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## 4.0 Explosives Siting Plan

### 4.1 Safety Criteria

EEG will follow all applicable safety guidance for explosives siting, including:

- TM 60A-1-1-22, EOD Procedures: General EOD Safety Precautions
- EP 385-1-95a, Basic Safety Concepts and Considerations for Ordnance and Explosives Operations
- ER 385-1-95, Safety and Health Requirements for Ordnance and Explosives (OE) Operations
- DoD 6055.9-STD, DoD Ammunition and Explosives Safety Standards
- HNC-ED-CS-S-98-7, CEHNC Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions
- Ordnance and Explosives Response (EM 1110-1-4009)
- Procedures for Demolition of Multiple Rounds (Consolidated Shots) on OE Sites, August 1998 (terminology update March 2000)
- HNC-ED-CS-S-00-3, Use of Water for Mitigation of Fragmentation and Blast Effects Due to Detonation of Munitions
- DDESB TP 16, Methodologies for Calculating Primary Fragmentation Characteristics

### 4.2 Distances and Areas

#### 4.2.1 Munitions Response Sites

In accordance with EM 1110-1-4009, use of the MSD for accidental detonations, defined as the range to no more than one hazardous fragment per 600 square feet, requires written justification, a risk analysis, calculation of this distance by CEHNC-ED-CS-S, and concurrence of CEHNC-OE-S. A list of MEC suspected to be encountered during the field effort is included in **Table 2-1**. The MGF D for each item is included for each site. The MGF D at each of the cays and the associated MSD calculations from DDESB TP 16 are included in **Table 4-1** and in Appendix G of this Work Plan.

Table 4-1. Minimum Separation Distances

Removal Area	MGFD	Unintentional detonations		Intentional detonations		
		Maximum fragmentation distance	To sides & rear using OFB	Without engineering controls	Using sandbag mitigation	Using water mitigation
Cerro Balcon	3-inch Stokes	1,346	200	1,346	200	200 <sup>A</sup>
Isla Culebrita	20 mm HEI	318	200	318	200	200
Cayo Botella	6-inch naval projectile	2,510	300 <sup>B</sup>	2,510	220	275 <sup>A</sup>
Cayo Alcarraza	MK 83 1,000-pound bomb	3,288	NA	3,288	NA	NA
Los Gemelos	MK 83 1,000-pound bomb	3,288	NA	3,288	NA	NA
Cayo Lobo	MK 76 25-pound practice bomb with Mk4 spotting charge	200	200	200	200	200
Cayo del Agua	76 mm HE	1,742	200	1,742	200	200 <sup>A</sup>
Cayo Tiburon	MK 83 1,000-pound bomb	3,288	NA	3,288	NA	NA
Cayos Genequi	MK 82 500-pound bomb	3,177	NA	3,177	NA	NA
All distances in feet A = Requires the use of 1,100-gallon tank for water mitigation for this munition B = Requires the use of an open front barricade (OFB) for this munition						

#### 4.2.2 Planned or Established Demolition Areas

During this removal action, all MEC will be blown in place or consolidated in shots within the work area in which the item is found. Rounds that are unfuzed and acceptable to move may be consolidated with those rounds that are blown in place; therefore, a planned or established demolition area will not be sited.

### 4.3 Footprint Areas

#### 4.3.1 Blow in Place

4.3.1.01 Blow-in-place operations will be performed when the MEC is unacceptable to be moved. EEG will blow in place any fuzed ordnance or ordnance deemed unacceptable to move.

4.3.1.02 Soil samples will need to be collected at the blow-in-place site before and after disposal procedures. If conditions permit, and with safety considerations as the priority, soil samples will be collected in accordance with the Munitions Constituents Sampling and Analysis Plan (per DID MR-005-10), included as Appendix E.

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### 4.3.2 Collection Points

All MEC found will be disposed of in the site area in which the item is discovered. Collection points for MEC will not be established. MEC items will be blown in place or transported to a consolidated shot point if they are acceptable to be moved.

### 4.3.3 In-Grid Consolidated Shots

If a situation requires the destruction of consolidated munitions, the procedures will be followed for demolition of multiple rounds (consolidated shots) developed and published by the CEHNC, Procedures for Demolition of Multiple Rounds (Consolidated Shots) on OE Sites, August 1998 (terminology update March 2000).

## 4.4 Explosives Storage Magazines

### 4.4.1 Type of Magazines

4.4.1.01 One explosives storage magazine (Type II aboveground portable box) will be secured to store the necessary demolition materials on the work site. The magazine will be located in a secured fenced-in area near Cerro Balcon (see Appendix B, Map B-2). All security and storage requirements of DoD 6055.9 STD will be met. The magazine will include a cap box that will be used to store the blasting caps, less than 1 pound NEW. The main portion of the magazine will be used to store the time fuse, time fuse igniters, detonating cord, jet perforators, boosters, binary explosives, and other explosive materials as identified in Chapter 3 of this plan. The total NEW will not exceed 100 pounds in this magazine. Work on the cays will require the purchase of additional types of explosives per **Table 3-2**. These explosives will be purchased as the amount of explosives is reduced, ensuring that the NEW will not exceed 100 pounds in the magazine at any given time.

4.4.1.02 The quantity-distance (Q-D) is based on a maximum of 100 pounds NEW and determined to be 658 feet from the nearest inhabited building and 395 feet from public traffic, in accordance with DoD 6055.9 STD. Inter-magazine separation distance will be 51 feet should a second magazine be brought in.

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#### 4.4.2 Tabulated List of Explosives

For this operation, EEG intends to limit the NEW of the material in storage to less than 100 pounds at any given time. A list of planned explosives to be used is found in **Table 3-1**.

Additional types of explosives will be purchased during the field effort to conduct operations on the cays per **Table 3-2**.

#### 4.4.3 Engineering Controls When Quantity-Distance Cannot Be Met

4.4.3.01 Two buildings are in proximity to the Cerro Balcon site. As these buildings are greater than 200 feet from the removal area, tamping will be an adequate method of mitigation. In the event that the investigation site is expanded to the proximity of the buildings, tamping, water, or sandbag barricades may be employed to reduce the fragmentation hazard. Tamping will be used in accordance with HNC-ED-CS-S-98-7, CEHNC Use of Sandbags for Mitigation of Fragmentation and Blast Effects Due to Intentional Detonation of Munitions. Sandbag mitigation must be performed in accordance with HNC-ED-CS-S-98-7. Water may be used for mitigation in accordance with HNC-ED-CS-S-00-3. Both reports will be available to the demolition supervisor on site. The BEM in accordance with DDESB TP 16 will be used for items larger than 155 mm in diameter. No other engineering controls are anticipated for this site, as no houses are within the present site boundaries.

4.4.3.02 The surface removal operations to be conducted by EEG are non-intrusive; however, there may be minimal excavation due to partially protruding items that may be found at the site. The one house in the valley is presently unoccupied and will not be occupied during intrusive operations; therefore, the use of barricades to protect property and the public is not anticipated.

#### 4.4.4 Site Maps

4.4.4.01 The following site maps are found in Appendix B and include the appropriate Q-D arcs from the amended explosives safety submission and other explosives-related information identified in this plan.

- Map B-1 Culebra Municipality and Investigation Sites
- Map B-2 Cerro Balcon (OOU-3) Grid Layout, Explosives Magazine Location, and Quantity Distance Map
- Map B-3 Culebrita (OOU-4) and Cayo Botella (OOU-5) Grid Layout and Quantity Distance Map
- Map B-4 Cayo Lobo (OOU-5) Grid Layout and Quantity Distance Map

- Map B-5 Cayo Alcarraza and Los Gemelos (OOU-5) Grid Layout and Quantity Distance Map
- Map B-6 Cayo Tiburon and Cayos Geniqui (OOU-5) Grid Layout and Quantity Distance Map
- Map B-7 Cayo del Aqua (OOU-5) Grid Layout and Quantity Distance Map
- Map B-8 Geology Map
- Map B-9 Environmental Sensitivity Index Map

4.4.4.02 The Q-Ds for each of the associated sites are included in **Table 4-1**.