FS Report.

### **5.1 Development of Potential Remedial Alternatives**

The following potential remedial alternatives have been assembled from viable technologies and general response actions:

- Land MRS
  - Alternative 1 – No Action
  - Alternative 2 – LUCs
  - Alternative 3 – Partial subsurface clearance with LUCs
  - Alternative 4 – Subsurface clearance

In accordance with DoDM 4715.20 (2012), a minimum of three alternatives for each MRS are required. One alternative must consider no action alternative, a second must consider an action to remediate the site to a condition that allows UU/UE, and a third alternative will consider an action to remediate the site to a protective condition that requires LUCs. For the Land MRS, Alternative 1 meets the requirement for a no action alternative. Alternatives 2 and 3 meet the requirement for an alternative with LUCs, and Alternative 4 meets the requirement for an alternative, which will achieve UU/UE.

- Inland Water MRS
  - Alternative 1 – No Action
  - Alternative 2 – LUCs
  - Alternative 3 – Subsurface clearance

For the Inland Water MRS, Alternative 1 meets the requirement for a no action alternative. Alternative 2 meets the requirement for an alternative with LUCs, and Alternative 3 meets the requirement for an alternative, which will achieve UU/UE.

General descriptions of each alternative developed for the Land and Inland Water MRSs are provided in Sections 5.2 through 5.3 below.

## **5.2 Land MRS**

### **5.2.1 Alternative 1 – No Action**

#### **5.2.1.1 Description**

A “no action” alternative is required by the NCP to be developed during a FS to provide a baseline for comparison against other contemplated alternatives. In Alternative 1, the government would take no action with regard to locating, removing, and disposing of any potential MEC present within the Land MRS. In addition, no public awareness or education training would be initiated with regard to the risk of encountering MEC. For this alternative, it is assumed that no change to the current land use of the MRS would occur. There are no costs expected for this alternative as there is no government action and no long term management.

#### **5.2.1.2 Evaluation**

*Effectiveness:* This alternative would not be effective at achieving the RAO of protecting recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion.

*Implementability:* This alternative is considered easy to implement. No construction, maintenance or monitoring would be required with this alternative.

*Relative Cost:* No costs are associated with this alternative since no action is required.

*Summary:* The No Action alternative will be retained for detailed analysis as required by the NCP.

### **5.2.2 Alternative 2 – Land Use Controls**

#### **5.2.2.1 Description**

Risks related to encountering MEC may be managed for the Land MRS through a limited action alternative consisting of various LUCs. The implementation of a LUC alternative based on public awareness and education components in the Land MRS would provide a means for USACE to coordinate an effort to reduce MEC encounters by workers and recreational users and visitors (i.e., unqualified and untrained personnel) through behavior modification. Successful implementation of LUC would be contingent upon the cooperation and active participation of the

workers and recreational users and visitors and authorities of the Army and other government agencies to protect the public from explosives hazards. Alternative 2 for the Land MRS was developed using USACE guidance EP 1110-1-24 for *Establishing and Maintaining Institutional Controls for Ordnance and Explosive Projects* (USACE, 2000) as a reference.

Three forms of public informational materials for education would be LUC components under Alternative 2.

1. Development and distribution of informational materials to provide awareness to property owners and other land users of the presence of MEC, and the MEC that is encountered while performing recreational or maintenance, improvement, or construction activities at the MRS.
2. For the general public accessing the MRS for recreational or visiting purposes, installation and maintenance of signage at strategic access points in the MRS would be used to alert users of the MRS history and nature of munitions present, in addition to public safety information (i.e., recognize, retreat, and report [3Rs]).
3. Training materials and information necessary to conduct annual training would be provided to the local government and/or TTOR to offer awareness on the MEC characterized at the MRS and the 3Rs policy that will be used for future discoveries at the MRS. Attendance would be open to the public, but specifically focused on the recreational users, workers, local responders, and Town officials.

The LUCs would remain in-place to address residual hazards or risks must be managed in the long-term. LUC enforcement, review of site conditions, and maintenance activities for this alternative is a means of performing long-term management (LTM) following achievement of response complete and can be performed on a periodic or as-needed basis. LUC enforcement activities would include providing recurring awareness training materials and reproduction of informational materials.

The NCP, at 40 CFR 300.430(f)(4)(ii), requires five-year reviews if the remedial action results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for UU/UE. Because this remedial alternative will results in contaminants remaining on-site above levels that allow for UU/UE, a review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Five year reviews will continue to be conducted no less often than every five years until any contaminants remaining on-site are at levels at or below those allowing for UU/UE. While NCP requires five year reviews for sites which do not achieve UU/UE, the five year reviews are not part of the remedy of the Land MRS Alternative 2.

## 5.2.2.2 Evaluation

*Effectiveness:* The effectiveness of this alternative is considered moderate. The RAO (to protect recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top four feet of subsurface soil or sediment during intrusive activities and by dune erosion) would be achieved through exposure controls. Potential impacts to human health and the environment would be minimal during the implementation of the LUCs. However, the reliability of LUCs to prevent exposure places the burden on site users to follow the 3Rs rather than removing the risk permanently.

*Implementability:* Implementation of this alternative is considered easy. It is technically easy to install signs, provide information to the public, and develop and provide training materials to the local government and TTOR. This alternative will require maintenance of signs and Five Year Reviews. Administratively, this alternative is easy to implement as it does not require specialized equipment or training.

*Relative Cost:* Costs for this alternative are expected to be low (<\$1,000,000).

*Summary:* While the effectiveness of Alternative 2 (LUCs) is limited, it is retained for detailed analysis for the Land MRS because of the low cost and easy technical implementation.

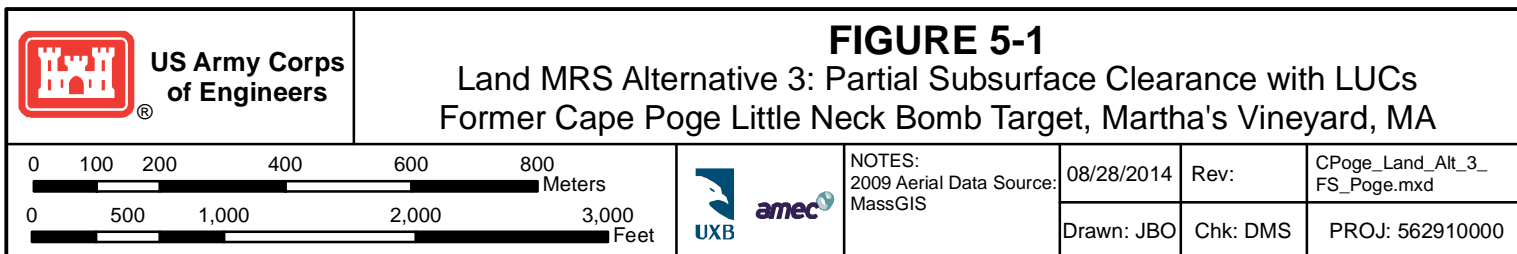
## 5.2.3 Alternative 3 – Partial Subsurface Clearance with LUCs

### 5.2.3.1 Description

Alternative 3 includes removal of subsurface MEC hazards to 3 feet below ground surface in the open areas of the Land MRS (31 acres), as shown on Figure 5-1. This alternative will include a subsurface clearance of all dunes along the Land MRS boundary. LUCs would be implemented on the remaining 31 areas that are heavily vegetated. The following general tasks would be included in Alternative 3.

- Mobilization Site Management
- Survey and positioning
- Brush clearing (where needed)
- Digital geophysical mapping and data analysis
- Anomaly reacquisition and resolution
- MEC removal
- MPPEH disposal (e.g., BIP)





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- MDAS waste stream treatment (off-site) disposal
- Site restoration
- Demobilization
- 3 years of post construction vegetation monitoring
- Development and reproduction of training materials
- Annual sign maintenance
- Five-Year Review to evaluate effectiveness of the alternative

The 31 acres designated for clearance under this alternative would require vegetation removal to gain access during the clearance and to support equipment and staging areas, although the removal activities would be considered light removal since the heavily vegetated areas of the MRS are excluded from the alternative. The vegetation removed would be disposed of on-site after chipping.

Detection of MEC would be performed using digital detection instrumentation such as the EM61-MK2 that employs TDEMI technology. Positioning for the digital instrumentation would be conducted using a Global Positioning System (GPS). These technologies are anticipated to be viable based on MRS-specific munitions and physical characteristics and successful past use at the MRS during the RI.

Anomalies would be reacquired using a robotic total station. Intrusive activities would be performed using hand-tools and restoration of disturbed areas would be required. Any MPPEH recovered during the clearance would be BIP or consolidated for disposal. The MDAS would be consolidated during removal, certified as explosive-free MDAS, and disposed off-site for recycling.

Site restoration would be necessary in areas where vegetation was cleared. Native grasses would be planted in the 31 cleared acres and will require coordination with TTOR. Post-construction monitoring of revegetated areas will be conducted for three years after completion of this alternative.

Since sensitive species are known to exist within the MRS, this alternative will require coordination with MA NHESP and TTOR and a rare plant and wildlife habitat evaluation will be conducted during development of the work plan in accordance with MA NHESP guidelines. The field work would be scheduled to avoid sensitive species as much as possible. Work will also be coordinated with the Massachusetts Historical Commission and the Wampanoag Tribal Historic Preservation Office as necessary.

LUCs would be implemented as described in Alternative 2 for the 31 acres. This alternative would require Five Year Reviews since it will not achieve unlimited use and unrestricted exposure. However, these reviews are not considered as part of the remedy for the Land MRS Alternative 3.

### 5.2.3.2 Evaluation

*Effectiveness:* This alternative is considered moderately to highly effective. The RAO (to protect recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion) would be achieved to a high degree of certainty in the open areas and would allow recreation activities that could involve intrusive activities to occur. LUCs would be effective within the heavily vegetated areas of the MRS to prevent exposure to MEC. This alternative uses proven and reliable technologies that will permanently remove the MEC hazard from a portion of the site. While this alternative presents potential impacts to human health and the environment during implementation (UXO personnel and vegetation loss), the impacts will be minimized through use of safety plans and coordination with MADEP, MA NHESP and TTOR as necessary.

*Implementability:* The implementability of Alternative 3 is considered moderate. This alternative can be readily implemented and resources and equipment are available. This alternative will require three years of vegetation monitoring to ensure site restoration activities were successful. This alternative will also require maintenance of signs and Five Year Reviews, and specialized equipment and personnel with specialized training will be required to successfully implement a subsurface clearance.

*Relative Cost:* The cost of conducting this alternative (Partial Subsurface Clearance with LUCs) is considered moderate (~ \$2M to \$3M).

*Summary:* Since this alternative has a moderate cost and would be highly effective in achieving the RAO and reducing the hazards associated with of MEC, this alternative will be retained for detailed analysis.

### 5.2.4 Alternative 4 –Subsurface Clearance

#### 5.2.4.1 Description

Alternative 4 includes clearing the entire 62 acre MRS of subsurface MEC to 3 feet below ground surface. The following general tasks would be included in Alternative 4.

- Mobilization
- Site management
- Survey and positioning
- Brush clearing (where needed)
- Digital geophysical mapping and data analysis
- Anomaly reacquisition and resolution

- MEC removal
- MPPEH disposal (e.g., BIP)
- MDAS waste stream treatment (off-site) disposal
- Site restoration
- Demobilization
- 3 years of post construction vegetation monitoring
- Development and reproduction of training materials
- Annual sign maintenance
- Five-Year Review to evaluate effectiveness of the alternative

Approximately 50% of the area (31 acres) included in the MRS is heavily vegetated and will require extensive vegetation removal to gain access during the clearance and to support equipment and staging areas. The vegetation removed would be disposed of on-site after chipping. Detection of MEC for removal would be performed using digital detection instrumentation such as the EM61-MK2 that employs TDEMI technology. Positioning for the digital instrumentation would be conducted using a GPS. These technologies are anticipated to be viable based on MRS-specific munitions and physical characteristics and successful past use at the MRS during the RI.

Anomalies would be reacquired using a robotic total station. Intrusive activities would be performed using both mechanized equipment and hand-tools and restoration of disturbed areas would be required. Intrusive activities are anticipated to occur within the top three feet of soil. However, if anomalies are detected below three feet, they will be removed. Any MPPEH recovered during the clearance would be BIP or consolidated for disposal. The MDAS would be consolidated during removal, certified as explosive-free MDAS, and disposed off-site for recycling.

Site restoration would be necessary in areas where vegetation was cleared. Native grasses would be planted in the 31 cleared acres and will require coordination with TTOR. Post-construction monitoring of revegetated areas will be conducted for three years after completion of this alternative.

Since sensitive species are known to exist within the MRS, this alternative will require coordination with MA NHESP and TTOR and a rare plant and wildlife habitat evaluation will be conducted during development of the work plan in accordance with MA NHESP guidelines. The field work would be scheduled to avoid sensitive species as much as possible. Work will also be coordinated with the Massachusetts Historical Commission and the Wampanoag Tribal Historic Preservation Office as necessary.

Based on the RI findings, there is a low probability for encountering MEC other than MK-23 or MK-5 practice bombs with spotting charges. However, given the dynamic nature of the dunes

1 due to severe erosion and rebuilding, informational materials will be developed and distributed to  
2 property owners, awareness training materials will be developed, and signs will be installed and  
3 maintained to ensure the safety of land owners, workers, and the public. A Five-Year Review  
4 will be conducted to confirm the project RAO of protecting recreational users, visitors, and  
5 workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet  
6 of subsurface soil or sediment during intrusive activities and by dune erosion was achieved.

#### 7 **5.2.4.2 Evaluation**

8 *Effectiveness:* This alternative would be highly effective. The RAO (to protect recreational  
9 users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure  
10 in the top three feet of subsurface soil or sediment during intrusive activities and by dune  
11 erosion) would be achieved to a high degree of certainty. This alternative uses proven and  
12 reliable technologies that will permanently remove the MEC hazard from the site. While this  
13 alternative presents potential impacts to human health and the environment during  
14 implementation (UXO personnel and vegetation loss), the impacts will be minimized through use  
15 of safety plans and coordination with MADEP, MA NHESP and TTOR as necessary.

16 *Implementability:* The implementability of Alternative 4 is considered moderate. This  
17 alternative can be readily implemented and resources and equipment are available. This  
18 alternative will not require maintenance upon completion, but will require three years of  
19 vegetation monitoring to ensure site restoration activities were successful. Specialized  
20 equipment and personnel with specialized training will be required to successfully implement a  
21 subsurface clearance and vegetation clearance of the entire MRS will be required.

22 *Relative Cost:* The cost of conducting a subsurface clearance across the entire MRS is  
23 considered moderate (~\$3M).

24 *Summary:* Since this alternative has a moderate cost and would be highly effective in achieving  
25 the RAO and reducing the hazards associated with of MEC, this alternative will be retained for  
26 detailed analysis.

### 27 **5.3 Inland Water MRS**

#### 28 **5.3.1 Alternative 1 – No Action**

##### 29 **5.3.1.1 Description**

30 A “no action” alternative is required by the NCP to be developed during a FS to provide a  
31 baseline for comparison against other contemplated alternatives. In Alternative 1, the  
32 government would take no action with regard to locating, removing, and disposing of any  
33 potential MEC present within the Inland Water MRS. No public awareness or education training

would be initiated and it is assumed that no change to the current land use of the MRS would occur. There are no costs expected for this alternative as there is no government action and no long term management.

#### **5.3.1.2 Evaluation**

*Effectiveness:* This alternative would not be effective at achieving the RAO of protecting recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion.

*Implementability:* This alternative would be technically easy to implement since it would not require any action.

*Relative Cost:* No costs are associated with this alternative since no action is required.

*Summary:* The No Action alternative will be retained for detailed analysis as required by the NCP.

### **5.3.2 Alternative 2 – Land Use Controls**

#### **5.3.2.1 Description**

Alternative 2 for the Inland Water MRS involves the implementation of a LUC alternative based on public awareness and education components to provide a means for USACE to coordinate an effort to reduce MEC encounters by workers and recreational users, shellfish workers, and visitors (i.e., unqualified personnel) through behavior modification. Successful implementation of LUC would be contingent upon the cooperation and active participation of recreational users and visitors and authorities of the Army and other government agencies to protect the public from explosives hazards. Alternative 2 for the Inland Water MRS was developed using USACE guidance EP 1110-1-24 for *Establishing and Maintaining Institutional Controls for Ordnance and Explosive Projects* (USACE, 2000) as a reference.

Alternative 2 for the Inland Water MRS would include the same three forms of public informational materials as Alternative 2 for the Land MRS (development and distribution of informational materials and providing awareness training materials).

LUC enforcement activities would include performing recurring awareness training and reviews and reproduction of informational materials on an annual basis and conducting periodic inspections and maintenance of installed signs.

The NCP, at 40 CFR 300.430(f)(4)(ii), requires five-year reviews if the remedial action results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow

for UU/UE. Because this remedial alternative will results in contaminants remaining on-site above levels that allow for UU/UE, a review will be conducted within five years after initiation of the remedial action to ensure that the remedy is, or will be, protective of human health and the environment. Five year reviews will continue to be conducted no less often than every five years until any contaminants remaining on-site are at levels at or below those allowing for UU/UE. While NCP requires five year reviews for sites which do not achieve UU/UE, the five year reviews are not part of the remedy of the Inland Water Alternative 2.

#### **5.3.2.2 Evaluation**

*Effectiveness:* The effectiveness of this alternative is moderate. The RAO (to protect recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion) would be achieved through exposure controls. Potential impacts to human health and the environment would be minimal during the implementation of the LUCs. However, the reliability of LUCs to prevent exposure places the burden on site users to follow the 3Rs rather than removing the risk permanently. In addition, shell fisherman may be adversely effected if the proposed LUCs hinder their ability to fish or harvest shellfish.

*Implementability:* Implementation of this alternative is considered easy. It is technically easy to install signs, provide information to the public, and develop and provide training materials to the local government. This alternative will require maintenance of signs and Five Year Reviews. Administratively, this alternative is easy to implement as it does not require specialized equipment or training.

*Relative Cost:* Costs for this alternative are expected to be low (<\$1M).

*Summary:* While the effectiveness of Alternative 2 (LUCs) is limited, it is retained for detailed analysis for the Inland Water MRS because of the low cost and easy technical implementation.

### **5.3.3 Alternative 3 – Subsurface Clearance**

#### **5.3.3.1 Description**

Alternative 3 includes clearing the entire Inland Water MRS of MEC to approximately 3 feet below the inland water floor. The following general tasks would be included in Alternative 3:

- Mobilization
- Site management
- Survey and positioning
- Digital geophysical mapping and data analysis
- Anomaly reacquisition and resolution

- MEC removal
- MPPEH disposal (e.g., BIP)
- MDAS waste stream treatment (off-site) disposal
- Site restoration
- Demobilization
- Development and reproduction of training materials
- Annual sign maintenance
- Five-Year Review to evaluate effectiveness of the alternative

DGM would be utilized on the entire the MRS using a boat-towed EM61-MK2 or similar. Positioning for the digital instrumentation would be conducted using a GPS. These technologies are anticipated to be viable based on MRS-specific munitions and physical characteristics and successful past use at the MRS during the RI.

Anomalies identified during DGM activities would be reacquired using a robotic total station and anomaly resolution (or intrusive activities) would be performed using a combination of hand-tools, as successfully accomplished in during the RI, and mechanical methods. Intrusive activities are anticipated to occur within the top three feet of soil. However, if anomalies are detected below three feet, they will be removed. Mechanical methods (such as a marsh buggy or similar amphibious excavator with floatation tracks) would be used for deeper anomalies which could require excessive time to dig by hand underwater.

Any MPPEH recovered during the clearance would be BIP or consolidated for disposal. The MDAS would be consolidated during removal, certified as explosive-free MDAS, and disposed off-site for recycling.

Since eelgrass is known to exist within the Inland Water MRS this alternative will require coordination with MADEP and MA NHESP. Field work would be scheduled to minimize adverse effects this sensitive resource.

Based on the RI findings, there is a low probability for encountering MEC other than MK-23 or MK-5 practice bombs with spotting charges. However, informational materials will be developed and distributed to property owners, awareness training materials will be developed, and signs will be installed and maintained to ensure the safety of land owners, workers, and the public. A five-year review to confirm the project RAO of protecting recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion was achieved.



### 5.3.3.2 Evaluation

*Effectiveness:* This alternative is considered highly effective. The RAO (to protecting recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion) would be achieved to a high degree of certainty. This alternative used proven and reliable technologies that will permanently remove the MEC hazard from the site. While this alternative presents potential impacts to human health and the environment during implementation such as safety risks to UXO personnel and potential habitat and shellfish loss, the impacts will be minimized through use of safety plans and coordination with MADEP and MA NHESP.

*Implementability:* The implementability of Alternative 3 is considered moderate. This alternative can be readily implemented and resources and equipment are available. This alternative will not require maintenance or monitoring upon completion. However, specialized equipment and personnel with specialized training will be required to successfully implement a subsurface clearance. In addition, subsurface clearance activities within water present some technical difficulties due to the dynamic nature of the water and reduced visibility underwater

*Relative Cost:* The cost of conducting a subsurface clearance across the entire MRS is considered moderate to high (~\$5M).

*Summary:* Since this alternative would be highly effective in achieving the RAO and reducing the hazards associated with of MEC, this alternative will be retained for detailed analysis.

## 5.4 Screening of Potential Remedial Alternatives

The results of the initial screening of potential remedial alternatives assembled for the Land and Inland Water MRSs are present in Table 5-1 using the three criteria of effectiveness, implementability, and cost. As a result of the screening, all of the alternatives were considered viable and were retained for further evaluation.

**Table 5-1. Summary of Potential Remedial Alternatives Screening for the Land MRS and Inland Water MRS**

MRS	Alternative	Relative Effectiveness	Implementability	Relative Cost	Overall Viability <sup>a</sup>
Land MRS	Alternative 1: No DoD Action Indicated	Low	Easy	None	Required by NCP to be retained
	Alternative 2: Land Use Controls	Moderate	Easy	Low	Moderate: Retained

	Alternative 3: Partial Subsurface Clearance with Land Use Controls	Moderate-High	Moderate	Moderate	Moderate: Retained
	Alternative 4: Subsurface Clearance	High	Moderate	Moderate	High: Retained
Inland Water MRS	Alternative 1: No DoD Action Indicated	Low	Easy	None	Required by NCP to be retained
	Alternative 2: Land Use Controls	Moderate	Easy	Low	Moderate: Retained
	Alternative 3: Subsurface Clearance	High	Moderate	Moderate - High	High: Retained

Note: <sup>a</sup> Overall viability primarily considers the relative effectiveness and implementability.

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2  
3

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## 6.0 Detailed Analysis

The detailed analysis of alternatives consists of the analysis and presentation of the information needed to allow decision-makers to select a site remedy, not the decision-making process itself. During the detailed analysis, each alternative for the Land and Inland Water MRSs is assessed against the NCP evaluation criteria described in Subsection 6.1. The results of the detailed analysis are arrayed to compare the alternatives against each other to identify the remedial alternative that provides the best balance of benefits versus costs. This detailed analysis approach is designed to provide decision-makers sufficient information to adequately compare the alternatives, to select an appropriate remedy for the Land and Inland Water MRSs, and to demonstrate satisfaction of the CERCLA remedy selection requirements in the DD.

Based on the screening of potential alternatives for each MRS (Table 5-1), the following alternatives will be evaluated in detail against the NCP criteria:

- Land MRS
  - Alternative 1 – No Action
  - Alternative 2 – LUCs
  - Alternative 3 – Partial Subsurface Clearance with LUCs
  - Alternative 4 – Subsurface Clearance
- Inland Water MRS
  - Alternative 1 – No Action
  - Alternative 2 – LUCs
  - Alternative 3 – Subsurface Clearance

### 6.1 Evaluation Criteria

Evaluation criteria are described in the NCP, Section 300.430(e)(9). The criteria were developed to address the CERCLA requirements and considerations, and to address the additional technical and policy considerations that are important in selecting remedial alternatives. These evaluation criteria serve as the basis for conducting the detailed analyses during the FS and for selecting an appropriate remedial action. The evaluation criteria with the associated statutory considerations are described below.

As described in the NCP, the following two “threshold criteria” must be met in order for the alternative to be considered further:

1. **Overall protectiveness of human health and the environment** - Determines whether an alternative achieves the RAO by eliminating, reducing, or controlling threats to public health and the environment through LUCs, engineering controls, or treatment. An emphasis is placed on effectiveness in terms of worker safety issues during remedial actions and post-remedial action for local residents and workers based on future land use.
2. **Compliance with ARARs** - Evaluates whether the alternative meets federal and state environmental statutes, regulations, and other requirements that pertain to the site, or whether a waiver is justified. The ARARs identified for the Land and Inland Water MRS alternatives are summarized in Table 6-1.

**Table 6-1. ARARs identified for Land and Inland Water MRS Alternatives**

Alternative	Applicable or Relevant and Appropriate Requirements	
	16 U.S.C. §1538(a)(1), Federal Endangered Species Regulations	40 CFR 264.601, Resource Conservation and Recovery Act, Miscellaneous Units
<b>Land MRS</b>		
Alternative 1 – No Action	-	-
Alternative 2 – LUCs	-	-
Alternative 3 – Partial Subsurface Clearance with LUCs	✓	✓
Alternative 4 – Subsurface Clearance	✓	✓
<b>Inland Water MRS</b>		
Alternative 1 – No Action	-	-
Alternative 2 – LUCs	-	-
Alternative 3 – Subsurface Clearance	✓	✓

No ARARs were identified associated with Alternatives 1 or 2. For the alternatives involving clearance activities, 40 CFR Part 264, Subpart X would be an ARAR if MPPEH or confirmed MEC items are identified requiring on-site disposal operations, and if a consolidated shot approach is employed in lieu of a BIP technology. The Federal Endangered Species Regulations in 16 U.S.C. §1538(a)(1) also be ARARs associated with clearance alternative since the work could impact threatened and endangered species.

1 The following five “balancing criteria” described below are weighed against each other and are  
2 the primary criteria upon which the detailed analysis is based:

- 3       3. **Long-term effectiveness and permanence** - Considers the ability of an alternative to  
4       maintain protection of human health and the environment over time. The evaluation of  
5       the long-term effectiveness and permanence of containment and controls takes into  
6       account the magnitude of residual risk, the adequacy of the alternative in limiting the risk,  
7       the need for long-term monitoring and management, and the administrative feasibility of  
8       maintaining the LUCs and the potential risk should they fail. The evaluation also  
9       considers mechanisms such as the CERCLA Five-Year Review process to assess on a  
10      periodic basis the long-term effectiveness and permanence, as well as the protectiveness,  
11      of the alternative.
- 12      4. **Reduction of toxicity, mobility, or volume (TMV) of contaminants through**  
13      **treatment** - Considers an alternative's use of treatment to reduce the harmful effects of  
14      principal contaminants, their ability to move in the environment, and the amount of  
15      contamination present.
- 16      5. **Short-term effectiveness** - Considers the length of time needed to implement an  
17      alternative and the risks the alternative poses to workers, residents, and the environment  
18      during implementation. In addition, for MEC, safety considerations include an evaluation  
19      of what resources available and how long it will take to mitigate MEC risks and achieve  
20      RAOs.
- 21      6. **Implementability** - Considers the technical and administrative feasibility of  
22      implementing the alternative, including factors such as the relative availability of goods  
23      and services, and the relative effort associated with implementation of the alternative.
- 24      7. **Cost** - Includes estimated capital costs. Cost estimates are expected to be accurate within  
25      a range of +50% to -30% (EPA, 2000).

26 The last two criteria, the “modifying criteria,” are usually evaluated following the receipt of  
27 comments on the FS, and thus are completed after the Proposed Plan and public comment period  
28 on the plan and are presented in the Decision Document:

- 29      8. **State acceptance** - Assesses the technical and administrative issues and concerns the  
30      state (Massachusetts Department of Environmental Protection) may have regarding each  
31      of the alternatives evaluated in this FS as well as the preferred alternative presented in the  
32      Proposed Plan. State acceptance of an alternative will be evaluated after the Proposed  
33      Plan is issued for public comment. Therefore, the state acceptance criterion is not  
34      considered in the FS.

- 1       9. **Community acceptance** - Assesses the issues and concerns the public may have  
2       regarding each of the alternatives evaluated in this FS as well as the preferred alternative  
3       presented in the Proposed Plan. Community acceptance of an alternative will be  
4       evaluated after the Proposed Plan is issued for public comment. Therefore, the  
5       community acceptance criterion is not considered in the FS.

## 6   **6.2   Land MRS**

### 7   **6.2.1   Alternative 1 – No Action**

8   The No Action alternative for the Land MRS is evaluated relative to the NCP criteria as follows:

- 9       1. **Overall Protectiveness of Human Health and the Environment** – Alternative 1 would  
10      not be protective of human health and the environment.

11      The MEC HA conducted during the RI estimated the Land MRS was a Hazard Level 2,  
12      indicating a high potential explosive hazard condition. The MEC HA was revised during  
13      the FS to consider a no action alternative. The MEC HA indicates that implementation of  
14      a no action alternative would not change the MEC HA score and the site would continue  
15      to have a high potential explosive hazard condition. The revised MEC HA worksheets  
16      are provided in Appendix C.

- 17      2. **Compliance with ARARs** - There are no ARARs associated with Alternative 1.

- 18      3. **Long-Term Effectiveness and Permanence** – Alternative 1 is not expected to reduce  
19      the magnitude of risk over the long term based on intended future land use. The no  
20      action alternative requires no technical components and poses no uncertainties regarding  
21      its performance. Exposure to MEC is anticipated to increase over time with continued  
22      land use throughout the MRS by the public; therefore it would not provide long-term  
23      effectiveness and permanence.

- 24      4. **Reduction of TMV of Contaminants Through Treatment** - Alternative 1 would not  
25      reduce the toxicity, volume or mobility associated with the MEC explosive hazards  
26      within the MRS.

- 27      5. **Short-Term Effectiveness** – There would be no additional risk to the community or  
28      workers because there are no construction or operation activities associated with  
29      Alternative 1, and it would require no time to complete.

- 30      6. **Implementability** – Alternative 1 is considered easily implementable. It poses no  
31      technical difficulties and no permits or coordination with other agencies would be  
32      required.

- 33      7. **Cost** - The total cost to perform Alternative 1 is \$0.



## 6.2.2 Alternative 2 – Land Use Controls

Alternative 2 – LUCs for the Land MRS is evaluated relative to the NCP criteria as follows:

1. **Overall Protectiveness of Human Health and the Environment** - Alternative 2 would be protective since it controls exposure through LUCs.

MEC was identified during the RI in the subsurface of the MRS and the MEC HA conducted during the RI estimated the Land MRS was a Hazard Level 2, indicating a high potential explosive hazard condition. The MEC HA was revised during the FS to consider Alternative 2 (Appendix C). The MEC HA indicates that implementation of LUCs would not change the MEC HA score and the site would continue to have a high potential explosive hazard condition. However, LUCs such as signage and educational programs would inform the public of the threat and provide information to assist with recognition of MEC; thereby controlling exposure to MEC.

2. **Compliance with ARARs** - There are no ARARs associated with Alternative 2.

3. **Long-Term Effectiveness and Permanence** – Alternative 2 would provide protectiveness through LUCs as long as the LUCs remain in place. Since this alternative reduces the exposure to MEC rather than the amount of MEC, it is contingent upon the cooperation and active participation of the local government with existing property owner (TTOR), local responders, and the public using the MRS. The LUC components for risk management include printed informational materials such as signs, brochures, fact sheets, and providing training materials awareness and 3Rs protocol to be followed if MEC is encountered in the future.

Maintaining the LUCs in the long term is required. If the LUC components fail, there would be a risk of untrained personnel handling MEC when encountered. LUC enforcement (i.e., awareness training and review and reproduction of informational materials), periodic inspections (at least annually) and maintenance (i.e., installed signs) would be conducted to ensure that LUCs remain effective and that the land use has not changed. Reviews would also be conducted once every 5 years as required by CERCLA to determine if the remedy is or will be protective of human health and the environment.

4. **Reduction of TMV of Contaminants Through Treatment** - Alternative 2 will not reduce the toxicity, mobility or volume of contaminants and does not satisfy the statutory preference for treatment as a principal element of the remedy.
5. **Short-Term Effectiveness** - There would be no additional risk to workers, residents or the environment because there are no construction intrusive activities associated with Alternative 2. Approximately 6 months would be required to establish LUCs associated with Alternative 2.

6. **Implementability** - The LUC components recommended in Alternative 2 can be readily implemented. There are no technical difficulties associated with this alternative, and the materials and services needed to implement this alternative are available. Printed informational materials and training materials (media-based) can be readily developed and disseminated.

7. **Cost** - The total cost to perform Alternative 2 at the Land MRS is \$684,000. This cost has been rounded to the nearest thousand dollars. The cost estimate for Alternative 2 is provided in Appendix D.

This alternative would require Five Year Reviews to be conducted. These costs are not included in the alternative cost above, but are estimated to be \$42,000 for each review required.

### 6.2.3 Alternative 3 – Partial Subsurface Clearance with LUCs

Alternative 3 – Partial Subsurface Clearance of MEC is evaluated relative to the NCP criteria for the Land MRS as follows:

1. **Overall Protectiveness of Human Health and the Environment** - Alternative 3 would provide protection since it would reduce the threat of exposure to MEC by eliminating MEC in 31 acres and by controlling exposure through LUCs on the remaining 31 acres.

Based on the results of the RI, 100% of MEC present in the MRS was discovered within the subsurface (UXB, 2014). The MEC HA conducted during the RI estimated the Land MRS was a Hazard Level 2, indicating a high potential explosive hazard condition. The MEC HA was revised during the FS to consider Alternative 3. The MEC HA indicates that after a partial clearance of the Land MRS, the explosive hazard would be reduced to a Hazard Level 3, which indicates a moderate potential explosive hazard condition.

The implementation of this alternative creates safety risks for the remedial workers. An Explosives Safety Plan would be developed and followed to minimize threats to workers. The MEC would be consolidated during removal, certified as explosive-free MDAS, and disposed off-site for recycling in a manner protective of human health and the environment. Any MPPEH or suspect MEC would be inspected, and if determined safe to move, would be consolidated, treated (i.e., demolition by venting), and removed from the MRS for disposal as certified MDAS resulting in little potential for adverse impacts to environmental resources. Munitions that are determined to be MPPEH or confirmed MEC rather than MD and that are not acceptable to move would be BIP. The BIP demolition results in a more confined waste stream than consolidation and is, therefore, more protective of human health and the environment. Demolition activities may also negatively impact environmental resources that cannot be moved. The waste stream could

1 be reduced and protectiveness could be increased through the use of appropriate  
2 mitigation techniques.

- 3 2. **Compliance with ARARs** – Two ARARs were identified for the Land MRS  
4 Alternative 3: 40 CFR 264.601 and 16 U.S.C. §1538(a)(1). Alternative 3 would comply  
5 with both ARARs and procedures for ensuring compliance would be developed in the  
6 Remedial Action Work Plan. Clearance of MEC (including using a consolidated shot  
7 approach is needed) would be performed to fulfill all DoD and EPA guidance for  
8 munitions response and explosives safety. Work would also be scheduled to comply with  
9 16 U.S.C. §1538(a)(1) by avoiding impacts to threatened and endangered species.

- 10 3. **Long-Term Effectiveness and Permanence** - Clearance of MEC in the subsurface  
11 would provide long-term effectiveness by permanently removing MEC from portions of  
12 the MRS and preventing MEC exposure through LUCs in the remainder of the MRS.  
13 This alternative is contingent upon the cooperation and active participation of the local  
14 government with existing property owner (TTOR), local responders, and the public using  
15 the MRS.

16 Maintaining the LUCs in the long term is required. If the LUC components fail, there  
17 would be a risk of untrained personnel handling MEC when encountered. LUC  
18 enforcement (i.e., awareness training and review and reproduction of informational  
19 materials), periodic inspections (at least annually) and maintenance (i.e., installed signs)  
20 would be conducted to ensure that LUCs remain effective and that the land use has not  
21 changed. Reviews would also be conducted once every 5 years as required by CERCLA  
22 to determine if the remedy is or will be protective of human health and the environment.

- 23 4. **Reduction of TMV of Contaminants Through Treatment** - Clearance would fully  
24 eliminate the TMV of MEC in a portion of the MRS. Alternative 3 satisfies the statutory  
25 preference for treatment as a principal element of the remedy because MEC would be  
26 destroyed. Alternative 3 would not fully eliminate MEC since only 31 of the 62 acres  
27 within the MRS would undergo clearance.

- 28 5. **Short-Term Effectiveness** – In the short-term, implementation of Alternative 3 will  
29 increase in risk to workers and the environment since the work involves exposure to  
30 potentially explosive items. These risks would be mitigated through use of SOPs for  
31 conducting MEC removals. Impacts to local residents and the public may occur, but  
32 would be temporary and limited to the immediate work area. Equipment or material  
33 staging areas may be required, but could be constructed within a designated area within  
34 the MRS. Some vegetation clearance is anticipated, therefore there would be some  
35 impacts to the environment. Procedures for minimizing, reducing or mitigating negative  
36 effects would be developed in the Remedial Action Work Plan. It is estimated that partial

1 clearance under Alternative 3 would require approximately 3 months of field work to  
2 implement. Approximately 6 months would be required to establish LUCs associated  
3 with Alternative 3.

4 6. **Implementability** - Subsurface clearance of MEC is technically and administratively  
5 feasible and can be implemented at the Land MRS, as demonstrated during the RI.  
6 Materials and services to perform Alternative 3 are readily available. Coordination with  
7 MADEP, MA NHESP and TTOR is required for this alternative.

8 7. **Cost**—The total cost to perform Alternative 3 at the Land MRS is \$2,353,000. The cost  
9 estimate for Alternative 3 is provided in Appendix D.

10 This alternative would require Five Year Reviews to be conducted. These costs are not  
11 included in the alternative cost above, but are estimated to be \$42,000 for each review  
12 required.

#### 13 6.2.4 Alternative 4 – Subsurface Clearance

14 Alternative 4 – Subsurface Clearance of MEC is evaluated relative to the NCP criteria for the  
15 Land MRS as follows:

16 1. **Overall Protectiveness of Human Health and the Environment** - Alternative 4 would  
17 provide protection since it would eliminate MEC exposure within the MRS.

18 Based on the results of the RI, 100% of MEC present in the MRS was discovered within  
19 the subsurface (UXB, 2014). The MEC HA conducted during the RI estimated the Land  
20 MRS was a Hazard Level 2, indicating a high potential explosive hazard condition. The  
21 MEC HA was revised during the FS to consider Alternative 4. The MEC HA indicates  
22 that after a partial clearance of the Land MRS, the explosive hazard would be reduced to  
23 a Hazard Level 4, which indicates a low potential explosive hazard condition.

24 Like Alternative 3, the implementation of Alternative 4 creates safety risks for the  
25 remedial workers. An Explosives Safety Plan would be developed and followed to  
26 minimize threats to workers. The MEC would be consolidated during removal, certified  
27 as explosive-free MDAS, and disposed off-site for recycling in a manner protective of  
28 human health and the environment. Any MPPEH or suspect MEC would be inspected,  
29 and if determined safe to move, would be consolidated, treated (i.e., demolition by  
30 venting), and removed from the MRS for disposal as certified MDAS resulting in little  
31 potential for adverse impacts to environmental resources. Munitions that are determined  
32 to be MPPEH or confirmed MEC rather than MD and that are not acceptable to move  
33 would be BIP. The BIP demolition results in a more confined waste stream than  
34 consolidation and is, therefore, more protective of human health and the environment.

1 Demolition activities may also negatively impact environmental resources that cannot be  
2 moved. The waste stream could be reduced and protectiveness could be increased  
3 through the use of appropriate mitigation techniques.

4 2. **Compliance with ARARs** – Two ARARs were identified for the Land MRS  
5 Alternative 4: 40 CFR 264.601 and 16 U.S.C. §1538(a)(1). Alternative 4 would comply  
6 with both ARARs and procedures for ensuring compliance would be developed in the  
7 Remedial Action Work Plan. Clearance of MEC would be performed to fulfill all DoD  
8 and EPA guidance for munitions response and explosives safety. Work would also be  
9 scheduled to comply with 16 U.S.C. §1538(a)(1) by avoiding impacts to threatened and  
10 endangered species.

11 3. **Long-Term Effectiveness and Permanence** - Clearance of MEC within the MRS would  
12 provide long-term effectiveness by permanently eliminating MEC from the MRS. In  
13 addition, educational materials would be distributed and signs would be maintained. A  
14 five year review would be conducted to confirm UU/UE.

15 4. **Reduction of TMV of Contaminants Through Treatment** - This alternative would  
16 fully eliminate the TMV of MEC through subsurface clearance. Alternative 4 satisfies  
17 the statutory preference for treatment as a principal element of the remedy because MEC  
18 would be destroyed.

19 5. **Short-Term Effectiveness** – In the short-term, implementation of Alternative 3 will  
20 increase in risk to workers and the environment since the work involves exposure to  
21 potentially explosive items. Impacts to local residents and the public may occur, but  
22 would be temporary and limited to the immediate work area. Equipment or material  
23 staging areas may be required, but could be constructed within a designated area within  
24 the MRS. Extensive vegetation clearance is anticipated, therefore there would be some  
25 impacts to the environment. Procedures for minimizing, reducing or mitigating negative  
26 effects would be developed in the Remedial Action Work Plan. It is estimated that  
27 Alternative 4 would require approximately 5 months of field work to implement.

28 6. **Implementability** - Subsurface clearance of MEC is technically and administratively  
29 feasible and can be implemented at the Land MRS, as demonstrated during the RI.  
30 Materials and services to perform Alternative 4 are readily available. Coordination with  
31 MADEP, MA NHESP and TTOR is required for this alternative.

32 7. **Cost**—The total cost to perform Alternative 4 at the Land MRS is \$3,033,000. The cost  
33 estimate for Alternative 4 is provided in Appendix D.

34 The five year reviews associated with this alternative is not included in the alternative  
35 cost above, but is estimated to be \$42,000.

1   **6.3    Inland Water MRS**

2   **6.3.1   Alternative 1 – No Action**

3   The No Action   alternative for the Inland Water MRS is evaluated relative to the NCP criteria as  
4   follows:

- 5       1. **Overall Protectiveness of Human Health and the Environment** - Alternative 1 would  
6       not be protective of human health and the environment. MEC was identified during the  
7       RI in the subsurface of the MRS. A No Action alternative would not eliminate, reduce,  
8       or control the threat of human exposure to MEC at the site.
- 9       2. **Compliance with ARARs** - There are no ARARs associated with Alternative 1.
- 10      3. **Long-Term Effectiveness and Permanence** - Alternative 1 is not expected to reduce the  
11      magnitude of risk over the long term based on intended future land use. The no action  
12      alternative requires no technical components and poses no uncertainties regarding its  
13      performance. Exposure to MEC is anticipated to increase over time with continued land  
14      use throughout the MRS by the public; therefore it would not provide long-term  
15      effectiveness and permanence.
- 16      4. **Reduction of TMV of Contaminants Through Treatment** - Alternative 1 would not  
17      reduce the toxicity, volume or mobility associated with the MEC explosive hazards  
18      within the MRS.
- 19      5. **Short-Term Effectiveness** - The no action alternative would not pose any risks during  
20      implementation to workers, residents, or the environment. However, RAOs would not be  
21      achieved and hazards would remain at the site indefinitely.
- 22      6. **Implementability** - Alternative 1 is considered easily implementable. It poses no  
23      technical difficulties and no permits or coordination with other agencies would be  
24      required.
- 25      7. **Cost** - The total cost to perform Alternative 1 is \$0.

26   **6.3.2   Alternative 2 – Land Use Controls**

27   Alternative 2 – LUCs for the Inland Water MRS is evaluated relative to the NCP criteria as  
28   follows:

- 29      1. **Overall Protectiveness of Human Health and the Environment** - Alternative 2 would  
30      be protective since it controls exposure through LUCs. MEC was identified during the  
31      RI in the subsurface of the Inland Water MRS. LUCs such as signage and educational

1 programs would inform the public of the threat and provide information to assist with  
2 recognition of MEC; thereby controlling exposure to MEC.

3 2. **Compliance with ARARs** - There are no ARARs associated with Alternative 2.

4 3. **Long-Term Effectiveness and Permanence** – Alternative 2 would provide  
5 protectiveness through LUCs as long as the LUCs remain in place. Since this alternative  
6 reduce the exposure to MEC rather than the amount of MEC, it 2 is contingent upon the  
7 cooperation and active participation of the local government with existing property owner  
8 (TTOR), local responders, and the public using the MRS. The LUC components for risk  
9 management include printed informational materials such as signs, brochures, fact sheets,  
10 and providing training materials awareness and 3Rs protocol to be followed if MEC is  
11 encountered in the future.

12 Maintaining the LUCs in the long term is required. If the LUC components fail, there  
13 would be a risk of untrained personnel handling MEC when encountered. LUC  
14 enforcement (i.e., awareness training and review and reproduction of informational  
15 materials), periodic inspections (at least annually) and maintenance (i.e., installed signs)  
16 would be conducted to ensure that LUCs remain effective and that the land use has not  
17 changed. Reviews would also be conducted once every 5 years as required by CERCLA  
18 to determine if the remedy is or will be protective of human health and the environment.

19 4. **Reduction of TMV of Contaminants Through Treatment** - Alternative 2 will not  
20 reduce the toxicity, mobility or volume of contaminants and does not satisfy the statutory  
21 preference for treatment as a principal element of the remedy.

22 5. **Short-Term Effectiveness** - There would be no additional risk to workers, residents or  
23 the environment because there are no construction or intrusive activities associated with  
24 Alternative 2. Approximately 6 months would be required to establish LUCs associated  
25 with Alternative 2.

26 6. **Implementability** - The LUC components recommended in Alternative 2 can be readily  
27 implemented. There are no technical difficulties associated with this alternative, and the  
28 materials and services needed to implement this alternative are available. Printed  
29 informational materials and training materials (media-based) can be readily developed  
30 and disseminated.

31 7. **Cost** - The total cost to perform Alternative 2 at the Inland Water MRS is \$684,000. This  
32 cost has been rounded to the nearest thousand dollars. The cost estimate for Alternative 2  
33 is provided in Appendix D.



1 This alternative would require Five Year Reviews to be conducted. These costs are not  
2 included in the alternative cost above, but are estimated to be \$42,000 for each review  
3 required.

### 4 **6.3.3 Alternative 3 – Subsurface Clearance**

5 Alternative 3 – Subsurface Clearance of MEC is evaluated relative to the NCP criteria for the  
6 Inland Water MRS as follows:

- 7 1. **Overall Protectiveness of Human Health and the Environment** - Alternative 3 would  
8 provide protection since it would eliminate MEC exposure within the MRS. Based on  
9 the results of the RI, 100% of MEC present in the MRS was discovered within the  
10 subsurface (UXB, 2014). A subsurface clearance within the entire MRS would remove  
11 MEC from within the entirety of the MRS and would be a permanent remedial alternative  
12 over the long-term because it would eliminate risk regardless of the future use of the  
13 property.

14 Like Alternative 3, the implementation of Alternative 4 creates safety risks for the  
15 remedial workers. An Explosives Safety Plan would be developed and followed to  
16 minimize threats to workers. The MEC would be consolidated during removal, certified  
17 as explosive-free MDAS, and disposed off-site for recycling in a manner protective of  
18 human health and the environment. Any MPPEH or suspect MEC would be inspected,  
19 and if determined safe to move, would be consolidated, treated (i.e., demolition by  
20 venting), and removed from the MRS for disposal as certified MDAS resulting in little  
21 potential for adverse impacts to environmental resources. Munitions that are determined  
22 to be MPPEH or confirmed MEC rather than MD and that are not acceptable to move  
23 would be BIP. The BIP demolition results in a more confined waste stream than  
24 consolidation and is, therefore, more protective of human health and the environment.  
25 Demolition activities may also negatively impact environmental resources that cannot be  
26 moved, such as the eelgrass located on the inland water floor. The waste stream could be  
27 reduced and protectiveness could be increased through the use of appropriate mitigation  
28 techniques.

- 29 2. **Compliance with ARARs** - Two ARARs were identified for the Inland Water MRS  
30 Alternative 3: 40 CFR 264.601 and 16 U.S.C. §1538(a)(1). Alternative 3 would comply  
31 with both ARARs and procedures for ensuring compliance would be developed in the  
32 Remedial Action Work Plan. Clearance of MEC would be performed to fulfill all DoD  
33 and EPA guidance for munitions response and explosives safety. Work would also be  
34 scheduled to comply with 16 U.S.C. §1538(a)(1) by avoiding impacts to threatened and  
35 endangered species.

3. **Long-Term Effectiveness and Permanence** - Clearance of MEC would provide long-term effectiveness by permanently removing MEC from the MRS. Alternative 3 would provide long-term effectiveness through the permanent removal of MEC throughout the entirety of the MRS. In addition, educational materials would be distributed and signs would be maintained. A five year review would be conducted to confirm UU/UE.
4. **Reduction of TMV of Contaminants Through Treatment** - This alternative would fully eliminate the TMV of MEC through subsurface clearance. Alternative 3 satisfies the statutory preference for treatment as a principal element of the remedy because MEC would be destroyed.
5. **Short-Term Effectiveness** – In the short-term, implementation of Alternative 3 will increase in risk to workers and the environment since the work involves exposure to potentially explosive items. Adverse impacts to eelgrass and shellfish are possible during clearance activities but would be minimized through coordination with MADEP and MA NHESP. Impacts to local residents and the public may occur, but would be temporary and limited to the immediate work area. Equipment or material staging areas may be required, but could be constructed within one designated area within the MRS. Procedures for minimizing, reducing or mitigating negative effects would be developed in the Remedial Action Work Plan. It is estimated that subsurface clearance under Alternative 3 would require approximately 7 months to implement.
6. **Implementability** - Subsurface clearance of MEC is technically and administratively feasible and can be implemented at the Inland Water MRS, as shown during the RI. Materials and services to perform Alternative 3 are readily available. Coordination with MADEP and MA NHESP is required for this alternative.
7. **Cost** - The total cost to perform Alternative 3 at the Inland Water MRS is \$4,996,000. The cost estimate for Alternative 3 is provided in Appendix D.  
The five year reviews associated with this alternative is not included in the alternative cost above, but is estimated to be \$42,000.

#### 6.4 Comparative Analysis of Remedial Alternatives

Based on the detailed analysis of remedial alternatives, the strengths and weaknesses of the remedial alternatives relative to one another are evaluated with respect to each of the NCP criteria below.

#### 6.4.1 Land MRS Comparative Analysis

1. **Overall Protectiveness of Human Health and the Environment** - Because MEC was identified during the RI in the subsurface, and the MEC HA estimated an explosive risk is anticipated to be present at the Land MRS, the threat of human exposure to MEC and the potential for MEC to be handled by unqualified and untrained personnel exists. Alternative 1 would not eliminate, reduce, or control the threat of human exposure to subsurface MEC; therefore it does not meet the threshold criteria and cannot be considered further. Alternative 2 would be protective since it controls exposure through LUCs. Alternative 3 provides protectiveness as MEC would be destroyed throughout the accessible portion of the MRS (31 acres) and would control exposure through LUCs for the remaining 31 acres of the MRS. Alternative 4 is protective of human health because subsurface MEC would be destroyed from the entirety of the MRS. Risks to the environment associated with Alternative 4 are greatest and would require extensive planning, management, monitoring of endangered and threatened species, restoration, and potential follow-on work to ensure recovery is attained.
2. **Compliance with ARARs** - There are no ARARs associated with Alternative 1 or Alternative 2, and Alternatives 3 and 4 would be implemented and performed to comply with all ARARs. Fieldwork for Alternatives 3 and 4 would be scheduled during the offseason and during those times when endangered or threatened species and habitats would not be adversely affected. In addition, Alternatives 3 and 4 would require a biologist to survey the area prior to any intrusive work to ensure clearance activities would not adversely impact threatened or endangered species. Alternative 4 would be the most intrusive in nature and would require significant attention to avoid impacts on environmental resources.
3. **Long-Term Effectiveness and Permanence** - Alternative 2 would be protective since it controls exposure through LUCs. However, it relies on exposure control rather than removal or treatment. Under Alternative 3, all MEC would be destroyed within the accessible portion of the MRS, but would still require LUCs in the long-term. Alternative 4 would remove MEC hazards from within the entirety of the MRSs and would be the most effective and permanent remedial alternative over the long-term because it would eliminate risk regardless of the future use of the property.
4. **Reduction of TMV of Contaminants Through Treatment** - Alternatives 1 and 2 would not reduce the TMV of MEC within the MRS. Alternative 3 would be effective in the reduction of TMV through removal of all MEC within the accessible portion of the MRS (31 acres). Alternative 4 would be the most effective in reducing the TMV of MEC because all detectable MEC throughout the entirety of the MRS would be destroyed.

1 Alternatives 3 and 4 would satisfy the statutory preference for treatment as a principal  
2 element of the remedy because MEC would be destroyed.

- 3 5. **Short-Term Effectiveness** - Because no construction activities are associated with either  
4 alternative, Alternatives 1 and 2 would not present significant additional risk to the public  
5 or workers at the MRS. Alternatives 3 and 4 would increase risk to the public and  
6 workers during clearance of MEC to variable degrees based on the implementation of  
7 exclusion zones for intrusive activities and in cases where MPPEH or suspect MEC is  
8 encountered requiring treatment on-site to render the item MDAS. Alternatives 1 and 2  
9 would not cause damage to the environment because no clearing, grubbing, or excavation  
10 would be required. Alternative 3 would cause some damage to the environment because  
11 of the vegetation clearance required to conduct subsurface activities on a portion of the  
12 MRS. Alternative 4 would cause the most initial damage to the environment and would  
13 require interim measures for protection and significantly more restoration than  
14 Alternative 3 as a result of the larger scale of vegetation clearance and intrusive activities  
15 throughout the entirety of the MRS. The time durations required to complete  
16 Alternatives 2, 3 and 4 is approximately 6 months.

- 17 6. **Implementability** – Alternatives 1 and 2 would both be easily implementable.  
18 Alternatives 3 and 4 would also be implementable, but would require considerable more  
19 effort and manpower than Alternatives 1 and 2. Subsurface clearance technologies are  
20 proven and were successfully implemented within the MRS during the RI. Alternative 4  
21 would be more difficult to implement than Alternative 3 since it requires clearance of a  
22 larger area and removal of heavily vegetated areas within the MRS. Specific activities,  
23 including development of awareness training materials for workers and use of protection  
24 procedures and mitigation techniques would be required to preserve environmental  
25 resources during Alternatives 3 and 4.

- 26 7. **Cost**—The total cost to perform each alternative is as follows:

- 27 • Alternative 1 = \$0
- 28 • Alternative 2 = \$684,000
- 29 • Alternative 3 = \$2,353,000
- 30 • Alternative 4 = \$3,033,000

31 Note: Costs have been rounded to the nearest thousand dollars.

## 32 6.4.2 Inland Water MRS Comparative Analysis

- 33 1. **Overall Protectiveness of Human Health and the Environment** - Alternative 1 would  
34 not eliminate, reduce, or control the threat of human exposure to MEC; therefore it does

1 not meet the threshold criteria and cannot be considered further. Alternative 2 would be  
2 protective since it controls exposure through LUCs. Alternative 3 is protective of human  
3 health because subsurface MEC from the entirety of the MRS would be destroyed. Risks  
4 to the environment associated with Alternative 3 are greatest and would require extensive  
5 planning, management, monitoring of endangered and threatened species, restoration, and  
6 potential follow-on work to ensure recovery is attained.

7 2. **Compliance with ARARs** - There are no ARARs associated with Alternative 1 or  
8 Alternative 2. Alternative 3 would be implemented and performed to comply with all  
9 ARARs.

10 3. **Long-Term Effectiveness and Permanence** - Alternative 2 would be protective since  
11 it controls exposure through LUCs. However, it relies on exposure control that than  
12 removal or treatment. Alternative 3 would remove MEC hazards from within the  
13 entirety of the MRS and would be the most effective and permanent remedial alternative  
14 over the long-term because it would eliminate risk regardless of the future use of the  
15 property.

16 4. **Reduction of TMV of Contaminants Through Treatment** - Alternatives 1 and 2 would  
17 not reduce the TMV of MEC within the MRS. Alternative 3 would be highly effective in  
18 reducing the TMV of MEC because all detectable MEC throughout the entirety of the  
19 MRS would be destroyed and it would satisfy the statutory preference for treatment as a  
20 principal element of the remedy.

21 5. **Short-Term Effectiveness** - Alternatives 1 and 2 would not present significant additional  
22 risk to the public or workers at the MRS since no construction activities are associated  
23 with either alternative. Alternative 3 would increase risk to the public and workers  
24 during clearance of MEC to variable degrees based on the implementation of exclusion  
25 zones for intrusive activities and in cases where MPPEH or suspect MEC is encountered  
26 requiring treatment on-site to render the item MDAS. The time durations required to  
27 complete Alternative 2 is estimated at 6 months. Alternative 3 would require  
28 approximately 7 months to implement the field work.

29 6. **Implementability** - Alternatives 1 and 2 would both be easily implementable.  
30 Alternative 3 would also be implementable, but would required considerable more effort  
31 and manpower than Alternatives 1 and 2. Underwater subsurface clearance technologies  
32 are proven and were successfully implemented within the MRS during the RI.  
33 Alternative 3 will require UXO-trained divers along with marine excavation equipment  
34 (i.e. marine excavator) to implement. Specific activities, including the development of  
35 awareness training materials for workers and use of protection procedures and mitigation  
36 techniques would be required to preserve environmental resources during Alternative 3.

1        7. **Cost**—The total cost to perform each alternative is as follows:

- 2            • Alternative 1 = \$0
- 3            • Alternative 2 = \$684,000
- 4            • Alternative 3 = \$4,996,000

5            Note: Costs have been rounded to the nearest thousand dollars.

6        Table 6-1 presents the comparative summary of the detailed analysis of the alternatives for the  
7        Land and Inland Water MRSs. For both MRSs, the Subsurface Clearance of the entirety of each  
8        MRS most favorably meets all of the evaluated detailed analysis criteria as compared to other  
9        alternatives. While the complete subsurface clearance alternatives would require the most  
10       manpower and time to implement, they would provide the highest level of protectiveness over  
11       the long-term and will achieve the RAO of protecting recreational users, visitors, and workers at  
12       the MRSs from explosive hazards associated with MEC exposure in the top three feet of  
13       subsurface soil or sediment during intrusive activities and by dune erosion.

1                      **Table 6-2              Comparative Summary of Detailed Analysis of Remedial Alternatives**

	Threshold Criteria		Balancing Criteria					Modifying Criteria <sup>2</sup>	
	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness	Reduction of TMV through Treatment	Short-Term Effectiveness	Implementability	Cost <sup>1</sup>	State Acceptance	Community Acceptance
<b>Land MRS Alternatives</b>									
Alternative 1: No Action	○	●	○	○	●	●	\$0	TBD	TBD
Alternative 2: LUCs	●	●	◐	○	●	●	\$684,000	TBD	TBD
Alternative 3: Partial Subsurface Clearance with LUCs	●	●	◐	◐	◐	●	\$2,353,000	TBD	TBD
Alternative 4: Subsurface Clearance	●	●	●	●	◐	●	\$3,033,000	TBD	TBD
<b>Inland Water MRS Alternatives</b>									
Alternative 1: No Action	○	●	○	○	●	●	\$0	TBD	TBD
Alternative 2: LUCs	●	●	◐	○	●	●	\$684,000	TBD	TBD
Alternative 3: Subsurface Clearance	●	●	●	●	◐	●	\$4,996,000	TBD	TBD

2        Notes:    <sup>1</sup> Costs are detailed in Appendix D. Costs provided here do not include Five Year Review Costs (\$42,000 per review) are required for Land MRS Alternatives 2 and 3,  
3                      and Inland Water MRS Alternative 2.

4                      <sup>2</sup> The modifying criteria will be evaluated after the Proposed Plan following review and input from these parties.

5                      ● Favorable (Yes for threshold criteria)

6                      ◐ Moderately Favorable

7                      ○ Not Favorable (No for threshold criteria)

8                      TBD = to be determined

9



## 7.0 References

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- 1        *Former Cape Poge Little Neck Bomb Target MRS, Former Moving Target Machine Gun*  
2        *Range at South Beach MRS, & Tisbury Great Pond MRS, Martha's Vineyard,*  
3        *Massachusetts, Final. September.*
- 4    UXB, 2014. *Remedial Investigation Report, Former Cape Poge Little Neck Bomb Target Area*  
5        *of Investigation, Final. June.*
- 6    VRHabilis (VRH), 2008. *Visual Ordnance Sweep Report. November.*
- 7    VRH, 2010. UXO Incident Report, April 20.
- 8    VRH, 2010a. UXO Incident Report, April 25.

**APPENDIX A**  
**UPDATED CONCEPTUAL SITE MODEL**

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Revised Conceptual Site Model Summary  
Former Cape Poge Little Neck Bomb Target Munitions Response Area

Facility Profile	Physical Profile	Release Profile	Land Use and Exposure Profile	Ecological Profile
<p><b>Facility Description:</b></p> <ul style="list-style-type: none"><li>MRA is approximately 349 acres. <sup>(1)</sup></li><li>Located on the Little Neck peninsula, which is bound to the north by Shear Pen Pond, to the west and south by Cape Poge Bay, and to the east by a small strip of land that separates the site from the Atlantic Ocean.</li><li>No permanent structures were constructed by the U.S. Navy at the site. <sup>(2)</sup></li><li>Available records do not specify the precise layout and usage the target; however, the standard range cell consisted of a circle with a radius of 1,500 feet (ft) from the target center and consisting of 162 acres. <sup>(2)</sup></li></ul> <p><b>Site History:</b></p> <ul style="list-style-type: none"><li>The site was used for day and night practice bombing activities from approximately July 1944 until approximately March 1947. <sup>(2)</sup></li><li>Records do not indicate that the property was ever used to store, transport, treat, or dispose of the associated munitions used on property. <sup>(2)</sup></li></ul> <p><b>Munitions Potentially Used:</b></p> <ul style="list-style-type: none"><li>100-Pound Practice Bomb, Mark (MK)15-series;</li><li>Miniature Practice Bombs, AN-MK 5 Mod 1, AN-MK 23, AN-MK43;</li><li>Signal Practice Bomb, MK4 Mods 3 &amp; 4;</li><li>Signal Practice Bomb, MK6 Mod 0; and,</li><li>Flare, Aircraft, Parachute, M26 &amp; AN-M26. <sup>(2)</sup></li></ul>	<p><b>Site Characteristics:</b></p> <ul style="list-style-type: none"><li>Approximately 177 acres of land and beach</li><li>Approximately 172 acres of inland water</li></ul> <p><b>Topography (Land area):</b></p> <ul style="list-style-type: none"><li>Relatively flat maritime shrub thicket, salt marsh, and maritime beach. <sup>(1)</sup></li></ul> <p><b>Vegetation (Land area):</b></p> <ul style="list-style-type: none"><li>Salt Marsh Cordgrass, Salt Meadow Cordgrass, Black Grass, Salt Marsh Fleabane, and glassworts, with Marsh Elder and Groundsel Tree along their fringes. <sup>(1)</sup></li></ul> <p><b>Surface Water:</b></p> <ul style="list-style-type: none"><li>Surface water is located within marshes and mudflats.</li><li>Surface water runoff is not expected in upland areas.</li></ul> <p><b>Soils:</b></p> <ul style="list-style-type: none"><li>Soils located on the sand dunes consist of medium to coarse sands and are excessively drained.</li><li>Soils located in marshes consist of a dense layer of organic material over fine grained sand and are very poorly drained.</li></ul> <p><b>Geology:</b></p> <ul style="list-style-type: none"><li>Glacial deposits consisting of recent beach and marsh sediments, glacial deposits, interglacial deposits, and glacially deformed ancient coastal plain sediments. <sup>(2)</sup></li><li>Bedrock is encountered at approximately 500 ft below ground Surface (bgs) and is comprised of metamorphic and igneous rocks. <sup>(2)</sup></li></ul> <p><b>Hydrogeology:</b></p> <ul style="list-style-type: none"><li>Depth of groundwater ranges from 0 to greater than 6 ft bgs.</li><li>Groundwater on Martha’s Vineyard is primarily discharged directly to the ocean and surrounding bays. <sup>(2)</sup></li></ul> <p><b>Meteorology:</b></p> <ul style="list-style-type: none"><li>Average Annual Rainfall = 46 inches per year. <sup>(2)</sup></li></ul>	<p><b>Contaminants of Potential Concern:</b></p> <ul style="list-style-type: none"><li>Munitions and explosives of concern (MEC) primarily consisting of AN-MK 23s.</li><li>Antimony, lead, and zinc.</li></ul> <p><b>Media of Potential Concern:</b></p> <ul style="list-style-type: none"><li>Surface and subsurface soil, sediment, and groundwater</li></ul> <p><b>Confirmed MEC/MD Locations:</b></p> <ul style="list-style-type: none"><li>During the 2009 Time-Critical Removal Action, 127 Munitions Debris (MD) items were identified and removed. Items included AN-MK23 and AN-MK5 practice bombs. These items were heavily concentrated along the western edge of Little Neck. Additional debris items were identified in the central and southern marsh area as well as along shoreline to the north and south of Little Neck. <sup>(3)</sup></li><li>During the 2010-2011 Remedial Investigation, nature and extent of MEC and MD was delineated. 88 MEC items and 325 MD items were recovered. Recovered items included intact and expended AN-MK23 3-pound practice bombs and the remnants of a 100-pound practice bomb. These items were concentrated on Little Neck around the historic bomb target location.</li><li>MEC and MD items were found down to 3 feet below ground surface (or inland water floor) in both the Land and Inland Water MRSs. The majority of items in both MRSs were found at 2 feet below ground surface (or below the inland water floor).</li></ul> <p><b>MC Results:</b></p> <ul style="list-style-type: none"><li>During the 2010-2011 RI, surface soil, subsurface soil, sediment, and groundwater samples were collected. Sample results indicate that MC concentrations do not exceed residential direct contact screening criterion. Antimony, lead, and zinc were detected in soil samples at concentrations that exceeded ecological screening criterion.</li></ul> <p><b>Identified Pathways:</b></p> <ul style="list-style-type: none"><li>Based upon sampling results, munitions constituents (MCs) have not been released at concentrations above human health screening criterion. Antimony, lead, and zinc were detected in soil at concentration above ecological screening criterion. Results indicate that adsorption of MCs to surface soil particles have been the primary mechanism influencing the extent of MCs in the environment.</li><li>MEC and MD items located in Shear Pen Pond and Cape Poge Bay are subject to transport via dredging activities.</li></ul>	<p><b>Current Landowners:</b></p> <ul style="list-style-type: none"><li>The Trustees of Reservations and the Commonwealth of Massachusetts (inland and coastal waters). <sup>(1)</sup></li></ul> <p><b>Current Land Use:</b></p> <ul style="list-style-type: none"><li>Part of the Cape Poge Wildlife Refuge. <sup>(2)</sup></li><li>Currently, the MRS remains mostly undeveloped; however, there are several single-family residential homes located in the northern portion of Cape Poge.</li><li>The public has access to both the Land and Inland Water MRSs.</li><li>Common property activities include, but are not limited to, camping sunbathing, swimming, four-wheel driving, picnicking, hiking, fishing, clamming, scalloping, crabbing and visiting the lighthouse. <sup>(2)</sup></li><li>Intrusive activities on land include camping and working, which could expose MEC. In addition, dune erosion could also result in exposure to subsurface MEC.</li><li>Intrusive activities within the inland water include clamming and commercial scalloping. Scalloping typically disturbs the top foot of sediment, but depending on the type of dredge used, exposure could be deeper.</li></ul> <p><b>Future Land Use:</b></p> <ul style="list-style-type: none"><li>It is anticipated that the future land use will remain the same.</li></ul> <p><b>Resource Identification:</b></p> <ul style="list-style-type: none"><li>Based on information in the Massachusetts Department of Environmental Protection Geographic Information System, the area does not qualify as a non-potable use area and use of groundwater as potable supply must be assumed.</li></ul> <p><b>Potential Receptors:</b></p> <ul style="list-style-type: none"><li>Potential receptors associated with current and future land use include residents, recreational users, and site workers for MEC and MCs. Biota is also a potential receptor for MCs.</li><li>There is concern that visitors have been moving bombs and concern over public digs in mudflats for clams. <sup>(1)</sup></li></ul>	<p><b>Property Description:</b></p> <ul style="list-style-type: none"><li>The site consists of upland sand dunes, lower areas consisting of marshes, mudflats, and inland waters.</li><li>The present land use includes primarily recreational use (including hiking, camping, and clamming) and commercial scalloping.</li></ul> <p><b>Potential Ecological Receptors:</b></p> <ul style="list-style-type: none"><li>Inland and plant species, fish, birds, insects, and mammals that inhabit or migrate through the site. Associated threatened and endangered species are included.</li><li>Eelgrass, a sensitive habitat, is known to exist in the inland water.</li></ul> <p><b>Threatened and Endangered Species:</b></p> <ul style="list-style-type: none"><li>There are approximately 37 federal/state threatened, endangered, and/or special concern species that could be present at the site. <sup>(1)</sup></li></ul> <p><b>Relationship of Munitions Debris to Habitat:</b></p> <ul style="list-style-type: none"><li>Munitions items may be located within and/or adjacent to habitat areas.</li></ul>

Notes:  
<sup>(1)</sup> UXB International, Inc., 2011. *Final Revision 1, 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.* January.  
<sup>(2)</sup> U.S. Army Corps of Engineers St. Louis District, 2009. *Draft Report, Preliminary Assessment, Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, MA, FUDS Property – D01MA0595.* February.  
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**APPENDIX B**  
**INSTITUTIONAL ANALYSIS**



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NOVEMBER 2014

# **INSTITUTIONAL ANALYSIS REPORT**

**FORMER CAPE POGE LITTLE NECK BOMB TARGET  
MUNITIONS RESPONSE AREA  
MARTHA'S VINEYARD, MASSACHUSETTS**

**FUDS Property No. D01MA0595  
Contract No. W912DY-04-D-0019  
Task Order No. 0006**



**Prepared for:  
U. S. ARMY CORPS OF ENGINEERS  
NEW ENGLAND DISTRICT**

**Prepared by:**



**UXB International, Inc.**

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## ACRONYMS

Army	U.S. Army
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DERP	Defense Environmental Restoration Program
DoD	Department of Defense
EP	Engineer Pamphlet
ER	Engineer Regulation
EPA	U.S. Environmental Protection Agency
FS	feasibility study
FUDS	Formerly Used Defense Site
IC	institutional control
LUC	land use control
LTM	long-term management
MADEP	Massachusetts Department of Environmental Protection
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
MRA	munitions response area
MRS	munitions response site
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
TPP	Technical Project Planning
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Command
USC	United States Code

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## 1.0 PURPOSE OF THE STUDY

This Institutional Analysis identifies and analyzes the institutional framework necessary to support the development of an effective land use control (LUC) response action alternative for the Land and Inland Water Munitions Response Sites (MRSs), located within the Former Cape Poge Little Neck Bomb Target Munitions Response Area (MRA). The MRSs and MRA are Formerly Used Defense Site (FUDS) Property Number D01MA0595, located on Martha's Vineyard, Massachusetts. The purpose of this report is to document the information gathered which stakeholders have jurisdiction over and to access the capability and willingness of these entities to assert LUCs that would protect the public from any hazards potentially present associated with munitions and explosives of concern (MEC) within the limits of the MRSs.

The Feasibility Study (FS) was performed in support of the Department of Defense (DoD) Military Munitions Response Program (MMRP). UXB International, Inc. was authorized to conduct the FS through a United States Army Engineering Support Center, Huntsville Contract, No. W912DY-04-D-0019, Task Order No. 006.

## 2.0 METHODOLOGY

Two types of general response actions are typically considered for remedial action at munitions response sites for comparison to a baseline condition of "no action":

- **Risk Management** - Risk Management, which is considered a "limited" action alternative by the U.S. Environmental Protection Agency (EPA), includes various LUC options that rely on legal mechanisms, engineering controls, or administrative functions to control access or to modify human behavior and provide long-term management (LTM) of risk.
- **Removal Action** - Remaining munitions can be detected and removed from the ground surface and/or below the ground surface. Alternatives for munitions clearance include technologies for detection, positioning for the detection technologies, removal, and disposal.

In accordance with the FUDS program guidance, the term LUCs encompasses physical, legal, or administrative mechanisms that restrict the use of, or limit access to, contaminated property to reduce risk to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination and physical barriers to limit access to property, such as fences or signs. The legal mechanisms are generally the same as those used for institutional controls (ICs) as discussed in the NCP. ICs are a subset of LUCs and are primarily legal mechanisms imposed to ensure the continued effectiveness of land use restrictions imposed as part of a remedial decision. Legal mechanisms include restrictive covenants, negative easements, equitable servitudes, and deed notices. Administrative mechanisms, which can also

be ICs, include notices, adopted local land use plans and ordinances, educational programs, construction permitting, or other existing land use management systems that may be used to ensure compliance with use restrictions. Educational programs can include a variety of types of information dissemination and training that can be tailored to specifically address an identified hazard and exposed populations.

Development of LUC components considered for the MRSs referred to the United States Army Corps of Engineers (USACE) guidance Engineering Pamphlet (EP) 1110-1-24 for Establishing and Maintaining Institutional Controls for Ordnance and Explosive Projects (USACE, 2000). The main objective is to design controls that rely on legal mechanisms, physical barriers or warnings, or administrative mechanisms such as construction support or educational components to restrict access or modify human behavior to reduce exposure risks. LUCs should be managed and maintained at the local level whenever possible. For FUDS properties, property owners or state and local government agencies with appropriate authorities (i.e., zoning boards) are often the best candidates for LUC management and enforcement (USACE, 2004). Effectiveness of LUCs is dependent on coordination and willingness to participate in maintenance and enforcement by all stakeholders for the duration that the specific control applies to the MRS.

The methodology used to evaluate potential LUCs focused on reducing the potential for handling munitions at the MRSs and included a review of the government and non-government entities that have some form of jurisdiction or ownership of the properties within the MRSs. Data was collected from site documentation, public records, discussions with the project stakeholders at Technical Project Planning (TPP) sessions, and through the development of questionnaires sent to all stakeholders. Once jurisdiction and ownership were determined, information concerning these entities was reviewed, including:

- capabilities;
- resources; and,
- willingness to participate.

During the review of current and future capabilities of ICs, current and future land use and public safety resources were considered. The review and analysis focused on identifying potential controls that could be included in a comprehensive risk management strategy for the Land MRS and Inland Water MRS to support the FS effort.

### **3.0 SCOPE OF EFFORT**

The Institutional Analysis was prepared in accordance with U.S. Army (Army) guidance, including MMRP document, *Final Military Munitions Response Program, Munitions Response Remedial Investigation/Feasibility Study Guidance* [U.S. Army Environmental Command (USAEC, 2009)], and EP 1110-1-24, *Establishing and Maintaining Institutional*



*Controls for Ordnance and Explosives Projects* (USACE, 2000). The scope of effort for the Institutional Analysis is to gather information and document which stakeholder entities have jurisdiction over the Land MRS and the Inland Water MRS; defines authority, responsibility, capability, resources, and the willingness of each entity to participate in ICs to protect the public from explosive hazards; identifies potential strategies available to implement access control and public safety awareness actions for the property; and, defines and analyzes intergovernmental relationships, joint responsibilities, LUC functions, technical capabilities, funding sources, and recommendations.

#### 4.0 SELECTION CRITERIA

Based on relevance to the IC process for the MRSs, the following agencies and organizations were selected for the Institutional Analysis including:

1. Department of the Army;
2. Massachusetts Department of Environmental Protection (MADEP);
3. The Trustees of Reservations (TTOR); and,
4. Town of Edgartown, Massachusetts.

Criteria used to identify these entities included: known jurisdiction as a public agency; authority to assist in implementation; responsibility for the control of land use; known willingness/ability to assist; land ownership; and, known resources and capability to provide public information or education for awareness activities.

**Department of the Army:** The Army is the executive agent for the FUDS program, and USACE is the program's executing agent. USACE is the lead agency providing technical oversight and project management with funding for response actions requested through the Environmental Restoration-FUDS account at the MRSs. USACE must comply with the Defense Environmental Restoration Program (DERP) statute [10 United States Code (USC) § 2701 et seq.], Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (42 USC § 9601 et seq.), Executive Orders 12580 and 13016, the NCP, and all applicable Department of Defense (DoD) [e.g., EP 1110-1-18 (USACE, 2006), ER 200-3-1 (USACE, 2004), DoD *Management Guidance for the DERP* (DoD, 2012)] and Army policies in managing and executing the FUDS program (USACE, 2004). Because the land within the MRS is not owned, by the DoD, USACE has minimal control relative to implementing, maintaining, monitoring, or enforcing ICs.

**Massachusetts Department of Environmental Protection:** MADEP is the support agency providing regulatory support for remedial decision-making at the MRS. MADEP is the state agency responsible for ensuring clean air and water, the safe management of toxics and hazards, the recycling of solid and hazardous wastes, the timely cleanup of hazardous

waste sites and spills, and the preservation of wetlands and coastal resources. MADEP has been fully engaged in the TPP process at the MRSs and has provided guidance on all activities performed to date. Based on the response received from solicitations regarding willingness and capability to participate in LUCs at the MRSs, MADEP indicated that the agency would be willing to distribute information provided by USACE and supports LUCs as part of a remedial alternative, but was not willing or capable to contribute to funding for LUCs.

**The Trustees of Reservations:** TTOR is a non-profit land conservation and historic preservation organization dedicated to preserving natural and historical places in the Commonwealth of Massachusetts. TTOR owns and manages the Cape Poge Wildlife Refuge, which encompasses the majority of the Land MRS. TTOR does not have local zoning or enforcement authority. Based on the response received from solicitations regarding willingness and capability to participate in LUCs at the MRSs, TTOR indicated that the organization would be willing to distribute information provided by USACE and supports LUCs as part of a remedial alternative, but was not willing or capable to contribute to funding for LUCs.

**Town of Edgartown:** The Town of Edgartown officials, responders, and various natural resource agencies have interest and involvement in the FUDS project, which were coordinated with throughout the project. Specifically, Edgartown officials who may be solicited for information about the MRSs have been made aware of the findings and progress of investigation at the MRS through presentations at TPP meetings and local responders have been alerted to munitions discovered at the MRSs through the 911 system. Based on the response received, the Town of Edgartown would not be willing or capable of distributing LUC information provided by USACE or contributing to funding for LUCs. A questionnaire was also sent to the Edgartown Shellfish Department, from which a response was not received.

## **5.0 ACCEPTANCE OF JOINT RESPONSIBILITY**

The agencies and organizations listed in Section 4 have been involved in the investigation process through the use of TPP meetings, the securing of right-of-entry agreements, and the inclusion in report distribution for investigation findings for the MRSs to date. The LUC components being contemplated in the FS are designed to provide a mechanism that affects human behavior to reduce the risk of encountering munitions remaining at the MRSs. LUCs established for the MRSs require landowner support to be effective. As indicated above, the landowners (TTOR and the Town of Edgartown) both responded to the questionnaire developed by USACE to facilitate the Institutional Analysis. Therefore, the willingness and capabilities of all landowners is known.

## **6.0 TECHNICAL CAPABILITY**

No private residences are located within the MRSs. Minimal technical capabilities are needed for TTOR and the Town of Edgartown, including officials and natural resource agencies, to provide specific awareness to the property users. USACE is technically capable of performing all other potential response actions, including support in the form of technical guidance to property owners should they pursue establishing legal mechanisms for their properties to address munitions.

## **7.0 INTERGOVERNMENTAL RELATIONSHIPS**

USACE is the lead agency providing technical oversight and project management with funding for response actions requested through the Environmental Restoration FUDS account at the MRSs. MADEP is the support agency for remedial decision-making at the MRSs. Both agencies have worked successfully to perform investigation and response efforts to date. The landowners (TTOR and the Town of Edgartown) have control and jurisdiction over the land within the MRSs in accordance with land use, ordinance, and zoning rules for the Town of Edgartown.

## **8.0 STABILITY**

The Town of Edgartown, USACE, and MADEP are all considered stable institutions.

## **9.0 FUNDING SOURCES**

Funding has been provided through the Army FUDS program. Additional funding will be required through the Engineer Regulation (ER)-FUDS account to implement a remedial alternative for the MRSs. Neither TTOR, MADEP, nor the Town of Edgartown indicated that they would be willing or capable to fund IC components for the MRSs as part of a remedial alternative.

## **10.0 RECOMMENDATIONS**

There are no existing LUCs currently at the MRSs. All project stakeholders will continue to be involved in the selection of a final remedy and implementation for the MRSs in accordance with CERCLA and the NCP. In the FS, the following remedial action objective was established for the Land and Inland Water MRSs: to protect recreational users, visitors, and workers at the MRSs from explosive hazards associated with MEC exposure in the top three feet of subsurface soil or sediment during intrusive activities and by dune erosion. Informational materials and educational LUC components to provide awareness and affect human behavior have been identified that are either considered a remedial alternative themselves, or will support an active clearance option being contemplated in the FS.

Based on the results of the Institutional Analysis, USACE shall manage and execute establishment of all LUC components, if any, included in the final remedy selected.

Funding will be required through the ER-FUDS account to implement LUCs for the MRSs. Both MADEP and TTOR are willing to provide support to distribute information provided by USACE; however, neither is willing or capable to contribute to funding for LUCs. The Town of Edgartown is not willing to distribute information provided by USACE or contribute to funding for LUCs.

## **11.0 REFERENCES**

- Code of Federal Regulations, Title 40 -*Protection of Environment*, Volume 28, Chapter I, Part 300-*National Oil And Hazardous Substances Pollution Contingency Plan*.
- DoD (Department of Defense). 2012. *DoD Manual 4715.20, Defense Environmental Restoration Program (DERP) Management*. March 2012.
- USACE (United States Army Corps of Engineers). 2000. Engineer Pamphlet 1110-1-24, *Establishing and Maintaining Institutional Controls for Ordnance and Explosives Projects*. December 2000.
- USACE, 2004. Engineer Regulation 200-3-1, *Formerly Used Defense Sites (FUDS) Program Policy*. May 2004.
- USACE, 2006. Engineer Pamphlet 1110-1-18. *Military Munitions Response Process*. 3 April 2006.
- USAEC (U.S. Army Environmental Command), 2009. *Final Military Munitions Response Program, Munitions Response Remedial Investigation/Feasibility Study Guidance*. October 2009.
- United States Environmental Protection Agency (EPA), 1988. *Interim Final Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA*. October.

**APPENDIX C**  
**MEC HAZARD ASSESSMENT**

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## MEC HA Summary Information

Site ID:	FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)
Date:	4/30/2012

Please identify the single specific area to be assessed in this hazard assessment. From this point forward, all references to "site" or "MRS" refer to the specific area that you have defined.

### A. Enter a unique identifier for the site:

Former Cape Poge Littleneck Bomb Target, Land/Beach Areas

## Comments

MEC HA does not include underwater areas (inland water and ocean)

Provide a list of information sources used for this hazard assessment. As you are completing the worksheets, use the "Select Ref(s)" buttons at the ends of each subsection to select the applicable information sources from the list below.

Ref. No. Title (include version, publication date)

- 1 *Visual Ordnance Sweep Report*. VRHabilis, 2008.
- 2 *Draft Preliminary Assessment, Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, MA, FUDS Property Number - D01MA0595*. USACE, 2009.
- 3 *Explosives 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*. USAECH, 2010.
- 4 *Draft Final Site Specific Final Report For The Time Critical Removal Action (TCRA) at Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Dukes County, Massachusetts, and Former Movig Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts*. USACE, 2010.
- 5 *Final Revision 3, 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*. UXB, 2011.

**B. Briefly describe the site:**

1. Area (include units):	236 (No. D01MA0595 - 141 acres)	The FUDS boundary was expanded based upon previously identified MEC and/or MD.
2. Past munitions-related use:		
Target Area		
3. Current land-use activities (list all that occur):		
Hiking, biking, recreational activities, residential, and TTOR maintenance		
4. Are changes to the future land-use planned?	No	
5. What is the basis for the site boundaries?		
The expanded Area of Investigation boundary was based upon previously identified MEC and/or MD.		
6. How certain are the site boundaries?		
Site boundaries can be reduced based on RI field work, but the former target areas is highly contaminated.		
Reference(s) for Part B: <b>Visual Ordinance Sweep Report. VKHADINS, 2008.</b> <b>Draft Preliminary Assessment, Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, MA, FUDS Property Number - D01MA0595. USACE, 2009.</b> <b>Draft Final Site Specific Final Report For The Time Critical Removal Action (TCRA) at Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Dukes County, Massachusetts, and Former Movig Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts. USACE, 2010.</b> <b>Final Revision 3, 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. UXB, 2011.</b>		



**C. Historical Clearances**

1. Have there been any historical clearances at the site?

Yes, subsurface clearance

2. If a clearance occurred:

a. What year was the clearance performed?

2009

b. Provide a description of the clearance activity (e.g., extent, depth, amount of munitions-related items removed, types and sizes of removed items, and whether metal detectors were used):

TCRA, surface and subsurface - 127 munitions debris items recovered (AN-MK23 and AN-MK5). Hand-held analog detectors used in Mag/Dig approach. MD items were recovered between 0 and 1 ft bgs.

Reference(s) for Part C:

**Draft Final Site Specific Final Report For The Time Critical Removal Action (TCRA) at Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Dukes County, Massachusetts, and Former Movig Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts. USACE, 2010.**

**D. Attach maps of the site below (select 'Insert/Picture' on the menu bar.)**

Site ID: **FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)**

Date: **4/30/2012**

## Cased Munitions Information

Item No.	Munition Type (e.g., mortar, projectile, etc.)	Munition Size	Munition Size Units	Mark/Model	Energetic Material Type	Is Munition Fuzed?	Fuzing Type	Fuze Condition	Minimum Depth for Munition (ft)	Location of Munitions	Comments (include rationale for munitions that are "subsurface only")
1	Bombs	3	lb	AN-MK23	Spotting Charge	No			0	Surface and Subsurface	From PA, RI investigation
2	Bombs	3	lb	AN-MK5	Spotting Charge	No			0	Surface and Subsurface	From TCRA

Reference(s) for table above:



**Draft Preliminary Assessment, Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, MA, FUDS Property Number - D01MA0595. USACE, 2009.**  
**Draft Final Site Specific Final Report For The Time Critical Removal Action (TCRA) at Former Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, Dukes County, Massachusetts, and Former Movig Target Machine Gun Range at South Beach, Martha's Vineyard, Edgartown, Massachusetts. USACE, 2010.**  
**Final Revision 3, 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. UXB, 2011.**

## Bulk Explosive Information

Item No.	Explosive Type	Comments
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

Reference(s) for table above:

Site ID: **FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)**  
Date: **4/30/2012**

**Activities Currently Occurring at the Site**

Activity No.	Activity	Number of people per year who participate in the activity	Number of hours per year a single person spends on the activity	Potential Contact Time (receptor hours/year)	Maximum intrusive depth (ft)	Comments
1	Hiking, Biking, Recreational Activities	2,600	48	<b>124,800</b>	1	1 trip per month; 4 hours per trip
2	Residential	50	5,840	<b>292,000</b>	4	16 hours per day, year round
3	TTOR Maintenance	4	390	<b>1,560</b>	2	
4						
5						
6						
7						
8						
9						
10						
11						
12						
Total Potential Contact Time (receptor hrs/yr):				<b>418,360</b>		
Maximum intrusive depth at site (ft):					<b>4</b>	

Reference(s) for table above:

**Draft Preliminary Assessment, Cape Poge Little Neck Bomb Target Site, Chappaquiddick Island, MA, FUDS Property Number - D01MA0595. USACE, 2009.**



Site ID: **FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)**  
Date: **4/30/2012**

### Planned Remedial or Removal Actions

Response Action No.	Response Action Description	Expected Resulting Minimum MEC Depth (ft)	Expected Resulting Site Accessibility	Will land use activities change if this response action is implemented?	What is the expected scope of cleanup?	Comments
1	NDAI	0	Full Accessibility	No	No MEC cleanup	
2	LUCs	0	Full Accessibility	No	No MEC cleanup	
3	Surface Clearance/LUCs	0	Full Accessibility	No	cleanup of MECs located on the surface only	entire area
4	Partial Subsurface Clearance	0	Full Accessibility	No	cleanup of MECs located on the surface only	accessible areas only
5	Full Subsurface Clearance	4	Full Accessibility	No	cleanup of MECs located both on the surface and subsurface	entire area
6						

According to the 'Summary Info' worksheet, no future land uses are planned. For those alternatives where you answered 'No' in Column E, the land use activities will be assessed against current land uses.

--	--

Reference(s) for table above:



The following table is used to determine scores associated with the energetic materials. Materials are listed in order from most hazardous to least hazardous.

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
High Explosive and Low Explosive Filler in Fragmenting Rounds	100	100	100
White Phosphorus	70	70	70
Pyrotechnic	60	60	60
Propellant	50	50	50
Spotting Charge	40	40	40
Incendiary	30	30	30

**The most hazardous type of energetic material listed in the 'Munitions, Bulk Explosive Info' Worksheet falls under the category 'Spotting Charge'.**

*Score*

Baseline Conditions:	40
Surface Cleanup:	40
Subsurface Cleanup:	40

1. What is the Explosive Safety Quantity Distance (ESQD) from the Explosive Siting Plan or the Explosive Safety Submission for the MRS?

6 feet

2. Are there currently any features or facilities where people may congregate within the MRS, or within the ESQD arc?

Yes

3. Please describe the facility or feature.

Residential, TTOR land, Cape Poge Lighthouse

MEC Item(s) used to calculate the ESQD for current use activities

### Item #1. Bombs (3lb, Spotting Charge)

### Item #2. Bombs (3lb, Spotting Charge)

[illegible]

The following table is used to determine scores associated with the location of additional human receptors (current use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

**4. Current use activities are 'Inside the MRS or inside the ESQD arc', based on Question 2.'**

*Score*

Baseline Conditions:

**30**

Surface Cleanup:

**30**

Subsurface Cleanup:

**30**

5. Are there future plans to locate or construct features or facilities where people may congregate within the MRS, or within the ESQD arc?

6. Please describe the facility or feature.

MEC Item(s) used to calculate the ESQD for future use activities

The following table is used to determine scores associated with the location of additional human receptors (future use activities):

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Inside the MRS or inside the ESQD arc	30	30	30
Outside of the ESQD arc	0	0	0

**7. Please answer Question 5 above to determine the scores.**

*Score*

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

### Site Accessibility Input Factor Categories

The following table is used to determine scores associated with site accessibility:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Full Accessibility	No barriers to entry, including signage but no fencing	80	80	80
Moderate Accessibility	Some barriers to entry, such as barbed wire fencing or rough terrain	55	55	55
Limited Accessibility	Significant barriers to entry, such as unguarded chain link fence or requirements for special transportation to reach the site	15	15	15
Very Limited Accessibility	A site with guarded chain link fence or terrain that requires special equipment and skills (e.g., rock climbing) to access	5	5	5

### Current Use Activities

Select the category that best describes the site accessibility under the current use scenario:

Full Accessibility

Baseline Conditions:

### Surface Cleanup:

### Subsurface Cleanup:

*Score*

80

80

80

### *Future Use Activities*

Baseline Conditions:

### Surface Cleanup:

### Subsurface Cleanup:

Reference(s) for above information:

***Response Alternative No. 1: NDAI***

**Based on the 'Planned Remedial or Removal Actions' Worksheet, this alternative will lead to 'Full Accessibility'.**

Baseline Conditions: 80

Surface Cleanup: **80**

Subsurface Cleanup: 80

### ***Response Alternative No. 2: LUCs***

**Based on the 'Planned Remedial or Removal Actions' Worksheet, this alternative will lead to 'Full Accessibility'.**

Baseline Conditions: 80

Surface Cleanup: 80

Subsurface Cleanup: 80

### ***Response Alternative No. 3: Surface Clearance/LUCs***

**Based on the 'Planned Remedial or Removal Actions' Worksheet, this alternative will lead to 'Full Accessibility'.**

Baseline Conditions: 80

Surface Cleanup: 80

Subsurface Cleanup: 80

### ***Response Alternative No. 4: Partial Subsurface Clearance***

**Based on the 'Planned Remedial or Removal Actions' Worksheet, this alternative will lead to 'Full Accessibility'.**

Baseline Conditions: 80

Surface Cleanup: **80**

Subsurface Cleanup: 80

### ***Response Alternative No. 5: Full Subsurface Clearance***

**Based on the 'Planned Remedial or Removal Actions' Worksheet, this alternative will lead to 'Full Accessibility'.**

Baseline Conditions: 80

Surface Cleanup: **80**

Subsurface Cleanup: 80



**Response Alternative No. 6:**

Please enter site accessibility information in the 'Planned Remedial or Removal Actions' Worksheet to continue.

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

**Potential Contact Hours Input Factor Categories**

The following table is used to determine scores associated with the total potential contact time:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup	
Many Hours	≥1,000,000 receptor-hrs/yr	120	90	30	
Some Hours	100,000 to 999,999 receptor hrs/yr	70	50	20	
Few Hours	10,000 to 99,999 receptor-hrs/yr	40	20	10	
Very Few Hours	<10,000 receptor-hrs/yr	15	10	5	

**Current Use Activities :**

Input factors are only determined for baseline conditions for current use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is:

Based on the table above, this corresponds to a input factor score for baseline conditions of:

**Future Use Activities :**

Input factors are only determined for baseline conditions for future use activities. Based on the 'Current and Future Activities' Worksheet, the Total Potential Contact Time is:

Based on the table above, this corresponds to a input factor score of:

receptor  
**418,360** hrs/yr  
**70** Score

receptor  
hrs/yr  
Score

### Subsurface Cleanup:

20

**Response Alternative No. 5: Full Subsurface Clearance**

**Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will not change if this alternative is implemented.**

**Total Potential Contact Time, based on the contact time listed for current use activities (see 'Current and Future Activities' Worksheet)**

Based on the table above, this corresponds to input factor scores of:

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

**418,360**

**Score**

**70**

**50**

**20**

**Response Alternative No. 6:**

**Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet.**

**Please complete the table before returning to this section.**

**Total Potential Contact Time**

Based on the table above, this corresponds to input factor scores of:

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

**Score**

**Amount of MEC Input Factor Categories**

The following table is used to determine scores associated with the Amount of MEC:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup	
Target Area	Areas at which munitions fire was directed	180	120	30	
	Sites where munitions were disposed of by open burn or open detonation methods.				
OB/OD Area	This category refers to the core activity area of an OB/OD area. See the "Safety Buffer Areas" category for safety fans and kick-outs.	180	110	30	

Function Test Range	Areas where the serviceability of stored munitions or weapons systems are tested. Testing may include components, partial functioning or complete functioning of stockpile or developmental items.	165	90	25
Burial Pit	The location of a burial of large quantities of MEC items.	140	140	10
Maneuver Areas	Areas used for conducting military exercises in a simulated conflict area or war zone	115	15	5
Firing Points	The location from which a projectile, grenade, ground signal, rocket, guided missile, or other device is to be ignited, propelled, or released.	75	10	5
Safety Buffer Areas	Areas outside of target areas, test ranges, or OB/OD areas that were designed to act as a safety zone to contain munitions that do not hit targets or to contain kick-outs from OB/OD areas.	30	10	5
Storage	Any facility used for the storage of military munitions, such as earth-covered magazines, above-ground magazines, and open-air storage areas.	25	10	5
Explosive-Related Industrial Facility	Former munitions manufacturing or demilitarization sites and TNT production plants	20	10	5

Select the category that best describes the *most hazardous* amount of MEC: *Score*

Target Area

Baseline Conditions: **180**

Surface Cleanup: **120**

Subsurface Cleanup: **30**

## Minimum MEC Depth Relative to the Maximum Intrusive Depth Input Factor

### Categories

#### Current Use Activities

The shallowest minimum MEC depth, based on the 'Cased Munitions Information' Worksheet:

The deepest intrusive depth:

The table below is used to determine scores associated with the minimum MEC depth relative to the maximum intrusive depth:

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240	150	95
Baseline Condition: MEC located surface and subsurface, After Cleanup: Intrusive depth does not overlap with subsurface MEC.	240	50	25
Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth overlaps with minimum MEC depth.	150	N/A	95
Baseline Condition: MEC located only subsurface. Baseline Condition or After Cleanup: Intrusive depth does not overlap with minimum MEC depth.	50	N/A	25

**Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth will overlap after cleanup. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.' For 'Current Use Activities', only Baseline Conditions are considered.**

#### Future Use Activities

Deepest intrusive depth:

**Not enough information has been entered to determine the input factor category.**

**Response Alternative No. 1: NDAI**

0 ft

4 ft

240 Score

ft

Score

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet):

**Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will not change if this alternative is implemented.**

**Maximum Intrusive Depth, based on the maximum intrusive depth listed for current use activities (see 'Current and Future Activities' Worksheet)**

0 ft

4 ft

**Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth overlaps. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.'**

*Score*

240

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

**Response Alternative No. 2: LUCs**

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet):

**Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will not change if this alternative is implemented.**

**Maximum Intrusive Depth, based on the maximum intrusive depth listed for current use activities (see 'Current and Future Activities' Worksheet)**

0 ft

4 ft

**Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth overlaps. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.'**

*Score*

240

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

**Response Alternative No. 3: Surface Clearance/LUCs**

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet):

**Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will not change if this alternative is implemented.**

0 ft

**Maximum Intrusive Depth, based on the maximum intrusive depth listed for current use activities (see 'Current and Future Activities' Worksheet)**

**4 ft**

**Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth overlaps. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.'**

*Score*

Baseline Conditions:

Surface Cleanup:

**150**

Subsurface Cleanup:

***Response Alternative No. 4: Partial Subsurface Clearance***

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet):

**0 ft**

**Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will not change if this alternative is implemented.**

**Maximum Intrusive Depth, based on the maximum intrusive depth listed for current use activities (see 'Current and Future Activities' Worksheet)**

**4 ft**

**Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth overlaps. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.'**

*Score*

Baseline Conditions:

Surface Cleanup:

**150**

Subsurface Cleanup:

***Response Alternative No. 5: Full Subsurface Clearance***

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet):

**4 ft**

**Based on the 'Planned Remedial or Removal Actions' Worksheet, land use activities will not change if this alternative is implemented.**

**Maximum Intrusive Depth, based on the maximum intrusive depth listed for current use activities (see 'Current and Future Activities' Worksheet)**

**4 ft**

**Because the shallowest minimum MEC depth is less than or equal to the deepest intrusive depth, the intrusive depth overlaps. MECs are located at both the surface and subsurface, based on the 'Munitions, Bulk Explosive Info' Worksheet. Therefore, the category for this input factor is 'Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.'**

*Score*

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

95

*Response Alternative No. 6:*

Expected minimum MEC depth (from the 'Planned Remedial or Removal Actions' Worksheet):

ft

Not enough information has been entered in the 'Planned Remedial or Removal Actions' Worksheet.

Please complete the table before returning to this section.

Maximum Intrusive Depth

ft

Not enough information has been entered to calculate this input factor.

Score

Baseline Conditions:

Surface Cleanup:

Subsurface Cleanup:

### Migration Potential Input Factor Categories

Is there any physical or historical evidence that indicates it is possible for natural physical forces in the area (e.g., frost heave, erosion) to expose subsurface MEC items, or move surface or subsurface MEC items?

Yes

If "yes", describe the nature of natural forces. Indicate key areas of potential migration (e.g., overland water flow) on a map as appropriate (attach a map to the bottom of this sheet, or as a separate worksheet).

Erosion is most critical

The following table is used to determine scores associated with the migration potential:

	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Possible	30	30	10
Unlikely	10	10	10

Based on the question above, migration potential is 'Possible.'

Score

Baseline Conditions:

30

Surface Cleanup:

30

Subsurface Cleanup:

10



██████████

No

- |                        | UXO | Baseline<br>Conditions | Surface<br>Cleanup | Subsurface<br>Cleanup |
|------------------------|-----|------------------------|--------------------|-----------------------|
| UXO Special Case       |     | 180                    | 180                | 180                   |
| UXO                    |     | 110                    | 110                | 110                   |
| Fuzed DMM Special Case |     | 105                    | 105                | 105                   |
| Fuzed DMM              |     | 55                     | 55                 | 55                    |
| Unfuzed DMM            |     | 45                     | 45                 | 45                    |
| Bulk Explosives        |     | 45                     | 45                 | 45                    |

**Based on your answers above, the MEC classification is 'UXO'.**

Baseline Conditions:

**Score**

**110**

Surface Cleanup:

**110**

Subsurface Cleanup:

**110**

### MEC Size Input Factor Categories

The following table is used to determine scores associated with MEC Size:

	Description	Baseline Conditions	Surface Cleanup	Subsurface Cleanup
Small	Any munitions (from the 'Munitions, Bulk Explosive Info' Worksheet) weigh less than 90 lbs; small enough for a receptor to be able to move and initiate a detonation	40	40	40
Large	All munitions weigh more than 90 lbs; too large to move without equipment	0	0	0

Based on the definitions above and the types of munitions at the site (see 'Munitions, Bulk Explosive Info' Worksheet), the MEC Size Input Factor is:

**Small**

**Score**

Baseline Conditions:

**40**

Surface Cleanup:

**40**

Subsurface Cleanup:

**40**

**Scoring Summary**

Site ID:	FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)	<b>a. Scoring Summary for Current Use Activities</b>	
Date:	4/30/2012	Response Action Cleanup:	No Response Action
<b>Input Factor</b>	<b>Input Factor Category</b>	<b>Score</b>	
I. Energetic Material Type	Spotting Charge	40	
II. Location of Additional Human Receptors	Inside the MRS or inside the ESQD arc	30	
III. Site Accessibility	Full Accessibility	80	
IV. Potential Contact Hours	100,000 to 999,999 receptor hrs/yr	70	
V. Amount of MEC	Target Area	180	
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth	Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240	
VII. Migration Potential	Possible	30	
VIII. MEC Classification	UXO	110	
IX. MEC Size	Small	40	
		<b>Total Score</b>	<b>820</b>
		<b>Hazard Level Category</b>	<b>2</b>

Site ID:	FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)	<b>b. Scoring Summary for Future Use Activities</b>	
Date:	4/30/2012	Response Action Cleanup:	No Response Action
<b>Input Factor</b>	<b>Input Factor Category</b>	<b>Score</b>	
I. Energetic Material Type			
II. Location of Additional Human Receptors			
III. Site Accessibility			
IV. Potential Contact Hours			
V. Amount of MEC			
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth			
VII. Migration Potential			
VIII. MEC Classification			
IX. MEC Size			
		<b>Total Score</b>	
		<b>Hazard Level Category</b>	

Site ID:	FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of Investigation)	<b>c. Scoring Summary for Response Alternative 1: NDAI</b>	
Date:	4/30/2012	Response Action Cleanup:	No MEC cleanup
<b>Input Factor</b>	<b>Input Factor Category</b>	<b>Score</b>	
I. Energetic Material Type	Spotting Charge	40	
II. Location of Additional Human Receptors	Inside the MRS or inside the ESQD arc	30	
III. Site Accessibility	Full Accessibility	80	
IV. Potential Contact Hours	100,000 to 999,999 receptor hrs/yr	70	
V. Amount of MEC	Target Area	180	
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth	Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240	
VII. Migration Potential	Possible	30	
VIII. MEC Classification	UXO	110	
IX. MEC Size	Small	40	
		<b>Total Score</b>	<b>820</b>
		<b>Hazard Level Category</b>	<b>2</b>

Site ID:	FUDS No. D01MA0595 (Former C	d. Scoring Summary for Response Alternative 2: LUCs	
Date:	4/30/2012	Response Action Cleanup:	No MEC cleanup
Input Factor	Input Factor Category	Score	
I. Energetic Material Type	Spotting Charge	40	
II. Location of Additional Human Receptors	Inside the MRS or inside the ESQD arc	30	
III. Site Accessibility	Full Accessibility	80	
IV. Potential Contact Hours	100,000 to 999,999 receptor hrs/yr	70	
V. Amount of MEC	Target Area	180	
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth	Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	240	
VII. Migration Potential	Possible	30	
VIII. MEC Classification	UXO	110	
IX. MEC Size	Small	40	
		Total Score	820
		Hazard Level Category	2

Site ID:	FUDS No. D01MA0595 (Former C	e. Scoring Summary for Response Alternative 3: Surface Clearance/LUCs	
Date:	4/30/2012	Response Action Cleanup:	cleanup of MECs located on the surface only
Input Factor	Input Factor Category	Score	
I. Energetic Material Type	Spotting Charge	40	
II. Location of Additional Human Receptors	Inside the MRS or inside the ESQD arc	30	
III. Site Accessibility	Full Accessibility	80	
IV. Potential Contact Hours	100,000 to 999,999 receptor hrs/yr	50	
V. Amount of MEC	Target Area	120	
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth	Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	150	
VII. Migration Potential	Possible	30	
VIII. MEC Classification	UXO	110	
IX. MEC Size	Small	40	
		Total Score	650
		Hazard Level Category	3

Site ID:	FUDS No. D01MA0595 (Former C	f. Scoring Summary for Response Alternative 4: Partial Subsurface Clearance	
Date:	4/30/2012	Response Action Cleanup:	cleanup of MECs located on the surface only
Input Factor	Input Factor Category	Score	
I. Energetic Material Type	Spotting Charge	40	
II. Location of Additional Human Receptors	Inside the MRS or inside the ESQD arc	30	
III. Site Accessibility	Full Accessibility	80	
IV. Potential Contact Hours	100,000 to 999,999 receptor hrs/yr	50	
V. Amount of MEC	Target Area	120	
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth	Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	150	
VII. Migration Potential	Possible	30	
VIII. MEC Classification	UXO	110	
IX. MEC Size	Small	40	
		Total Score	650
		Hazard Level Category	3

Site ID:	FUDS No. D01MA0595 (Former C	g. Scoring Summary for Response Alternative 5: Full Subsurface Clearance	
Date:	4/30/2012	Response Action Cleanup:	cleanup of MECs located both on the surface and subsurface
Input Factor	Input Factor Category	Score	
I. Energetic Material Type	Spotting Charge	40	
II. Location of Additional Human Receptors	Inside the MRS or inside the ESQD arc	30	
III. Site Accessibility	Full Accessibility	80	
IV. Potential Contact Hours	100,000 to 999,999 receptor hrs/yr	20	
V. Amount of MEC	Target Area	30	
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth	Baseline Condition: MEC located surface and subsurface. After Cleanup: Intrusive depth overlaps with subsurface MEC.	95	
VII. Migration Potential	Possible	10	
VIII. MEC Classification	UXO	110	
IX. MEC Size	Small	40	
		Total Score	455
		Hazard Level Category	4

Site ID:	FUDS No. D01MA0595 (Former C	h. Scoring Summary for Response Alternative 6:	
Date:	4/30/2012	Response Action Cleanup:	
Input Factor	Input Factor Category	Score	
I. Energetic Material Type	Spotting Charge		
II. Location of Additional Human Receptors	Inside the MRS or inside the ESQD arc		
III. Site Accessibility			
IV. Potential Contact Hours			
V. Amount of MEC	Target Area		
VI. Minimum MEC Depth Relative to Maximum Intrusive Depth			
VII. Migration Potential	Possible		
VIII. MEC Classification	UXO		
IX. MEC Size	Small		
		Total Score	
		Hazard Level Category	

MEC HA Hazard Level Determination			
Site ID:	FUDS No. D01MA0595 (Former Cape Poge Little Neck Bomb Target Area of		
Date:	4/30/2012		
		Hazard Level Category	Score
a. Current Use Activities		2	820
b. Future Use Activities			
c. Response Alternative 1: NDAI		2	820
d. Response Alternative 2: LUCs		2	820
e. Response Alternative 3: Surface Clearance/LUCs		3	650
f. Response Alternative 4: Partial Subsurface Clearance		3	650
g. Response Alternative 5: Full Subsurface Clearance		4	455
h. Response Alternative 6:			
Characteristics of the MRS			
Is critical infrastructure located within the MRS or within the ESQD arc?		Yes	
Are cultural resources located within the MRS or within the ESQD arc?		Yes	
Are significant ecological resources located within the MRS or within the ESQD arc?		Yes	

**APPENDIX D**  
**COST ESTIMATES**

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Land MRS  
Alternative 2  
Land Use Controls  
62 Acres

**CAPITAL COST:**

Bid Item No.	Description	Unit	Team Production (Units/Day)	# Teams	Duration (Weeks)	Weekly Cost Per Team	Cost Per Acre	Total
0100	Work and Safety Plans, UFP-QAPP, TPP	LS	N/A	N/A	N/A	\$98,286	N/A	\$0
0110	Explosive Safety Submission	LS	N/A	N/A	N/A	\$23,481	N/A	\$0
0200	Mobilization - Per Person	Person	N/A	N/A	N/A	\$2,633	N/A	\$0
0300	Site Management	Week	1.00	1	0.00	\$50,974	N/A	\$0
0310	Survey/Positioning	AC	10.00	1	0.00	\$15,178	\$0	\$0
0320	Brush Clearing	AC	12.00	1	0.00	\$9,639	\$0	\$0
	Environmental Monitoring and Coordination (Habitat Survey)	AC	15.00	1	0.00	\$12,462	\$0	\$0
0400	MEC Surface Removal	AC	3.00	2	0.00	\$41,240	\$0	\$0
0410	MEC Sub-surface Removal, Analogue	AC	2.00	1	0.00	\$42,821	\$0	\$0
0420	Digital Geophysical Mapping	AC	3.00	1	0.00	\$20,910	\$0	\$0
0430	Digital Data Analysis	AC	3.00	1	0.00	\$9,852	\$0	\$0
0440	Anomaly Reacquisition	AC	2.00	2	0.00	\$15,178	\$0	\$0
0450	Anomaly Resolution	AC	2.00	2	0.00	\$42,821	\$0	\$0
0500	Underwater Surface MEC Removal (Analog)	AC	1.00	2	0.00	\$42,821	\$0	\$0
0510	Underwater Subsurface MEC Removal (Analog)	AC	1.5	2	0.00	\$96,273	\$0	\$0
0520	DGM - Underwater	AC	4.0	1	0.00	\$36,411	\$0	\$0
0540	Anomaly Resolution - Underwater	AC	1.5	2	0.00	\$96,273	\$0	\$0
0600	MDAS Certification and Disposal	LS	0.2	1	0.00	\$19,121	N/A	\$0
0610	Site Restoration	LS	0.1	1	0.00	\$28,329	N/A	\$0
0620	Demobilization	Person	N/A	N/A	N/A	\$2,633	N/A	\$0
0700	Remedial Action Completion Report	LS	N/A	N/A	N/A	\$80,199	N/A	\$0
0710	Land Use Control Plan	LS	N/A	N/A	N/A	\$36,741	N/A	\$36,741
0800	Land Use Control Implementation	LS	N/A	N/A	N/A	\$110,978	N/A	\$110,978
0810	Annual Post-Construction Revegetation Monitoring	Year	N/A	N/A	N/A	\$27,318	N/A	\$0
	Sub-Total							\$147,719
	Contingency							\$22,158
	Sub-Total							\$169,877
	Infrastructure Improvements							\$3,398
	Project Management							\$8,494
	Remedial Design (USACE)							\$13,590
	Construction Management (USACE)							\$10,193
	<b>Total Capital Cost</b>							<b>\$205,551</b>

**LONG-TERM MANAGEMENT COST:**

	Description	Year	QTY	Unit	Unit Cost	Total
900	Long-Term Management	1-30	30	EA	\$13,882	\$416,460
	Sub-Total					\$416,460
	Contingency					\$62,469
	Project Management					\$20,823
	<b>Total Long-Term Management Cost</b>					<b>\$478,929</b>

**ALTERNATIVE 2: TOTAL CAPITAL AND LONG-TERM MANAGEMENT COST:**

**\$684,480**

**PERIODIC COST:**

	Description	Year	QTY	Unit	Unit Cost	Total
0820	Five Year Review (cost per review)	5	1	EA	\$41,739	\$41,739
	<i>*5 Year Review not included in total alternative cost estimate</i>					

Notes: AC = acres      EA = each      LS = lump sum      N/A = not applicable      WK = week

Land MRS Alternative 3 Partial Subsurface Clearance with Land Use Controls 31 Acres of Subsurface Clearance								
<b>COST:</b>								
Bid Item No.	Description	Unit	Team Production (Units/Day)	# Teams	Duration (Weeks)	Weekly Cost Per Team	Cost Per Acre	Total
0100	Work and Safety Plans, UFP-QAPP, TPP	LS	N/A	N/A	N/A	\$98,286	N/A	\$98,286
0110	Explosive Safety Submission	LS	N/A	N/A	N/A	\$23,481	N/A	\$23,481
0200	Mobilization - Per Person	Person	N/A	N/A	N/A	\$2,633	N/A	\$63,192
0300	Site Management	Week	1.00	1	7.00	\$50,974	N/A	\$356,817
0310	Survey/Positioning	AC	10.00	1	0.62	\$15,178	\$304	\$9,410
0320	Brush Clearing	AC	5.00	1	1.24	\$71,625	\$2,865	\$88,815
	Environmental Monitoring and Coordination (Habitat Survey)	AC	N/A	N/A	N/A	\$43,029	\$1,388	\$43,029
0400	MEC Surface Removal	AC	3.00	1	0.00	\$41,240	\$0	\$0
0410	MEC Sub-surface Removal, Analog	AC	2.00	1	0.00	\$42,821	\$0	\$0
0420	Digital Geophysical Mapping	AC	3.00	1	2.07	\$20,910	\$1,394	\$43,215
0430	Digital Data Analysis	AC	3.00	1	2.07	\$9,852	\$657	\$20,361
0440	Anomaly Reacquisition	AC	2.00	2	1.55	\$15,178	\$1,518	\$47,050
0450	Anomaly Resolution	AC	2.00	2	1.55	\$42,821	\$4,282	\$132,745
0500	Underwater Surface MEC Removal (Analog)	AC	1.00	2	0.00	\$42,821	\$0	\$0
0510	Underwater Subsurface MEC Removal (Analog)	AC	1.5	2	0.00	\$96,273	\$0	\$0
0520	DGM - Underwater	AC	4.0	1	0.00	\$36,411	\$0	\$0
0540	Anomaly Resolution - Underwater	AC	1.5	2	0.00	\$96,273	\$0	\$0
0600	MDAS Certification and Disposal	LS	0.2	1	1.00	\$19,121	N/A	\$19,121
0610	Site Restoration	LS	0.1	1	1.00	\$28,329	\$914	\$28,329
0620	Demobilization	Person	N/A	N/A	N/A	\$2,633	N/A	\$63,192
0700	Remedial Action Completion Report	LS	N/A	N/A	N/A	\$80,199	N/A	\$80,199
0710	Land Use Control Plan	LS	N/A	N/A	N/A	\$36,741	N/A	\$36,741
0800	Land Use Control Implementation	LS	N/A	N/A	N/A	\$110,978	N/A	\$110,978
0810	Annual Post-Construction Revegetation Monitoring	Year	N/A	N/A	N/A	\$27,318	N/A	\$81,954
	Sub-Total							\$1,346,913
	Contingency							\$202,037
	Sub-Total							\$1,548,950
	Infrastructure Improvements							\$30,979
	Project Management							\$77,448
	Remedial Design (USACE)							\$123,916
	Construction Management (USACE)							\$92,937
	<b>Total Cost</b>							<b>\$1,874,230</b>
<b>LONG-TERM MANAGEMENT COST:</b>								
	Description	Year	QTY	Unit	Unit Cost	Total		
900	Long-Term Management	1-30	30	EA	\$13,882	\$416,460		
	Sub-Total					\$416,460		
	Contingency					\$62,469		
	Project Management					\$20,823		
	<b>Total Long-Term Management Cost</b>					<b>\$478,929</b>		
<b>ALTERNATIVE 3: TOTAL CAPITAL AND LONG-TERM MANAGEMENT COST:</b>								<b>\$2,353,159</b>
<b>PERIODIC COST:</b>								
	Description	Year	QTY	Unit	Unit Cost	Total		
0820	Five Year Review (cost per review)	5	1	EA	\$41,739	\$41,739		

AC = acres

EA = each

LS = lump sum

N/A = not applicable

WK = week

Land MRS  
Alternative 4  
Subsurface Clearance  
62 Acres

**COST:**

Bid Item No.	Description	Unit	Team Production (Units/Day)	# Teams	Duration (Weeks)	Weekly Cost Per Team	Cost Per Acre	Total
0100	Work and Safety Plans, UFP-QAPP, TPP	LS	N/A	N/A	N/A	\$98,286	N/A	\$98,286
0110	Explosive Safety Submission	LS	N/A	N/A	N/A	\$23,481	N/A	\$23,481
0200	Mobilization - Per Person	Person	N/A	N/A	N/A	\$2,633	N/A	\$63,192
0300	Site Management	Week	1.00	1	13.00	\$50,974	N/A	\$662,660
0310	Survey/Positioning	AC	10.00	1	1.24	\$15,178	\$304	\$18,820
0320	Brush Clearing	AC	5.00	1	2.48	\$71,625	\$2,865	\$177,630
0330	Environmental Monitoring and Coordination (Habitat Survey)	AC	N/A	N/A	N/A	\$86,058	\$1,388	\$86,058
0400	MEC Surface Removal	AC	3.00	2	0.00	\$41,240	#DIV/0!	\$0
0410	MEC Sub-surface Removal, Analog	AC	2.00	1	0.00	\$42,821	\$0	\$0
0420	Digital Geophysical Mapping	AC	3.00	1	4.13	\$20,910	\$1,394	\$86,429
0430	Digital Data Analysis	AC	3.00	1	4.13	\$9,852	\$657	\$40,722
0440	Anomaly Reacquisition	AC	2.00	2	3.10	\$15,178	\$1,518	\$94,101
0450	Anomaly Resolution	AC	2.00	2	3.10	\$42,821	\$4,282	\$265,491
0500	Underwater Surface MEC Removal (Analog)	AC	1.00	2	0.00	\$42,821	\$0	\$0
0510	Underwater Subsurface MEC Removal (Analog)	AC	1.5	2	0.00	\$96,273	\$0	\$0
0520	DGM - Underwater	AC	4.0	1	0.00	\$36,411	\$0	\$0
0540	Anomaly Resolution - Underwater	AC	1.5	2	0.00	\$96,273	\$0	\$0
0600	MDAS Certification and Disposal	LS	0.2	1	1.00	\$19,121	N/A	\$19,121
0610	Site Restoration	LS	0.1	1	2.00	\$56,658	\$914	\$113,316
0620	Demobilization	Person	N/A	N/A	N/A	\$2,633	N/A	\$63,192
0700	Remedial Action Completion Report	LS	N/A	N/A	N/A	\$80,199	N/A	\$80,199
0710	Land Use Control Plan	LS	N/A	N/A	N/A	\$36,741	N/A	\$36,741
0800	Land Use Control Implementation	LS	N/A	N/A	N/A	\$110,978	N/A	\$110,978
0810	Annual Post-Construction Revegetation Monitoring	Year	N/A	N/A	N/A	\$27,318	N/A	\$81,954
Sub-Total								\$2,122,369
Contingency								\$318,355
Sub-Total								\$2,440,724
Infrastructure Improvements								\$48,814
Project Management								\$122,036
Remedial Design (USACE)								\$195,258
Construction Management (USACE)								\$146,443
<b>Total Cost</b>								<b>\$2,953,277</b>

**LONG-TERM MANAGEMENT COST:**

	Description	Year	QTY	Unit	Unit Cost	Total
900	Long-Term Management	1-5	5	EA	\$13,882	\$69,410
Sub-Total						\$69,410
Contingency						\$10,412
Project Management						\$3,471
<b>Total Long-Term Management Cost</b>						<b>\$79,822</b>

**ALTERNATIVE 4: TOTAL CAPITAL AND LONG-TERM MANAGEMENT COST: \$3,033,098**

**PERIODIC COST:**

	Description	Year	QTY	Unit	Unit Cost	Total
0820	Five Year Review (cost per review)	5	1	EA	\$41,739	\$41,739

AC = acres

EA = each

LS = lump sum

N/A = not applicable

WK = week

Inland Water MRS Alternative 2 Land Use Controls 172 Acres								
<b>COST:</b>								
Bid Item No.	Description	Unit	Team Production (Units/Day)	# Teams	Duration (Weeks)	Weekly Cost Per Team	Cost Per Acre	Total
0100	Work and Safety Plans, UFP-QAPP, TPP	LS	N/A	N/A	N/A	\$98,286	N/A	\$0
0110	Explosive Safety Submission	LS	N/A	N/A	N/A	\$23,481	N/A	\$0
0200	Mobilization - Per Person	Person	N/A	N/A	N/A	\$2,633	N/A	\$0
0300	Site Management	Week	1.00	1	0.00	\$50,974	N/A	\$0
0310	Survey/Positioning	AC	10.00	1	0.00	\$15,178	\$0	\$0
0320	Brush Clearing	AC	5.00	1	0.00	\$71,625	\$0	\$0
0330	Environmental Monitoring and Coordination	AC	15.00	1	0.00	\$12,462	\$0	\$0
0400	MEC Surface Removal	AC	3.00	2	0.00	\$41,240	\$0	\$0
0410	MEC Sub-surface Removal, Analogue	AC	2.00	1	0.00	\$42,821	\$0	\$0
0420	Digital Geophysical Mapping	AC	3.00	1	0.00	\$20,910	\$0	\$0
0430	Digital Data Analysis	AC	3.00	1	0.00	\$9,852	\$0	\$0
0440	Anomaly Reacquisition	AC	2.00	2	0.00	\$15,178	\$0	\$0
0450	Anomaly Resolution	AC	2.00	2	0.00	\$42,821	\$0	\$0
0500	Underwater Surface MEC Removal (Analog)	AC	1.00	2	0.00	\$42,821	\$0	\$0
0510	Underwater Subsurface MEC Removal (Analog)	AC	1.5	2	0.00	\$96,273	\$0	\$0
0520	DGM - Underwater	AC	4.0	1	0.00	\$36,411	\$0	\$0
0540	Anomaly Resolution - Underwater	AC	1.5	2	0.00	\$96,273	\$0	\$0
0600	MDAS Certification and Disposal	LS	0.2	1	0.00	\$19,121	N/A	\$0
0610	Site Restoration	LS	0.1	1	0.00	\$14,165	N/A	\$0
0620	Demobilization	Person	N/A	N/A	N/A	\$2,633	N/A	\$0
0700	Remedial Action Completion Report	LS	N/A	N/A	N/A	\$80,199	N/A	\$0
0710	Land Use Control Plan	LS	N/A	N/A	N/A	\$36,741	N/A	\$36,741
0800	Land Use Control Implementation	LS	N/A	N/A	N/A	\$110,978	N/A	\$110,978
0810	Annual Post-Construction Revegetation Monitoring	Year	N/A	N/A	N/A	\$27,318	N/A	\$0
Sub-Total								\$147,719
Contingency								\$22,158
Sub-Total								\$169,877
Infrastructure Improvements								\$3,398
Project Management								\$8,494
Remedial Design (USACE)								\$13,590
Construction Management (USACE)								\$10,193
<b>Total Cost</b>								<b>\$205,551</b>
<b>LONG-TERM MANAGEMENT COST:</b>								
	Description		Year	QTY	Unit	Unit Cost		Total
900	Long-term Management		1-30	30	EA	\$13,882		\$416,460
Sub-Total								\$416,460
Contingency								\$62,469
Project Management								\$20,823
<b>Total Long-Term Management Cost</b>								<b>\$478,929</b>
<b>ALTERNATIVE 2: TOTAL CAPITAL AND LONG-TERM MANAGEMENT COST:</b>								<b>\$684,480</b>
<b>PERIODIC COST:</b>								
	Description		Year	QTY	Unit	Unit Cost		Total
0820	Five Year Review (cost per review)		5	1	EA	\$41,739		\$41,739

AC = acres

EA = each

LS = lump sum

N/A = not applicable

WK = week

Inland Water MRS Alternative 3 Subsurface Clearance 172 Acres								
<b>COST:</b>								
Bid Item No.	Description	Unit	Team Production (Units/Day)	# Teams	Duration (Weeks)	Weekly Cost Per Team	Cost Per Acre	Total
0100	Work and Safety Plans, UFP-QAPP, TPP	LS	N/A	N/A	N/A	\$98,286	N/A	\$98,286
0110	Explosive Safety Submission	LS	N/A	N/A	N/A	\$23,481	N/A	\$23,481
0200	Mobilization - Per Person	Person	N/A	N/A	N/A	\$2,633	N/A	\$63,192
0300	Site Management	Week	1.00	1	17.00	\$50,974	N/A	\$866,556
0310	Survey/Positioning	AC	10.00	1	3.44	\$15,178	\$0	\$52,211
0320	Brush Clearing	AC	5.00	1	0.00	\$71,625	\$0	\$0
0330	Environmental Monitoring and Coordination	AC	15.00	1	0.00	\$12,462	\$0	\$0
0400	MEC Surface Removal	AC	3.00	2	0.00	\$41,240	\$0	\$0
0410	MEC Sub-surface Removal, Analogue	AC	2.00	1	0.00	\$42,821	\$0	\$0
0420	Digital Geophysical Mapping	AC	3.00	1	0.00	\$20,910	\$0	\$0
0430	Digital Data Analysis	AC	2.50	1	13.76	\$9,852	\$788	\$135,566
0440	Anomaly Reacquisition	AC	2.00	2	0.00	\$15,178	\$0	\$0
0450	Anomaly Resolution	AC	2.00	2	0.00	\$42,821	\$0	\$0
0500	Underwater Surface MEC Removal (Analog)	AC	0.75	2	0.00	\$42,821	\$0	\$0
0510	Underwater Subsurface MEC Removal (Analog)	AC	1.50	2	0.00	\$96,273	\$0	\$0
0520	DGM - Underwater	AC	4.00	1	8.60	\$36,411	\$2,913	\$313,133
0540	Anomaly Resolution - Underwater	AC	2.00	2	8.60	\$96,273	\$9,627	\$1,655,901
0600	MDAS Certification and Disposal	LS	0.20	1	1.00	\$19,121	N/A	\$19,121
0610	Site Restoration	LS	0.10	1	2.00	\$14,165	N/A	\$14,165
0620	Demobilization	Person	N/A	N/A	N/A	\$2,633	N/A	\$63,192
0700	Remedial Action Completion Report	LS	N/A	N/A	N/A	\$80,199	N/A	\$80,199
0710	Land Use Control Plan	LS	N/A	N/A	N/A	\$36,741	N/A	\$36,741
0800	Land Use Control Implementation	LS	N/A	N/A	N/A	\$110,978	N/A	\$110,978
0810	Annual Post-Construction Revegetation Monitorir	Year	N/A	N/A	N/A	\$27,318	N/A	\$0
	Sub-Total							\$3,532,719
	Contingency							\$529,908
	Sub-Total							\$4,062,626
	Infrastructure Improvements							\$81,253
	Project Management							\$203,131
	Remedial Design (USACE)							\$325,010
	Construction Management (USACE)							\$243,758
	<b>Total Cost</b>							<b>\$4,915,778</b>
<b>LONG-TERM MANAGEMENT COST:</b>								
	Description	Year	QTY	Unit	Unit Cost	Total		
900	Long-term Management	1-5	5	EA	\$13,882	\$69,410		
	Sub-Total					\$69,410		
	Contingency					\$10,412		
	Project Management					\$3,471		
	<b>Total Long-Term Management Cost</b>					<b>\$79,822</b>		
<b>ALTERNATIVE 4: TOTAL CAPITAL AND LONG-TERM MANAGEMENT COST:</b>								<b>\$4,995,599</b>
<b>PERIODIC COST:</b>								
	Description	Year	QTY	Unit	Unit Cost	Total		
0820	Five Year Review (cost per review)	5	1	EA	\$41,739	\$41,739		

AC = acres

EA = each

LS = lump sum

N/A = not applicable

WK = week

Bid Item Number: 100

Description: Work and Safety Plans Including UFP-QAPP, (D, DF, F) and TPP Meetings

Description: Work and Safety Plans Including OFF-QAPP, (D, DP, P) and TPF Meetings											
	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ 66,796.15	
Administrative/Clerical	HR	\$ 19.23	40	\$ 769.23				\$ 1,384.62	\$ 2,153.85		
CADD/GIS Operator	HR	\$ 31.25	80	\$ 2,500.00				\$ 4,500.00	\$ 7,000.00		
Certified Industrial Hygienist	HR	\$ 45.67	8	\$ 365.38				\$ 657.69	\$ 1,023.08		
Chemist	HR	\$ 36.06	40	\$ 1,442.31				\$ 2,596.15	\$ 4,038.46		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25	40	\$ 1,250.00				\$ 2,250.00	\$ 3,500.00		
Engineer/Scientist - Junior Level	HR	\$ 28.85	80	\$ 2,307.69				\$ 4,153.85	\$ 6,461.54		
Engineer/Scientist - Mid Level	HR	\$ 40.87	60	\$ 2,451.92				\$ 4,413.46	\$ 6,865.38		
Engineer/Scientist - Senior Level	HR	\$ 50.48	40	\$ 2,019.23				\$ 3,634.62	\$ 5,653.85		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06	40	\$ 1,442.31				\$ 2,596.15	\$ 4,038.46		
Project Geophysicist	HR	\$ 52.88	120	\$ 6,346.15				\$ 11,423.08	\$ 17,769.23		
Public Relations/Affairs Specialist	HR	\$ 24.04	40	\$ 961.54				\$ 1,730.77	\$ 2,692.31		
QC/Safety Manager	HR	\$ 52.88	16	\$ 846.15				\$ 1,523.08	\$ 2,369.23		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85	40	\$ 1,153.85				\$ 2,076.92	\$ 3,230.77		
LABOR - FIELD										\$ 12,055.97	
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -		
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23	120	\$ 6,027.98				\$ 6,027.98	\$ 12,055.97		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS										\$ 5,321.10	
Consumable Supplies and LVE (2% Labor)				\$ 1,577.04				\$ 236.56	\$ 1,813.60		
CAD/GIS Software	Hr	\$ 10.00	80	\$ 800.00				\$ 120.00	\$ 920.00		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00	3	\$ 1,500.00				\$ 225.00	\$ 1,725.00		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00	3	\$ 750.00				\$ 112.50	\$ 862.50		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM										\$ 14,112.57	3 TPP Mtgs
Mileage	Mile	\$ 0.55	300			\$ 165.00		\$ 24.75	\$ 189.75		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00	9			\$ 6,750.00		\$ 1,012.50	\$ 7,762.50		
Rental Car/ with FOG	Day	\$ 75.00	9			\$ 675.00		\$ 101.25	\$ 776.25		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	18			\$ 2,304.00		\$ 345.60	\$ 2,649.60		
Lodging Tax - 20%	Man-Day	\$ 25.60	18			\$ 460.80		\$ 69.12	\$ 529.92		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	27			\$ 1,917.00		\$ 287.55	\$ 2,204.55		
SUBCONTRACTORS										\$ -	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
Task Unit Total								\$ 98,285.79			

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 110

Description: Explosive Safety Submission (D, DF, F)

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE											
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -	\$ 11,711.54	
CADD/GIS Operator	HR	\$ 31.25	60	\$ 1,875.00				\$ 3,375.00	\$ 5,250.00		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85	80	\$ 2,307.69				\$ 4,153.85	\$ 6,461.54		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 8,037.31	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23	80	\$ 4,018.66				\$ 4,018.66	\$ 8,037.31		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)				\$ 394.98				\$ 59.25	\$ 454.22	\$ 3,731.72	
CAD/GIS Software	Hr	\$ 10.00	60	\$ 600.00				\$ 90.00	\$ 690.00		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00	3	\$ 1,500.00				\$ 225.00	\$ 1,725.00		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00	3	\$ 750.00				\$ 112.50	\$ 862.50		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ -	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00				\$ -		\$ -	\$ -		
Lodging Tax - 20%	Man-Day	\$ 25.60				\$ -		\$ -	\$ -		
M&IE - Dukes County, MA	Man-Day	\$ 71.00				\$ -		\$ -	\$ -		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ -	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 23,480.57	

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 200  
Description: Mobilization - Per Person

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES	
LABOR HOME OFFICE										\$	-	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -			
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -			
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -			
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -			
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -			
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -			
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -			
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -			
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -			
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -			
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -			
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -			
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -			
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -			
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -			
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -			
LABOR - FIELD											\$	1,367.46
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -			
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -			
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -			
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -			
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -			
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -			
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -			
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -			
UXO Technician III	HR	\$ 42.73	16	\$ 683.73				\$ 683.73	\$ 1,367.46			
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -			
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -			
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -			
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -			
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -			
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -			
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -			
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -			
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -			
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -			
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -			
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -			
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -			
OTHER DIRECT COSTS										\$	31.45	
Consumable Supplies and LVE (2% Labor)				\$ 27.35				\$ 4.10	\$ 31.45			
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -			
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -			
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -			
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -			
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -			
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -			
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -			
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -			
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -			
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -			
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -			
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -			
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -			
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -			
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -			
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -			
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -			
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -			
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -			
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -			
TRAVEL AND PER DIEM										\$	1,234.07	
Mileage	Mile	\$ 0.55	50			\$ 27.50		\$ 4.13	\$ 31.63			
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -			
Airfare	RT	\$ 750.00	1			\$ 750.00		\$ 112.50	\$ 862.50			
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -			
Lodging - Dukes County, MA	Man-Day	\$ 128.00	1			\$ 128.00		\$ 19.20	\$ 147.20			
Lodging Tax - 20%	Man-Day	\$ 25.60	1			\$ 25.60		\$ 3.84	\$ 29.44			
M&IE - Dukes County, MA	Man-Day	\$ 71.00	2			\$ 142.00		\$ 21.30	\$ 163.30			
SUBCONTRACTORS										\$	-	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -			
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -			
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -			
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -			
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -			
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -			
								Task Unit Total	\$	2,632.98		

NOTES:  
1. UXO Rates from SCA  
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates



Bid Item Number: 300

Description: Site Management, 5-10 Schedule, Per week

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ 12,465.38	
Administrative/Clerical	HR	\$ 19.23	40	\$ 769.23				\$ 1,384.62	\$ 2,153.85		
CADD/GIS Operator	HR	\$ 31.25	40	\$ 1,250.00				\$ 2,250.00	\$ 3,500.00		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44	2	\$ 52.88				\$ 95.19	\$ 148.08		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06	16	\$ 576.92				\$ 1,038.46	\$ 1,615.38		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06	50	\$ 1,802.88				\$ 3,245.19	\$ 5,048.08		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87	40	\$ 1,634.62				\$ 1,634.62	\$ 3,269.23		
Site Manager - OT	HR	\$ 61.30	10	\$ 612.98				\$ 612.98	\$ 1,225.96		
Sr. UXO Supervisor	HR	\$ 50.23	40	\$ 2,009.33				\$ 2,009.33	\$ 4,018.66		
Sr. UXO Supervisor - OT	HR	\$ 75.35	10	\$ 753.50				\$ 753.50	\$ 1,507.00		
UXO Safety Officer	HR	\$ 45.23	40	\$ 1,809.33				\$ 1,809.33	\$ 3,618.66		
UXO Safety Officer - OT	HR	\$ 67.85	10	\$ 678.50				\$ 678.50	\$ 1,357.00		
UXO Quality Control Specialist	HR	\$ 45.23	40	\$ 1,809.33				\$ 1,809.33	\$ 3,618.66		
UXO Quality Control Specialist - OT	HR	\$ 67.85	10	\$ 678.50				\$ 678.50	\$ 1,357.00		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94	40	\$ 757.60				\$ 757.60	\$ 1,515.20		
Laborer - OT	HR	\$ 28.41	10	\$ 284.10				\$ 284.10	\$ 568.20		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)				\$ 690.42				\$ 103.56	\$ 793.98	5 @ 5 Days each	
CAD/GIS Software	Hr	\$ 10.00	40	\$ 400.00				\$ 60.00	\$ 460.00		
Cell Phone	Day	\$ 5.00	25	\$ 125.00				\$ 18.75	\$ 143.75		
DGM Software	Day	\$ 41.10	5	\$ 205.48				\$ 30.82	\$ 236.30		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00	25	\$ 375.00				\$ 56.25	\$ 431.25		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00	10	\$ 200.00				\$ 30.00	\$ 230.00		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00	25	\$ 125.00				\$ 18.75	\$ 143.75	5 @ 5 Days each	
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00	5	\$ 625.00				\$ 93.75	\$ 718.75		
Storage Containers - MDAS, Equip	Day	\$ 50.00	5	\$ 250.00				\$ 37.50	\$ 287.50		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	25	\$ 2,500.00				\$ 375.00	\$ 2,875.00		
Utility Vehicle w/ FOG	Day	\$ 40.00	5	\$ 200.00				\$ 30.00	\$ 230.00		
TRAVEL AND PER DIEM										\$ 9,040.15	5 Persons on Per Diem
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	35		\$ 4,480.00			\$ 672.00	\$ 5,152.00		
Lodging Tax - 20%	Man-Day	\$ 25.60	35		\$ 896.00			\$ 134.40	\$ 1,030.40		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	35		\$ 2,485.00			\$ 372.75	\$ 2,857.75		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00	1			\$ 750.00		\$ 112.50	\$ 862.50		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
Task Unit Total								\$ 50,973.87			

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 310  
Description: Survey - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE											
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -	\$ -	
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 3,991.42	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29	40	\$ 1,451.42				\$ 1,451.42	\$ 2,902.85		
UXO Technician II - OT	HR	\$ 54.43	10	\$ 544.28				\$ 544.28	\$ 1,088.57		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)					\$ 79.83			\$ 11.97	\$ 91.80	\$ 753.05	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00	5	\$ 50.00				\$ 7.50	\$ 57.50		
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	5	\$ 500.00				\$ 75.00	\$ 575.00		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ 1,808.03	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	7			\$ 896.00		\$ 134.40	\$ 1,030.40		
Lodging Tax - 20%	Man-Day	\$ 25.60	7			\$ 179.20		\$ 26.88	\$ 206.08		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	7			\$ 497.00		\$ 74.55	\$ 571.55		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00	5			\$ 7,500.00		\$ 1,125.00	\$ 8,625.00	\$ 8,625.00	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 15,177.50	

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 340  
Description: Environmental Monitoring - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ 23,907.69	
Administrative/Clerical	HR	\$ 19.23	24	\$ 461.54				\$ 830.77	\$ 1,292.31		
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25	180	\$ 5,625.00				\$ 10,125.00	\$ 15,750.00		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87	60	\$ 2,451.92				\$ 4,413.46	\$ 6,865.38		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87	20	\$ 817.31				\$ 817.31	\$ 1,634.62		
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29	80	\$ 2,902.85				\$ 2,902.85	\$ 5,805.70		
UXO Technician II - OT	HR	\$ 54.43	20	\$ 1,088.57				\$ 1,088.57	\$ 2,177.14		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS										\$ 1,346.08	
Consumable Supplies and LVE (2% Labor)				\$ 670.50				\$ 100.58	\$ 771.08	2 @ 5 Days each	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00	20	\$ 100.00				\$ 15.00	\$ 115.00		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00	10	\$ 400.00				\$ 60.00	\$ 460.00		
TRAVEL AND PER DIEM										\$ 8,157.87	
Mileage	Mile	\$ 0.55	100			\$ 55.00		\$ 8.25	\$ 63.25		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00	1			\$ 750.00		\$ 112.50	\$ 862.50		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	28			\$ 3,584.00		\$ 537.60	\$ 4,121.60		
Lodging Tax - 20%	Man-Day	\$ 25.60	28			\$ 716.80		\$ 107.52	\$ 824.32		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	28			\$ 1,988.00		\$ 298.20	\$ 2,286.20		
SUBCONTRACTORS										\$ -	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
Task Unit Total								\$ 43,029.09			

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 400

Description: MEC Surface Removal - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE											
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -	\$ -	
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 26,788.74	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73	40	\$ 1,709.33				\$ 1,709.33	\$ 3,418.66		
UXO Technician III - OT	HR	\$ 64.10	10	\$ 641.00				\$ 641.00	\$ 1,282.00		
UXO Technician II	HR	\$ 36.29	120	\$ 4,354.27				\$ 4,354.27	\$ 8,708.54		3 Persons
UXO Technician II - OT	HR	\$ 54.43	30	\$ 1,632.85				\$ 1,632.85	\$ 3,265.70		
UXO Technician I	HR	\$ 30.65	120	\$ 3,677.76				\$ 3,677.76	\$ 7,355.52		3 Persons
UXO Technician I - OT	HR	\$ 45.97	30	\$ 1,379.16				\$ 1,379.16	\$ 2,758.32		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)				\$ 535.77				\$ 80.37	\$ 616.14	\$ 1,794.89	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00	30	\$ 300.00				\$ 45.00	\$ 345.00		
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		6 @ 5 days each
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	5	\$ 500.00				\$ 75.00	\$ 575.00		
Utility Vehicle w/ FOG	Day	\$ 40.00	5	\$ 200.00				\$ 30.00	\$ 230.00		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55		\$ -		\$ -		\$ -	\$ -	\$ 12,656.21	7 Persons on Travel
Parking	Day	\$ 20.00		\$ -		\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00		\$ -		\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00		\$ -		\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	49	\$ 6,272.00		\$ 940.80		\$ 7,212.80			
Lodging Tax - 20%	Man-Day	\$ 25.60	49	\$ 1,254.40		\$ 188.16		\$ 1,442.56			
M&IE - Dukes County, MA	Man-Day	\$ 71.00	49	\$ 3,479.00		\$ 521.85		\$ 4,000.85			
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ -	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 41,239.84	

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 410

Description: MEC Sub-Surface Removal, Analog Methods - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ -	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -		
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -		
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73	40	\$ 1,709.33				\$ 1,709.33	\$ 3,418.66		
UXO Technician III - OT	HR	\$ 64.10	10	\$ 641.00				\$ 641.00	\$ 1,282.00		
UXO Technician II	HR	\$ 36.29	120	\$ 4,354.27				\$ 4,354.27	\$ 8,708.54		
UXO Technician II - OT	HR	\$ 54.43	30	\$ 1,632.85				\$ 1,632.85	\$ 3,265.70		
UXO Technician I	HR	\$ 30.65	120	\$ 3,677.76				\$ 3,677.76	\$ 7,355.52		
UXO Technician I - OT	HR	\$ 45.97	30	\$ 1,379.16				\$ 1,379.16	\$ 2,758.32		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)				\$ 535.77				\$ 80.37	\$ 616.14		
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00	5	\$ 1,375.00				\$ 206.25	\$ 1,581.25		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00	30	\$ 300.00				\$ 45.00	\$ 345.00		
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	5	\$ 500.00				\$ 75.00	\$ 575.00		
Utility Vehicle w/ FOG	Day	\$ 40.00	5	\$ 200.00				\$ 30.00	\$ 230.00		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	49			\$ 6,272.00		\$ 940.80	\$ 7,212.80		
Lodging Tax - 20%	Man-Day	\$ 25.60	49			\$ 1,254.40		\$ 188.16	\$ 1,442.56		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	49			\$ 3,479.00		\$ 521.85	\$ 4,000.85		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
								Task Unit Total	\$ 42,821.09		

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 420

Description: Digital Geophysical Mapping - Team

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ 8,251.92	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -		
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85	50	\$ 1,442.31				\$ 2,596.15	\$ 4,038.46		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63	50	\$ 1,081.73				\$ 1,947.12	\$ 3,028.85		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88	8	\$ 423.08				\$ 761.54	\$ 1,184.62		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											\$ 3,991.42
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -		
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29	40	\$ 1,451.42				\$ 1,451.42	\$ 2,902.85		
UXO Technician II - OT	HR	\$ 54.43	10	\$ 544.28				\$ 544.28	\$ 1,088.57		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS										\$ 3,242.85	
Consumable Supplies and LVE (2% Labor)				\$ 244.87				\$ 36.73	\$ 281.60		
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00	5	\$ 1,000.00				\$ 150.00	\$ 1,150.00		
Internet/Phone Service	Day	\$ 20.00	5	\$ 100.00				\$ 15.00	\$ 115.00		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00	5	\$ 750.00				\$ 112.50	\$ 862.50		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	5	\$ 500.00				\$ 75.00	\$ 575.00		
Utility Vehicle w/ FOG	Day	\$ 40.00	5	\$ 200.00				\$ 30.00	\$ 230.00		
TRAVEL AND PER DIEM										\$ 5,424.09	
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	21			\$ 2,688.00		\$ 403.20	\$ 3,091.20		
Lodging Tax - 20%	Man-Day	\$ 25.60	21			\$ 537.60		\$ 80.64	\$ 618.24		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	21			\$ 1,491.00		\$ 223.65	\$ 1,714.65		
SUBCONTRACTORS											\$ -
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
								Task Unit Total	\$ 20,910.28		

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 430  
Description: DGM Data Analysis

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
<b>LABOR HOME OFFICE</b>											
Administrative/Clerical	HR	\$ 19.23	8	\$ 153.85				\$ 276.92	\$ 430.77	\$ 9,315.38	
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88	50	\$ 2,644.23				\$ 4,759.62	\$ 7,403.85		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88	10	\$ 528.85				\$ 951.92	\$ 1,480.77		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
<b>LABOR - FIELD</b>											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ -	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -	\$ -	
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -	\$ -	
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -	\$ -	
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -	\$ -	
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -	\$ -	
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -	\$ -	
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -	\$ -	
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -	\$ -	
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -	\$ -	
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -	\$ -	
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -	\$ -	
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -	\$ -	
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -	\$ -	
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -	\$ -	
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -	\$ -	
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -	\$ -	
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -	\$ -	
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -	\$ -	
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -	\$ -	
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -	\$ -	
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -	\$ -	
<b>OTHER DIRECT COSTS</b>											
Consumable Supplies and LVE (2% Labor)				\$ 186.31				\$ 27.95	\$ 214.25	\$ 536.81	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10	5	\$ 205.48				\$ 30.82	\$ 236.30		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00	5	\$ 75.00				\$ 11.25	\$ 86.25		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
<b>TRAVEL AND PER DIEM</b>											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ -	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -	\$ -	
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -	\$ -	
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -	\$ -	
Lodging - Dukes County, MA	Man-Day	\$ 128.00				\$ -		\$ -	\$ -	\$ -	
Lodging Tax - 20%	Man-Day	\$ 25.60				\$ -		\$ -	\$ -	\$ -	
M&IE - Dukes County, MA	Man-Day	\$ 71.00				\$ -		\$ -	\$ -	\$ -	
<b>SUBCONTRACTORS</b>											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ -	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -	\$ -	
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -	\$ -	
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -	\$ -	
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -	\$ -	
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -	\$ -	
									Task Unit Total	\$ 9,852.19	

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 440

Description: Anomaly Reacquisition - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ -	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -		
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											\$ 3,991.42
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -		
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29	40	\$ 1,451.42				\$ 1,451.42	\$ 2,902.85		
UXO Technician II - OT	HR	\$ 54.43	10	\$ 544.28				\$ 544.28	\$ 1,088.57		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS										\$ 753.05	
Consumable Supplies and LVE (2% Labor)				\$ 79.83				\$ 11.97	\$ 91.80		
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00	5	\$ 50.00				\$ 7.50	\$ 57.50		
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	5	\$ 500.00				\$ 75.00	\$ 575.00		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM										\$ 1,808.03	
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	7			\$ 896.00		\$ 134.40	\$ 1,030.40		
Lodging Tax - 20%	Man-Day	\$ 25.60	7			\$ 179.20		\$ 26.88	\$ 206.08		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	7			\$ 497.00		\$ 74.55	\$ 571.55		
SUBCONTRACTORS											\$ 8,625.00
Surveyor	Day	\$ 1,500.00	5			\$ 7,500.00		\$ 1,125.00	\$ 8,625.00		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
								Task Unit Total	\$ 15,177.50		

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates



Bid Item Number: 450

Description: Anomaly Resolution - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE											
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -	\$ -	
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 26,788.74	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73	40	\$ 1,709.33				\$ 1,709.33	\$ 3,418.66		
UXO Technician III - OT	HR	\$ 64.10	10	\$ 641.00				\$ 641.00	\$ 1,282.00		
UXO Technician II	HR	\$ 36.29	120	\$ 4,354.27				\$ 4,354.27	\$ 8,708.54		
UXO Technician II - OT	HR	\$ 54.43	30	\$ 1,632.85				\$ 1,632.85	\$ 3,265.70		
UXO Technician I	HR	\$ 30.65	120	\$ 3,677.76				\$ 3,677.76	\$ 7,355.52		
UXO Technician I - OT	HR	\$ 45.97	30	\$ 1,379.16				\$ 1,379.16	\$ 2,758.32		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)					\$ 535.77			\$ 80.37	\$ 616.14	\$ 3,376.14	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00	5	\$ 1,375.00				\$ 206.25	\$ 1,581.25		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00	30	\$ 300.00				\$ 45.00	\$ 345.00		
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	5	\$ 500.00				\$ 75.00	\$ 575.00		
Utility Vehicle w/ FOG	Day	\$ 40.00	5	\$ 200.00				\$ 30.00	\$ 230.00		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ 12,656.21	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	49			\$ 6,272.00		\$ 940.80	\$ 7,212.80		
Lodging Tax - 20%	Man-Day	\$ 25.60	49			\$ 1,254.40		\$ 188.16	\$ 1,442.56		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	49			\$ 3,479.00		\$ 521.85	\$ 4,000.85		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ -	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 42,821.09	

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 510

Description: Underwater Surface Clearance (Depth 3' and Greater) - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ -	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -		
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											\$ 47,141.60
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	5 Divers	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08	40	\$ 2,763.20				\$ 2,763.20	\$ 5,526.40		
Dive Master - OT	HR	\$ 103.62	10	\$ 1,036.20				\$ 1,036.20	\$ 2,072.40		
Dive Safety Officer	HR	\$ 64.08	40	\$ 2,563.20				\$ 2,563.20	\$ 5,126.40		
Dive Safety Officer - OT	HR	\$ 96.12	10	\$ 961.20				\$ 961.20	\$ 1,922.40		
UXO Qualified Diver	HR	\$ 59.08	200	\$ 11,816.00				\$ 11,816.00	\$ 23,632.00		
UXO Qualified Diver - OT	HR	\$ 88.62	50	\$ 4,431.00				\$ 4,431.00	\$ 8,862.00		
OTHER DIRECT COSTS										\$ 10,600.51	
Consumable Supplies and LVE (2% Labor)				\$ 942.83				\$ 141.42	\$ 1,084.26	6 Sets @ 5 Days	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00	30	\$ 7,500.00				\$ 1,125.00	\$ 8,625.00		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00	30	\$ 750.00				\$ 112.50	\$ 862.50		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -	6 @ 5 days	
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM										\$ 12,656.21	
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	49			\$ 6,272.00		\$ 940.80	\$ 7,212.80		
Lodging Tax - 20%	Man-Day	\$ 25.60	49			\$ 1,254.40		\$ 188.16	\$ 1,442.56		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	49			\$ 3,479.00		\$ 521.85	\$ 4,000.85		
SUBCONTRACTORS											\$ 25,875.00
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00	5			\$ 22,500.00		\$ 3,375.00	\$ 25,875.00		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 96,273.32	

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 520

Description: Underwater DGM (Depth 3' and Greater) - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ 5,721.15	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -		
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87	50	\$ 2,043.27				\$ 3,677.88	\$ 5,721.15		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD										\$ -	
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -		
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS										\$ 3,006.59	
Consumable Supplies and LVE (2% Labor)				\$ 114.42				\$ 17.16	\$ 131.59		
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00	5	\$ 2,500.00				\$ 375.00	\$ 2,875.00		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM										\$ 1,808.03	
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	7			\$ 896.00		\$ 134.40	\$ 1,030.40		
Lodging Tax - 20%	Man-Day	\$ 25.60	7			\$ 179.20		\$ 26.88	\$ 206.08		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	7			\$ 497.00		\$ 74.55	\$ 571.55		
SUBCONTRACTORS										\$ 25,875.00	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00	5			\$ 22,500.00		\$ 3,375.00	\$ 25,875.00		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 36,410.77	

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 550

Description: Anomaly Removal - Underwater - Weekly Rate

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ -	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -	\$ -	
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											\$ 47,141.60
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 10,600.51	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08	40	\$ 2,763.20				\$ 2,763.20	\$ 5,526.40		
Dive Master - OT	HR	\$ 103.62	10	\$ 1,036.20				\$ 1,036.20	\$ 2,072.40		
Dive Safety Officer	HR	\$ 64.08	40	\$ 2,563.20				\$ 2,563.20	\$ 5,126.40		
Dive Safety Officer - OT	HR	\$ 96.12	10	\$ 961.20				\$ 961.20	\$ 1,922.40		
UXO Qualified Diver	HR	\$ 59.08	200	\$ 11,816.00				\$ 11,816.00	\$ 23,632.00		
UXO Qualified Diver - OT	HR	\$ 88.62	50	\$ 4,431.00				\$ 4,431.00	\$ 8,862.00		
OTHER DIRECT COSTS											\$ 10,600.51
Consumable Supplies and LVE (2% Labor)				\$ 942.83				\$ 141.42	\$ 1,084.26	\$ 12,656.21	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00	30	\$ 7,500.00				\$ 1,125.00	\$ 8,625.00		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00	30	\$ 750.00				\$ 112.50	\$ 862.50		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00	5	\$ 25.00				\$ 3.75	\$ 28.75		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM											\$ 12,656.21
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ 25,875.00	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	49			\$ 6,272.00		\$ 940.80	\$ 7,212.80		
Lodging Tax - 20%	Man-Day	\$ 25.60	49			\$ 1,254.40		\$ 188.16	\$ 1,442.56		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	49			\$ 3,479.00		\$ 521.85	\$ 4,000.85		
SUBCONTRACTORS											\$ 25,875.00
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ 96,273.32	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00	5			\$ 22,500.00		\$ 3,375.00	\$ 25,875.00		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
								Task Unit Total	\$ 96,273.32		

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 600

Description: MDAS Certification and Disposal - LS

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE											
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -	\$ -	
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 8,692.07	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73	40	\$ 1,709.33				\$ 1,709.33	\$ 3,418.66		
UXO Technician III - OT	HR	\$ 64.10	10	\$ 641.00				\$ 641.00	\$ 1,282.00		
UXO Technician II	HR	\$ 36.29	40	\$ 1,451.42				\$ 1,451.42	\$ 2,902.85		
UXO Technician II - OT	HR	\$ 54.43	10	\$ 544.28				\$ 544.28	\$ 1,088.57		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)					\$ 173.84			\$ 26.08	\$ 199.92	\$ 1,062.42	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00	5	\$ 250.00				\$ 37.50	\$ 287.50		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	5	\$ 500.00				\$ 75.00	\$ 575.00		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ 3,616.06	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	14			\$ 1,792.00		\$ 268.80	\$ 2,060.80		
Lodging Tax - 20%	Man-Day	\$ 25.60	14			\$ 358.40		\$ 53.76	\$ 412.16		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	14			\$ 994.00		\$ 149.10	\$ 1,143.10		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00					\$ -	\$ -	\$ -	\$ 5,750.00	
Brush Clearing	Day	\$ 5,000.00					\$ -	\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00					\$ -	\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00					\$ -	\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00	1				\$ 5,000.00	\$ 750.00	\$ 5,750.00		
Warning Signs and Brochures	LS	\$ 1,000.00					\$ -	\$ -	\$ -		
									Task Unit Total	\$ 19,120.55	

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 610  
Description: Site Restoration - WEEKLY RATE

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ 8,750.00	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -		
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25	100	\$ 3,125.00				\$ 5,625.00	\$ 8,750.00		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD										\$ 8,661.99	
Site Manager	HR	\$ 40.87	40	\$ 1,634.62				\$ 1,634.62	\$ 3,269.23		
Site Manager - OT	HR	\$ 61.30	10	\$ 612.98				\$ 612.98	\$ 1,225.96		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94	80	\$ 1,515.20				\$ 1,515.20	\$ 3,030.40		
Laborer - OT	HR	\$ 28.41	20	\$ 568.20				\$ 568.20	\$ 1,136.40		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS										\$ 7,300.48	
Consumable Supplies and LVE (2% Labor)				\$ 348.24				\$ 52.24	\$ 400.48		
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00	10	\$ 5,000.00				\$ 750.00	\$ 5,750.00		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	10	\$ 1,000.00				\$ 150.00	\$ 1,150.00		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM										\$ 3,616.06	
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -		
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	14			\$ 1,792.00		\$ 268.80	\$ 2,060.80		
Lodging Tax - 20%	Man-Day	\$ 25.60	14			\$ 358.40		\$ 53.76	\$ 412.16		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	14			\$ 994.00		\$ 149.10	\$ 1,143.10		
SUBCONTRACTORS										\$ -	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
								Task Unit Total	\$ 28,328.53	WEEKLY RATE	

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 620  
Description: Demobilization - Per Person

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES	
LABOR HOME OFFICE										\$	-	
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -			
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -			
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -			
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -			
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -			
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -			
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -			
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -			
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -			
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -			
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -			
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -			
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -			
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -			
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -			
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -			
LABOR - FIELD												\$
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -			
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -			
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -			
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -			
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -			
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -			
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -			
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -			
UXO Technician III	HR	\$ 42.73	16	\$ 683.73				\$ 683.73	\$ 1,367.46			
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -			
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -			
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -			
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -			
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -			
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -			
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -			
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -			
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -			
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -			
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -			
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -			
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -			
OTHER DIRECT COSTS										\$	31.45	
Consumable Supplies and LVE (2% Labor)					\$ 27.35			\$ 4.10	\$ 31.45			
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -			
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -			
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -			
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -			
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -			
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -			
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -			
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -			
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -			
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -			
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -			
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -			
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -			
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -			
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -			
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -			
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -			
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -			
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -			
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -			
TRAVEL AND PER DIEM										\$	1,234.07	
Mileage	Mile	\$ 0.55	50			\$ 27.50		\$ 4.13	\$ 31.63			
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -			
Airfare	RT	\$ 750.00	1			\$ 750.00		\$ 112.50	\$ 862.50			
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -			
Lodging - Dukes County, MA	Man-Day	\$ 128.00	1			\$ 128.00		\$ 19.20	\$ 147.20			
Lodging Tax - 20%	Man-Day	\$ 25.60	1			\$ 25.60		\$ 3.84	\$ 29.44			
M&IE - Dukes County, MA	Man-Day	\$ 71.00	2			\$ 142.00		\$ 21.30	\$ 163.30			
SUBCONTRACTORS										\$	-	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -			
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -			
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -			
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -			
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -			
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -			
								Task Unit Total	\$ 2,632.98			

NOTES:  
1. UXO Rates from SCA  
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 700

Description: Remedial Action Completion Report (D, DF, F)

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE											
Administrative/Clerical	HR	\$ 19.23	40	\$ 769.23				\$ 1,384.62	\$ 2,153.85	\$ 62,461.54	
CADD/GIS Operator	HR	\$ 31.25	120	\$ 3,750.00				\$ 6,750.00	\$ 10,500.00		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06	40	\$ 1,442.31				\$ 2,596.15	\$ 4,038.46		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25	40	\$ 1,250.00				\$ 2,250.00	\$ 3,500.00		
Engineer/Scientist - Junior Level	HR	\$ 28.85	120	\$ 3,461.54				\$ 6,230.77	\$ 9,692.31		
Engineer/Scientist - Mid Level	HR	\$ 40.87	80	\$ 3,269.23				\$ 5,884.62	\$ 9,153.85		
Engineer/Scientist - Senior Level	HR	\$ 50.48	40	\$ 2,019.23				\$ 3,634.62	\$ 5,653.85		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88	120	\$ 6,346.15				\$ 11,423.08	\$ 17,769.23		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 12,055.97	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23	120	\$ 6,027.98				\$ 6,027.98	\$ 12,055.97		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)					\$ 1,490.35			\$ 223.55	\$ 1,713.90	\$ 5,681.40	
CAD/GIS Software	Hr	\$ 10.00	120		\$ 1,200.00			\$ 180.00	\$ 1,380.00		
Cell Phone	Day	\$ 5.00			\$ -			\$ -	\$ -		
DGM Software	Day	\$ 41.10			\$ -			\$ -	\$ -		
Dive Equipment	Day	\$ 250.00			\$ -			\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00			\$ -			\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00			\$ -			\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00			\$ -			\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00			\$ -			\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00			\$ -			\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00			\$ -			\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00			\$ -			\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00	3		\$ 1,500.00			\$ 225.00	\$ 1,725.00		
Shipping - Equipment	EA	\$ 500.00			\$ -			\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00	3		\$ 750.00			\$ 112.50	\$ 862.50		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00			\$ -			\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00			\$ -			\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00			\$ -			\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00			\$ -			\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00			\$ -			\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00			\$ -			\$ -	\$ -		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ -	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00				\$ -		\$ -	\$ -		
Lodging Tax - 20%	Man-Day	\$ 25.60				\$ -		\$ -	\$ -		
M&IE - Dukes County, MA	Man-Day	\$ 71.00				\$ -		\$ -	\$ -		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ -	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 80,198.91	

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates



Bid Item Number: 710  
Description: Land Use Control Plan (D, DF, F)

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE											
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -	\$ 32,711.54	
CADD/GIS Operator	HR	\$ 31.25	60	\$ 1,875.00				\$ 3,375.00	\$ 5,250.00		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85	160	\$ 4,615.38				\$ 8,307.69	\$ 12,923.08		
Engineer/Scientist - Mid Level	HR	\$ 40.87	80	\$ 3,269.23				\$ 5,884.62	\$ 9,153.85		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04	80	\$ 1,923.08				\$ 3,461.54	\$ 5,384.62		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ -	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS											
Consumable Supplies and LVE (2% Labor)					\$ 654.23			\$ 98.13	\$ 752.37	\$ 4,029.87	
CAD/GIS Software	Hr	\$ 10.00	60	\$ 600.00				\$ 90.00	\$ 690.00		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00	3	\$ 1,500.00				\$ 225.00	\$ 1,725.00		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00	3	\$ 750.00				\$ 112.50	\$ 862.50		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ -	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00				\$ -		\$ -	\$ -		
Lodging Tax - 20%	Man-Day	\$ 25.60				\$ -		\$ -	\$ -		
M&IE - Dukes County, MA	Man-Day	\$ 71.00				\$ -		\$ -	\$ -		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ -	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
									Task Unit Total	\$ 36,741.40	

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 710  
Description: Land Use Control Plan Implementation

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
<b>LABOR HOME OFFICE</b>											
Administrative/Clerical	HR	\$ 19.23	40	\$ 769.23				\$ 1,384.62	\$ 2,153.85	\$ 14,000.00	
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -		
Engineer/Scientist - Junior Level	HR	\$ 28.85	80	\$ 2,307.69				\$ 4,153.85	\$ 6,461.54		
Engineer/Scientist - Mid Level	HR	\$ 40.87		\$ -				\$ -	\$ -		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04	80	\$ 1,923.08				\$ 3,461.54	\$ 5,384.62		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
<b>LABOR - FIELD</b>											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -	\$ 6,837.31	
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73	80	\$ 3,418.66				\$ 3,418.66	\$ 6,837.31		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
<b>OTHER DIRECT COSTS</b>											
Consumable Supplies and LVE (2% Labor)				\$ 416.75				\$ 62.51	\$ 479.26	\$ 1,629.26	
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00	10	\$ 1,000.00				\$ 150.00	\$ 1,150.00		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
<b>TRAVEL AND PER DIEM</b>											
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -	\$ 8,011.59	
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00	3			\$ 2,250.00		\$ 337.50	\$ 2,587.50		
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	21			\$ 2,688.00		\$ 403.20	\$ 3,091.20		
Lodging Tax - 20%	Man-Day	\$ 25.60	21			\$ 537.60		\$ 80.64	\$ 618.24		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	21			\$ 1,491.00		\$ 223.65	\$ 1,714.65		
<b>SUBCONTRACTORS</b>											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -	\$ 80,500.00	
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00	20			\$ 20,000.00		\$ 3,000.00	\$ 23,000.00		
Training Video Production	LS	\$ 50,000.00	1			\$ 50,000.00		\$ 7,500.00	\$ 57,500.00		
Task Unit Total										\$ 110,978.16	

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 810  
Description: Long Term Management - Annual Post-Construction Vegetation Monitoring

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES
LABOR HOME OFFICE										\$ 20,946.15	
Administrative/Clerical	HR	\$ 19.23	24	\$ 461.54				\$ 830.77	\$ 1,292.31		
CADD/GIS Operator	HR	\$ 31.25	40	\$ 1,250.00				\$ 2,250.00	\$ 3,500.00		
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -		
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -		
Ecologist/Biologist	HR	\$ 31.25	80	\$ 2,500.00				\$ 4,500.00	\$ 7,000.00		
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -		
Engineer/Scientist - Mid Level	HR	\$ 40.87	80	\$ 3,269.23				\$ 5,884.62	\$ 9,153.85		
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -		
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -		
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -		
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -		
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -		
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -		
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -		
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -		
LABOR - FIELD											
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -		
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -		
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -		
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -		
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -		
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -		
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -		
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -		
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -		
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -		
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -		
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -		
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -		
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -		
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -		
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -		
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -		
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -		
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -		
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -		
OTHER DIRECT COSTS										\$ 481.76	
Consumable Supplies and LVE (2% Labor)				\$ 418.92				\$ 62.84	\$ 481.76		
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -		
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -		
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -		
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -		
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -		
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -		
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -		
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -		
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -		
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -		
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -		
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -		
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -		
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -		
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -		
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -		
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -		
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -		
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -		
TRAVEL AND PER DIEM										\$ 5,890.19	
Mileage	Mile	\$ 0.55	50			\$ 27.50		\$ 4.13	\$ 31.63		
Parking	Day	\$ 20.00	0			\$ -		\$ -	\$ -		
Airfare	RT	\$ 750.00	2			\$ 1,500.00		\$ 225.00	\$ 1,725.00		
Rental Car/ with FOG	Day	\$ 75.00	6			\$ 450.00		\$ 67.50	\$ 517.50		
Lodging - Dukes County, MA	Man-Day	\$ 128.00	14			\$ 1,792.00		\$ 268.80	\$ 2,060.80		
Lodging Tax - 20%	Man-Day	\$ 25.60	14			\$ 358.40		\$ 53.76	\$ 412.16		
M&IE - Dukes County, MA	Man-Day	\$ 71.00	14			\$ 994.00		\$ 149.10	\$ 1,143.10		
SUBCONTRACTORS											
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -		
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -		
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -		
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -		
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -		
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -		
Training Video Production	LS	\$ 50,000.00				\$ -		\$ -	\$ -		
Task Unit Total									\$ 27,318.10		

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 820

Description: 5 Year Review (Plan, Review and Report)

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES		
LABOR HOME OFFICE										\$ 28,188.46			
Administrative/Clerical	HR	\$ 19.23	40	\$ 769.23				\$ 1,384.62	\$ 2,153.85				
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -				
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -				
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -				
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -				
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -				
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -				
Engineer/Scientist - Mid Level	HR	\$ 40.87	100	\$ 4,086.54				\$ 7,355.77	\$ 11,442.31				
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -				
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -				
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -				
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -				
Public Relations/Affairs Specialist	HR	\$ 24.04	100	\$ 2,403.85				\$ 4,326.92	\$ 6,730.77				
QC/Safety Manager	HR	\$ 52.88	40	\$ 2,115.38				\$ 3,807.69	\$ 5,923.08				
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -				
Technical Writer	HR	\$ 28.85	24	\$ 692.31				\$ 1,246.15	\$ 1,938.46				
LABOR - FIELD												\$ 5,525.65	
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -				
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -				
Sr. UXO Supervisor	HR	\$ 50.23	40	\$ 2,009.33				\$ 2,009.33	\$ 4,018.66				
Sr. UXO Supervisor - OT	HR	\$ 75.35	10	\$ 753.50				\$ 753.50	\$ 1,507.00				
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -				
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -				
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -				
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -				
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -				
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -				
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -				
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -				
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -				
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -				
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -				
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -				
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -				
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -				
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -				
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -				
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -				
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -				
OTHER DIRECT COSTS										\$ 775.42			
Consumable Supplies and LVE (2% Labor)				\$ 674.28				\$ 101.14	\$ 775.42				
CAD/GIS Software	Hr	\$ 10.00	0	\$ -				\$ -	\$ -				
Cell Phone	Day	\$ 5.00		\$ -				\$ -	\$ -				
DGM Software	Day	\$ 41.10		\$ -				\$ -	\$ -				
Dive Equipment	Day	\$ 250.00		\$ -				\$ -	\$ -				
Excavator w/FOG	Day	\$ 275.00		\$ -				\$ -	\$ -				
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -				
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -				
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -				
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -				
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -				
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -				
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -				
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -				
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -				
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -				
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -				
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -				
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -				
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -				
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -				
TRAVEL AND PER DIEM										\$ 7,249.60			
Mileage	Mile	\$ 0.55	200			\$ 110.00		\$ 16.50	\$ 126.50				
Parking	Day	\$ 20.00	10			\$ 200.00		\$ 30.00	\$ 230.00				
Airfare	RT	\$ 750.00	3			\$ 2,250.00		\$ 337.50	\$ 2,587.50				
Rental Car/ with FOG	Day	\$ 75.00	5			\$ 375.00		\$ 56.25	\$ 431.25				
Lodging - Dukes County, MA	Man-Day	\$ 128.00	15			\$ 1,920.00		\$ 288.00	\$ 2,208.00				
Lodging Tax - 20%	Man-Day	\$ 25.60	15			\$ 384.00		\$ 57.60	\$ 441.60				
M&IE - Dukes County, MA	Man-Day	\$ 71.00	15			\$ 1,065.00		\$ 159.75	\$ 1,224.75				
SUBCONTRACTORS												\$ -	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -				
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -				
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -				
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -				
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -				
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -				
Training Video Production	LS	\$ 50,000.00				\$ -		\$ -	\$ -				
								Task Unit Total	\$ 41,739.14				

## NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates

Bid Item Number: 900  
Description: Long Term Management (Annual Costs)

	UOM	UNIT RATE	QTY	LABOR	ODCs	TRAVEL	SUB	OH, G&A, FEE	LINE TOTAL	CATEGORY TOTAL	NOTES		
LABOR HOME OFFICE										\$ 4,576.92			
Administrative/Clerical	HR	\$ 19.23		\$ -				\$ -	\$ -				
CADD/GIS Operator	HR	\$ 31.25		\$ -				\$ -	\$ -				
Certified Industrial Hygienist	HR	\$ 45.67		\$ -				\$ -	\$ -				
Chemist	HR	\$ 36.06		\$ -				\$ -	\$ -				
Contract Admin/Procurement	HR	\$ 26.44		\$ -				\$ -	\$ -				
Ecologist/Biologist	HR	\$ 31.25		\$ -				\$ -	\$ -				
Engineer/Scientist - Junior Level	HR	\$ 28.85		\$ -				\$ -	\$ -				
Engineer/Scientist - Mid Level	HR	\$ 40.87	40	\$ 1,634.62				\$ 2,942.31	\$ 4,576.92				
Engineer/Scientist - Senior Level	HR	\$ 50.48		\$ -				\$ -	\$ -				
Engineering Technician	HR	\$ 21.63		\$ -				\$ -	\$ -				
Project Controls/Scheduling	HR	\$ 36.06		\$ -				\$ -	\$ -				
Project Geophysicist	HR	\$ 52.88		\$ -				\$ -	\$ -				
Public Relations/Affairs Specialist	HR	\$ 24.04		\$ -				\$ -	\$ -				
QC/Safety Manager	HR	\$ 52.88		\$ -				\$ -	\$ -				
Site Geophysicist	HR	\$ 36.06		\$ -				\$ -	\$ -				
Technical Writer	HR	\$ 28.85		\$ -				\$ -	\$ -				
LABOR - FIELD												\$ -	
Site Manager	HR	\$ 40.87		\$ -				\$ -	\$ -				
Site Manager - OT	HR	\$ 61.30		\$ -				\$ -	\$ -				
Sr. UXO Supervisor	HR	\$ 50.23		\$ -				\$ -	\$ -				
Sr. UXO Supervisor - OT	HR	\$ 75.35		\$ -				\$ -	\$ -				
UXO Safety Officer	HR	\$ 45.23		\$ -				\$ -	\$ -				
UXO Safety Officer - OT	HR	\$ 67.85		\$ -				\$ -	\$ -				
UXO Quality Control Specialist	HR	\$ 45.23		\$ -				\$ -	\$ -				
UXO Quality Control Specialist - OT	HR	\$ 67.85		\$ -				\$ -	\$ -				
UXO Technician III	HR	\$ 42.73		\$ -				\$ -	\$ -				
UXO Technician III - OT	HR	\$ 64.10		\$ -				\$ -	\$ -				
UXO Technician II	HR	\$ 36.29		\$ -				\$ -	\$ -				
UXO Technician II - OT	HR	\$ 54.43		\$ -				\$ -	\$ -				
UXO Technician I	HR	\$ 30.65		\$ -				\$ -	\$ -				
UXO Technician I - OT	HR	\$ 45.97		\$ -				\$ -	\$ -				
Laborer	HR	\$ 18.94		\$ -				\$ -	\$ -				
Laborer - OT	HR	\$ 28.41		\$ -				\$ -	\$ -				
Dive Master	HR	\$ 69.08		\$ -				\$ -	\$ -				
Dive Master - OT	HR	\$ 103.62		\$ -				\$ -	\$ -				
Dive Safety Officer	HR	\$ 64.08		\$ -				\$ -	\$ -				
Dive Safety Officer - OT	HR	\$ 96.12		\$ -				\$ -	\$ -				
UXO Qualified Diver	HR	\$ 59.08		\$ -				\$ -	\$ -				
UXO Qualified Diver - OT	HR	\$ 88.62		\$ -				\$ -	\$ -				
OTHER DIRECT COSTS										\$ 9,305.27			
Consumable Supplies and LVE (2% Labor)					\$ 91.54			\$ 13.73	\$ 105.27				
Sign Maintenance	Ea	\$ 500.00	6	\$ 3,000.00				\$ 450.00	\$ 3,450.00				
Letters/Brocures/Fact Sheets	LS	\$ 500.00	1	\$ 500.00				\$ 75.00	\$ 575.00				
Distribute DVDs	LS	\$ 500.00	1	\$ 500.00				\$ 75.00	\$ 575.00				
Update Website	LS	\$ 1,500.00	1	\$ 1,500.00				\$ 225.00	\$ 1,725.00				
Annual Inspection	LS	\$ 2,500.00	1	\$ 2,500.00				\$ 375.00	\$ 2,875.00				
Field Computer w/ printer	Day	\$ 15.00		\$ -				\$ -	\$ -				
GPS Positioning Equipment	Day	\$ 200.00		\$ -				\$ -	\$ -				
Internet/Phone Service	Day	\$ 20.00		\$ -				\$ -	\$ -				
Magnetometer - Underwater	Day	\$ 25.00		\$ -				\$ -	\$ -				
Magnetometer, Analog	Day	\$ 10.00		\$ -				\$ -	\$ -				
Radio, Hand Held	Day	\$ 5.00		\$ -				\$ -	\$ -				
Report Duplication and Binding	LS	\$ 500.00		\$ -				\$ -	\$ -				
Shipping - Equipment	EA	\$ 500.00		\$ -				\$ -	\$ -				
Shipping - Reports	LS	\$ 250.00		\$ -				\$ -	\$ -				
Site Infrastructure (Trailer, Porta Potty, etc.)	Day	\$ 125.00		\$ -				\$ -	\$ -				
Storage Containers - MDAS, Equip	Day	\$ 50.00		\$ -				\$ -	\$ -				
TDEM and Positioning Equip - Underwater	Day	\$ 500.00		\$ -				\$ -	\$ -				
TDEM Digital Instrument, Land	Day	\$ 150.00		\$ -				\$ -	\$ -				
Truck - 4x4 Crew Cab, w FOG	Day	\$ 100.00		\$ -				\$ -	\$ -				
Utility Vehicle w/ FOG	Day	\$ 40.00		\$ -				\$ -	\$ -				
TRAVEL AND PER DIEM										\$ -			
Mileage	Mile	\$ 0.55				\$ -		\$ -	\$ -				
Parking	Day	\$ 20.00				\$ -		\$ -	\$ -				
Airfare	RT	\$ 750.00				\$ -		\$ -	\$ -				
Rental Car/ with FOG	Day	\$ 75.00				\$ -		\$ -	\$ -				
Lodging - Dukes County, MA	Man-Day	\$ 128.00				\$ -		\$ -	\$ -				
Lodging Tax - 20%	Man-Day	\$ 25.60				\$ -		\$ -	\$ -				
M&IE - Dukes County, MA	Man-Day	\$ 71.00				\$ -		\$ -	\$ -				
SUBCONTRACTORS												\$ -	
Surveyor	Day	\$ 1,500.00				\$ -		\$ -	\$ -				
Brush Clearing	Day	\$ 5,000.00				\$ -		\$ -	\$ -				
Dive Boat with Crew	Day	\$ 4,500.00				\$ -		\$ -	\$ -				
Explosives Materials and Delivery	EA	\$ 750.00				\$ -		\$ -	\$ -				
MDAS Shipping and Disposal	LS	\$ 5,000.00				\$ -		\$ -	\$ -				
Warning Signs and Brochures	LS	\$ 1,000.00				\$ -		\$ -	\$ -				
Training Video Production	LS	\$ 50,000.00				\$ -		\$ -	\$ -				
								Task Unit Total	\$ 13,882.19				

NOTES:

1. UXO Rates from SCA
2. Dive Rates from MA Dep of Labor, Prevailing Wage Rates