



U.S. Army Corps of Engineers
Southeast and Pacific IMA Region

FINAL
Site Specific Work Plan Addendum
to the
Programmatic Work Plan
Culebra Island, Puerto Rico

FUDS Project No. I02PR0068
October 2006

In Support of
FUDS MMRP Site Inspections Project

Prepared by:
PARSONS

5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Prepared for:

U.S. Army Corps of Engineers, Jacksonville District
701 San Marco Boulevard
Jacksonville, FL 32207

&

U.S. Army Engineering and Support Center, Huntsville
4820 University Square
Huntsville, Alabama 35816

Contract: W912DY-04-D-0005
Task Order: 0008

200-1f

I02PR006802 01.14 0501



MEMO FOR Charlie Fales

17 Oct 06

SUBJECT: Culebra Island, Puerto Rico – Final Site Specific Work Plan Addendum,
dated October 2006

1. I logged in this work plan on 10-17-06. However, I did not send a copy to any of the regulators. The cover letter said that copies were sent to Daphnie Kildare in San Juan Area Office for distribution to the regulators.
2. The only copy I sent out was one copy of the CD to Ivan Acosta's shop for their records/files.



Abby Hernandez
Civ Eng Tech
CESAJ-DP-S

ROUTING AND TRANSMITTAL SLIP

Date 17 October 2006

TO: (Name, office, symbol, room number, building, Agency/Post)	Initials	Date
1. CESAJ-PD-EP / IVAN ACOSTA		
2.		
3.		
4.		
5.		

Action		File	Note and Return
Approval		For Clearance	Per Conversation
As Requested		For Correction	Prepare Reply
Circulate	X	For Your Information	See Me
Comment		Investigate	Signature
Coordination		Justify	

REMARKS

Attached is one copy of the FINAL SITE SPECIFIC WORK PLAN ADDENDUM TO THE PROGRAMMATIC WORK PLAN FOR CULEBRA ISLAND, PUERTO RICO. DATED October 2006.

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org-symbol, Agency/Post) Abby Hernandez	Room No.-Bldg 4E / #134 / K10
	Phone No. 904-232-3420

From: Crain, Michael E NWO [Michael.E.Crain@nwo02.usace.army.mil]

Sent: Tuesday, August 01, 2006 1:40 PM

To: Walker, Deborah D HNC

Subject: Culebra Comments

Our ITR comments on the Culebra Island Draft Site Specific Work Plan are attached. Sandy Frye (Regulatory specialist) also reviewed it and had no comments.

HTRW Center of Expertise - Review Comments

Reviewer Name: Dunker, Jan W.
Discipline Chemistry
CX Project Review No. 69933
Date: 10/10/2006
Project Location Culebra Island, PR
Document Name: Draft - Site-Specific Work Plan Addendum to the Programmatic Work Plan, FUDS MMRP Site Inspections Project, Southeast and Pacific IMA Region, Culebra Island, FUDS Project No. I02PR0068, Culebra Island, PR

Comment # 1: Page 3-2; Section 3.1.2.2: Project-specific DQOs are missing or incomplete. See EM 200-1-2 *Technical Project Planning (TPP) Process*, 31 Aug 1998 (URL = <http://www.usace.army.mil/inet/usace-docs/eng-manuals/em200-1-2/toc.htm>). See also EPA QA/G-4, *Guidance on Systematic Planning Using the Data Quality Objectives Process*, EPA/240/B-06/001 February 2006. DQOs should be framed as if/then statements with quantitative criteria. See also <http://www.hanford.gov/dqo/index.html>. The decision units are not specified (Step 4 of the DQO process). The statistic for the comparison is not specified (typically the average concentration, Step 2 of the DQO process). The performance or acceptance criteria are not specified (decision error tolerances, Step 6 of the DQO process).

Response #1: The DQOs included in this SS-WP have been review and revised during a meeting with Bill Veith and John Sikes. The detail requested is above the level agreed upon during the SS-WP on board review.

Comment # 2: Page 3-7; Section 3.3.3: The rationale for selecting the soil sampling depth of 4 to 6 inches bgs rather than 0 to 2 inches bgs should be presented.

Response #2: This was done at the request of the regulators as they felt that a 4 to 6 inch depth would represent the soil most likely to contain contamination. The text was changed to state that the regulators requested that the sample be taken at a depth of 4 to 6 inches to account for the volatile environment on Culebra and the possibility of migration or leaching to the subsurface.

Comment # 3: Page 4-4; Section 4.7: See the above comments concerning project-specific DQOs.

Response #3: See response to comment #1

Comment # 4: Page 4-9; Table 4.3; small arms: If tungsten steel is used for the M2 Armor Piercing (AP) bullets then tungsten (W) should be included as a chemical constituent. It is not clear why molybdenum (Mo) is included as a potential chemical constituent. Since single- or double-base powder is the propellant then nitrocellulose and nitroglycerin should be in the list of chemical constituents. It is not clear why TNT is listed as a potential chemical constituent for .30 caliber small arms ammunition. Note the description of small arms from the munitions datasheets state that "Although steel, aluminum, zinc and plastic materials have been used experimentally, brass, a composition of 70 percent copper and 30 percent zinc, is the most commonly used material for cartridge cases." Thus brass should be the only constituent of .30 caliber small arms ammunition cartridge cases, and aluminum should not be included as a potential chemical constituent. Similar comments apply to other small arms ammunition.

Response #4: The text has been reviewed and edited per comment.

Comment # 5: Page 4-10; Table 4.3; Trench Mortar, 3 Inch: Please clarify the components of this munition. The table indicates that the "body" is composed of TNT or Nitrostarch, Barium nitrate, Sodium nitrate, and Ammonium nitrate. The

munitions data sheet indicates that “Both shells are loaded with a high explosive charge of either TNT or Nitrostarch.” The shell body is of forged steel.

Response #5: The munitions data sheets only list general details such as TNT or Nitrostarch other sources show that Barium nitrate, Sodium nitrate, and Ammonium nitrate are chemical constituents that are found in this munition. See Appendix E page E-6 of the Camp Calvin B. Matthews Preliminary Assessment where the MC components of the 3-inch HE Trench Mortar are listed.

Comment # 6: Page 4-11; Table 4.3; Mk 23, 3-lb Practice bomb: It is not clear why lead, zinc, copper, aluminum, potassium, and titanium are potential constituents where the body of the munition is cast iron.

Response #6: The MC has been changed to iron only.

Reviewer Name: Crain, Mike
Discipline Geology
CX Project Review No. 69933
Date: 10/10/2006
Project Location Culebra Island, Puerto Rico
Document Name: Draft Site Specific Work Plan, FUDS MMRP Site Inspection, Culebra Island, Puerto Rico

Comment # 1: 3.1.2.2 – This section isn't really a DQO statement. It is a narrative of the work that is planned. It does not include the elements of a DQO, such as stating the decision to be made, the decision limits, etc. Each DQO should be clearly spelled out with all the required elements clearly stated.

Response #1: The DQOs included in this SS-WP have been review and revised during a meeting with Bill Veith and John Sikes.

Reviewer Name: Walker, Terry L.
Discipline Risk Assessor
CX Project Review No. 69933
Date: 10/10/2006
Project Location Culebra Island, PR
Document Name: Draft SSWP for MMRP SI

Comment # 1: Section 1.3.1, fourth bullet, page 1-3. This reviewer submitted a comment on the Draft TPP Memo that has not been addressed in this SSWP. That comment is repeated here as the requirements of the PWS are not being met by the proposed screening. "Comparison of site sample concentrations to R9 PRGs will not evaluate the potential for ecological threats (or lack thereof). Although I do not know what the PREQB will supply as R2 soil screening criteria, since the document suggests that more stringent of the two will be used, I am assuming that these values are not intended for ecological screening, either. Many of these ranges are listed in the CSM as wildlife refuges, yet wildlife is not listed as potential receptors. It would seem more likely that ecological entities will be the only receptors at many of these ranges. Screening against ecological benchmarks can allow elimination of compounds, pathways and/or receptors from further investigation at the RI stage, and is required for this work effort. Please delineate how the ecological screening will be accomplished for these sites."

Response #1: In the interest of moving this project along and in accordance with recent discussion with the RSC Program Manager, Monique Ostermann, Parsons plans to proceed to field work for this SI but will evaluate ecological screening concerns in accordance with the program approved "white paper" (SLERA). This evaluation will be captured in the SI report.

A footnote has been added to the CSEM to document that eco will be assessed in accordance with the White Paper.

From: Zaruba, Robert K NWO
Sent: Monday, July 24, 2006 1:46 PM
To: Walker, Deborah D HNC; Cochrane, Chris HNC
Subject: ITR-SSWP-Culebra

Greetings:

1-The SS Work Plan looks pretty good. It follows the TPP memo. I has specifics where needed and allows flexibility where needed (sample locations and site walkover).

Response – Comment Noted.

2-Include more details about shipping samples. i.e. is ice readily available?, will samples be shipped back with team or seperately?

Response – Details on the shipping process have been added to section 4.2.5 of the SS-WP.

Regards

Robert K. Zaruba P.E.
Project Manager
US Army Corps of Engineers
Phone: (402) 221-7659 FAX: (402) 221-7796

DESIGN REVIEW COMMENTS

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|--|--|---|--------------------------------------|
| <input type="checkbox"/> SITE DEV & GEO | <input type="checkbox"/> MECHANICAL | <input checked="" type="checkbox"/> OE SAFETY | <input type="checkbox"/> SYSTEMS ENG |
| <input type="checkbox"/> ENVIR PROT & UTIL | <input type="checkbox"/> MFG TECHNOLOGY | <input type="checkbox"/> ADV TECH | <input type="checkbox"/> VALUE ENG |
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| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Control # 07-044-06

DATE 20 July 2006

NAME Michael Smith 509-8708

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1	GENERAL	<p>After reviewing the Draft Site Specific Work Plan Addendum to the Programmatic Work Plan for this project, I agree with the procedures described by the contractor.</p> <p>ACTION CODES W - WITHDRAWN A - ACCEPTED/CONCUR N - NON-CONCUR D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED</p>	A- Comment Noted

DESIGN REVIEW COMMENTS

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REVIEW Control # 07-044-06

DATE 20 July 2006

NAME Michael Smith 509-8708

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1	GENERAL	<p>After reviewing the Draft Site Specific Work Plan Addendum to the Programmatic Work Plan for this project, I agree with the procedures described by the contractor.</p> <p>ACTION CODES W - WITHDRAWN A - ACCEPTED/CONCUR N - NON-CONCUR D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED</p>	A - Comment Noted.

DESIGN REVIEW COMMENTS

PROJECT Culebra CN 07-044-06 SD 26 July 06

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REVIEW SSWP
 DATE 21 July 2006
 NAME Terry/CEHNC-ED-CS-P 1460

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	Page 1-3	Four bullet states that Region IX residential PRGs will be used for comparison of metals and explosives in soil/sediment. Fifth bullet states that ambient data will be used for comparison of metal results and further on page 3-3 it states that a qualitative order of magnitude comparison with site-specific ambient samples may be conducted. Correct for consistency throughout document.	A- The text has been changed to state explicitly that the sample will be compared to the comparison criteria and ambient samples.
2.	Table 4.4b	This table lists white phosphorus as a target analyte, although it is not listed on Table 4.2. Correct.	A - A note has been added to table 4.3 that 81mm WP rounds were only fired at Northwest Peninsula. We will not be sampling in that area and therefore none of the samples will include WP analysis. The use of hand grenades is mentioned but never including WP. The WP hand grenade has been removed from Table 4.3.

ACTION CODES W - WITHDRAWN
 A - ACCEPTED/CONCUR N - NON-CONCUR
 D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED

DESIGN REVIEW COMMENTS

PROJECT Culebra, PR CN 07-044-06 SD 26 July 06

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| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Draft SSWP
 DATE 26 July 06
 NAME M. Gooding/CEHNC-ED-CS-P /256-895-1635

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	Figure 2.3	Please add in the legend what the red squares, blue squares, and red triangles indicate.	A – The legend has been updated.
2.	Pg. 3-4	In the first paragraph it states that the Tax Assessors Office will be contacted for property ownership. Please clarify that this is the procedure for Puerto Rico.	A – The reference to the Tax assessor's office was removed as all of the property owners will be identified through USACE in order to get ROE for the property.
3.	Figure 3.1	Please add in the legend what the red squares and red triangles indicate.	A – The legend has been changed to specify each symbol.
4.		There are no other comments at this time.	

ACTION CODES W - WITHDRAWN
 A - ACCEPTED/CONCUR N - NON-CONCUR
 D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED

DESIGN REVIEW COMMENTS

PROJECT Culebra Addendum to Work Plan

CN 07-044-06

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| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW DRAFT dated July 2006
 DATE 26 July 2006
 NAME Kellie Williams / ED-SY-S/ 256-895-1584-

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	CEHNC-ED-SY-S has reviewed the document and has the following comments.	
2.	General	Request Parson's CIH sign site-specific AAP.	A - Chapter 6 has been revised to include the CIH signature.
3.			

ACTION CODES W - WITHDRAWN
 A - ACCEPTED/CONCUR N - NON-CONCUR
 D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED

DESIGN REVIEW COMMENTS

PROJECT Culebra Island SSWP

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| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Draft
 DATE 27 August 2006
 NAME Deborah Walker/CEHNC-OE-CX/256-895-1796

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1	General	Request that my comments from the TPP memo be reviewed for impact, as they were submitted to Parsons after this document was submitted to USACE. Many (possibly all) are relevant to this document as well, but are not repeated here for brevity.	A – Comment Noted.
2	General	Given the logistics challenges at this site, would have anticipated additional information to address items such as shipping complications, Customs/USDA inspections related to soil importation (including permit documentation), etc. This would also include documentation regarding boating operations (i.e., will Parsons be manning the boats or will this be hired out, etc.)	A – Text has been added to address sample shipment (section 4.2.5) and boating operations (section 3.2.8).
3	1.2.4, pg. 1-2	<p>a. The MC data collected during Construction Support operations (to include the 2004 Field Sampling & Analysis Report for Construction Support Phase Ib, Culebra Island National Wildlife Refuge) may be applicable. If the locations are not part of the SI property boundary, no document change is necessary.</p> <p>b. Limited MC data is also being collected as part of the other ongoing actions at Culebra Island. To the extent they are available and appropriate for use in the SI, recommend they be incorporated.</p>	<p>A - This report has been reviews and pertains only to Northwest Peninsula which will not be included in this SI due to PL 93-166.</p> <p>A - Any MC data available will be included in the SI report and will be incorporated into the SI recommendation.</p>
4	1.3, General	Recommend documenting Region II's role in this SI, as determined during TPP process.	A – This documentation should be requested from the district.
5	2.3, pg. 2-3	Recommend including PL 93-166 and explaining the implications (here or elsewhere). The maps, in particular, should be annotated to clarify where SI activities cannot take place.	A – The maps will be annotated to show the areas where work will not be conducted due to PL 93-166. The text will included reference to PL 93-166
6	2.5, pg. 2-4	There were a number of construction support operations within the Island and an ongoing removal action. These should be addressed if their footprint is within the SI footprint.	A – Detail concerning these construction support and removal actions will be included in the SI report where appropriate. At this time only those investigations listed in section 2.5 and the 2004

ACTION CODES W - WITHDRAWN
 A - ACCEPTED/CONCUR N - NON-CONCUR
 D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED

DESIGN REVIEW COMMENTS

PROJECT Culebra Island SSWP

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| <input type="checkbox"/> STRUCTURAL | <input type="checkbox"/> INST & CONTROLS | <input type="checkbox"/> SPECIFICATIONS | |

REVIEW Draft
 DATE 27 August 2006
 NAME Deborah Walker/CEHNC-OE-CX/256-895-1796

ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
7	2.5.5, pg. 2-4	Confirm that the detailed information provided here is from the 2004 ASR supplement rather than the 2005 Supplemental ASR.	Construction Support Phase Ib report have been provided directly or through the EKO or PIRS websites. The Phase Ib report does not apply due to PL 93-166. A – This information is from the 2004 ASR Supplement.
8	Table 2.1	Add munitions from construction support and removal action activities if they are within the SI footprint.	A – The munitions listed in all available reports have been included.
9	Schedule	Note that stakeholder reviews should allow 45 days.	A – The schedule has been changed to include 30 working days which is equivalent to 45 calendar days.
10	3.1.2.4, pg. 3-3	It is unlikely that SHPO can provide ecological resource data.	A – The text will be changed to read “Data gaps will be filled via QR, MC sampling, data collection from local/state agencies to included ecological and cultural resources, receptor information, groundwater well users, and supply sources/served population, etc.”
11	Table 4.3, pg. 4-9	Please do a bit more research before leaving these blank. For example, the Navy’s history of torpedos document is available online and provides relatively detailed specification information: https://www.keyportmuseum.cnrnw.navy.mil/html/part2.htm . Additionally, per TM 9-1300-214, HBX and H6 are both made up of RDX, TNT, aluminum, wax, and lecithin.	A – Data Entered into Table 4.3
12	Table 4.5	Clarify whether intent is to sample for white phosphorus or not.	A – White phosphorus was used on Northwest Peninsula and WP samples will not be collected on the remainder of the site. The SS-WP text has been changed to remove all reference to sampling for WP.

ACTION CODES W - WITHDRAWN
 A - ACCEPTED/CONCUR N - NON-CONCUR
 D - ACTION DEFERRED VE - VE POTENTIAL/VEP ATTACHED

**Comments on the
Site Specific Work Plan Addendum to the
Programmatic Work Plan
Culebra Island, Puerto Rico
In Support of the FUDS MMRP SI Project
Dated: July 2006
Comments Developed August 10, 2006**



Cmt. No.	Pg.	Sec.	Comment/Recommendation
1	1-1	1.1	<p>This section referenced the Final PWP dated October 2005 as the background document for this Site Specific work plan. Please forward a copy of the Final PWP to EQB.</p> <p>Response: CESAJ should be contacted to provide an electronic copy of the October 2005 Final Programmatic Work Plan.</p>
2	1-2 2-2	1.2.4 2.2.2	<p>An MEC removal action is currently being performed on Culebra. Please reference this project in these paragraphs which document the additional work that serves to verify that MEC exists on Culebra.</p> <p>Response: Text has been added to paragraph 1.2.4 to reference the current removal action at Cerro Balcon. Details pertaining to the items found during this action have not been provided to Parsons as this point for inclusion into the SS-WP; however, effort will be made to acquire this information for inclusion in the SI Report. Text has also been added to paragraph 2.2.2 to state that information on the current Removal Action will be including in the SI report where applicable.</p>
3	N/A	Figure 2.3 Figure 3-1	<p>This figure contains some items in the legend that are not shown on the map and some markings on the map that are not defined in the legend. Examples are:</p> <ol style="list-style-type: none"> 1. Items in legend that are not on the map:

Cmt. No.	Pg.	Sec.	Comment/Recommendation
			<p>a. Water areas for direct fire at boats – 1935 (possibly 1924) Response: these areas are the red circle shown using the pattern in the legend. See the circle just north of the number 10 on area 10 surrounding Hill #325.</p> <p>b. Standing barrages previously registered 1935 (possibly 1924) Response: Standing barrages are seen on the border of Area 11 and 14 and also southwest of the 05 label.</p> <p>c. 1902 – 1903 Gun positions Response: The 1902 – 1903 Gun positions are located just north of Mosquito bay on Carenero Pt., also on near Mangrove Harbor and near hill 325 and the town of Dewey.</p> <p>2. Items on map not shown on legend:</p> <p>a. Solid blue lines such as those bracketing Area 13 and north of Area 13 Response: Those are the 1939 Military Excercises. The map labels tell the type of range.</p> <p>b. Solid red and blue squares in Areas 06 Response: These have been added to the figure.</p> <p>c. Blue “ladders” radiating northward from the southeast tip of Culebra Response: That is part of the Artillery Range showing the danger area on the sides of the impact area. These are labeled by the arrows midway out and at the end of the range.</p> <p>It is recommended that Figure 2.3 be improved by deleting unused legend icons and checking to make sure that all markings on the map are defined in the legend.</p> <p>Similar, but not identical, comments apply to Figure 3-1.</p> <p>Response: The legends on Figures 2.3 and 3.1 have been reviewed and changed to include only items shown on the map and the figures have been reviewed to ensure that items are either labeled or included in</p>

Cmt. No.	Pg.	Sec.	Comment/Recommendation
			the map legend.
4	3-2	3.1.2.1.1	<p>There is a minor incorrect reference in this section since it references “paragraph 3.1.2.1 above” which is only the heading for this subsection and doesn’t contain the information that is referenced.</p> <p>Response: The text was referencing paragraph 3.1.2.1 as apposed to section 3.1.2.1. The text has been changed for clarity and now references section 3.1.2.</p>
5	3-5	3.3	<p>This section references the “... approved procedures for reporting” finding MEC “... as presented in the PWP”. Since Culebra is a populated island, EQB is concerned with the safety of local residents and visitors. EQB requests that these MEC reporting procedures be provided to EQB so they can be evaluated to ensure the safety of local residents and visitors from MEC found during the SI.</p> <p>Response: The MEC notification procedures have been included in the Final SS-WP as Attachment 3-1.</p>
6	4-9 4-11	Table 4.3	<p>This table appears to be incomplete. For example:</p> <ol style="list-style-type: none"> 1. There is no technical information listed for the MK 27 HE torpedo. Since it is an HE torpedo it should at least be possible to determine the type and amount of HE used in the warhead. The hazards on the propulsion system of the torpedo should also be listed. Response: Detail available for the MK 27 HE torpedo has been added to Table 4.3 2. The MK 76, MK 106 and MK 23 3-lb. practice bombs are listed as “inert”. However, they were likely to be used with spotting charges which contain explosives or other MC which should be identified. Response: Information about the potential MC associated with the spotting charges has been added to Table 4.3. 3. The 37-mm projectile is identified as having the filler “FNH”. Please identify what this filler is. Response: FNH is Flashless Nonhygroscopic and text has been added to define the acronym in Table 4.3 4. There is no technical information provided for the MK 14/15 Navy general torpedo. At a minimum, high explosives and hazards associated with the propulsion system should be listed. Response: Detail available for the MK 14/15 Navy general torpedo has been added to Table 4.3 <p>It is recommended that this table be improved by providing the missing or questionable information. Response: Comment Noted.</p>

Cmt. No.	Pg.	Sec.	Comment/Recommendation
7	5-3	5.3.3	<p>The statement is made in this section that “The green, hawksbill, and leatherback sea turtles will nest on beach areas anytime from January through December.” This implies nesting year-round. The reviewer is not sure if this was the intent of this statement or if this is a typo. If the intention of this sentence is to describe year-round nesting it may be better to say that the nesting takes place “year-round” instead of from “January to December”.</p> <p>Response: The text has been changed to state, “The green, hawksbill, and leatherback sea turtles each nest on beach areas during different seasons resulting in year round nesting on Culebra’s beaches.”</p> <p>Also, this chapter identifies turtles as endangered species. If turtles nest on the beaches year-round, are there any special precautions that are necessary to prevent disturbing or harming the endangered nesting turtles?</p> <p>Response: Teresa Tallevast with the US Department of Fish and Wildlife will meet with the site visit team and provide instructions if any special procedures are needed in the beach areas.</p>
8	6-3	Figure 6.1	<p>What does the small map at the bottom of this figure show? What is the significance of the red star icon in the water in Ensenada Honda?</p> <p>Response: The figure has been edited to point out the location of the hospital and the red star has been removed.</p>

Felix Lopez/R4/FWS/DOI

To 14/07/2006 12:33 p.m. susan_silander@fws.gov,

Lisamarie.Carrubba@noaa.gov, hhorta

<hhorta@coqui.net>,

matos_reservas@yahoo.com, Teresa

Tallevast <teretall@hotmail.com>,

Teresa Tallevast/R4/FWS/DOI,

"Cochrane, Chris HNC"

<Chris.Cochrane@hnd01.usace.army.mi

l>, yarissa martinez

<yarissaaymee@yahoo.com>,

yarissamartinez@jca.gobierno.pr,

"Acosta, Ivan SAJ"

<Ivan.Acosta@saj02.usace.army.mil>,

"Colon, Nelson R SAJ"

<Nelson.R.Colon@saj02.usace.army.mi

l>

cc

Henry.Richard@epamail.epa.gov,

Richard G Henry/R9/FWS/DOI

Subject

SI; Culebra Draft Technical Project

Planning Memorandum and Associated

Documents](Document link: Felix

Lopez)

Ricardo this is why I don't like expedited reviews and changing documents in meetings or via emails, things fall through the cracks, good meeting notes are not taken or circulated. This was discussed back in February and March. EQB, DNER and FWS discussed changes to the various sampling sites.

I may be wrong but I thought we had agreed on the following:

Cayo Norte : Soil samples were to be moved further west one in a drainage and one on the slopes. An additional sediment sample was going to be taken in the lagoon on the south shore of Cayo Norte. See enclosed drawing.

Response: The soil samples have been moved to the drainage and on the south facing slope of Cayo Norte. The sediment sample has been added in the lagoon.

Soil sample 16: This is a back ground sample. It was located next to the cemetery, we recommended that it be moved either east or north. It has been moved east but to the center of lower camp. It is now in the middle of the oldest known occupied area on Culebra, the site of the original settlement, the site of the Navy camp, and now the site of

FWS and Municipal facilities. This has had human occupation for the last 150 years and nothing about it can be considered background. This site needs to be changed.

Response: Soil sample #16 has been moved north and a little west of Lower Camp. The soil sample may be moved a little further out of town by the field team if field evidence shows that a better location is nearby.

Soil sample 21: This is still located on a rocky headland, it should be moved inland, we had previously recommended sampling avoid the beach areas.

Response: Soil Sample #21 has been moved up off the beach and rocky headland.

Did we ever come to a conclusion on the defoliant issue ?? Or did we agree to hold it for a later time.

Response: Historical documents reviewed so far have not revealed any information pertaining to the use of Defoliant on Culebra however the records will be reviewed further as part of the SI Report and if any information is found it will be noted in the SI report. The field team will take photos and document changes in vegetation and will take particular notice of the state and type of vegetation found on cayo Lobo.

Other details: How will Parsons access Cayo Lobo, Cayo Norte (private property) and Culebrita ?? There are no docks on any of the islands. Cayo Norte has fringing reefs, Cayo Lobo has underwater UXO. Culebrita has mooring buoys but off shore.

Response: Parsons will hire a local charter vessel to access the surrounding cays and cayos. Every effort will be made to reach each of the cays. The ROE for each of the pieces of property will be secured by CESAJ.

To help us all keep track of things I recommend that in the future, meeting minutes be circulated 15 days after the meeting to make sure things are documented and included in future document revisions.

Response: Comment noted on future meetings Parsons will work to circulate meeting minutes in a timely manner.

(See attached file: Cayo Norte.JPG)

Felix Lopez
USFWS
Caribbean FO

FW SI.txt; Culebra Draft Technical Project Planning Memorandum and Associated Documents.txt

-----Original Message-----

From: Vazquez, Ricardo R SAJ [mailto:Ricardo.R.Vazquez@saj02.usace.army.mil]
Sent: Thursday, September 07, 2006 12:03 PM
To: Kelley, Laura; Silkebakken, Don
Cc: Cochrane, Chris HNC
Subject: FW: SI; Culebra Draft Technical Project Planning Memorandum and Associated Documents]
Importance: High

Please, my apology for my confusion.

Thanks
Ricardo

Ricardo R. Vazquez, P.E.
IIS Project Manager for
DERP-FUDS-MMRP
CESAJ-DP-S
904-232-1649

-----Original Message-----

From: Felix_Lopez@fws.gov [mailto:Felix_Lopez@fws.gov]
Sent: Friday, July 14, 2006 1:53 PM
To: Vazquez, Ricardo R SAJ
Subject: FW: SI; Culebra Draft Technical Project Planning Memorandum and Associated Documents]
Importance: High

Ricardo I sent this to everyone except you, here it is.

Felix

----- Forwarded by Felix Lopez/R4/FWS/DOI on 14/07/2006 01:52 p.m. -----

Felix
Lopez/R4/FWS/DOI

14/07/2006 12:33
p.m.

To
susan_silander@fws.gov,
Lisamarie.Carrubba@noaa.gov, hhorta
<hhorta@coqui.net>,
matos_reservas@yahoo.com, Teresa
Tallevast <teretail@hotmail.com>,
Teresa Tallevast/R4/FWS/DOI,
"Cochrane, Chris HNC"
<Chris.Cochrane@hnd01.usace.army.mil>,
yarissa martinez
<yarissaaymee@yahoo.com>,
yarissamartinez@jca.gobierno.pr,
"Acosta, Ivan SAJ"
<Ivan.Acosta@saj02.usace.army.mil>,
"Colon, Nelson R SAJ"
<Nelson.R.Colon@saj02.usace.army.mil>

cc
Henry.Richard@epamail.epa.gov,
Richard G Henry/R9/FWS/DOI

Subject

FW SI.txt; Culebra Draft Technical Project Planning Memorandum and Associated Documents.txt
SI; Culebra Draft Technical Project
Planning Memorandum and Associated
Documents](Document link: Felix
Lopez)

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(See attached file: Cayo Norte.JPG)

Felix Lopez
USFWS
Caribbean FO

FW SI.txt; Culebra Draft Technical Project Planning Memorandum and Associated Documents.txt

----- Message from "Vazquez, Ricardo R SAJ" <Ricardo.R.Vazquez@saj02.usace.army.mil>
on Tue, 11 Jul 2006 18:06:17 -0400

To: susan_silander@fws.gov, Lisamarie.Carrubba@noaa.gov,
Felix_Lopez@fws.gov, hhorta <hhorta@coqui.net>,
matos_reservas@yahoo.com, Teresa Tallevast <teretail@hotmail.com>,
teresa_tallevast@fws.gov

cc: "Cochrane, Chris HNC" <Chris.Cochrane@hnd01.usace.army.mil>, yarissa
martinez <yarissaaymee@yahoo.com>, yarissamartinez@jca.gobierno.pr,
"Acosta, Ivan SAJ" <Ivan.Acosta@saj02.usace.army.mil>, "Colon,
Nelson R SAJ" <Nelson.R.Colon@saj02.usace.army.mil>, "Martinez,
Migdalia SAJ" <Migdalia.Martinez@saj02.usace.army.mil>

Subj SI; Culebra Draft Technical Project Planning Memorandum and
ect: Associated Documents

Saludos a Todos;

Please notice that subject copies were delivered on June 27, 2006. Under contract with Parson's we have 30 days for review and receiving comments. However if we can do sooner the sooner Parson will move to the next stage. Sampling locations were selected as coordinated with the TPP members, and is my understanding that site selections are as per recommendations and agreement. The other issue was samples depth, and we agreed to TPP recommendation. Please if there are no comments we also need to know. E-mails are acceptable for comments or a no comments statement. We all want Parsons at site as soon as possible.

Gracias
Ricardo

Ricardo R. Vazquez, P.E.
IIS Project Manager for
DERP-FUDS-MMRP
CESAJ-DP-S
904-232-1649
Fax# 904-232-3920

PARSONS

Parsons Infrastructure & Technology Group, Inc.

5390 Triangle Parkway • Suite 100 • Norcross, Georgia 30092 • (770) 446-4900 • Fax: (770) 446-4910 • www.parsons.com

October 10, 2006

U.S. Army Engineering & Support Center
ATTN: CEHNC-OE-DC (Ms. Chris Cochrane)
4820 University Square
Huntsville, Alabama 35816-1822
256-895-1696

Subject: Contract W912DY-04-D-0005, Delivery Order 0008
MMRP SI for SE and Pacific IMA Region – Final SS-WP
Culebra Island, Puerto Rico

Dear Ms. Cochrane:

Parsons has prepared this Final Site-Specific Work Plan (SS-WP) for the Culebra Island, PR site. Two copies have been provided for your back check. We have simultaneously forwarded one hard copy and three electronic copies of the document to Mr. Charles Fales of the Jacksonville District. Three hard copies and five CDs have been forwarded to Ms. Daphnie Kildare-Torres for distribution to the PREQB, PRDNER, USFWS, and Dr. Lisamarie Carrubba. In addition, single copies have been forwarded to HTRW CX, and MM CX; electronic copies have also been provided. All comments received on the Draft document have been addressed.

If you have any questions or comments, please contact me at (678) 969-2384 or (404) 606-0346 (cell) or the Deputy Project Manager (Ms. Laura Kelley).

Sincerely,

PARSONS

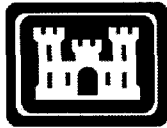


Don Silkebakken, P.E.
MMRP SI Project/Program Manager

cc: Charles Fales (CESAJ) – 1 copy/3 CDs
Daphnie Kildare-Torres – 3 copies/5 CDs
Betina Johnson / Deborah Walker (MM CX) – 1 copy/1 CD
Mike Crain (HTRW CX) – 1 copy/1 CD
Laura Kelley - Project File (744647.17000)

2 cd's in book (also
sheep) 10-17-06





U.S. Army Corps of Engineers
Southeast and Pacific IMA Region

FINAL
Site Specific Work Plan Addendum
to the
Programmatic Work Plan
Culebra Island, Puerto Rico

FUDS Project No. I02PR0068
October 2006

In Support of
FUDS MMRP Site Inspections Project

Prepared by:
PARSONS

5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

Prepared for:

U.S. Army Corps of Engineers, Jacksonville District
701 San Marco Boulevard
Jacksonville, FL 32207

&

U.S. Army Engineering and Support Center, Huntsville
4820 University Square
Huntsville, Alabama 35816

Contract: W912DY-04-D-0005
Task Order: 0008

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LIST OF ACRONYMS

AOC	Area of Concern
AP	Armor Piercing
ASR	Archives Search Report
bgs	below ground surface
CEHNC	Huntsville, U.S. Army Engineering and Support Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CEMVR	U.S. Army Corps of Engineers, Rock Island District
CEMVS	U.S. Army Corps of Engineers, St. Louis District
CENWO	U.S. Army Corps of Engineers, Omaha District
CESAJ	U.S. Army Corps of Engineers, Jacksonville District
CHE	Chemical Health Evaluation
CoRIS	Coral Reef Information System
CPR	Cardiopulmonary Resuscitation
CRREL	Cold Regions Research and Engineering Laboratory
CRWQCB	California Regional Water Quality Control Board
CSM	Conceptual Site Model
CSEM	Conceptual Site Exposure Model
CWM	Chemical Warfare Material
CZMP	Coastal Zone Management Plan
DERP	Defense Environmental Restoration Program
DID	Data Item Description
DQO	Data Quality Objective
EE/CA	Engineering Evaluation/Cost Analysis
EHE	Explosive Hazard Evaluation
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
ER	Engineering Regulation
ERFPP	Emergency Response and Fire Prevention Plan
ESE	Environmental Science and Engineering
FDE	Findings and Determination of Eligibility
FLEX	Fleet Landing Exercise
FSP	Field Sampling Plan
FTL	Field Team Leader
FUDS	Formerly Used Defense Site
GIS	Geographic Information System

LIST OF ACRONYMS CONTINUED

GPS	Global Positioning System
HE	High Explosive
HEI	High Explosive Incendiary
HHE	Health Hazard Evaluation
HRS	Hazard Ranking System
HTW	Hazardous and Toxic Waste
IDW	Investigative-Derived Waste
INPR	Inventory Project Report
MC	Munitions Constituents
MD	Munitions Debris
MDL	Method Detection Limits
MEC	Munitions and Explosives of Concern
MM CX	Military Munitions Center of Expertise
MM DC	Military Munitions Design Center
MMRP	Military Munitions Response Program
MRA	Munitions Range Area
MRS	Munitions Range Site
MRSPP	Military Response Site Prioritization Protocol
MS	Matrix Spike
MSD	Matrix Spike Duplicate
MTA	MTA, Inc
NDAI	No DoD Action Indicated
NHA	National Historic Areas
NHL	National Historic Landmarks
NOAA	National Oceanic and Atmospheric Administration
NPS	National Parks Service
NRIS	National Register Information System
NWI	National Wetlands Inventory
NWRS	National Wildlife Refuge System
OSD	Office of the Secretary of Defense
PA	Preliminary Assessment
PAPP	Programmatic Accident Prevention Plan
PDA	Personal Digital Assistant
PFSP	Programmatic Field Sampling Plan
PM	Project Manager
POP	Period of Performance

LIST OF ACRONYMS CONTINUED

PQL	Practical Quantitation Limits
PRDNER	Puerto Rico Department of Natural and Environmental Resources
PREQB	Puerto Rico Environmental Quality Board
PRG	Preliminary Remediation Goal
PSAP	Programmatic Sampling and Analysis Plan
PWP	Programmatic Work Plan
PWS	Project Work Statement
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
QR	Qualitative Reconnaissance
RAC	Risk Assessment Code
RI/FS	Remedial Investigation / Feasibility Study
ROE	Right-of-Entry
SAP	Sampling and Analysis Plan
SHPO	State Historic Preservation Office
SI	Site Inspection
SS-WP	Site-Specific Work Plan
STL	Severn Trent Laboratories
SVT	Site Visit Team
TCRA	Time Critical Removal Action
TESS	Threatened and Endangered Species System
TNT	2,4,6-Trinitrotoluene
TPP	Technical Project Planning
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Society
UXO	Unexploded Ordnance
WP	White Phosphorus

CHAPTER 1 INTRODUCTION

1.1 APPLICATION

1.1.1 This Site-Specific Work Plan (SS-WP) document has been prepared for the *Culebra Island site in Puerto Rico (Formerly Used Defense Site [FUDS] Project Number I02PR0068)*. This SS-WP Addendum serves as an extension to the Programmatic Work Plan (PWP) and Programmatic Sampling and Analysis Plan (PSAP) to conduct Site Inspections (SI) under the Military Munitions Response Program (MMRP) within the U.S. Army Corps of Engineers (USACE) Southeast and Pacific Military Munitions Design Center region. The reader is directed to the Final PWP (dated October 2005, prepared by Parsons) and Final PSAP (dated September 2005, prepared by USACE), inclusive of all subsequent addenda, for additional detail regarding the majority of SI procedures, resources, and methods that are common to most SI field actions. The PWP and PSAP have been reviewed and approved by USACE for use during implementation of the SI program.

1.1.2 The intent of this SS-WP Addendum is merely to augment the PWP and PSAP, as warranted, to present pertinent site-specific information and procedural deviations that could not be readily captured in the programmatic documents or were the result of Technical Project Planning (TPP) Project Team agreements requiring modifications to the preliminary SI Technical Approach (see Subchapter 1.3 below). The PWP and PSAP are intended to be all-inclusive documents specifically tailored to address the foreseeable universe of potential SI actions. Conversely, the SS-WP Addendum has been prepared with emphasis on brevity and usability (with regard to the field implementation team) and is not intended to restate protocol already addressed elsewhere. It should be noted that the PWP and PSAP will accompany the SS-WP Addendum during the conduct of SI field activities.

1.2 SI PROJECT OBJECTIVE – CULEBRA ISLAND

1.2.1 The purpose and scope of this SI project is described in Subchapter 1.2 of the PWP. However, the primary objective can be summarized as the determination, through reconnaissance and munitions constituent (MC) sampling, as to whether the site should be recommended for immediate action (Time Critical Removal Action [TCRA] or in some cases Non-Time Critical Removal Action [NTCRA]), subsequent characterization actions (such as a remedial investigation/feasibility study [RI/FS]), or no Department of Defense (DoD) Action Indicated (NDAI). An NDAI recommendation is limited exclusively to munitions and explosives of concern (MEC) and MC contamination issues and does not address Hazardous and Toxic Waste (HTW) concerns the site may pose. Additionally, if an NDAI recommendation is warranted and MEC and/or MC contamination issues are

subsequently identified, the site would be re-opened and would start the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process over again.

1.2.2 The key to performing a successful and cost effective SI is understanding that an SI is not designed to characterize or delineate (lateral or vertical extent) potential site contamination. It is merely a site screening initiative to address whether MEC, MC, or both are present at the site. Per Engineering Regulation (ER) 200-3-1 guidance for conducting SI, "The SI is not intended as a full-scale study of the nature and extent of contamination or explosive hazards" and only requires collection of "the minimum amount of information necessary."

1.2.3 Frequently, sufficient data from prior studies, the Preliminary Assessment (PA), or the Archives Search Report (ASR) exists to support an anticipated recommendation for the site with regards to MEC, MC, or both. In such instances, data collection is tailored more towards providing compelling evidence in support of an NDAI assertion or for demonstrating a strategy for focusing an RI/FS to substantially smaller tracts within the site.

1.2.4 For the Culebra Island site, sufficient MEC data exists to support a recommendation for RI/FS prior to conducting the field portion of the SI. The site use as a Marine and Navy training area for aerial bombing, ground maneuvers, artillery, torpedo, and mortar firing has been verified. In addition, the presence of MEC onsite has been confirmed through documented findings during Explosive Ordnance Disposal (EOD) surveys, the 1995 ASR site visit, the MTA, Inc (MTA) 1995 Interim Remedial Action, the Environmental Science and Engineering (ESE) 1997 Engineering Evaluation/Cost Analysis (EE/CA), and the removal action that is presently underway at Cerro Balcon. Therefore, the SI for the Culebra Island site will not only attempt to further evaluate MEC and MC presence in known target areas but will also evaluate MEC presence in remote and peripheral portions of the site. In this manner, the SI Report recommendation can potentially focus on reduced areas of concern (AOCs) for RI/FS. To date, no MC sampling data has been collected at the site. Therefore, environmental samples will be biased to coincide with site locations most likely to display evidence of residual MC contamination (such as the target areas or areas displaying munitions debris [MD] presence), if MC contamination is present.

1.3 TPP SUMMARY

1.3.1 The Culebra Island site, falls under the purview of the USACE Jacksonville District (CESAJ). A TPP meeting was facilitated by CESAJ on February 28, 2006 followed by a windshield tour of the site on March 1, 2006 and included representatives of CESAJ, Parsons, Puerto Rico Environmental Quality Board (PREQB), Puerto Rico Department of Natural and Environmental Resources (PRDNER), and the U.S. Fish and Wildlife Service (USFWS). TPP Project Team concurrence with the Technical Approach presented in the Final TPP Memorandum issued on August 23, 2006 was achieved (see Appendix A). This SS-WP Addendum reflects the project team decisions resulting from the meeting as well as those directly resulting from follow-on actions. Key TPP facts and decisions are summarized below:

- The Project Team concurs with the Technical Approach (anticipated RI/FS) as revised at the TPP meeting on February 28, 2006 inclusive of number, type, and location of samples, as well as sampling methodology and laboratory analyses. A total of 28 surface soil samples (4 to 6 inches) and 4 sediment samples will be collected. Three of the twenty-eight surface soil samples (#16, #22, and #27, as depicted on the conceptual site model [CSM]) are planned to be used as ambient samples for comparison of metals. The Project Team concurs that the site does not support accessible groundwater; thus collection of samples from these media was not deemed warranted at the SI phase.
- All samples, except sample #13, (inclusive of those selected for ambient purposes) will be analyzed for MC compounds to include explosive constituents and metals. Sample #13 will be analyzed for lead, copper and antimony only to screen for MC associated with the small arms range located near the airport.
- The Project Team agrees that the exact soil sampling locations will be left to the professional judgment of the Field Team after navigating to the location depicted on the SS-WP Addendum maps. The sampling locations will serve as a starting point to assist the Field Team in finding conditions indicative of MEC and MC contamination and will represent the fallback sample location in the absence of biased field locations.
- A windshield tour of the site location was conducted on March 1, 2006. Significant vegetation is noted in most areas. Topographically the site contains steep sea cliffs, moderate hills, and significant rock accumulations. Vegetation is extremely restrictive with dense underbrush including hardwood trees and thorned bushes. Some pruning will be required for the Field Team to access soil sample locations. Access to this site is obtained by unimproved roads requiring four-wheel drive vehicles. Satellite phones will be employed by the field team as cell phone communication is sporadic at best. Photographs of site conditions were taken and will be presented in the SS-WP Addendum. Due to the proximity of the site to the ocean, significant winds were also noted and will require the field team to dress accordingly. Soil is present across the majority of the site thus collection of soil samples will be in accordance with the PWP.
- The Project Team concurs with the use of Environmental Protection Agency (EPA) Region IX residential soil Preliminary Remediation Goals (PRGs) for explosives (post meeting discussion with PREQB resulted in a decision to use only EPA Region IX PRGs because Region II does not have established Soil Screening Criteria). A table presenting these values will be included in the SS-WP. In addition to screening criteria, metals concentrations will be compared to site ambient metals concentrations obtained from the three samples (#16, #22 and #27) collected from outside of the impact areas. The Commonwealth of Puerto Rico background metals information will not be used for comparison due to differences in the geology of Culebra and that of Puerto Rico.
- The likelihood of elevated metals concentrations in soil samples was recognized by PREQB due to the presence of volcanic rock and soil. Therefore, elevated metals

concentrations will not necessarily signify the need for additional sampling or RI/FS by itself but will be evaluated in conjunction with other SI findings.

- The Project Team agreed that no ocean water areas would be investigated as part of the SI. The SI will only evaluate land portions of the site; however the SI will recommend that a detailed study of the hazards associated with MEC presence in the ocean be evaluated as part of the RI/FS.
- The TPP Project Team agreed that analysis of groundwater for MC and the presence of perchlorate should not be conducted as part of this SI. Human exposure pathways to groundwater are not complete. There are no wells onsite or in the vicinity of the site. Due to the small size and annual desiccation of most surface water bodies on the island, the Project Team believes that it is more likely that potential MC contamination would be present in lagoon sediment and not in the water itself. Five sediment samples from lagoons in Project Areas 04, 05, 07 and 08 will be collected in lieu of collecting water samples from standing water, natural springs, or wells.
- The Reserve Forces Facilities Authorization Act of 1974 prohibits federal funding for the clean up the Flamenco Peninsula portion of Culebra Island (Figures 1 and 2). Section 204(c) of the Act, referred to as public law 93-166, addressed the use of federal funds for environmental cleanup on Culebra Island:

Notwithstanding any other provisions of law, the present bombardment area on the island of Culebra shall not be utilized for any purpose that would require decontamination at the expense of the United States. Any lands sold, transferred, or otherwise disposed of by the United States as a result of the relocation of the operations referred to in subsection (a) [ship-to-shore and other gun fire and bombing operations of the U.S. Navy] may be sold, transferred, or otherwise disposed of only for public park or public recreational purposes.

The SI will not be conducted on the portion of Culebra (Northwest Peninsula) referred to in PL 93-166 and shown on Figure 2.1.

- The Project Team did not identify any site specific issues requiring an expedited project schedule or document reviews for this site.

1.3.2 For the Culebra Island site, this SS-WP Addendum has been written to address those items mentioned above and any other site-specific concerns needing further clarification of the PWP and PSAP. The regulator PREQB and the major landowners PRDNER and USFWS concur with the Technical Approach and field procedures, as presented. The final TPP Memorandum is included in Appendix A.

1.4 SITE-SPECIFIC WORK PLAN ORGANIZATION

This SS-WP Addendum covers the investigation and all associated preparations necessary for SI activities at the Culebra Island site. The reader is referred to the PWP or

PSAP for the general programmatic information intentionally excluded from this document. The SS-WP Addendum is organized as follows:

- Chapter 1 – Introduction
- Chapter 2 – Project Description
- Chapter 3 – Field Investigation Plan
- Chapter 4 – Sampling and Analysis Plan
- Chapter 5 – Environmental Protection Plan
- Chapter 6 – Accident Prevention Plan
- Chapter 7 - References
- Appendices

CHAPTER 2 PROJECT DESCRIPTION

2.1 PROJECT LOCATION



The Culebra Island site, located 17 miles east of the Island of Puerto Rico, consists of 9,460 acres of FUDS eligible property including approximately 1,030 acres of water and 8,430 acres of land. Within the site 13 project areas have been designated for the MMRP and are part of this SI. Project Area 02

includes Northwest Peninsula and Cerro Balcon on Culebra Island and several surrounding cayos. Project Areas 03 and 04 include the Flamingo Bay water area and Flamingo Lagoon Maneuver Area, respectively. Project Area 05 is the Mortar and Combat Range Area consisting of the main portion of land in the center of Culebra and completely surrounds Cerro Balcon. Project Area 06, Artillery Firing Area, includes all of the land around Mangrove Harbor on Culebra Island east of Project Area 05. Project Area 07, Culebrita Artillery Impact Area, encompasses all of the northern portion of Culebrita and also Cayo Botella. Cayo Norte is designated at Project Area 08, Cayo Norte Impact Area. The southern leg of Culebra Island, south of the Town of Dewey, consists of Project Area 10, Defensive Firing Area #1, and Project Area 09, Soldado Point Mortar and Bombing Area. North of Dewey is Project Area 11, Defensive Firing Area #2, bordered on the west by Luis Pena Channel Water Areas, Project Area 12. Project area 13 includes Cayo Luis Pena and the surrounding water. The land around the airport and along the northeast side of Great Harbor is Project Area 14, Airfield and Camp Area. Figure 2.1 shows the location and boundaries of the site.



2.2 SITE DESCRIPTION

2.2.1 Several investigations have been conducted at the Culebra Island site. These investigations confirmed that Culebra Island and the surrounding cays and cayos were used for aerial bombing, maneuvers, artillery firing, and amphibious training. Access is unrestricted on most of the island although natural barriers such as dense vegetation and

rocky cliffs make access to many areas difficult. The site includes municipal, residential, and recreational areas. Portions of the island are also used for grazing cattle.

2.2.2 Presented below is a summary of site-specific information collected as part of the 1991 Inventory Project Report (CESAJ,1991), 1995 Archives Search Report (USACE, Rock Island District [CEMVR], 1995), 1995 Interim Remedial Action Report (MTA, 1995), 1997 Engineering Evaluation/Cost Analysis (ESE, 1997), 2004 Archives Search Report Supplement (CEMVR, 2004), 2005 Revised Inventory Project Report (CESAJ, 2005), and 2005 Supplemental Archives Search Report (USACE, St. Louis District [CEMVS], 2005). Where appropriate, the information has been revised to reflect data collected during the TPP Meeting and site visit as well as other sources. Information pertaining to the removal action currently underway at Cerro Balcon has not been made available to date; however, this information will be included in the SI Report where applicable. Archaeology and endangered species issues were re-evaluated and are presented in Chapter 5.

2.2.1 Geology and Soils

Culebra Island and the surrounding cays and cayos are part of the Culebra Archipelago. The rocks are intrusive or extrusive volcanic rocks consisting of predominantly Andesite lava and tuff. The rocks on the north-central portion of Culebra and on the east side of Cayo Luis Pena contain diorite porphyry inclusions and have little to no porosity due to compaction and quartz and calcite growth in the pore space.

2.2.2 Climate

The weather at Culebra Island is generally warm year round due to its tropical marine climate. Average rainfall is approximately 36 inches with the heaviest rain in May, October, September, and November. The months of August through November are considered the wet season and the driest months are January through April. Daily temperatures average 80°F year round with an average maximum of 86°F and an average low of 74°F. Wind are generally from the east-northeast during November through January and from the east during February through October. Winds speeds average 8 knots. Hurricane season is from June through November and severe hurricanes hit Culebra every 10 to 20 years.

2.2.3 Topography and Vegetation

Culebra Island and the surrounding cays and cayos have irregular rugged coastlines with sandy beaches, lagoons, coastal wetlands, and mountainous terrain. The highest point on Culebra is Mount Resaca at approximately 630 feet. Vegetation is moderately to extremely dense on undeveloped portions of Culebra, Luis Pena Cay, Northeast Cay, and Culebrita; however, vegetation is sparse or absent on many of the smaller cayos as most are rocky with very little soil. Hazardous vegetation include the Mesquite acacia or thorny brush which may be present on Culebra and all of the surrounding cays and the poisonous manchineel tree (also called Manzanillo Tree on Culebra) which is known to be present on Northwest peninsula.

2.2.4 Hydrology

Fresh water on the island of Culebra is scarce and when present is high in chloride and saline. Surface water is also scarce and only intermittent or seasonal in streams or creeks. Many creeks are dry and only drain water during rainstorm events and natural springs and seeps are present only during wet seasons. Residents of the Island of Culebra get their water from the desalination plant that the Navy installed at Lower Camp.

2.3 GENERAL HISTORY

2.3.1 In 1898, the Spanish American War concluded and the Kingdom of Spain ceded all public lands in Culebra and its adjacent cays to the United States. Shortly after, in 1900, President Theodore Roosevelt placed Culebra under the jurisdiction of the Department of the Navy. In 1903, the U.S. Navy acquired approximately 4,200 acres of land by transfer and purchase; further donations, transfers, and leases between 1939 and 1965 brought the total land acquired to approximately 4,800 acres. Although portions of the site were never formally acquired, military use included the entire Island of Culebra and all surrounding cays. U.S. Navy retained 87.5 acres near Flamingo Point that is not eligible for FUDS.

2.3.2 Although reconnaissance trips, development of a base, and placement of guns began as early as 1902; the first maneuvers at Culebra did not begin until January 1914 with the Marines first Advance Base Expedition establishing several encampments and 3-inch and 5-inch gun batteries at the mouth of Great Harbor. The Marines' use of the Island continued over several more decades. In 1922 an exercise was conducted firing 7-inch, 8-inch, 3-inch, 155mm, 75mm, and 37mm guns. In 1924 maneuvers included establishment of ammunition dumps throughout the Island, firing of 75mm and 155mm guns, and mine placement in several water areas around Culebra.

2.3.3 In 1934 the U.S. Navy and Marines organized to carry out the first Fleet Landing Exercise (FLEX), Fleet Problem XV. Weapons used during this exercise included .30 cal machine guns, 3-inch anti-aircraft guns, 6-inch gun batteries, 75mm batteries, and 6-inch naval guns. Six more FLEXs were conducted on Culebra Island between 1935 and 1941. Photographic accounts document additional Marine landing exercises in 1946 and 1947. Marine training at Culebra is believed to have continued until the late 1950s. Culebra Island and surrounding cays and cayos were used for bombing and gunnery training by the Navy from 1935 through 1975. Naval exercises included aerial bombardment, submarine torpedo fire and naval gunfire directed at Northwest Peninsula and many cays. All use of the island was terminated in 1975. In summary the Island of Culebra, nearby cays, and surrounding water were used between 1902 and 1975 for training operations involving bombs, mortars, rockets, torpedoes, projectiles, and small arms.

2.4 CURRENT AND PROJECTED LAND USE

The Culebra Island site is home to the Municipality of Culebra. There are two main commercial areas; the town of Dewey located on the west side of Great Harbor and the area surrounding the airport on the north end of Great Harbor. Several residential developments are scattered throughout the island while other portions of the island are

managed by the USFWS and PRDNER for wildlife conservation and recreational use. It is anticipated that the land use will remain the same and that development for similar purposes will likely continue on site.

2.5 PREVIOUS INVESTIGATIONS

2.5.1 1991 Inventory Project Report

An Inventory Project Report (INPR) was signed on 24 December 1991 establishing the Culebra Island site as a FUDS, defining a site boundary, and assigning a FUDS Project No. I02PR006800. The Findings and Determination of Eligibility (FDE) concluded that the entire site except for 87.5 acres still under control of the Navy was eligible for the Defense Environmental Restoration Program (DERP).

2.5.2 1995 Archives Search Report

The Archives Search Report (ASR) was completed by USACE, Rock Island District in February 1995 (CEMVR, 1995). The report was prepared after reviewing available records, photographs, and reports that documented the history of the site. As part of the ASR, a site visit was conducted in October 1994. During the site visit, the team identified munitions debris (MD) on Cayo Botella, Cayos Geniqui, and Cayo del Agua. In addition, MD was identified on Flamenco Beach, Flamenco Peninsula, and on the hillside near Cerro Balcon. The ASR listed several ordnance items verified on site by either EOD personnel or the ASR site visit team. The confirmed munitions listed in the ASR are shown in Table 2.1.

2.5.3 1995 Interim Remedial Action

In 1995 MTA, Inc. completed an Interim Remedial Action on 3.66 acres of the Flamenco Bay Campground near Flamenco Beach to dispose of unexploded ordnance (UXO) within two feet of the ground surface at the camp ground. Work was conducted on the site between 12 May and 26 May 1995. MTA found 11 items of UXO and munitions-related scrap.

2.5.4 1997 Final Engineering Evaluation/Cost Analysis

In March 1997, Environmental Science and Engineering, Inc. (ESE) submitted the Final Engineering Evaluation/Cost Analysis (EE/CA) for the Former Culebra Island Naval Facility, Culebra Island, Puerto Rico. The EE/CA investigation included surface and subsurface sample grids on Flamenco Peninsula, Isla Culebrita, Cayo Botella, Cayo del Agua, Cayo Lobo, and Cerro Balcon. UXO items were found on all areas except Cayo Lobo and Cerro Balcon where only ordnance-related scrap was identified. Items found included 20mm high-explosive incendiary (HEI) devices, Mk76 practice bombs, Mk50s, 37mm projectiles, 5-inch rockets, 76mm projectiles, 3- to 6-inch naval projectiles, 81mm mortars, and grenades.

2.5.5 2004 Archives Search Report Supplement

The ASR Supplement was completed by CEMVS as an addition to the 1995 ASR (CEMVS, 1995). This report provides detail of aerial training conducted by the U.S. Navy

between 1935 and 1975 and identified the following range areas and types of munitions used:

- **Mortar Range**; This area is also called Cerro Balcon and is part of Project Area 02. The following munitions may have been used in this area: Mk1 3-inch high explosive (HE) Mortar and M329A1 4.2-inch HE Mortar.
- **Airfield Rifle Range**; This small arms range is seen on historic maps in the vicinity of the airport. Suspect munitions include General Small Arms.
- **Aerial Mining Range**; Water only area. Practice mines were dropped in this area and then cleared by divers or minesweepers.
- **Water Mine Field**; Water only area. Suspected to be used for mine training.
- **Water West**; Part of this area is included in Project Area 12. A local diver reported underwater ordnance in this area. Suspect munitions includes Mk II 6-inch HE.
- **Water Center**; This area is included in Project Area 12. A local diver reported underwater ordnance in this area. Suspect munitions includes Mk II 6-inch HE.
- **Water South**; This water area includes the small bay north of Soldado Point (part of Project Area 09). A local diver reported underwater ordnance in this area. Suspect ordnance according to the ASR Supplement includes Mk II 6-inch HE; however, other ordnance are suspected due to use as a 1936 aerial target and a 1938 mortar boat firing exercises.
- **Shark Rock**; Part of Project Area 02, also known as Cayo Tiburon, this area was used as a target for aerial gunnery with bombs and rockets. Suspected ordnance include Mk82 General Purpose 500 lb HE Bombs and 5-inch Zuni Rockets.
- **Palada Cay**; Part of Project Area 02, also known as Cayos Geniqui, this area was used as a target for aerial gunnery with bombs and rockets. Suspected ordnance include Mk82 General Purpose 500 lb HE Bombs and 5-inch Zuni Rockets.
- **Ladrone Cay**; Part of Project Area 02, also known as Cayo Botella, this area was used as a target for aerial gunnery with bombs and rockets. Suspected ordnance include Mk82 General Purpose 500 lb HE Bombs and 5-inch Zuni Rockets.
- **Culebrita Strafing Range**; This strafing range target was located on north side of Culebrita and is part of Project Area 07. Suspected munitions include General Small Arms, .50 cal Small Arms, and MKI 20mm HEI.

- **Culebrita Torpedo Range**; This range firing was from the water north of Culebrita targeted at the sheer cliffs of Cayos Geniqui, part of Project Area 02. Suspected munitions include the Navy's General Torpedo.
- **Naval Gunfire Target Area**; This range was a naval gunfire and air-to-ground range with its target located on Northwest Peninsula, Project Area 02. Munitions included General Small Arms, .50 cal Small Arms, Mk80s series General Purpose Bombs, M1 105mm HE, Mk21 8-inch armor piercing (AP), Mk5 16-inch AP, 2.75-inch Rockets, and the 11.75-inch Tiny Tim Rocket.
- **Twin Rocks**; This area is also known as Los Gemelos and is part of Project Area 02. These cayos were used as targets for aerial bombs and rockets. Munitions included Mk80s series General Purpose Bombs, 5-inch Zuni Rockets, and Mk8 5-inch Practice Rockets.
- **Fungy Bowl**; This area is also known as Alcarazza and is part of Project Area 02. This large rock was used as a target for aerial bombs and rockets. Suspected munitions include Mk80s series general purpose bombs and 5-inch Zuni Rockets.
- **Cross Cay**; This area, also known as Cayo Lobo, is part of Project Area 02 and was used as a strafing and bombing target. Munitions included General Small Arms, .50 cal Small Arms, Mk80s series General Purpose Bombs, and MkI 20mm HEI.
- **Agua Cay**; This area, also known as Water Key, is part of Project Area 02 and was used as a target for bombing and rocket fire. Munitions include Mk80s series General Purpose Bombs and 2.75-inch Rockets.
- **Air-to-Ground North**; This target was located at the northern tip of Northwest Peninsula is part of Project Area 02. Munitions used on this target include General Small Arms, .50 cal Small Arms, Mk82 500lb General Purpose Bombs, 2.75-inch Rockets, and 11.75-inch Tiny Tim Rockets.
- **Air-to-Ground South**; This target was located at the northern tip of Northwest Peninsula and is part of Project Area 02. Munitions used on this target include General Small Arms, .50 cal Small Arms, Mk82 500lb General Purpose Bombs, 2.75-inch Rockets, and 11.75-inch Tiny Tim Rockets.
- **Rifle Range South**; This small arms range is believed to be located on undeveloped land near the southern tip of the island in Project Area 09. This range has not been confirmed; however, munitions used at this range would have included only General Small Arms.

This data from the ASR Supplement is also included in the Conceptual Site Model (CSM, see Appendix B) and range boundaries are provided in Figure 2.2. No site visit was conducted in support of the ASR Supplement.

2.5.6 2005 Revised Inventory Project Report

A Revised INPR was completed in June 2005. The Revised INPR further clarified the military use of the island of Culebra and divided the original site, Property No I02PR0068, into 14 separate project areas. One Hazardous and Toxic Waste (HTW) project was identified and assigned the project number 00 and 13 MMRP project areas were identified and assigned a Risk Assessment Code score. Project area 01 was not defined. The following MMRP projects and Risk Assessment Code (RAC) scores were listed:

- Project 02 – Culebra and Cayos, RAC 1
- Project 03 – Flamingo Bay Water Area, RAC 1
- Project 04 – Flamingo Lagoon Maneuver Area, RAC 1
- Project 05 – Mortar and Combat Range Area, RAC 1
- Project 06 – Artillery Firing Area, RAC 3
- Project 07 – Culebrita Artillery Impact Area, RAC 1
- Project 08 – Cayo Norte Impact Area, RAC 3
- Project 09 – Soldado Point Mortar and Bombing Area, RAC 2
- Project 10 – Defensive Firing Area #1, RAC 2
- Project 11 – Defensive Firing Area #2, RAC 1
- Project 12 – Luis Pena Channel Water Areas, RAC 1
- Project 13 – Cayo Luis Pena Impact Area, RAC 1
- Project 14 – Airfield and Camp Area, RAC 3

Details on each project areas are provided in the CSM (see Appendix B) and project area boundaries are shown on Figure 2.1.

2.5.7 2005 Supplemental Archives Search Report

The Supplemental ASR was completed by USACE, St. Louis District in 2005 as an addition to the 1995 ASR (CEMVS, 1995). The Supplemental ASR is the source of most of the historical information pertaining to site operations and identifies the key areas of focus for the SI. This document provided a detailed summary of military activities conducted on Culebra Island and the surrounding cays and cayos. The document summarizes planned and/or executed maneuvers, and training conducted at the site including specific time periods, locations, and munitions used. Figure 2.3 shows the areas of use as determined by USACE using historical maps and documents collected as part of this Supplemental ASR.

2.6 MUNITIONS AND EXPLOSIVES OF CONCERN

Information provided in the INPR, ASR, ASR Supplement, and other sources were used to develop the list of known or potential MEC items for the Culebra Island site. Table 2.1 is a visual and informational identification guide for use by the SI field team to ensure proper MEC and MD documentation. The breakdown of the components and fillers of these munitions and the potential munitions constituents is included in Chapter 4.

**Table 2.1
Confirmed Munitions
Culebra Island, PR**

Munition	Photograph/Diagram
<p>Small Arms Ammunition .50 cal Carbine*</p>	
<p>Mk 27 HE Torpedo*</p>	
<p>Mk 76 Practice Bomb*^</p>	

**Table 2.1 (Continued)
Confirmed Munitions
Culebra Island, PR**


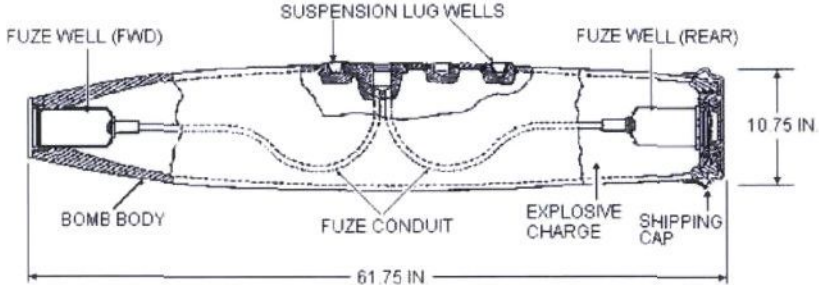

Munition	Photograph/Diagram
Mk 106*	
Mk82 500 lb HE Bomb*	 <p>(NOTE: PRESENCE OF SUSPENSION LUGS DETERMINED BY NSN)</p>
3-inch stokes mortar*^	

Table 2.1 (Continued)
Confirmed Munitions
Culebra Island, PR

Munition	Photograph/Diagram
5-inch projectile*^	
6-inch Projectile*^	
81mm Mortar*^	

Table 2.1 (Continued)
Confirmed Munitions
Culebra Island, PR

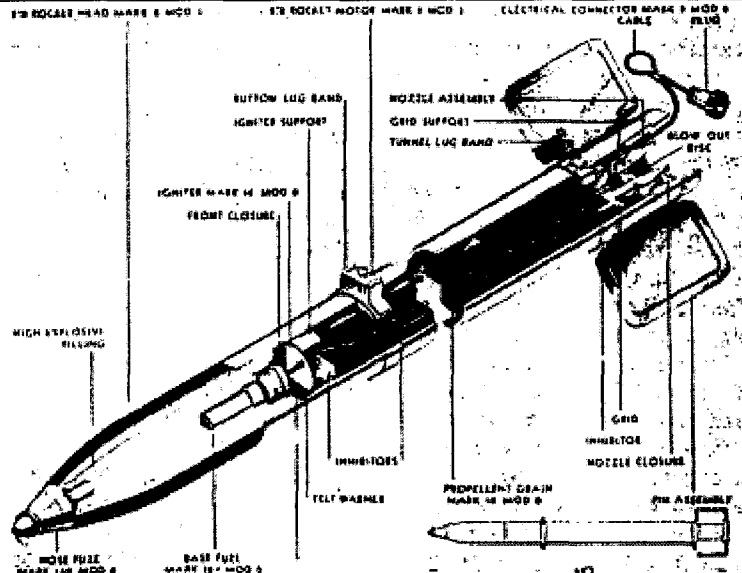
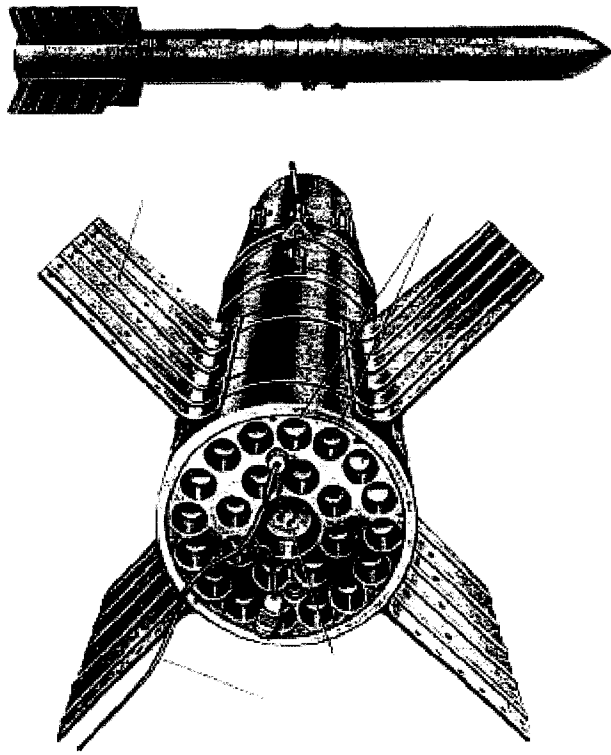
Munition	Photograph/Diagram
<p>5-inch Rocket*^</p>	 <p>Labels in diagram include: ROCKET HEAD MAKE 8 MOD 5, ROCKET MOTOR MAKE 8 MOD 1, ELECTRICAL CONNECTOR MAKE 8 MOD 9, BUTTOM LUG BAND, IGNITER SUPPORT, IGNITER MAKE 14 MOD 0, FRONT CLOSURE, HIGH EXPLOSIVE FILLING, MOSE FUZE MAKE 14 MOD 0, BASE FUZE MAKE 14 MOD 0, INJECTOR, TELT WASHLE, PROPELLENT GRAIN MAKE 14 MOD 0, PIR ASSEMBLY, NOZZLE ASSEMBLY, GRID SUPPORT, TUNNEL LUG BAND, BLOW OUT, GRID, INJECTOR, NOZZLE CLOSURE.</p>
<p>11.75-inch Tiny Tim Aerial Rocket*</p>	 <p>The top image is a photograph of the rocket. The bottom image is a detailed diagram showing the rocket's four large, swept-back fins and the multi-tube nozzle at the rear.</p>

Table 2.1 (Continued)
Confirmed Munitions
Culebra Island, PR

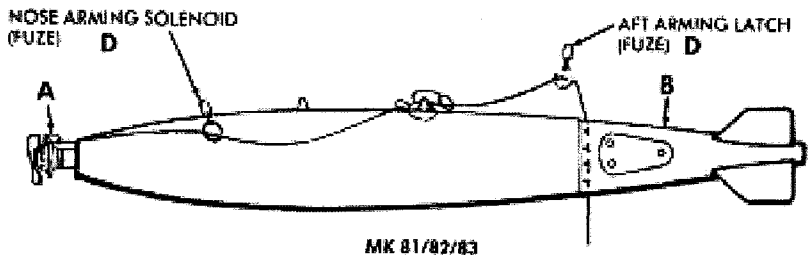



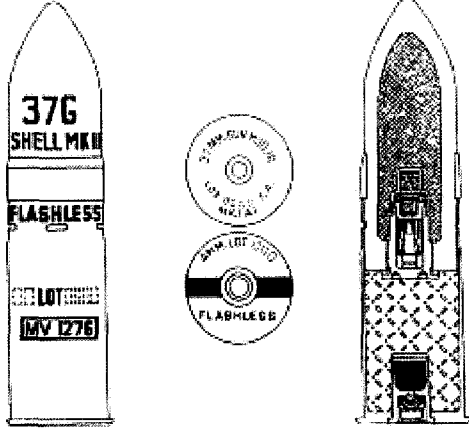
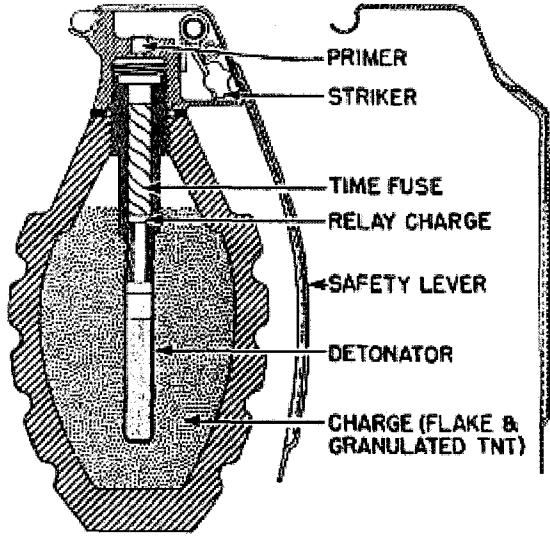

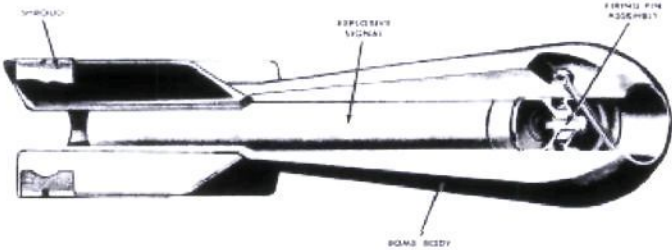
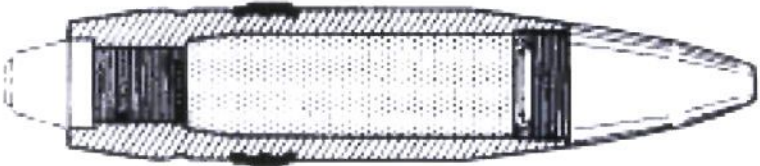
Munition	Photograph/Diagram														
Mk 80 series bomb*	 <p>NOSE ARMING SOLENOID (FUZE) D</p> <p>AFT ARMING LATCH (FUZE) D</p> <p>A B</p> <p>MK 81/82/83</p>														
Mk 14/15*	<p>MK 14 TORPEDO</p> <table border="0"> <tr> <td><i>Speed (knots):</i></td> <td><i>Range (yards):</i></td> </tr> <tr> <td>Low 31.1</td> <td>Low 9000</td> </tr> <tr> <td>High 46.3</td> <td>High 4500</td> </tr> </table>  <p>MK 15 TORPEDO</p> <table border="0"> <tr> <td><i>Speed (knots):</i></td> <td><i>Range (yards):</i></td> </tr> <tr> <td>Low 26.5</td> <td>Low 15,000</td> </tr> <tr> <td>Medium 33.5</td> <td>Medium 10,000</td> </tr> <tr> <td>High 45.0</td> <td>High 6000</td> </tr> </table> 	<i>Speed (knots):</i>	<i>Range (yards):</i>	Low 31.1	Low 9000	High 46.3	High 4500	<i>Speed (knots):</i>	<i>Range (yards):</i>	Low 26.5	Low 15,000	Medium 33.5	Medium 10,000	High 45.0	High 6000
<i>Speed (knots):</i>	<i>Range (yards):</i>														
Low 31.1	Low 9000														
High 46.3	High 4500														
<i>Speed (knots):</i>	<i>Range (yards):</i>														
Low 26.5	Low 15,000														
Medium 33.5	Medium 10,000														
High 45.0	High 6000														
20mm HEI Projectile^	<p>CARTRIDGE, H.E.I., 20 mm, MK. I, WITH FUZE, PERCUSSION, D.A., No. 253, MK. III /A/</p>  <p>0.75 MAX. 7.75 MAX.</p> <ul style="list-style-type: none"> Ⓐ Primer, Percussion, M36A1 Ⓑ Case, Cartridge, M21A1 Ⓒ Incendiary Composition Ⓓ Tetryl Charge or Comp. "A" (Alternate charge) Ⓔ Fuse, Percussion, D.A., No. 253, Mk. III /A/ 														

Table 2.1 (Continued)
Confirmed Munitions
Culebra Island, PR

Munition	Photograph/Diagram
37mm Projectile, unspecified^	
76mm Projectile, unspecified^	N/A
Grenade, unspecified^	

**Table 2.1 (Continued)
Confirmed Munitions
Culebra Island, PR**

Munition	Photograph/Diagram
5-inch Illumination shell ^	
Mk 23, 3-lb Practice bomb^	
40mm Projectile, unspecified^	

*Munitions listed as confirmed by EOD or the ASR site visit team in the February 1995 Archives Search Report.

^Documented UXO identified during the Environmental Science & Engineering, Inc. 1997 EE/CA.

2.7 PROJECT ORGANIZATION/POINTS OF CONTACT

2.7.1 The local USACE District for the Culebra Island site is Jacksonville (CESAJ). The regulatory authority for this site is the PREQB. To date, the EPA has not participated in planning associated with this site and has deferred to PREQB. The contact information for CESAJ and PREQB and the rest of the site-specific team is presented in Table 2.2.

2.7.2 The Parsons' SI Field Team for the Culebra Island site will be comprised of three dedicated persons each qualified in their area of expertise. The Team will be led by the Field Team Leader (FTL) who will be knowledgeable about the historical and logistical details regarding the Culebra Island site. The FTL will manage the Field Team and make decisions on behalf of the Parsons' Project Manager (or his representative). The FTL will be supported by an individual charged with the implementation of the approved MC sampling protocol as well as the techniques for the Qualitative Reconnaissance (QR). The Field Team will include an UXO Technician III tasked with all aspects of field safety as well as identification of MEC, MD, or other military debris encountered.

2.7.3 For the Culebra Island site, the Field Team will be comprised of the following individuals:

- FTL, Nancy Heflin
- Sampling Lead, Erich Stedman
- UXO Technician, Rick White

**Table 2.2
Key Technical Contacts
Culebra Island, PR**

Organization	Name	Telephone/FAX
U.S. Army Corps of Engineers, Jacksonville District (CESAJ) CESAJ-DP-H 701 San Marco Boulevard Jacksonville, FL 32207	Mr. Ricardo R. Vazquez Florida FUDS Manager / Project Manager <i>Email:</i> Ricardo.r.vazquez@saj02.usace.army.mil	(904) 232-1649
U.S. Army Corps of Engineers, Jacksonville District (CESAJ) 701 San Marco Boulevard Jacksonville, FL 32207	Mr. Ivan Acosta <i>Email:</i> Ivan.Acosta@saj02.usace.army.mil	(904) 232-1693 (904) 629-0158 (cell)
U.S. Army Corps of Engineers, Jacksonville District (CESAJ) 400 Fernandez Juncos San Juan, PR 00901-3299	Mr. Noel Acevedo Mindez <i>Email:</i> noel.acevedo@saj02.usace.army.mil	(787) 729-6876 (787) 289-7030 (FAX)
U.S. Army Corps of Engineers, Jacksonville District (CESAJ) 400 Fernandez Juncos San Juan, PR 00901-3299	Ms. Migdalia Martinez Real Estate Section <i>Email:</i> migdalia.martinez@saj02.usace.army.mil	(787) 729-6904
U.S. Army Engineer Center Huntsville CEHNC-OE-DC 4820 University Square Huntsville, AL 35816-1822	Ms. Chris Cochrane USACE MMRP SI Project Manager Southeast and Pacific USACE geographic region <i>Email:</i> Chris.Cochrane@hnd01.usace.army.mil	(256) 895-1696 (256) 895-1378 (FAX) (256) 990-0888 (cell)
U.S. Army Engineer Center Huntsville CEHNC-ED-CS-P 4820 University Square Huntsville, AL 35816-1822	Mr. Mike Gooding Technical Manager <i>Email:</i> Michael.R.Gooding@hnd01.usace.army.mil	(256) 895-1635 (256) 895-1602 (FAX)
U.S. Army Engineer Center Huntsville 4820 University Square Huntsville, AL 35816-1822	Mr. Bill Veith <i>Email:</i> William.D.Veith@hnd01.usace.army.mil	(256) 895-1592
U.S. Army Corps of Engineers, Omaha District (CENWO) 12565 W. Center Rd, Omaha NE 68144	Ms. Heidi Novotny HTRW CX - Facilitator <i>Email:</i> heidi.l.novotny@usace.army.mil	(402) 697-2626
U.S. Army Engineer Center Huntsville CEHND-ED-CS-P 4820 University Square Huntsville, AL 35816-1822	Ms. Becky Terry Project Chemist <i>Email:</i> Rebecca.K.Terry@hnd01.usace.army.mil	(256) 895-1460 (256) 895-1378 (FAX)

**Table 2.2 (Continued)
Key Technical Contacts
Culebra Island, PR**

Organization	Name	Telephone/FAX
U.S. Army Corps Engineers, St. Louis District (CEMVS), CEMVS-EC-P 1222 Spruce St. St. Louis, MO 63103-2833	Mr. Tom Freeman Email: Tom.Freeman@us.army.mil	(314) 331-8785
PR Environmental Quality Board P.O. Box 11488 Santurce, PR 00910	Ms. Yarissa A. Martinez <i>Email:</i> yarissamartinez@jca.gobierno.pr	(787) 365-8573
U.S. Fish and Wildlife Service P.O. Box 510 Boqueron, PR 00622	Mr. Felix Lopez <i>Email:</i> felix_lopez@fws.gov	(787) 851.7297
U.S. Fish and Wildlife Service P.O. Box 510 Boqueron, PR 00622	Ms. Susan Silander <i>Email:</i> susan_silander@fws.gov	(787) 851-7258
U.S. Fish and Wildlife Service Culebra National Wildlife Refuge P.O. Box 190 Culebra, PR 00622	Ms. Teresa Tallevast Refuge Manager <i>Email:</i> caribbeanisland@fws.gov	(787) 742-0115
Puerto Rico Dept. of Natural Resources P.O. Box 906660 Punta de Tierra Sta. San Juan, PR 00901		
Parsons 5390 Triangle Pkwy, Suite 100 Norcross, GA 30092	Mr. Don Silkebakken Project Manager Email: Don.Silkebakken@Parsons.com	(678) 969-2384 (770) 446-4910 (FAX) (404) 606-0346 (cell)
Parsons 5390 Triangle Pkwy, Suite 100 Norcross, GA 30092	Ms. Laura Kelley Deputy Project Manager Email: Laura.Kelley@Parsons.com	(678) 969-2437 (770) 446-4910 (FAX) (404) 934-1266 (cell)
Parsons 5390 Triangle Pkwy, Suite 100 Norcross, GA 30092	Ms. Nancy Heflin Field Team Leader Email: Nancy.Heflin@Parsons.com	(678) 969-2362 (770) 446-4910 (FAX)
U.S. Army Engineer Center Huntsville CEHNC-OE-CX 4820 University Square Huntsville, AL 35816-1822	Mr. Bradford McCowan Program Manager Email: Bradford.L.McCowan@hnd01.usace.army.mil	(256) 895-1174 (256) 895-1378 (FAX)
U.S. Army Engineer Center Huntsville CEHND-OE-CX 4820 University Square Huntsville, AL 35816-1822	Ms. Deborah Walker MC Advisor Email: Deborah.D.Walker@hnd01.usace.army.mil	(256) 895-1796 (256) 722-8709 (FAX) (256) 503-4766 (cell)

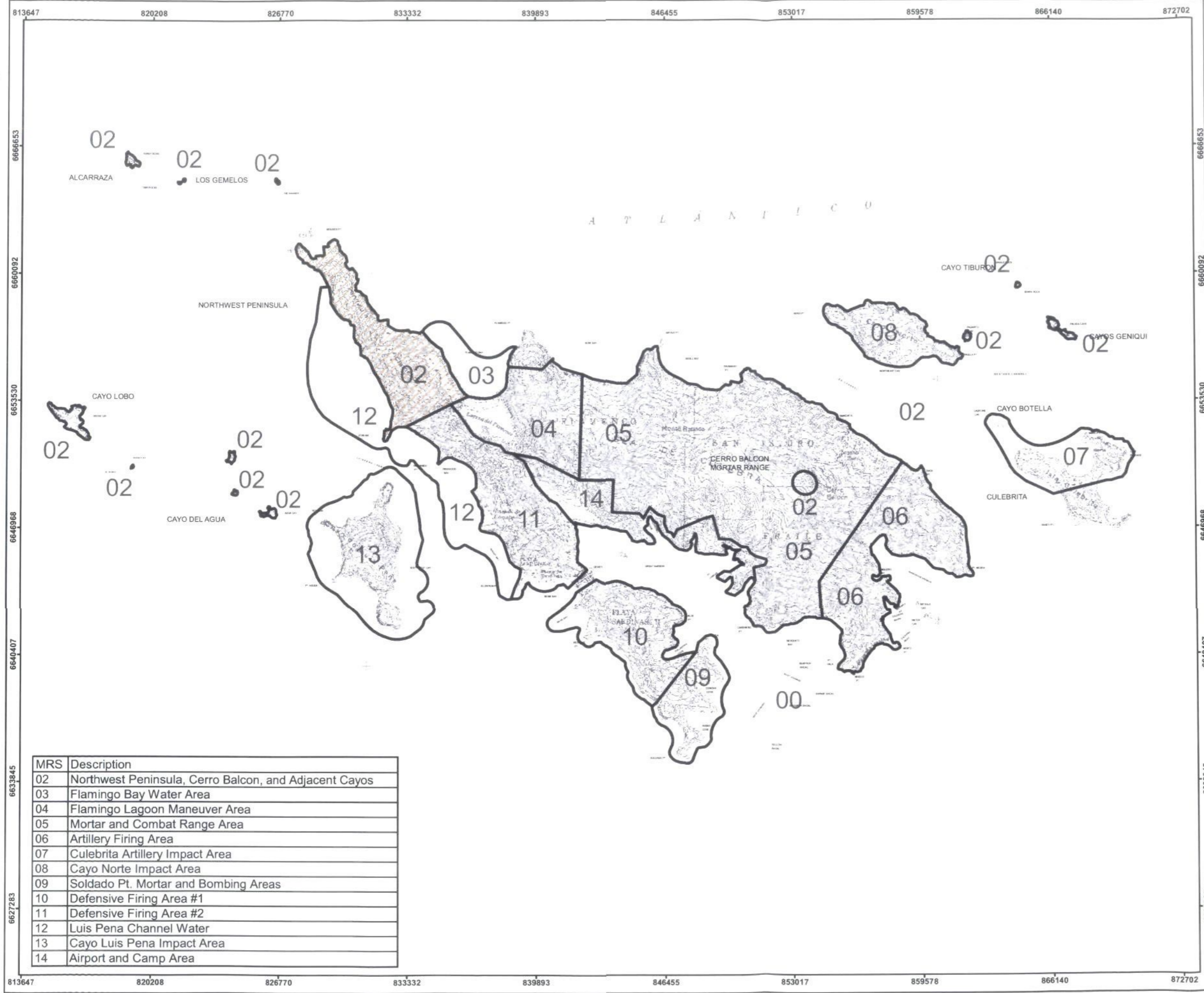
2.8 PROJECT SCHEDULE

The Culebra Island site was awarded August 19, 2005 as part of the MMRP USACE Southeast and Pacific Military Munitions Design Center (MM DC) region program. The project schedule, shown on Figure 2.4, is dynamic but has been updated to reflect actual milestones achieved to date, as well as incorporate government and regulator review cycles and submittals for pending milestones.

Figure 2.1

Culebra Island

Puerto Rico

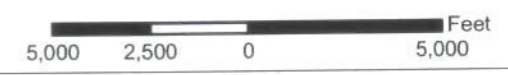


Legend

- SECTOR BOUNDARY
- AREA EXCLUDED FROM SI PER PL93-166



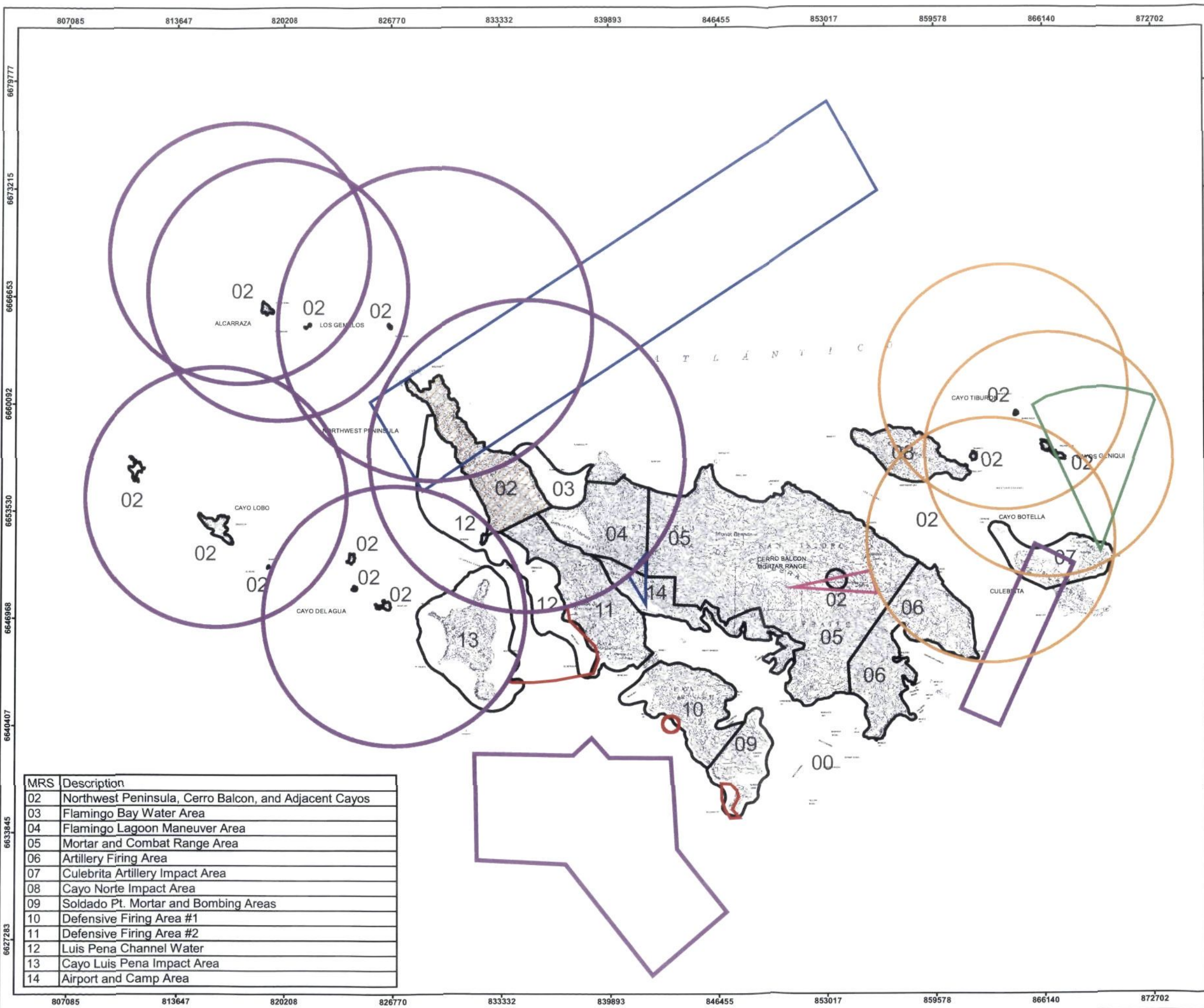
Image Source: USGS Topo Maps
 Projection: UTM Zone 20N NAD83, Map Units in Feet



MRS	Description
02	Northwest Peninsula, Cerro Balcon, and Adjacent Cayos
03	Flamingo Bay Water Area
04	Flamingo Lagoon Maneuver Area
05	Mortar and Combat Range Area
06	Artillery Firing Area
07	Culebrita Artillery Impact Area
08	Cayo Norte Impact Area
09	Soldado Pt. Mortar and Bombing Areas
10	Defensive Firing Area #1
11	Defensive Firing Area #2
12	Luis Pena Channel Water
13	Cayo Luis Pena Impact Area
14	Airport and Camp Area

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER	
DESIGNED BY: BT	<p align="center">Culebra Island</p> <p>SCALE: As Shown PROJECT NUMBER: 744647.17000</p> <p>DATE: October 2006 PAGE NUMBER:</p> <p>FILE: X:\GIS\Site_inspections_ne\Maps\Culebra_PR\Fig1.mxd 2-19</p>	
DRAWN BY: BT		
CHECKED BY: NH		
SUBMITTED BY: DS		

Figure 2.2
Ranges
Culebra Island
 Puerto Rico



Legend

- Air-to-Ground
- Bombing Range
- Mortar Range
- Multiple/Combined
- R & D
- Small Arms
- Sector Boundary
- Area Excluded from SI per PL 93-166



Image Source: USGS Topo Maps
 Projection: UTM Zone 20N NAD83, Map Units in Feet

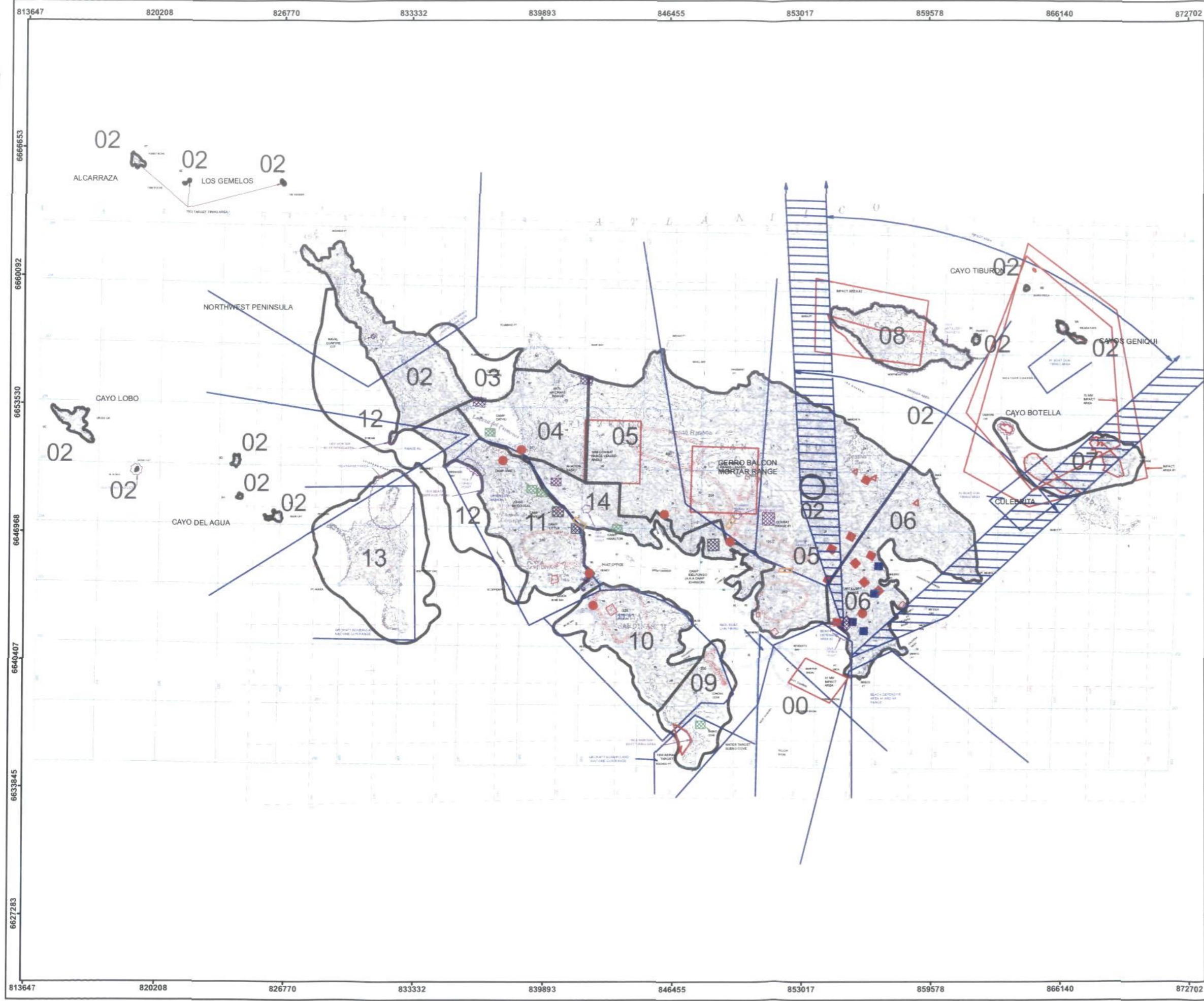
Feet
 6,000 3,000 0 6,000

MRS	Description
02	Northwest Peninsula, Cerro Balcon, and Adjacent Cayos
03	Flamingo Bay Water Area
04	Flamingo Lagoon Maneuver Area
05	Mortar and Combat Range Area
06	Artillery Firing Area
07	Culebrita Artillery Impact Area
08	Cayo Norte Impact Area
09	Soldado Pt. Mortar and Bombing Areas
10	Defensive Firing Area #1
11	Defensive Firing Area #2
12	Luis Pena Channel Water
13	Cayo Luis Pena Impact Area
14	Airport and Camp Area

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER
DESIGNED BY: BT	Culebra Island
DRAWN BY: BT	SCALE: As Shown PROJECT NUMBER: 744647.17000
CHECKED BY: NH	DATE: October 2006 PAGE NUMBER:
SUBMITTED BY: DS	FILE: X:\GIS\Site_inspections_ne\Maps\Culebra_PRFig2_2.mxd 2-20

Figure 2.3

**Culebra Island
National Wildlife Refuge**
Puerto Rico



- Legend**
- 1924 OUTPOST AND AMMUNITION STORAGE LOCATIONS
 - 1936 ARTILLERY & AERIAL TARGET
 - 1939 MILITARY EXERCISES
 - 1887 PROPERTY LOTS
 - 1902-1903 GUN POSITIONS
 - 1914 MILITARY GRID
 - 1924 MILITARY AREA
 - ▨ AREAS FOR DIRECT FIRE INFANTRY AND TANKS - 1935 (POSSIBLY 1924)
 - ▨ WATER AREAS FOR DIRECT FIRE AT BOATS - 1935 (POSSIBLY 1924)
 - ▨ STANDING BARRAGES PREVIOUSLY REGISTERED 1935 (POSSIBLY 1924)
 - 1936 MILITARY GRID
 - 1936 ARTILLERY AREAS AND AERIAL TARGET
 - ▨ FEATURES TAKEN FROM 1937 MAP TITLED "U.S. FLEET LANDING EXERCISE #4"
 - 1938 MILITARY AREAS
 - 1939 MILITARY EXERCISES
 - ▨ FEATURE TAKEN FROM 1936-1049 OBLIQUE PHOTOS
 - SECTOR BOUNDARY

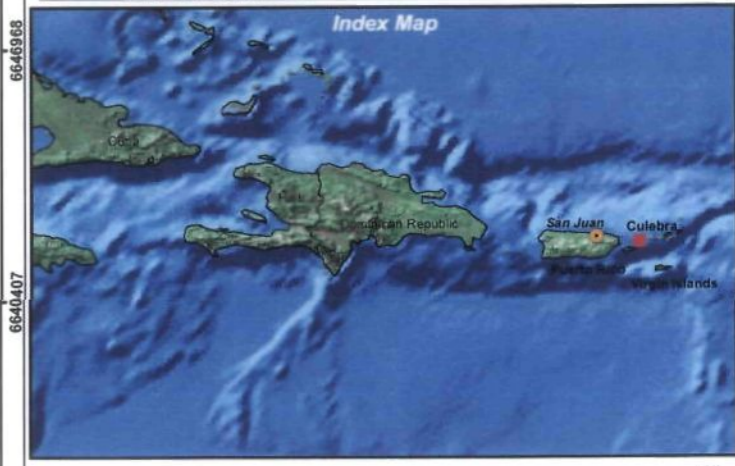


Image Source: USGS Topo Maps
 Projection: UTM Zone 20N NAD83, Map Units in Feet

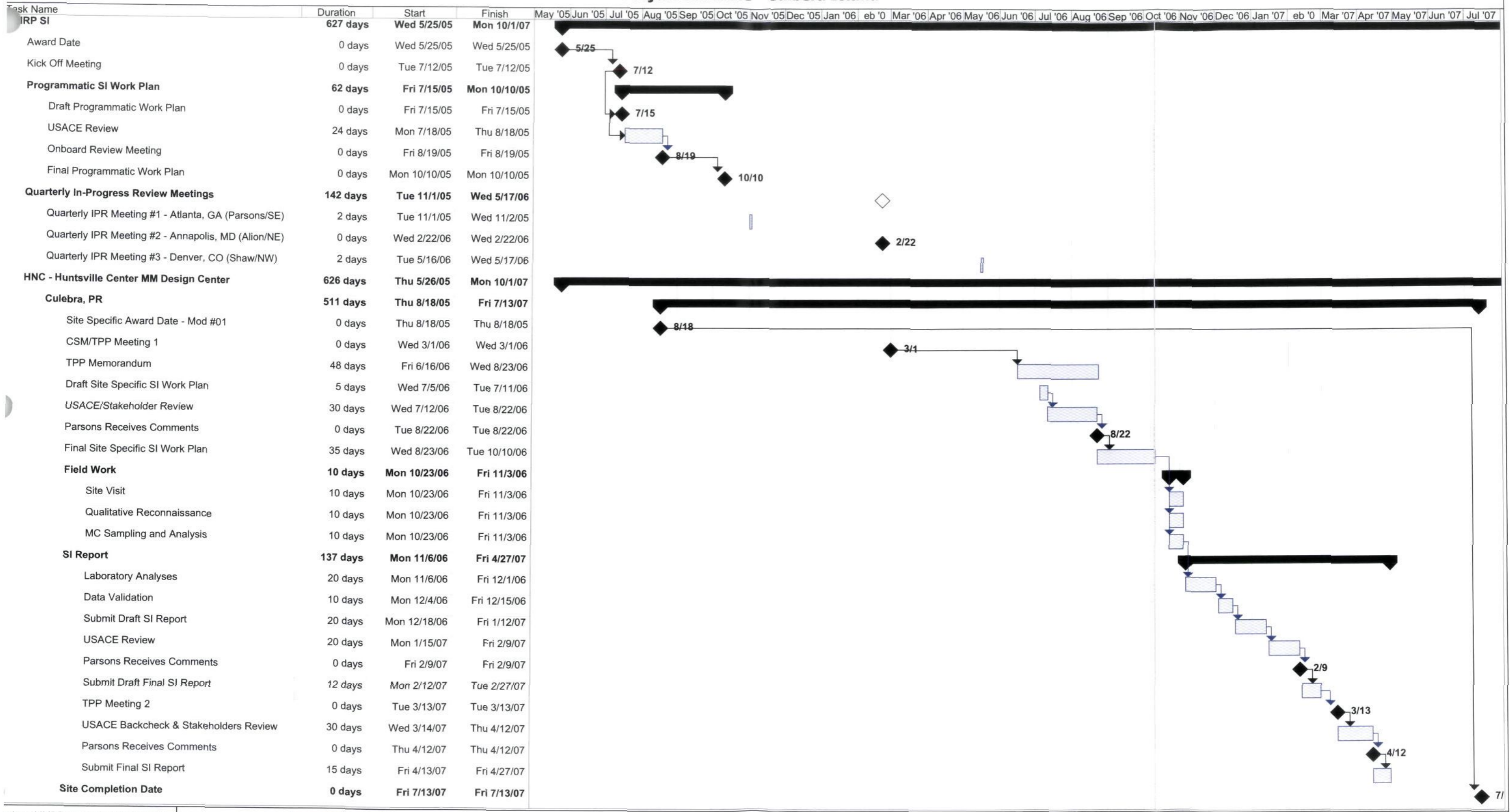
5,000 2,500 0 5,000 Feet

PARSONS

U.S. ARMY CORPS
 OF ENGINEERS
 HUNTSVILLE CENTER

DESIGNED BY: BT	Sample Locations		PROJECT NUMBER: 744647.17000
DRAWN BY: BT			PAGE NUMBER: 2-21
CHECKED BY: NH	SCALE: As Shown	DATE: October 2006	
SUBMITTED BY: DS	FILE: X:\GIS\Site_inspections_ne\Maps\Culebra_PRFig2_3.mxd		

**Figure 2.4
Project Schedule - Culbera Island**



Project: MMRP SE Schedule May 06.r
Date: Tue 10/10/06

Task Milestone Summary Rolled Up Milestone

CHAPTER 3

FIELD INVESTIGATION PLAN

3.1 TECHNICAL APPROACH

The overall approach to munitions response activities is presented in Chapter 3, paragraph 3.1 of the PWP. As stated in Chapter 1, sufficient MEC data exist to support a recommendation for RI/FS prior to the conduct of the field portion of the SI for the Culebra Island site. Therefore, the Technical Approach, as established during the February 28, 2006 TPP Meeting, will focus on a biased screening for the presence of MC in areas with the highest potential for contamination. Details of the site-specific MC and QR strategy for the Culebra Island site are described in subsequent sections of this chapter.

3.1.1 Conceptual Site Model

As part of the TPP process, a “living” Conceptual Site Model (CSM) and Conceptual Site Exposure Model (CSEM) have been developed for the Culebra Island site. The current CSM and CSEM are provided in Appendix B of this SS-WP Addendum. The CSM and CSEM will be revised throughout the SI process as additional site information is collected.

3.1.2 Data Quality Objectives

3.1.2.1 As stated in Subchapter 1.2, the primary objective of this SI project is to evaluate, through QR and MC sampling, the applicability of the next appropriate CERCLA phase. Potential subsequent post-SI phases include immediate action (TCRA or NTCRA), characterization action (RI/FS), or non-action (NDAI). In many instances sufficient historical data exists (prior to the conduct of SI field activities) to justify proceeding directly to RI/FS. This predetermination is highly dependent on combinations and interactions of such parameters as demographics, land use, confirmed MEC presence, known pending development, existing deed restrictions, historical incidents, political concerns, endangered species, groundwater use, and others. In such cases, the SI field objective is transformed to emphasize the collection of data to support a focused RI/FS as well as provide compelling evidence and associated rationale for excluding large project areas from further consideration.

3.1.2.2 Secondary objectives of this SI also include collection of sufficient data for EPA’s development of the site-specific Hazard Ranking System (HRS) Score as well as for the completion of the Office of the Secretary of Defense’s (OSD) Munitions Response Site Prioritization Protocol (MRSPP).

3.1.2.3 To ensure accomplishment or attainment of the project objectives detailed above, Data Quality Objectives (DQOs) were developed for the Culebra Island site in accordance with the process presented in Chapter 3, paragraph 3.1.2 of the PWP. The DQOs are outlined below along with criteria for achieving the specific DQO. The DQO worksheets are provided in Appendix A of this SS-WP Addendum.

3.1.2.1 Qualitative Reconnaissance DQO

3.1.2.1.1 For the 9,460 acre (8,430 land and 1,030 water) Culebra Island site, QR will be conducted throughout as much of Culebra Island, Culebrita, Northeast Cay, Luis Pena Cayo, and Cayo Lobo as practical based on vegetation and topography. In addition, attempts will be made to gain access to other cays and visual QR will be conducted from the boat when access is not possible. As discussed in Chapter 1 of this SS-WP, Northwest Peninsula will not be investigated as part of this SI. Representative QR tracks are shown on Figures 3.2A, 3.2B, and 3.2C. The QR tracks represent approximately 74.4 land acres. The water acreage will not be inspected during this SI as agreed to by the TPP project team. The team will, in as much as possible, cover that amount of acreage, which may be limited due to vegetation and terrain. The acreage was derived by assuming the site visit team (SVT) will proceed in single file covering a five-foot path as they advance. The team must proceed in a single file with the UXO technician in the lead based on the potential MEC present and the associated hazards. This site has been predetermined as proceeding to RI/FS (for MEC), as described in Section 3.1.2 above, due to historical findings and site use; therefore, the QR DQO will be attained by default. The QR will be conducted by the SVT in a meandering path format traversing the project site from one sampling location to the next to include inspection of the various AOCs. Data collected during the QR will be used as "optimum" SI data for refinement of the subsequent focused RI/FS to be conducted as a separate project. Additional intermittent QR will be conducted outside the known target areas to support deletion of these sub-areas from further consideration during RI/FS.

3.1.2.1.2 In order to accomplish the QR SI component, the SVT (inclusive of a UXO qualified individual) will employ the QR protocol detailed in the PWP to document visual observations of field conditions (topography and vegetation) and evidence of MEC (or munitions debris indicative of MEC). In addition, the presence of craters, targets, and other pertinent site features will be recorded to support the SI recommendation. The Minelab geophysical instrument has been selected to be used for identification of potential MEC and munitions debris located on the surface but below the leaf litter, as well as for anomaly avoidance.

3.1.2.2 Munitions Constituents DQO

3.1.2.2.1 For the Culebra Island site the MC sampling will be conducted from 28 surface soil locations and 4 sediment locations coincident with the QR path and as agreed upon by the Project Team during the February 28, 2006 TPP Meeting. The locations are illustrated in Figures 3.1 and 3.2, and the rationale for each location is presented in Table

3.1. No groundwater or surface water were deemed warranted. Twenty-nine biased surface soil and sediment sample locations were selected with consideration of the known impact areas as well as observations noted during the 1997 EE/CA. Three ambient sample locations, #16, #22, and #27, were selected in areas believed to be the least likely impacted by training activities. If the presence of MC exceeds EPA Region IX Residential PRGs, (see Table 4.5), then RI/FS (for MC) may be recommended. In addition, a qualitative order of magnitude comparison with site-specific ambient samples may be conducted to further evaluate the justification of the RI/FS for MC.

3.1.2.2.2 In order to accomplish the MC SI component, the SVT (inclusive of a UXO qualified individual) will employ the MC sampling protocol detailed in the PWP, PSAP, and PSAP Addendum. For the Culebra Island site MC sampling will consist of explosives and selected metals, as detailed in Tables 4.4 and 4.5. The Minelab geophysical instrument has been selected to be used for subsurface anomaly screening prior to surface soil sampling collection.

3.1.2.3 The Parsons SI Project Chemist evaluated the composition of the munitions (and fillers) used during training conducted on the Culebra Island site and developed the list of compounds/analytes for sample analysis. The complete list of munitions potentially used at the Culebra Island site are presented in Table 2.1. A summary table of the munitions constituents known to occur in the MEC confirmed at the Culebra Island site is provided in Table 4.3. The chemical-specific DQOs are discussed in Subchapter 4.7.

3.1.2.3 Hazard Ranking System DQO

3.1.2.3.1 This task is currently under review by EPA and may be deleted as a task. The rationale being used by EPA for deletion is the fact that only the MC portion of the HRS is being provided; therefore, EPA can not complete the HRS scoring for a munitions response area or site (MRA/MRS), since the HRS scoring also includes HTW and other data necessary to complete the HRS. Until such time as we are informed by the contracting officer that the MC data for EPA to prepare the HRS is not required, Parsons will proceed in accordance with the project work statement (PWS).

3.1.2.3.2 Specific input data will be collected for EPA to populate the HRS score sheets. The data will be collected from existing document sources. Source documents for HRS information will include the 1991 INPR, 1995 ASR, 1995 Interim Remedial Action Report, 1997 EE/CA, 2004 ASR Supplement, 2005 Revised INPR, and 2005 Supplemental ASR. Data gaps will be filled via MC sampling as well as collection from local/state agencies (demographics/population, groundwater well users and supply sources/served population, surface water within 2 miles, etc).

3.1.2.4 Military Response Site Prioritization Protocol DQO

Specific input data will be collected and the three modules for MRSPP populated as part of the SI. The modules include Explosive Hazard Evaluation (EHE), Chemical

Health Evaluation (CHE), of which Chemical Warfare Material (CWM) is a sub set, and Health Hazard Evaluation (HHE). The data will be collected from existing document sources. Source documents for MRSPP information will include the 1991 INPR, 1995 ASR, 1995 Interim Remedial Action Report, 1997 EE/CA, 2004 ASR Supplement, 2005 Revised INPR, and 2005 Supplemental ASR. Data gaps will be filled via QR, MC sampling, data collection from local/state agencies to included ecological and cultural resources, receptor information, groundwater well users, and supply sources/served population, etc.

3.2 SI FIELD PLANNING AND LOGISTICS

3.2.1 Historical Research and Review

The existing body of information pertinent to the Culebra Island site was thoroughly reviewed in advance of the TPP Project Meeting in February 2006 and summarized to the TPP Project Team as part of the development and concurrence of the selected Technical Approach for the site. Sampling locations and QR planning, as presented in this SS-WP Addendum, were the direct result of this review process. This information has been augmented with institutional knowledge and additional documentation provided by CESAJ or obtained by Parsons during coordination of the field effort. As part of mobilization preparation, the Field Team will be re-familiarized with all existing site information.

3.2.2 Right-of-Entry

For the Culebra Island site, CESAJ will secure the Right of Entry (ROE) for the site. Copies of the ROEs will remain in the custody of FTL at all times during the conduct of the SI field activities.

3.2.3 Sensitive Environments and Cultural Resources

The Culebra Island site has several threatened and endangered plant and animal species that may exist within the site. Due to minimal impact from proposed soil and sediment sampling it is not anticipated these sensitive plant communities will be negatively impacted. Wetlands have been confirmed to be present on site and one cultural resource has been identified on the Island of Culebrita. The FTL will have access to this information during the SI field effort. Chapter 5 of this SS-WP Addendum addresses precautions and identification procedures to ensure the SI actions are tailored to minimize any impacts at the site.

3.2.4 Brush Clearing

Due to the dense vegetation and limited access to sampling locations minimal brush clearing will be required for the SI field effort. Where brush clearing is required, machetes, gas-powered trimmers with saw blade attachments, and chainsaws will be used, as appropriate. Local contract personnel may perform brush-cutting activities under the oversight of Parsons personnel, including a UXO-qualified individual. The

UXO-qualified personnel will use a Minelab geophysical instrument to aid in searching the vegetation for surface MEC prior to cutting or removing brush. Trees and brush will be trimmed only to the amount necessary to allow the site visit team to perform QR and collect soil or sediment samples.

3.2.5 Equipment

There are no site-specific changes to the general SI equipment presented in the PWP. A Minelab geophysical instrument will be used for anomaly avoidance at this site.

3.2.6 Communications

The primary means of on-site communication will be satellite telephones and radios. The three person Field Team will remain together throughout all aspects of the field activities.

3.2.7 Training and Briefing

Training and briefing requirements are presented in Chapter 3, paragraph 3.3.5 of the PWP. For the Culebra Island site, any additional training will be conducted onsite during the Daily Tailgate Safety Briefing including endangered species, culturally significant areas and anticipated ordnance types.

3.2.8 Boating Operations

For the Culebra SI a local company will be used to charter a boat to take the field team to and from the surrounding cays and cayos. The project team will charter a 25' boat with dock and 12' Avon inflatable skiff from U.S. Coast Guard licensed Captain Jerry Lyshkov. The main boat will be maintained and operated by Captain Lyshkov and Parsons will operate the inflatable skiff when traveling from the boat to the beach to access each of the islands.

3.3 SI FIELD DATA COLLECTION

3.3.1 The SI field activities at the Culebra Island site include both MC sampling and QR. No intrusive MEC investigations, explosives handling, or MEC detonation will be conducted. In the event that an MEC item is identified during the SI, the approved procedures for reporting will be implemented, as presented in the PWP and in Attachment 3-1.

3.3.2 The MC sampling locations were finalized during the TPP Meeting in February 2006. The QR effort will focus on covering all of Culebra and the surrounding cayos. Observations of cayos will be made from the boat; however, when access is available to the cay QR will be conducted on foot. Extensive QR of developed areas will not be conducted beyond a cursory evaluation to further validate the lack of contamination in these areas. The exact location of the QR route will be determined in the field by the FTL based on visual observations and areas of predetermined focus.

3.3.3 The duration of the SI field effort, inclusive of QR and MC sampling, is anticipated to be approximately two weeks, but will not be terminated until the objectives for the site are met. During this time, Parsons will implement the Technical Approach as described in the PWP and as established by the Project Team on February 28, 2006 during the TPP meeting. In addition to MC sampling and QR, Parsons will conduct the following field components for the Culebra Island site:

- Collect necessary MC-related data to provide to the EPA to conduct Hazard Ranking System scoring; and
- Collect all data necessary to complete the Munitions Response Site Prioritization Protocol.

3.3.4 Data will also be gathered to identify any potential limitations to subsequent response actions. The field activities will be coordinated with the landowners to minimize impacts to onsite activities.

3.3.1 Qualitative Reconnaissance

An integral part of the SI field activities will be the conduction of the QR in accordance with the baseline procedures described in Chapter 3, paragraph 3.4.3 of the PWP. For the Culebra Island site, QR will be distributed throughout the site to confirm known range locations, as well as to evaluate the presence or absence of MEC/MD in remote portions of the site. Figures 3.2A, 3.2B and 3.2C include representative QR paths planned for the site. These transects are not meant to depict the exact path that the field team will follow, but rather provide a representative approximation of the level of effort and the location-based emphasis of the QR. To achieve the project objective, the field team must have the ability to remain flexible during the QR to navigate towards the areas indicating the highest likelihood of containing MEC (and potential MC contamination). Visual indicators of suspect areas include (but are not limited to) earthen berms, distressed vegetation, stained soil, ground scars or craters, bunker/target remnants, and visible MEC or MD. These areas will be inspected to qualitatively evaluate the concentration of residual MEC. The QR will incorporate the use of magnetometers, global positioning systems (GPS), personal digital assistants (PDA), and digital photography. See paragraph 3.4.3.4 of the PWP for details.

3.3.2 Munitions Constituent Sampling

3.3.2.1 The PSAP has been developed by the Military Munitions Center of Expertise (MM CX) as part of the PWP. Parsons has prepared an Addendum to the PSAP to include contractor- and laboratory-specific information. For the Culebra Island site, the Project Team agreed during the TPP process that the collection of twenty-eight soil samples and four sediment samples would be sufficient to meet the SI project objectives. The approximate sample locations are depicted on Figures 3.1, 3.2A, 3.2B and 3.2C. Table 3.1 provides the sample identifications, anticipated coordinates, munitions suspected, and rationale for selecting the sample locations.

3.3.2.2 The actual coordinates of the soil samples presented in Table 3.1 were not groundtruthed prior to the conduct of the SI field activities, but were established based on review of aerial photographs, historical training maps, and professional judgment. As such, the Field Team may navigate to a specified location and find that they are physically precluded from sampling at the location or otherwise adversely hindered by undesirable conditions (i.e., bedrock exposure, developed/cultivated area, presence of a man-made structure/road, etc.). Therefore, sample locations depicted on the SS-WP Addendum maps should be considered "preliminary" in nature and the TPP Project Team supports the following sampling protocol with regards to final location selection.

3.3.2.3 The following guidelines will be adhered to in order to obtain the actual soil sample location. The Field Team will navigate to the GPS coordinates specified in Table 3.1 and agreed to at the TPP Meeting. This action will be indirect as the QR activities and the MC sampling will be conducted concurrently. Upon arriving at an "preliminary" sample location, the Field Team will survey the immediate visible area to select the most appropriate biased (toward finding MC) location based on the objective of the sample. Criteria considered to be indicative of an MC-biased sample location are visual signs of MEC/MD, stained soils, disturbed vegetation or subsurface magnetic evidence of high metal (ferrous) content.

3.3.2.4 The thirty-two soil and sediment sample locations must be screened and approved by the UXO Technician III (with regards to potential subsurface anomalies) prior to final location selection and sample collection. In accordance with the PWP, the Cold Regions Research and Engineering Laboratory (CRREL) "Seven-Wheel" composite sampling technique will be employed for the soil samples. Each of the seven sampling locations must be approved by the UXO Technician prior to collection. The actual GPS coordinate for each sample location will be recorded and will be updated in the Geographic Information System (GIS) database. The process will be repeated for all soil sample locations.

3.3.3 Sample Collection

The sample collection procedures presented in the PSAP, the Parsons Final PSAP Addendum, and in the PWP will be followed. One procedural variance was requested by the Project Team the Culebra Island site. For the Culebra Island site the soil sampling depth will be 4 to 6 inches bgs instead of the 0 to 2 inches bgs as described in the PWP. This increased sample depth was requested by the regulators and will account for the volatile island environment and the increased likelihood of migration and leaching of MC to the subsurface. Additional details regarding sample collection, Investigative-Derived Waste (IDW) handling, and packaging are presented in Chapter 4 of this SS-WP Addendum.

3.3.4 Analytical Procedures and Data Validation

Analytical procedures and data validation are presented in Chapter 3, paragraph 3.5.3 of the PWP. The analytical methods to be used for the MC samples collected are listed in Chapter 4 of this SS-WP Addendum.

Figure 3.1

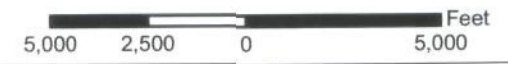
Sample Locations Culebra Island Puerto Rico

Legend

- SOIL SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION
- 1887 PROPERTY LOTS
- 1902-1903 GUN POSITIONS
- 1914 MILITARY GRID
- 1924 MILITARY AREA
- 1924 OUTPOST AND AMMUNITION STORAGE LOCATIONS
- / / / / AREAS FOR DIRECT FIRE INFANTRY AND TANKS - 1935 (POSSIBLY 1924)
- / / / / WATER AREAS FOR DIRECT FIRE AT BOATS - 1935 (POSSIBLY 1924)
- STANDING BARRAGES PREVIOUSLY REGISTERED 1935 (POSSIBLY 1924)
- 1936 MILITARY GRID
- 1936 ARTILERY AREAS AND AERIAL TARGET
- FEATURES TAKEN FROM 1937 MAP TITLED "U.S. FLEET LANDING EXERCISE #4"
- 1938 MILITARY AREAS
- 1939 MILITARY EXERCISES
- FEATURE TAKEN FROM 1936-1049 OBLIQUE PHOTOS
- SECTOR BOUNDARY



Image Source: USGS Topo Maps
Projection: UTM Zone 20N NAD83, Map Units in Feet



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DESIGNED BY: BT
DRAWN BY: BT
CHECKED BY: NH
SUBMITTED BY: DS

Proposed Sample Locations	
SCALE: As Shown	PROJECT NUMBER: 744647.17000
DATE: October 2006	PAGE NUMBER: 3-8
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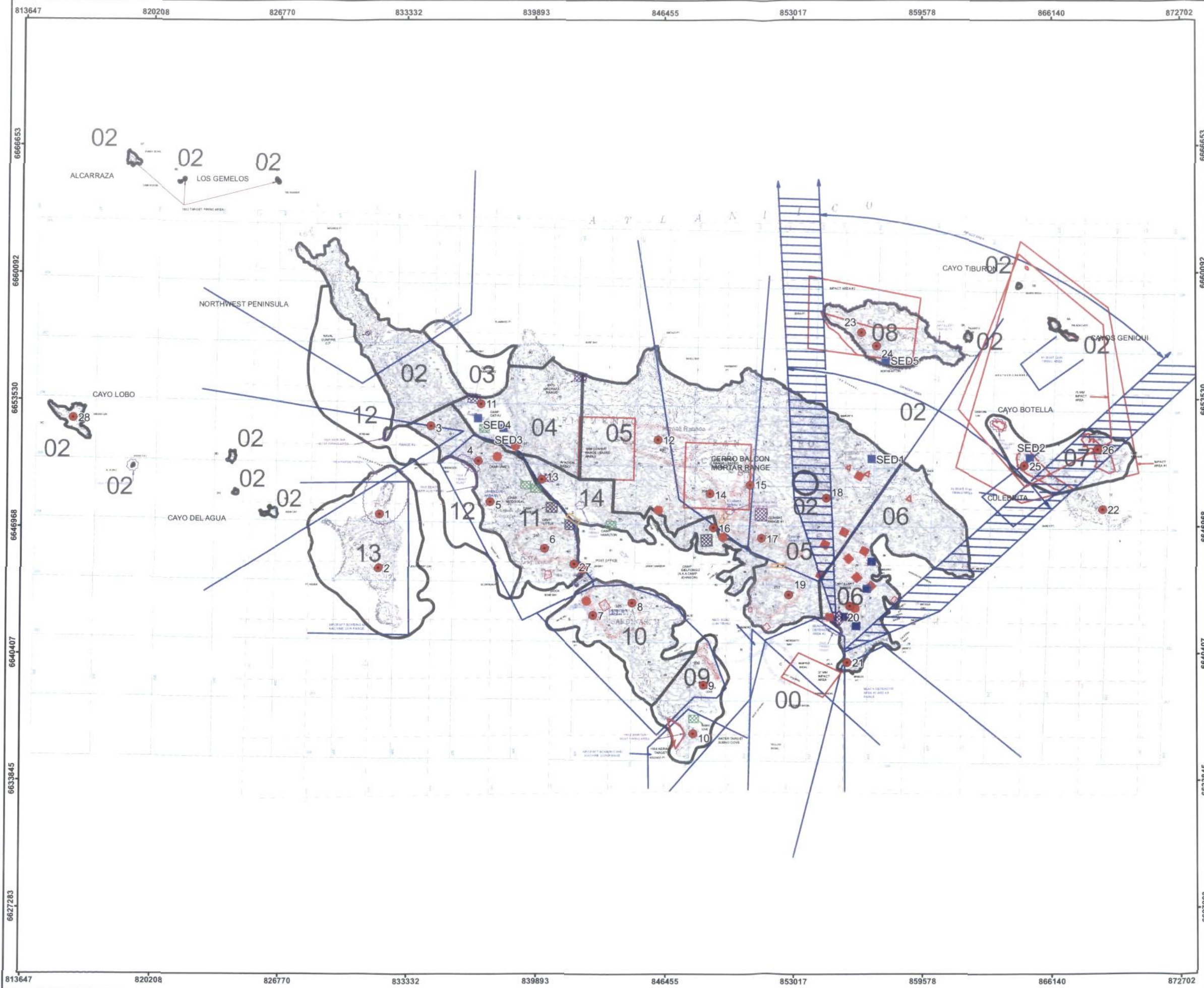




Figure 3.2A
**Qualitative Reconnaissance and
 Sample Locations Map
 Culebra Island**
 Puerto Rico

- Legend**
- SOIL SAMPLE LOCATION
 - SEDIMENT SAMPLE LOCATION
 - SECTOR BOUNDARY
 - REPRESENTATIVE QUALITATIVE RECONNAISSANCE TRACK



Image Source: 2004 Orthophotos
 Projection: UTM Zone 19N NAD27, Map Units in Feet

2,000 1,000 0 2,000 Feet

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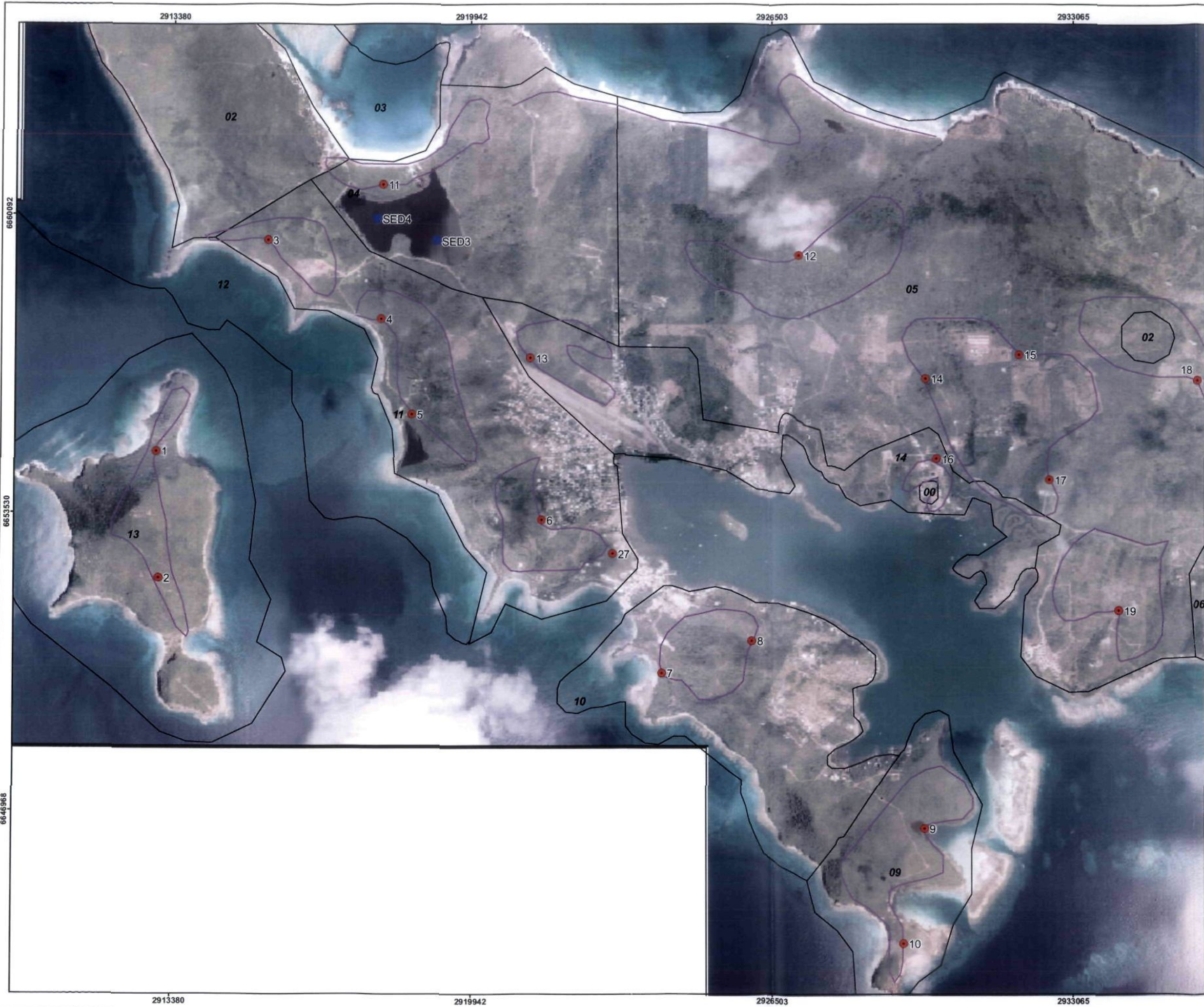


Figure 3.2B
**Qualitative Reconnaissance and
 Sample Locations Map
 Culebra Island**

Puerto Rico

Legend

- SOIL SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION
- SECTOR BOUNDARY
- REPRESENTATIVE QUALITATIVE RECONNAISSANCE TRACK



Image Source: 2004 Orthophotos
 Projection: UTM Zone 19N NAD27, Map Units in Feet



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DRAWN BY: BT		
CHECKED BY: NH	SCALE: As Shown	PROJECT NUMBER: 744647.17000
SUBMITTED BY: DS	DATE: October 2006	PAGE NUMBER: 3-10
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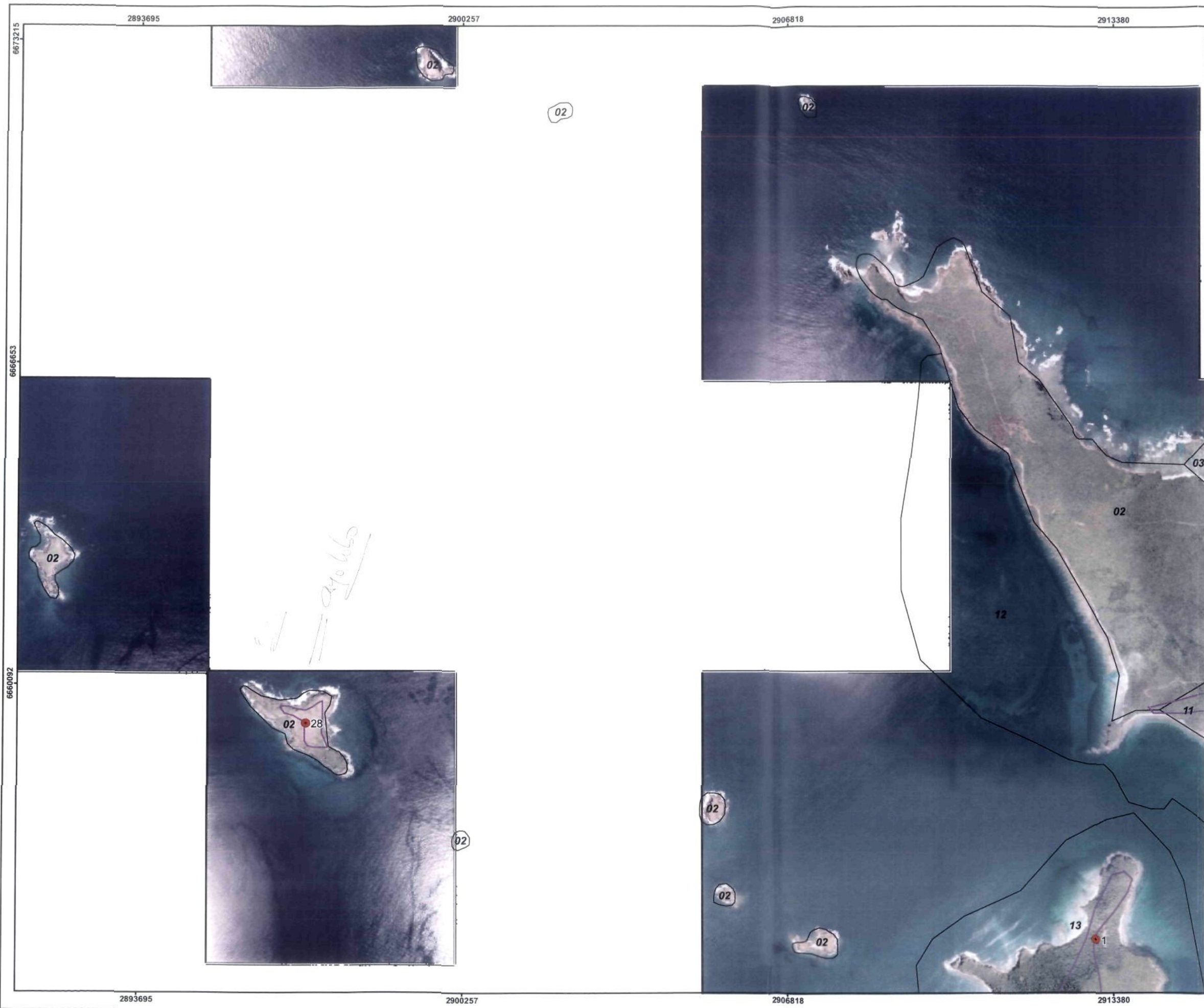


Figure 3.2C
Qualitative Reconnaissance and Sample Locations Map
Culebra Island
 Puerto Rico

Legend

- SOIL SAMPLE LOCATION
- SEDIMENT SAMPLE LOCATION
- SECTOR BOUNDARY
- REPRESENTATIVE QUALITATIVE RECONNAISSANCE TRACK



Image Source: 2004 Orthophotos
 Projection: UTM Zone 19N NAD27, Map Units in Feet

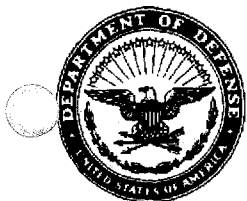
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PARSONS		U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER		
DESIGNED BY BT	Qualitative Reconnaissance and Sample Locations Map	SCALE: As Shown	PROJECT NUMBER: 744647.17000	
DRAWN BY BT		DATE: October 2006	PAGE NUMBER: 3-11	
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SUBMITTED BY DS				

Table 3.1 – Sampling Rationale
Culebra Island, Puerto Rico

Sample ID	Sample Coordinates		Media	Analysis	Munitions	Rationale
	Longitude	Latitude				
CUL-02-SS-06-28	-65.37709	18.32438	Soil	TAL Metals, Explosives	Small Arms, General; 50 Cal. Machine Gun; Bombs GP - Mk 81, Mk 82, Mk 83, & Mk 84; 20mm HEI, MKI	Sample on Cayo Lobo Target Area, TPP Team Agreement
CUL-04-SS-06-11	-65.31678	18.32717	Soil	TAL Metals, Explosives	.30 cal, .50 cal, and 81mm mortars, HE and practice, 75mm Shrapnel	FLEX #4 Combat Range #2
CUL-04-SE-06-03	-65.31344	18.32374	Sediment	TAL Metals, Explosives	.30 cal, .50 cal, and 81mm mortars, HE and practice, 75mm Shrapnel	FLEX #4 Combat Range #2, TPP Team Agreement
CUL-04-SE-06-04	-65.31719	18.32513	Sediment	TAL Metals, Explosives	.30 cal, .50 cal, and 81mm mortars, HE and practice, 75mm Shrapnel	FLEX #4 Combat Range #2, TPP Team Agreement
CUL-05-SS-06-12	-65.29074	18.32243	Soil	TAL Metals, Explosives	.30 cal, .50 cal and 81mm mortar, HE and practice, 75mm possible	Within Areas for Direct and Indirect Infantry and Tanks in 1935 and possible 1924 Anti-Aircraft Fire.
CUL-05-SS-06-14	-65.28298	18.31483	Soil	TAL Metals, Explosives	.30 cal, .50 cal and 81mm mortar, HE and practice, 75mm possible	Hill 204: Direct and Indirect Infantry and Tanks in 1935 and 1924 Anti-Aircraft Fire.
CUL-05-SS-06-15	-65.27711	18.31614	Soil	TAL Metals, Explosives	.30 cal, .50 cal and 81mm mortar, HE and practice, 75mm possible. Possible firing point for 75mm, 37mm, 155mm, 3", 7", and 8".	Hill 103: Firing Point for 1922 firing at Fungy Bowl, the Water, and Twin Rocks. Within Areas for Direct and Indirect Infantry and Tanks in 1935, 1924 Anti-Aircraft Fire, and 1936 Combat Range Area. FLEX #4 firing at slope of hill northwest of Cerro Balcon may reference this hill.
CUL-05-SS-06-17	-65.27534	18.30855	Soil	TAL Metals, Explosives	.30 cal, .50 cal and 81mm mortar, HE and practice, 75mm possible	Hill 191: Within Areas for Direct and Indirect Infantry and Tanks in 1935 and possible 1924 Anti-Aircraft Fire.
CUL-05-SS-06-18	-65.26594	18.31439	Soil	TAL Metals, Explosives	.30 cal, .50 cal and 81mm mortar	FLEX #4 Direct firing at southern slope of Cerro Balcon.
CUL-05-SS-06-19	-65.27115	18.30055	Soil	TAL Metals, Explosives	Various	Hill 203: 1935 Areas for Direct Fire, Infantry, and Tanks.
CUL-05-SE-06-01	-65.25937	18.32001	Sediment	TAL Metals, Explosives	Various, possible 75mm mortars	Within Mortar Firing Range, TPP Team Agreement.
CUL-06-SS-06-20	-65.26224	18.29904	Soil	TAL Metals, Explosives	Various	Beach Defensive Area, Artillery Firing Area.
CUL-06-SS-06-21	-65.26255	18.29103	Soil	TAL Metals, Explosives	37mm, Various	Corner of 37mm water impact area. Possible impact at point Vaca. Beach Defensive Area.
CUL-07-SS-06-22	-65.22538	18.31322	Soil	TAL Metals, Explosives	None	Sampling to determine the ambient background metals present in an area where no firing or impact would have occurred.
CUL-07-SS-06-25	-65.23698	18.31936	Soil	TAL Metals, Explosives	75mm	Target for 75mm Artillery Fire from Mosquito Bay.
CUL-07-SS-06-26	-65.22624	18.32175	Soil	TAL Metals, Explosives	75mm	Target for 75mm Artillery Fire from Mosquito Bay.
CUL-07-SE-06-02	-65.23617	18.32043	Sediment	TAL Metals, Explosives	75mm	Target for 75mm Artillery Fire from Mosquito Bay.
CUL-08-SS-06-23	-65.26102	18.33798	Soil	TAL Metals, Explosives	Various Artillery	1924 and 1936 impact area for Artillery.
CUL-08-SS-06-24	-65.25880	18.33610	Soil	TAL Metals, Explosives	Various Artillery	1924 and 1936 impact area for Artillery.
CUL-08-SE-06-05	-65.25743	18.33407	Sediment	TAL Metals, Explosives	Various Artillery	1924 and 1936 impact area for Artillery.
CUL-09-SS-06-09	-65.28359	18.28758	Soil	TAL Metals, Explosives	.30 cal, .45 cal, .50 cal, 37mm, 75mm, 155mm, 3-inch T.M., 5-inch, 30-lb frag bomb, 100-lb HE bomb, 1000 lb bomb	Impact Area for several FLEX exercises and Aerial Bombing.
CUL-09-SS-06-10	-65.28505	18.28063	Soil	TAL Metals, Explosives	.30 cal, .45 cal, .50 cal, 37mm, 75mm, 155mm, 3-inch T.M., 5-inch, 30-lb frag bomb, 100-lb HE bomb, 1000 lb bomb	Impact Area for several FLEX exercises and Aerial Bombing.
CUL-10-SS-06-08	-65.29420	18.29913	Soil	TAL Metals, Explosives	Various Anti-Aircraft Artillery	1924 Anti-Aircraft Firing on Hill 325.
CUL-10-SS-06-07	-65.29990	18.29731	Soil	TAL Metals, Explosives	Mortars, Anti-Aircraft Artillery	1939 Defensive Area #1, Possible Mortars dropped on beach from high ground.
CUL-11-SS-06-03	-65.32413	18.32398	Soil	TAL Metals, Explosives	Various	1939 Marine Defensive Area #2
CUL-11-SS-06-04	-65.31707	18.31908	Soil	TAL Metals, Explosives	Various	FLEX #4 Beach Barrage at Firewood Bay.
CUL-11-SS-06-05	-65.31527	18.31328	Soil	TAL Metals, Explosives	Various	1939 Marine Defensive Area #2
CUL-11-SS-06-06	-65.30720	18.30673	Soil	TAL Metals, Explosives	Various	Hill 310: 1924 and 1935 Anti-Aircraft Firing on Hill 310.
CUL-11-SS-06-27	-65.30280	18.30461	Soil	TAL Metals, Explosives	None	Sampling to determine the ambient background metals present in an area where no firing or impact would have occurred.
CUL-13-SS-06-01	-65.33148	18.31136	Soil	TAL Metals, Explosives	.50 Cal, 155mm GPF, 75mm AA, 37mm, 8" and 6" naval, and Aerial Bombs	Aerial bombing and naval bombardment on Luis Pena Cayo.
CUL-13-SS-06-02	-65.33145	18.30368	Soil	TAL Metals, Explosives	.50 Cal, 155mm GPF, 75mm AA, 37mm, 8" and 6" naval, and Aerial Bombs	Aerial bombing and naval bombardment on Luis Pena Cayo.
CUL-14-SS-06-13	-65.30772	18.31657	Soil	Lead, Copper, and Antimony Only	Small Arms	Small arms firing at the north end of the runway.
CUL-14-SS-06-16	-65.28239	18.30997	Soil	TAL Metals, Explosives	None	Sampling to determine the ambient background metals present in an area where no firing or impact would have occurred.

Attachment 3-1
UXO Encounter Procedures



DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF:

MAR 1 6 2006

CEHNC-OE-CX

MEMORANDUM FOR SEE DISTRIBUTION

SUBJECT: Procedure for Preliminary Assessment (PA) and Site Inspection (SI) Teams that Encounter Unexploded Ordnance (UXO) While Gathering Non-UXO Field Data, Military Munitions Center of Expertise (MM CX) Interim Guidance Document (IGD) 06-05

1. PURPOSE: This procedure describes the responsibilities of project teams during the preliminary assessment and site investigation phases should unexploded ordnance (UXO) be discovered.
2. APPLICABILITY: This guidance is applicable to the geographic military Districts, Military Munitions Response Program (MMRP) Design Centers, Major Subordinate Commands (MSCs), and designated Remedial Action Districts performing MMRP response actions.
3. REQUIREMENTS AND PROCEDURES:
 - a. During site visits to formerly used defense site (FUDS) properties to gather PA or SI information, in the rare instance that a UXO-qualified individual identifies an item that is an explosive hazard, the following actions will occur:
 - (1) The property owner or individual granting rights of entry to the property will be notified of the hazard and advised to call the local emergency response authority (i.e., police, sheriff, or fire department). The individual will also be informed that if they do not call the local response authority within 1 hour, the individual who identified the UXO item will notify the local emergency response authority.
 - (2) The local response authority will decide how to respond to the reported incident, including deciding not to respond (e.g., if the local response authority is already aware of the hazards on the property). If the local response authority decides to respond, the individual who identified the item or his designee will mark the location of the item and provide accurate location information to the emergency response authority. The individual who identified the item or his designee will generally remain in the area until the local response authority arrives, unless specifically indicated by the appropriate response authority that the individual may leave the area.
 - (3) During the SI, the state regulator may also be notified at their request.

MAR 1 6 2006

CEHNC-OE-CX

SUBJECT: Procedure for Preliminary Assessment (PA) and Site Inspection (SI) Teams that Encounter Unexploded Ordnance (UXO) While Gathering Non-UXO Field Data, Military Munitions Center of Expertise (MM CX) Interim Guidance Document (IGD) 06-05

b. During site visits to active installations or Base Realignment and Closure (BRAC) sites to gather PA or SI information, in the rare instance that a UXO-qualified individual identifies an item that is an explosive hazard, the following actions will occur:

(1) The installation point of contact (POC) or the BRAC coordinator will be notified of the hazard and requested to notify explosive ordnance disposal (EOD) through their channels.

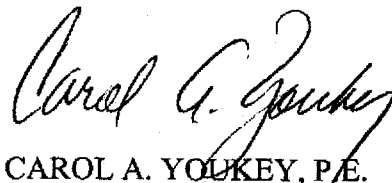
(2) The installation/EOD will make the determination if they are going to respond to the incident. The installation/EOD may be aware of the hazards at the site and make the decision not to respond. If the installation/EOD decides to respond, the individual who identified the item or his designee will mark the location and provide accurate location information to the installation/EOD unit and will remain in the area unless the installation/EOD unit requests otherwise.

c. Neither the US Army Corps of Engineers personnel, nor their contractors have the authority to call EOD to respond to an explosive hazard. This call is the responsibility of the local emergency response authority for FUDS properties and it must come through the proper chain of command on installations.

d. AR 75-14 and AR 75-15 contain the information on how EOD responds to explosives hazards.

4. EFFECTIVE DATES: The requirements and procedures set forth in this interim guidance are effective immediately. They will remain in effect indefinitely, unless superseded by other policy or regulation.

5. POINT OF CONTACT: If you need additional information, please contact Mr. Brad McCowan at 256-895-1174.



CAROL A. YOUKEY, P.E.
Chief, Center of Expertise for Ordnance
and Explosives Directorate

CHAPTER 4

SAMPLING AND ANALYSIS PLAN

4.1 INTRODUCTION

The MM CX has prepared the PSAP (consisting of the Field Sampling Plan [FSP] and the Quality Assurance Project Plan [QAPP]) for the MMRP SI Program. A PSAP Addendum was developed to describe Parsons' specific activities and procedures to be conducted during SIs. The Addendum augments the Final PSAP, documenting Parsons' specific variances from the PSAP and presenting Severn Trent Laboratories (STL) Denver's laboratory specific procedures, detection and quantitation limits, and precision and accuracy criteria. This Site-Specific Sampling and Analysis Plan (SAP) is not meant to be a stand alone document and should be used in conjunction with the Final PSAP and the Final PSAP Addendum. This document only addresses information directly related to the site and any variances from the program-wide procedures presented in the PSAP or PSAP Addendum. The PSAP and PSAP Addendum apply to all work performed by Parsons and its subcontractors.

4.2 SAMPLE COLLECTION

4.2.1 Surface Soil Samples

Prior to the advancement of any sampling equipment, each discrete sampling location will be screened by the UXO-qualified team escort to verify that no metallic items are present in the subsurface. All surface soil samples will be collected using the procedures described in Subchapter 5.1.2 of the Programmatic Field Sampling Plan (PFSP) and Subchapter 5.1 of the PFSP Addendum. Each sample location will consist of seven discrete samples that will be homogenized into a composite sample in accordance with the PSAP/PSAP Addendum procedures. Soil will be transferred to the appropriate sample collection containers as presented in Table 4.1. All remaining soil will be returned to the discrete sample locations to assist the field team in restoring the site to its original condition.

4.2.2 Wet Sediment Samples

The four wet sediment sample will be collected from lagoons on Culebra and Culebrita. The general location of the sediment sample is noted on Figures 3.1, 3.2A, 3.2B, and 3.2C. The procedures for collecting a wet sediment sample are found in Subchapter 5.1.3 of the PSAP.

4.2.3 Sample Containers

The samples will be collected in the appropriate sample containers and preserved as listed in Table 4.1. The sample containers for the explosives analysis will be filled first, followed by the sample containers for metals. The cap shall be secured tightly and the container clearly labeled as presented in Table 4.2. The sample containers will be placed on ice immediately. The sample handling and packaging procedures presented in Chapter 7 of the PSAP will be followed for all sample containers.

4.2.4 Quality Control /Quality Assurance Samples

For the Culebra Island site, Quality Control (QC) samples will be collected at the required frequency as specified in the PSAP. Field duplicate samples will be collected at a frequency of 10% per matrix (one in ten samples) and matrix spike/matrix spike duplicate (MS/MSD) samples will be collected at a frequency of 5% per matrix (one in twenty samples). The QC and Quality Assurance (QA) samples will be collected in accordance with the procedures identified in Subchapters 5.6 of the PFSP and PFSP Addendum. The sample identifications for the QC samples are included in Table 4.2. The QC samples will be analyzed for the same parameters as the parent sample and will be collected simultaneously with the parent sample. One QA Split sample will be collected at the request of the MM DC Project Manager (PM) or CESAJ PM. The sample will be collected immediately after the field QC sample and maintained on ice with the field samples until preparation for shipment to the laboratory. No equipment blank will be collected for the Culebra Island site since disposable sampling equipment will be used for sample collection. Temperature blanks will be included with each cooler sent to the laboratories.

4.2.5 Sample Shipment

4.2.5.1 The samples will be packaged and shipped in accordance with the procedures presented in Chapter 7 of the PFSP. For the Culebra site DHL was contacted to confirm shipping service for soils samples from Culebra to Denver. They confirmed that the shipment could be dropped off for shipment at the Culebra Airport. Parsons has obtained USDA soil permits from both SLT Denver and GPL Laboratories confirming their ability to receive and destroy foreign soils. The soil permits are shown in Attachment 4-1 and will be attached to the outside of each sample cooler. In order to ensure that the temperatures can be maintained over potentially longer shipping times few samples will be shipped per cooler to allow for more ice in each sample cooler. Special stickers will be affixed to each sample cooler with special handling instructions. Parsons will also have a fourth team member on site for logistics and sample handling in the event that unforeseen shipping problems arise.

4.2.5.2 The laboratory point of contact for the Culebra Island site is Ms. Lyn Benkers. Ms. Benkers' email address is lbenkers@stl-inc.com. The laboratory address for the field samples is:

STL-Denver
4955 Yarrow Street
Arvada, CO 80002
phone (800) 572-8958
fax (303) 431-7171

4.2.5.3 The QA samples will be sent to GPL Laboratories, Inc. as directed by USACE. The samples will be packaged identical to the field samples and sent via overnight courier to the laboratory. The point of contact for the QA laboratory will be Paul Ioannides. Mr. Ioannides' phone number is (301) 509-0667. The shipping address for the QA laboratory is:

GPL Laboratories
Attn: Sample Receiving
7210A Corporate Court
Frederick, MD 21703
Phone (301) 694-5310
Fax (301) 620-0720

4.3 INVESTIGATIVE DERIVED WASTE

Parsons anticipates minimal IDW to be generated during the field activities in support of the Culebra Island SI based on the usage of single use sampling equipment. For disposal of solid waste Parsons will follow the Investigation Derived Waste Plan presented in Sub-Chapter 3.6 of the PWP.

4.4 NONMEASUREMENT DATA

4.4.1 Nonmeasurement data will be collected for the Culebra Island site using information found in the 1991 INPR, 1995 ASR, 1995 Interim Remedial Action Report, 1997 EE/CA, 2004 ASR Supplement, 2005 Revised INPR, and 2005 Supplemental ASR. This initial information collected has been incorporated in the SS-WP Addendum. This site information will be supplemented using research via Internet searches, requests from agency contacts (i.e., State Historic Preservation Office, U.S. Fish and Wildlife Service, etc.), and site contacts, if applicable. Nonmeasurement data will include information relating to geology, climate, hydrogeology, federally- and state-listed threatened and endangered species known to be or potentially be onsite, sensitive habitats, wetlands, cultural and archeological resources, water resources, trees and shrubs, waste disposal sites, and impact mitigation measures.

4.4.2 Further data collection will be conducted to fulfill the contract requirements to complete the Munitions Response Site Prioritization Protocol (MRSPP) scoring sheets and to collect the pertinent MC-related Hazard Ranking System (HRS) scoring information. The primary information needed to complete the MRSPP scoring, such as hazard type (i.e., explosive or chemical) and accessibility, will come from historical site documents (ASR, ASR Supplement, Supplemental ASR, etc). To further supplement

current on- and off-site information needed for receptor scoring, additional data collection will be conducted to fulfill the contract requirements to complete the MRSPP scoring sheets and to collect the MC-related HRS scoring information. Additional data will include information regarding current on- and off-site activities/structures, population density, CERCLA sites, Resource Conservation and Recovery Act sites, well locations, and water supply information. Once the soil and sediment sampling has been completed and samples analyzed, the data will be used to score the health hazard evaluation of the MRSPP.

4.5 MUNITIONS CONSTITUENTS ANALYSIS

The list of munitions constituents for which the samples will be analyzed was derived based on the MEC known or suspected at the Culebra Island site. Each munition was broken down by case/cartridge and filler composition and those constituents were included in the analysis list. Table 4.3 presents the potential MEC for the site as well as the fillers and case composition. These are further broken down into specific explosives and metals that would be indicative of the fillers. This table of constituents was used to develop the metals list for samples collected from the Culebra Island site. Soil and sediment samples will be analyzed for the full list of explosives and total metals as presented in the PSAP.

4.6 ANALYTICAL METHODS

All samples will be analyzed in accordance with the procedures presented in the PSAP Addendum. Tables 4.4a, 4.4b list the appropriate analysis for each constituent.

4.7 DATA QUALITY OBJECTIVES

The DQOs have been developed for the Culebra Island site in accordance with the process presented in Chapter 3, paragraph 3.1.2 of the PWP and are provided as part of the Final TPP Memorandum documentation, presented in Appendix A of this SS-WP Addendum. The chemical-specific DQOs as agreed upon by the TPP Project Team are presented in Table 4.5. The soil and sediment sample DQOs consist of the EPA Region IX Residential PRGs.

**Table 4.1 Sample Containers, Preservatives, and Holding Times
Culebra Island, Puerto Rico**

Parameter	Sample Container	Preservative	Holding Time
SOIL AND SEDIMENT SAMPLES			
Explosives	1 4 oz wide-mouth glass w/ Teflon-lined cap	Cool to 4°C	14/40 days ^a
Total Metals	1 4 oz wide-mouth glass w/ Teflon-lined cap	Cool to 4°C	28 days (Hg); 180 days (others)

(a) 14 days from sample collection to extraction / 40 days from extraction to analysis

**Table 4.2 Sample Identification, Quality Control, and Quality Assurance Samples
Culebra Island, Puerto Rico**

Location/ Sample Identification	Matrix		Analysis		QC Samples ⁽¹⁾			QA Samples
	Soil	Sediment	Explosives	Total Metals	Field Duplicate ⁽²⁾	MS ⁽³⁾	MSD ⁽³⁾	Splits ⁽⁴⁾
Project Area 02 (02)								
CUL-02-SS-06-28	X		X	X				
Project Area 04 (04)								
CUL-04-SS-06-11	X		X	X	X			
CUL-04-SE-06-03		X	X	X				
CUL-04-SE-06-04		X	X	X				
Project Area 05 (05)								
CUL-05-SS-06-12	X		X	X				
CUL-05-SS-06-14	X		X	X				
CUL-05-SS-06-15	X		X	X				
CUL-05-SS-06-17	X		X	X	X	X	X	X
CUL-05-SS-06-18	X		X	X				
CUL-05-SS-06-19	X		X	X				
CUL-05-SE-06-01		X	X	X				

**Table 4.2 Sample Identification, Quality Control, and Quality Assurance Samples, Continued
Culebra Island, Puerto Rico**

Location/ Sample Identification	Matrix		Analysis		QC Samples ⁽¹⁾			QA Samples
	Soil	Sediment	Explosives	Total Metals	Field Duplicate ⁽²⁾	MS ⁽³⁾	MSD ⁽³⁾	Splits ⁽⁴⁾
Project Area 06 (06)								
CUL-06-SS-06-20	X		X	X				
CUL-06-SS-06-21	X		X	X				
Project Area 07 (07)								
CUL-07-SS-06-22	X		X	X				
CUL-07-SS-06-25	X		X	X	X	X	X	X
CUL-07-SS-06-26	X		X	X				
CUL-07-SE-06-02		X	X	X				
Project Area 08 (08)								
CUL-08-SS-06-23	X		X	X				
CUL-08-SS-06-24	X		X	X				
CUL-08-SE-06-05		X	X	X				
Project Area 09 (09)								
CUL-09-SS-06-09	X		X	X				
CUL-09-SS-06-10	X		X	X				
Project Area 10 (10)								
CUL-10-SS-06-08	X		X	X				

**Table 4.2 Sample Identification, Quality Control, and Quality Assurance Samples, Continued
Culebra Island, Puerto Rico**

Location/ Sample Identification	Matrix		Analysis		QC Samples ⁽¹⁾			QA Samples
	Soil	Sediment	Explosives	Total Metals	Field Duplicate ⁽²⁾	MS ⁽³⁾	MSD ⁽³⁾	Splits ⁽⁴⁾
CUL-10-SS-06-07	X		X	X				
Project Area 11 (11)								
CUL-11-SS-06-03	X		X	X				
CUL-11-SS-06-04	X		X	X				
CUL-11-SS-06-05	X		X	X				
CUL-11-SS-06-06	X		X	X				
CUL-11-SS-06-27	X		X	X				
Project Area 13 (13)								
CUL-13-SS-06-01	X		X	X				
CUL-13-SS-06-02	X		X	X				
Project Area 14 (14)								
CUL-14-SS-06-13	X			Pb, Cu, Sb				
CUL-14-SS-06-16	X		X	X				

- (1) – The QC samples will be analyzed for the same parameters as the parent sample.
- (2) – The sample number for the field duplicate will be replaced with FD#_ with the actual sample and the corresponding FD# recorded in the PDA/log.
- (3) – MS/MSD will be noted in the Comments section of the Chain-of-Custody.
- (4) – The QA split will be identified with the same ID as the parent sample with “QA” added at the end.

**Table 4.3 Chemical Composition of MEC and Potential Munitions Constituents
Culebra Island, Puerto Rico**

General Munition Type	Type/Model	Case Composition	Filler	Potential Constituent ^{1,2}
Small Arms Ammunition .30 cal with gliding metal jacket	M2 Ball	Brass	Lead antimony	Lead, antimony, copper, zinc, tungsten, molybdenum, iron, aluminum, calcium, strontium, magnesium, nitroglycerin
	M1 Tracer		Tracer Composition, Tungsten Chrome	
	M2 Armor Piercing (AP)		Steel	
	Primer, Percussion		Single- or double-base powder Primer Composition	
.30 cal Carbine with gliding metal jacket	M1 Ball	Brass	Lead antimony	Lead, antimony, iron, copper, zinc, molybdenum, aluminum, calcium, strontium, magnesium, nitroglycerin
	M16 Tracer		Tracer Composition	
	Propellant		Single- or double-base powder	
	Primer, Percussion		Primer Composition	
Small Arms Ammunition .50 cal with gliding metal jacket	M2 Ball	Brass	Soft steel	Calcium, iron, strontium, lead, tungsten, magnesium, molybdenum, nitroglycerin, antimony, Pentaerythritol Tetranitrate, potassium, TNT, perchlorate
	M1 Tracer		Tracer Composition	
	M10 Tracer		Tracer Composition	
	M17 Tracer		Tracer Composition	
	M21 Tracer		Tracer Composition	
	M2 AP		Tungsten Chrome Steel	
Mk 27 HE Torpedo "Cutie"	Battery	Brass, Steel, and/or Copper	Single- or double-base powder	RDX, TNT, aluminum, lead, iron, copper.
			Primer, Percussion	
Mk 76 Practice Bomb		Steel	Inert	Iron, potassium, zinc, titanium
			<i>Spotting Charge:</i> Black Powder, Smokeless Powder, Zinc Oxide, Titanium Tetrachloride	
Mk 106 Practice Bomb		Steel	Inert	Iron, potassium, zinc, titanium
			<i>Spotting Charge:</i> Black Powder, Smokeless Powder, Zinc Oxide, Titanium Tetrachloride	
5-inch projectile		Steel	TNT, Composition B (TNT, RDX)	RDX, TNT, iron
.6-inch projectile	Mk II HE	Steel	TNT	TNT, iron

**Table 4.3 Chemical Composition of MEC and Potential Munitions Constituents, Continued
Culebra Island, Puerto Rico**

General Munition Type	Type/Model	Case Composition	Filler	Potential Constituent ^{1,2}
Trench Mortar, 3 Inch (Stokes)	HE MK I and MK II	Steel	<i>Propellant:</i> Nitrocellulose, Nitroglycerine <i>Charge:</i> TNT or Nitrostarch, Barium nitrate, Sodium nitrate, Ammonium nitrate, <i>Fuze:</i> Black powder or Fulminate of mercury	Potassium, Antimony, Lead, TNT, Nitroglycerine, Barium, Mercury,
81 mm Mortar	Illumination M301 Fuse point detonating M84 Primer M34 Cartridge, Ignition M6 Propelling charge M2A1 White phosphorus (WP used on Northwest Peninsula only)	Steel	Illuminant Mix Double-based powder White phosphorus (WP) (WP used on Northwest Peninsula only)	Barium, aluminum, magnesium, zinc, iron, potassium, nitroglycerin, white phosphorus (WP). (WP used on Northwest Peninsula only)
5-inch Rocket, Zuni		Steel, copper	Composition B (TNT, RDX), Double-base propellant	TNT, RDX, nitroglycerin, copper, iron
11.75-inch Tiny Tim Aerial Rocket		Steel	TNT	TNT, iron
Mk 80 series bomb	Mk 81 Mk 82 Mk 83 Mk 84	Steel	Tritonal or H6	TNT, aluminum, iron
Shell, High-Explosive Incendiary 20mm,	MK 1 Fuze- MK.III Primer- M36A1 Cartridge M21A11		IMR powder Tetryl, incendiary mixture Composition A – Ammonium Nitrate Tetryl	Ammonium, aluminum, magnesium, Tetryl

**Table 4.3 Chemical Composition of MEC and Potential Munitions Constituents, Continued
Culebra Island, Puerto Rico**

General Munition Type	Type/Model	Case Composition	Filler	Potential Constituent ^{1,2}
37mm Projectile, unspecified		Steel	Flashless Nonhygroscopic (FNH)	Iron, Dinitrotoluene
76 mm Projectile, Unspecified		Steel	TNT, Composition B (TNT, RDX)	RDX, TNT, iron
Hand Grenade, unspecified Live Practice Smoke	Mk II M10 AN-M8 Smoke, HC M16 Smoke M30 Practice	Cast Iron Sheet Metal	TNT, Flaked or granular, EC blank Single based powder Hexachlorethane-zinc (HC) Colored smoke mixture Black powder Comp B (TNT, RDX)	TNT Zinc. Calcium, iron, strontium, lead, magnesium, molybdenum, RDX,
5-inch Illumination Shell	Mk 18	Fuze -Brass Steel	Black Powder, Magnesium	Potassium, magnesium
AN-Mk 23, 3-lb Practice bomb	AN-Mk23	Zinc or Cast Iron Aluminum Spotting Charge Case	Inert <i>Spotting Charge:</i> Black Powder, Smokeless Powder, Zinc Oxide, Titanium Tetrachloride	Iron, lead, zinc, copper, aluminum, potassium, titanium, Dinitrotoluene
40mm Projectile, unspecified	Projectile, configurations HE HE-I Mk 2 (dummy) Fuze: Mk 27, PD Primer Percussion	Steel	Inert Cast TNT Cast TNT and Incendiary Black powder, unknown primer mixture	Iron, TNT, barium, magnesium, aluminum, sodium, potassium
Mk 14/15 Navy General Torpedo	Battery	Brass, Steel, and/or Copper	HBX (Torpex)	RDX, TNT, Aluminum, Lead.
1 – For dedicated small arms only sites lead, antimony, and copper will be the primary constituents used to identify contamination.				
2 – Explosives constituents in small arms are confined to the cartridge only and are expended to project the bullets.				

**Table 4.4a Target Analyte List for Explosives by LC/MS
Culebra Island, Puerto Rico**

(based on SW-846 Method 8321A*)

Explosive Compound	CAS #	Comments
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	2691-41-0	
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	121-82-4	
1,3,5-Trinitrobenzene	99-35-4	
1,3-Dinitrobenzene	99-65-0	
Methyl-2,4,6-trinitrophenylnitramine (Tetryl)	479-45-8	
Nitrobenzene	98-95-3	
2,4,6-Trinitrotoluene (TNT)	118-96-7	
4-Amino-2,6-dinitrotoluene	19406-51-0	
2-Amino-4,6-dinitrotoluene	35572-78-2	
2,4-Dinitrotoluene	121-14-2	
2,6-Dinitrotoluene	606-20-2	
2-Nitrotoluene	88-72-2	
3-Nitrotoluene	99-08-1	
4-Nitrotoluene	99-99-0	
Nitroglycerin	55-63-0	
Pentaerythritol Tetranitrate	78-11-5	
Nitrobenzene-d5		Surrogate

The procedures presented in Section 2.4, then 2.3 of Method SW8330 will be used for soil samples.

**Table 4.4b Target Analyte List for Inorganics by ICP, ICP/MS, and CVAA
Culebra Island, Puerto Rico**

(based on SW-846 Methods as indicated below)

Metal	CAS #	Comments
Aluminum	7429-90-5	6010B ⁽¹⁾
Antimony	7440-36-0	6020 ⁽²⁾
Arsenic	7440-38-2	6020 ⁽²⁾
Barium	7440-39-3	6020 ⁽²⁾
Beryllium	7440-41-7	6020 ⁽²⁾
Cadmium	7440-43-9	6020 ⁽²⁾
Calcium	7440-70-2	6010B ⁽¹⁾
Chromium	7440-47-3	6020 ⁽²⁾
Cobalt	7440-48-4	6020 ⁽²⁾
Copper	7440-50-8	6020 ⁽²⁾
Iron	7439-89-6	6010B ⁽¹⁾
Lead	7439-92-1	6020 ⁽²⁾
Magnesium	7439-95-4	6010B ⁽¹⁾
Manganese	7439-96-5	6020 ⁽²⁾
Mercury	7439-97-6	7470A/7471A
Molybdenum	7439-98-7	6020 ⁽²⁾
Nickel	7440-02-0	6020 ⁽²⁾
Potassium	7440-09-7	6010B ⁽¹⁾
Selenium	7782-49-2	6020 ⁽²⁾
Silver	7440-22-4	6020 ⁽²⁾
Sodium	7440-23-5	6010B ⁽¹⁾
Strontium	7440-24-6	6010B ⁽¹⁾
Thallium	7440-28-0	6020 ⁽²⁾
Titanium	7440-32-6	6010B ⁽¹⁾
Vanadium	7440-62-2	6020 ⁽²⁾
Zinc	7440-66-6	6020 ⁽²⁾

(1) - The digestion method for 6010B soil samples is SW3050B.

(2) - The digestion method for 6020 soil samples is SW3050B.

**Table 4.5 Chemical-Specific Data Quality Objectives, Laboratory MDLs, and PQLs for Soil and Sediment Samples
Culebra Island, Puerto Rico**

Analyte	Abbreviation	CAS #	STL Denver Method Detection Limits (MDL) and Practical Quantitation Limits (PQL)		Site-Specific Human Health Screening Values Residential Soil (mg/kg)
			STL MDL	STL PQL	Region IX PRG ⁽¹⁾
Hexahydro-1,3,5-trinitro-1,3,5-triazine	RDX	121-82-4	0.027	0.18	4.4
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine	HMX	2691-41-0	0.058	0.12	3100
2,4,6-Trinitrotoluene	2,4,6-TNT	118-96-7	0.021	0.12	16
1,3,5-Trinitrobenzene	1,3,5-TNB	99-35-4	0.016	0.12	1800
1,3-Dinitrobenzene	1,3-DNB	99-65-0	0.018	0.12	6.1
2,4-Dinitrotoluene ⁽¹⁾	2,4-DNT	121-14-2	0.021	0.12	0.72
2,6-Dinitrotoluene ⁽¹⁾	2,6-DNT	606-20-2	0.021	0.12	0.72
2-Amino-4,6-dinitrotoluene	2-Am-DNT	35572-78-2	0.018	0.12	12
2-Nitrotoluene	2-NT	88-72-2	0.019	0.12	0.88
3-Nitrotoluene	3-NT	99-08-1	0.014	0.12	730
4-Amino-2,6-dinitrotoluene	4-Am-DNT	19406-51-0	0.023	0.12	12

**Table 4.5 Chemical-Specific Data Quality Objectives, Laboratory MDLs, and PQLs for Soil and Sediment Samples, Continued
Culebra Island, Puerto Rico**

Analyte	Abbreviation	CAS #	STL Denver Method Detection Limits (MDL) and Practical Quantitation Limits (PQL)		Site-Specific Human Health Screening Values Residential Soil (mg/kg)
			STL MDL	STL PQL	Region IX PRG ⁽¹⁾
4-Nitrotoluene	4-NT	99-99-0	0.014	0.12	12
Nitrobenzene	NB	98-95-3	0.027	0.12	20
Nitroglycerin	NG	55-63-0	0.035	0.50	35
Methyl-2,4,6-trinitrophenylnitramine	Tetryl	479-45-8	0.10	0.30	610
Pentaerythritol Tetranitrate	PETN	78-11-5	0.051	0.50	-
Aluminum	Al	7429-90-5	15	47	76000
Antimony	Sb	7440-36-0	0.071	0.20	31
Arsenic	As	7440-38-2	0.015	0.60	0.39
Barium	Ba	7440-38-2	0.038	0.20	5400
Beryllium	Be	7440-41-7	0.020	0.10	150

**Table 4.5 Chemical-Specific Data Quality Objectives, Laboratory MDLs, and PQLs for Soil and Sediment Samples, Continued
Culebra Island, Puerto Rico**

Analyte	Abbreviation	CAS #	STL Denver Method Detection Limits (MDL) and Practical Quantitation Limits (PQL)		Site-Specific Human Health Screening Values Residential Soil (mg/kg)
			STL MDL	STL PQL	Region IX PRG ⁽¹⁾
Cadmium	Cd	7440-43-9	0.0061	0.10	37
Calcium	Ca	7440-70-2	33	99	-
Chromium ⁽²⁾	Cr	7440-47-3	0.030	0.20	210
Cobalt	Co	7440-48-4	0.0013	0.10	900
Copper	Cu	7440-50-8	0.049	0.20	3100
Iron	Fe	7439-89-6	25	78	23000
Lead	Pb	7439-92-1	0.026	0.15	400
Magnesium	Mg	7439-95-4	8.9	30	-
Manganese	Mn	7439-96-5	0.028	0.15	1800
Nickel	Ni	7440-02-0	0.0028	0.033	1600
Potassium	K	7440-09-7	0.0082	0.20	-

**Table 4.5 Chemical-Specific Data Quality Objectives, Laboratory MDLs, and PQLs for Soil and Sediment Samples, Continued
Culebra Island, Puerto Rico**

Analyte	Abbreviation	CAS #	STL Denver Method Detection Limits (MDL) and Practical Quantitation Limits (PQL)		Site-Specific Human Health Screening Values Residential Soil (mg/kg)
			STL MDL	STL PQL	Region IX PRG ⁽¹⁾
Selenium	Se	7782-49-2	0.020	0.15	390
Silver	Ag	7440-22-4	56	300	390
Sodium	Na	7440-23-5	0.040	0.50	-
Thallium	Tl	7440-28-0	0.016	0.10	5.2
Titanium	Ti	7440-32-6	0.84	2.5	100,000
Vanadium	V	7440-62-2	142	500	78
Zinc	Zn	7440-66-6	0.26	1.0	23000
Mercury	Hg	7439-97-6	0.003	0.10	23

(1) – EPA Region IX PRGs dated 28 December 2004

(2) – Total chromium values

(-) – No screening level available

**Attachment 4-1
USDA Soil Permit**



**UNITED STATES
DEPARTMENT OF
AGRICULTURE**

**Animal and Plant
Health Inspection
Service**

**Plant Protection and
Quarantine**

Soil Permit

Permit
Number:

S-60617

Issued To: STL, Denver
(Timothy O'Shields)
4955 Yarrow Street
Arvada, Colorado 80002

TELEPHONE: (303) 736-0100

Under the authority of the Federal Plant Pest Act of May 23, 1957, permission is hereby granted to the facility/individual named above subject to the following conditions:

1. Valid for shipments of soil not heat treated at the port of entry, only if a Compliance Agreement (PPQ Form 519) has been completed and signed. Compliance Agreements and Soil Permits are non-transferable. If you hold a Soil Permit and you leave your present employer or Company, you must notify your local USDA office promptly. A copy of this permit must accompany all shipments.
2. To be shipped in sturdy, leakproof, containers.
3. To be released without treatment at the port of entry to permittee or authorized user.
4. To be used only for analysis and only in the facility of the permittee at STL, Denver, located in Arvada, Colorado.
5. No use of soil for growing purposes is authorized, including the isolation or culture of organisms imported in soil.
6. All unconsumed soil, containers, and effluent is to be autoclaved, incinerated, or heat treated by the permittee at the conclusion of the project as approved and prescribed by PPQ.
7. This permit authorizes shipments from all foreign sources, including Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands through any U.S. port of entry.

MARCH 31, 2007

Expiration Date

Lia Stewart

Approving Official LIA STEWART

WARNING: Any alteration, forgery, or unauthorized use of this Federal form is subject to civil penalties of up to \$250,000 (7 U.S.C. s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. s 1001).

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

Public reporting burden for this collection of information is estimated to average 1.25 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the form. Send comments regarding this burden estimate or any other aspects of this collection of information, including suggestions for reducing the burden, to USDA OIRM, Clearance Officer, Room 404-VI, Washington, DC 20250. When replying refer to the OMB number and form number in your letter.

COMPLIANCE AGREEMENT

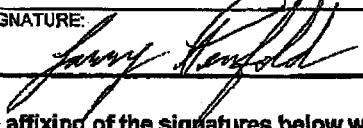
1. NAME AND MAILING ADDRESS:
STL Denver
4955 Yarrow St.
Arvada, CO 80002 (303) 421-6611

2. LOCATION:
same


3. REGULATED ARTICLE(S):
Soil, rock and sediment samples for processing.

4. APPLICABLE FEDERAL QUARANTINE(S) OR REGULATIONS:
7 CFR 330.300 & 7 CFR 330.302 are regulations which restrict the movement of soil into or through the USA as well as from State to State. Also Golden Nematode 301.85, Imported Fire Ant 301.81, Witchweed 301.80, & Corn Cyst Nematode 301.90.

5. I/We agree to the following:
See attached Stipulations.


6. SIGNATURE: 	7. TITLE: QA Manager	8. DATE SIGNED: 11/26/02
The affixing of the signatures below will validate this agreement which shall remain in effect until cancelled, but may be revised as necessary or revoked for noncompliance.		9. AGREEMENT NUMBER: SP-02-037
		10. DATE OF AGREEMENT: 11-26-02

11. PPQ OFFICIAL (Name and Title):
Patrick McPherren
State Plant Health Director

13. SIGNATURE:


12. ADDRESS:
USDA, APHIS, PPQ
3950 N. Lewiston St., Suite 330
Aurora CO 80011-1555
(303)371-3355

14. STATE AGENCY OFFICIAL (Name and Title):
Mitch Yergert
Acting Director, Division of Plant Industry

16. SIGNATURE:


15. ADDRESS:
Colorado Department of Agriculture
700 Kipling St., Suite 4000
Lakewood CO 80125-5894
(303)239-4154



**UNITED STATES
DEPARTMENT OF
AGRICULTURE**

**Animal and Plant
Health Inspection
Service**

**Plant Protection and
Quarantine**

Soil Permit

Permit
Number: S-73685

Issued To: GPL Laboratories
(Yemane Yohannes)
7210-A Corporate Court
Frederick, Maryland 21703-8386

TELEPHONE: (301) 694-5310

Under the authority of the Federal Plant Pest Act of May 23, 1957, permission is hereby granted to the facility/individual named above subject to the following conditions:

1. Valid for shipments of soil not heat treated at the port of entry, only if a Compliance Agreement (PPQ Form 519) has been completed and signed. Compliance Agreements and Soil Permits are non-transferable. If you hold a Soil Permit and you leave your present employer or Company, you must notify your local USDA office promptly. A copy of this permit must accompany all shipments.
2. To be shipped in sturdy, leakproof, containers.
3. To be released without treatment at the port of entry to permittee or authorized user.
4. To be used only for analysis and only in the facility of the permittee at GPL Laboratories, located in Frederick, Maryland.
5. No use of soil for growing purposes is authorized, including the isolation or culture of organisms imported in soil.
6. All unconsumed soil, containers, and effluent is to be autoclaved, incinerated, or heat treated by the permittee at the conclusion of the project as approved and prescribed by PPQ.
7. This permit authorizes shipments from all foreign sources, including Guam, Hawaii, Puerto Rico, and the U.S. Virgin Islands through any U.S. port of entry.

SEPTEMBER 30, 2010
Expiration Date


Approving Official **LIA STEWART**

WARNING: Any alteration, forgery, or unauthorized use of this Federal form is subject to civil penalties of up to \$250,000 (7 U.S.C. s 7734(b)) or punishable by a fine of not more than \$10,000, or imprisonment of not more than 5 years, or both (18 U.S.C. s 1001).

U.S. Department of Agriculture - Animal and Plant Health Inspection Service - Plant Protection and Quarantine

Application for Permit to Receive Soil

INSTRUCTIONS: Type or print legibly. Complete each block. Application must have the original signature of the person accepting responsibility for complying with the provisions of the permit. Additional information may be attached on a separate sheet of paper.

1. Origin of shipment(s) <input checked="" type="checkbox"/> Hawaii or Puerto Rico <input checked="" type="checkbox"/> Various foreign countries <input type="checkbox"/> One country (Specify) _____	2. Number of shipments per year anticipated <input type="checkbox"/> One only <input checked="" type="checkbox"/> Various
	3. Quantity per shipment <input type="checkbox"/> Less than 3 lbs. <input checked="" type="checkbox"/> Over 3 lbs.

4. Method of Shipment
 Mail Baggage Air Cargo Sea Cargo Overland Other _____

5. Method of packaging (Must be sturdy and leakproof; please describe)
Soil samples in glass or plastic containers, all placed in metal ice chests, leak-proof.

6. Port(s) of arrival desired (Specify) Denver	7. Approximate date for arrival of first shipment On-going
--	--

8. If importing less than 3 lbs. per shipment, will heat sterilization at the port of arrival interfere with intended use? **N/A**
 If no, check preferred treatment Dry Heat Steam Heat

Forward completed application directly to the Permit Unit, PPO, APHIS, USDA, 4700 River Road, Unit 136, Riverdale, MD 20737, if soil is to be treated at the port of arrival.

If yes, then the facility receiving the untreated soil must be inspected and approved to receive, handle, store, and dispose of soil under the conditions of a compliance agreement established by the Agency with a person who is in a position to be responsible for the soil received by the facility under the conditions of the permit. The same person must sign this permit application in block # 14.

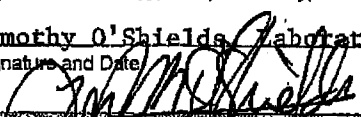
NOTE: Applications requiring facility approval must be forwarded by the applicant to the State Plant Health Director Office responsible for the State where soil is to be received. Refer to addresses on the reverse of this form.

9. Intended Use (Please provide specific information)
 Chemical or physical analysis **Testing for environmental contaminants using EPA methods.**
 As a growing medium for plants _____
 For the isolation and/or culture of organisms _____
 Other _____

10. Precautions to be used to prevent pest dissemination (Please describe)
 1) All samples are disposed in a hazardous waste facility by incineration.
 2) All samples kept in laboratory, a secure facility, at all times.
 3) Quarantine samples are tagged and kept in designated storage location.

11. Method of Final Disposition Autoclaving Incineration Other _____



Note: Please attach a detailed explanation if soil is to be moved or removed from the receiving facility without a sterilizing treatment.

12. Name and address of receiving facility STL Denver 4955 Yarrow St. Arvada, CO 80002 Telephone (303) 736-0100	13. Applicant's Name (type or print clearly) Timothy O'Shields, Laboratory Director
	14. Signature and Date  11/13/02

TO BE COMPLETED BY STATE AND FEDERAL REGULATORY OFFICIALS

Recommendation Approve Disapprove Accept USDA Decision

Conditions Recommended _____

Signature of State Official 	Title Acting Dir. S&P	State CO	Date December 3, 2002
Signature of PPO Official 	Title SP&D CO	Work Unit Arvada, CO	Date 12/02/02

CHAPTER 5 ENVIRONMENTAL PROTECTION PLAN

5.1 INTRODUCTION

5.1.1 This Environmental Protection Plan (EPP) has been prepared for the Culebra Island SI in accordance with Data Item Description (DID) MR-005-12 and the PWS. The purpose of the EPP is to ensure compliance with the National Environmental Policy Act and Army Regulation 200-2. Procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during site field activities are described below. Chapter 7 of the PWP contains general procedures that will be adhered to by the SI team.

5.1.2 The following sources were consulted for identifying environmental and cultural resources at the Culebra Island site:

- Topographic Map – U.S. Geological Survey (USGS)
- Wetlands Online Mapper – National Wetlands Inventory (NWI), U.S. Fish and Wildlife Service (USFWS)
- Threatened and Endangered Species System (TESS) – Endangered Species Program, USFWS
- National Wildlife Refuge System (NWRS) – USFWS
- Puerto Rico Department of Natural and Environmental Resources (PRDNER)
- National Park Service (NPS)
- National Register Information System (NRIS) – National Register of Historic Places (Culebra, Puerto Rico), NPS
- List of National Historic Landmarks (NHL) – National Historic Landmarks Program (Puerto Rico), NPS
- Historic Places in Puerto Rico and the Virgin Islands - NPS
- List of National Heritage Areas (NHA) – National Heritage Areas Program, NPS
- Puerto Rico Historic Preservation Office (PR SHPO)
- Garrow & Associates, Inc., 1992, *Results of the Archeological Testing and Data Recovery Investigations At the Lower Camp Site, Culebra Island National Wildlife Refuge, Puerto Rico*

- February 1995 Archive Search Report (ASR) Findings for the Culebra Island National Wildlife Refuge
- National Oceanic and Atmospheric Administration (NOAA):
 - Coastal Zone Management Program (CZMP)
 - National Marine Sanctuaries
 - National Estuarine Research Reserve System
 - Coral Reef Information System (CoRIS)
 - *Benthic Habitat Mapping of Puerto Rico and the U.S. Virgin Islands, 2002 CD-ROM*
 - *The State of Coral Reef Ecosystems of the United States and Pacific Freely Associated States: 2005- NOAA Technical Memorandum*
 - National Marine Fisheries Service
 - Caribbean Fishery Management Council
 - *Marine Managed Areas Inventory (Atlas and Table)*
 - Center for Coastal Monitoring and Assessment

5.2 ENDANGERED AND THREATENED SPECIES

5.2.1 The main island of Puerto Rico and its associated islands support 75 federally-listed threatened and endangered species consisting of 26 animals and 49 plants. Among this diverse group of fauna and flora are multiple species that are known to exist, potentially exist, or temporarily use areas within the Culebra Island, such as the migratory birds. Of the 75 federally-listed species nine are known or are suspected to occupy Culebra Island and/or the associated cays. In addition to the federally-listed species there are also 13 state-listed species known to occupy Culebra Island and/or the associated cays. The federally and state-listed species includes both terrestrial and marine life. The federally-listed species of most concern for the refuge are the Culebra Island giant anole, Virgin Islands tree boa, roseate tern, brown pelican, green sea turtle, hawksbill sea turtle, leatherback sea turtle, loggerhead sea turtle, *Leptocereus grantianus* (cactus), and Wheeler's peperomia. Due to declining populations the elkhorn and staghorn corals in the surrounding waters are proposed to be federally-listed threatened and endangered species. The federally and state-listed species that are known to exist within the Culebra Island site are presented in Table 5.1.

5.2.2 Parsons will ensure that the site visit team is versed in identifying and avoiding these species and if any are observed, care will be taken to not disturb them or their immediate habitat. Parsons will provide this species awareness training in our daily tailgate safety meetings.

5.3 SENSITIVE ENVIRONMENTS

5.3.1 According to the NWRS portions of Culebra Island and 22 of the associated cays are considered National Wildlife Refuge area. The three largest cayos are Culebrita, Cayo Norte, and Luis Pena. These resemble Culebra in that they all have sandy beaches, rugged coastline, and gentle to steep hills. Vegetation ranges from moderate to extremely dense. The smaller cays are primarily solid rock with sparse or no vegetation. A few of the smaller cays have small beaches; however, most are rugged rock all around.

5.3.2 The refuge consists of diverse sensitive habitats including wetlands, mangrove areas, coral reefs, seagrass beds, boulder forests on Mount Resaca and Cayo Luis Pena, seabird rookeries, and sea turtle nesting sites. The absence of development in refuge units protects fragile marine ecosystems from damage by erosion and sedimentation, helping to keep surrounding waters generally clear. Specific refuge areas on Culebra, Cayo Luis Pena, and Isla Culebrita are open to the public; however, most refuge lands (the cayos) are closed to the public because of their sensitive nature and potential for MEC.

5.3.3 The waters extending seaward three nautical miles from the mean high water line of Culebra are designated critical habitat for the green sea turtle. The seagrass beds in the surrounding waters are noted for the irreplaceable significance for sea turtle hatchlings and juvenile fish species. The green, hawksbill, and leatherback sea turtles each nest on beach areas during different seasons resulting in year round nesting on Culebra's beaches. Coral and sandy beaches on Cayo Luis Pena and Isla Culebrita have been designated critical habitat for hawksbill turtles.

5.3.4 The largest seabird nesting colony occurs at Peninsula Flamenco, where 60,000 sooty terns nest. This area is closed to the public because of the rookery and potential for MEC. Off shore cays provide a variety of habitat types for various species of migratory seabirds. Brackish lagoons and salt ponds which fluctuate with rainfall and tides are important areas for waterfowl and shorebirds, especially during winter migration months.

5.3.5 A fringing coral reef ecosystem near refuge cayos and along the Flamenco Peninsula supports the life cycles of multitudes of marine organisms. Coral reefs also reduce incoming wave energy, offering critical protection to coastlines during the tropical storm season. Mangrove and grass bed habitats behind the coral reefs rely on calm water provided by these effective reef barriers. There is a coral reef monitoring site just off the coast southwest of the town of Dewey.

5.3.6 The mangrove areas of the refuge form unique habitat vital for coastal wildlife. The thick mangroves form bountiful nurseries for marine life and serve as roosts and nesting sites for various birds. These vital trees also serve as a buffer by filtering sediment carried by surface water runoff from the surrounding sloping terrain, thereby protecting marine water quality.

5.3.7 The Mount Resaca and Cayo Luis Pena areas of the refuge preserve two of the few remaining blocks of dry tropical forest on Culebra. Large boulder-strewn areas of Mount Resaca comprise a park-like forest of cupey and jaguey trees with their impressive stilt roots. The boulders support orchids, bromeliads, anthuriums, and the endemic Wheeler's peperomia. These forests were once the home of the Culebra giant anole which has not been documented on the island since the 1930's. Other vegetative zones, including the thorn thickets, palm forest types, and cactus scrub associations support diverse bird and reptile species.

5.3.8 According to the PRDNER the conservation priority areas for Culebra and associated cays are as follows:

- All of the lagoons on Culebra,
- Monte Resaca,
- All beaches around Culebra,
- The designated critical habitat area for the Virgin Islands Boa,
- Flemenco Peninsula,
- Puerto del Manglar,
- Los Canos,
- Punta Soldado,
- Bahia (also called "Ensenada") Cementerio,
- All cayos and cays around Culebra,
- The Culebra National Wildlife Refuge, and
- The Canal Luis Pena Natural Reserve

5.3.9 Parsons will ensure that the SI team is versed in identifying and avoiding these sensitive areas and if any are observed, care will be taken to not disturb them. Parsons will provide this sensitive environments awareness training in our daily tailgate safety meetings.

5.4 WETLANDS

5.4.1 The USFWS Wetlands Online Mapper through the NWI was used to identify the wetlands within the Culebra Island sites. Currently, there is no wetland data available from NWI. However, the USGS topographic quadrangle map titled Culebra

and Adjacent Islands depicts wetland areas scattered along the coast line around the island. There also is brackish lagoons and salt ponds which fluctuate with rainfall and tides along the northern coast of Culebra. During the field SI effort sediment sampling will be conducted within the wetlands at Laguna Zoni and Flamenco Lagoon on Culebra and an unnamed lagoon on the west side of Culebrita.

5.4.2 During sediment sampling every effort will be made to leave the wetlands exactly as found. The field team will take the most direct route possible to the sampling location and avoid disturbing any wildlife that may be present on site. All sampling equipment will be carried on foot the sampling location or by small boat or float depending on water levels in the lagoon. All IDW that is generated while collecting sediment samples will be removed from site and disposed of in a properly as solid waste.

5.5 CULTURAL AND ARCHEOLOGICAL RESOURCES

5.5.1 According to the NRIS, NHL, NHA, and NPS there is only one registered cultural resource within the boundaries of the Culebra Island site. On the Isla Culebrita there is an historic lighthouse called Faro Isla de Culebritas. Entrance into the lighthouse is not open to the public due to the building deterioration. This cultural resource will not be disturbed during the SI efforts. According to the Puerto Rico SHPO there are no known architectural resources within the boundaries of the Culebra Island site; however, an architectural survey has not yet been conducted for Culebra. According to an archeological survey performed at Lower Camp in 1992 there is evidence of prehistoric and historic inhabitants. These archeological remnants were distributed over a half-acre area within the Lower Camp site.

5.5.2 During the SI effort care will be taken to not impact any known archeological areas or archeological remnants discovered during soil sampling. If an archeological remnant is discovered or suspected during the SI effort soil sampling will cease in that area, the coordinates will be recorded, and the proper agency will be notified.

5.6 WATER RESOURCES

5.6.1 The Island of Culebra is bordered on the north by the Atlantic Ocean and the Caribbean Sea to the south. The principal harbor is Ensenada Honda. PRDNER owns all water from the high tide mark out to nine miles. Tidal data for Culebrita Island show that tides are chiefly diurnal. The difference in height between mean higher high water and mean lower low water is approximately 1.1 foot. NOAA depth charts show water depth averaging about 70 to 90 feet in the areas surrounding Culebra and the cays. However, there are some areas reported over 130 feet deep west of the Flamenco Peninsula and east of Cayo Geniqui

5.6.2 Fresh water has always been a scarce resource, as there are no major or permanently flowing streams on Culebra. The surfacewater generally flows radially from points of recharge, as in the mountains, ridges and hills, to points of discharge, like lower

elevations, intermittent and seasonal creeks, streams, and the ocean. Normally the creeks and streams are dry and only collect and drain runoff water during rainstorms. There are about a dozen natural springs and seeps, but they are only charged after particularly wet seasons. There are some wells 10 to 20 feet deep in areas away from coastal seepage, but these wells are high in chloride concentrations and salinity. Residents of Culebra occupants get their potable water from the desalinization plant the Navy installed at the Lower Camp area.

5.6.3 During the Culebra Island site SI field effort, Parsons will not conduct any activities that discharge pollutants into waterways within, adjacent, or outside of the former training areas.

5.7 COASTAL ZONES

According to the NOAA CZMP, the site does lie within a coastal zone management area. However, Culebra Island, the associated cays, and immediate surrounding waters are not a national marine sanctuary, national marine fishery, or a national estuarine research reserve.

5.8 TREES AND SHRUBS

Trees and shrubs are covered in the PWP; however, for the Culebra Island site minimal pruning of vegetation will be conducted. Pruning of vegetation will be necessary at the Culebra Island site due to the extremely dense and impassable vegetation. The minimal pruning necessary to allow the site visit team access to sampling locations and for completion of QR will be conducted.

5.9 WASTE DISPOSAL SITES

Waste disposal policies are covered in the PWP. There are no site-specific changes for the Culebra Island site. In general, excess soil generated during sampling will be returned to the original boring and the sample location area restored as near as possible to the pre-sampling condition. Sampling equipment and other garbage generated will be collected and disposed off offsite.

5.10 IMPACT MITIGATION MEASURES

Impact mitigation measures are outlined in the PWP. There are no site-specific mitigation measures for the Culebra Island site.

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays



Common Name	Scientific Name	Federal Status	State Status
<p>Culebra Island Giant Anole</p> 	<p>Anolis roosevelti</p>	<p>Endangered</p>	<p>Critically Endangered</p>
<p>Peperomia wheeleri</p> 	<p>Peperomia wheeleri</p>	<p>Endangered</p>	<p>Endangered</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued


Common Name	Scientific Name	Federal Status	State Status
<p>(Caribbean) Brown Pelican</p> 	<p><i>Pelecanus occidentalis</i></p>	<p>Endangered</p>	<p>Endangered</p>
<p>Leptocereus grantianus (cactus-no photos available)</p>	<p><i>Leptocereus grantianus</i></p>	<p>Endangered</p>	<p>Critically Endangered</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued




Common Name	Scientific Name	Federal Status	State Status
<p>Green Sea Turtle</p> 	<p><i>Chelonia mydas</i></p>	<p>Endangered</p>	<p>Endangered</p>
<p>Hawksbill Sea Turtle</p> 	<p><i>Eretmochelys imbricate</i></p>	<p>Endangered</p>	<p>Endangered</p>
<p>Leatherback Sea Turtle</p> 	<p><i>Dermochelys coriacea</i></p>	<p>Endangered</p>	<p>Endangered</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued



Common Name	Scientific Name	Federal Status	State Status
<p>Loggerhead Sea Turtle</p> 	<p><i>Caretta caretta</i></p>	<p>Threatened</p>	<p>Threatened</p>
<p>Roseate Tern</p> 	<p><i>Sterna dougallii dougallii</i></p>	<p>Threatened</p>	<p>Threatened</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued



Common Name	Scientific Name	Federal Status	State Status
<p>Virgin Islands Tree Boa</p> 	<p><i>Epicrates monensis granti</i></p>	<p>Endangered</p>	<p>Critically Endangered</p>
<p>Ratapple (plant)</p> 	<p><i>Morisonia americana</i></p>	<p>N/A</p>	<p>Critical Element</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued



Common Name	Scientific Name	Federal Status	State Status
<p>Piriqueta viscosa (plant)</p> 	<p>Piriqueta viscosa</p>	<p>N/A</p>	<p>Critical Element</p>
<p>Aechmaea lingulata (Bromeliad plant)</p> 	<p>Aechmaea lingulata</p>	<p>N/A</p>	<p>Critical Element</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued

Common Name	Scientific Name	Federal Status	State Status
<p>Caesalpinia culebrae (flowering tree/shrub)</p> 	<p>Caesalpinia culebrae</p>	<p>N/A</p>	<p>Endemic/Critical Element</p>
<p>Stinging Bush (plant)</p> 	<p>Malpighia linearis</p>	<p>N/A</p>	<p>Critical Element</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued



Common Name	Scientific Name	Federal Status	State Status
<p>Culebrita Island Water Willow</p> 	<p><i>Justicia culebritae</i></p>	<p>N/A</p>	<p>Endemic/Critical Element</p>
<p>Ruddy Duck</p>  <p>Ruddy Duck</p>	<p><i>Oxyura jamaicensis</i></p>	<p>N/A</p>	<p>Endangered</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued



Common Name	Scientific Name	Federal Status	State Status
<p>Masked Duck</p> 	<p><i>Nomonyx dominica</i></p>	<p>N/A</p>	<p>Endangered</p>
<p>White-Cheeked Pintail</p> 	<p><i>Anas bahamensis</i></p>	<p>N/A</p>	<p>Threatened</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued





Common Name	Scientific Name	Federal Status	State Status
<p>West Indian Whistling-Duck</p> 	<p><i>Dendrocygna arborea</i></p>	<p>N/A</p>	<p>Critically Endangered</p>
<p>Least Grebe</p> 	<p><i>Tachybaptus dominicus</i></p>	<p>N/A</p>	<p>Data deficient</p>

Table 5.1 State and Federally-Listed Species Within the Culebra Island and Associated Cays, Continued

Common Name	Scientific Name	Federal Status	State Status
<p>Caribbean Coot</p> 	<p><i>Fulica caribaea</i></p>	<p>N/A</p>	<p>Threatened</p>
<p>White-Crowned Pigeon</p> 	<p><i>Patagioenas leucocephala</i></p>	<p>N/A</p>	<p>Data deficient</p>

CHAPTER 6
SITE-SPECIFIC ADDENDUM TO THE PROGRAMMATIC
ACCIDENT PREVENTION PLAN

PROGRAMMATIC WORK PLAN
SOUTHEAST AND PACIFIC IMA REGION
MILITARY MUNITIONS RESPONSE PROGRAM
FOR
CULEBRA ISLAND, PUERTO RICO

Prepared for:

U.S. ARMY CORPS OF ENGINEERS, CHARLESTON DISTRICT
AND
U.S. ARMY ENGINEERING AND SUPPORT CENTER HUNTSVILLE

Contract W912DY-04-D-0005
Delivery Order 0008

Prepared by:

PARSONS
5390 Triangle Parkway, Suite 100
Norcross, Georgia 30092

October 2006

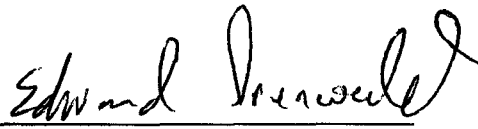
Project Manager:
Don Silkebakken, P.E.



(Signature)

10/10/2006
(Date)

Safety and Health Manager:
Ed Grunwald, CIH



(Signature)

10/10/2006
(Date)

CHAPTER 6

ACCIDENT PREVENTION PLAN

6.1 APPLICATION

The intent of this chapter is to augment the Programmatic Accident Prevention Plan (PAPP), as warranted, to present pertinent site-specific information and procedural deviations that could not be readily captured in the programmatic documents or were the result of TPP Project Team agreements requiring modifications to the preliminary SI Technical Approach (see Subchapter 1.3). It should be noted that the PAPP will accompany the SS-WP Addendum during the conduct of SI field activities.

6.2 MEDICAL SUPPORT

The PAPP documents the medical support plan for all sites associated with the Southeast and Pacific Division Range Support Center. Medical Support for the Culebra Island site visit team will be provided by the UXO Technician and the Field Team Leader, both First Aid and Cardiopulmonary Resuscitation (CPR) certified personnel. Copies of certification will be maintained by the field team onsite during the field effort and are included in Attachment 6-2 of this SS-WP Addendum. The local emergency contact numbers are listed in Table 6.1. The nearest hospital is the Culebra Community Emergency Health Center in the Town of Dewey, Culebra Island, Puerto Rico. Figure 6.1 shows the map and directions to the hospital from the site. In an emergency situation, the team will follow the guidelines set forth in the Emergency Response and Fire Prevention Plan (ERFPP) in Appendix J of the PWP.

6.3 HAZARDS AND RISKS

6.3.1 The hazards associated with tasks being performed at the Culebra Island site and the procedures that are to be employed to prevent accidents, injuries, and illness are discussed in, Attachment A, Chapter 2 of the PAPP. The potential tasks associated with the Culebra Island SI requiring a Certification of Task Hazard Assessment include the following:

- Mobilization/Demobilization;
- Sampling Collection and Packaging;
- Emergency Rescue;
- Motor Vehicle Operation; and
- Boating Operation.

All of the certifications are presented in Attachment 6-1. Any hazards not addressed in the PAPP that apply to the Culebra Island site are detailed below.

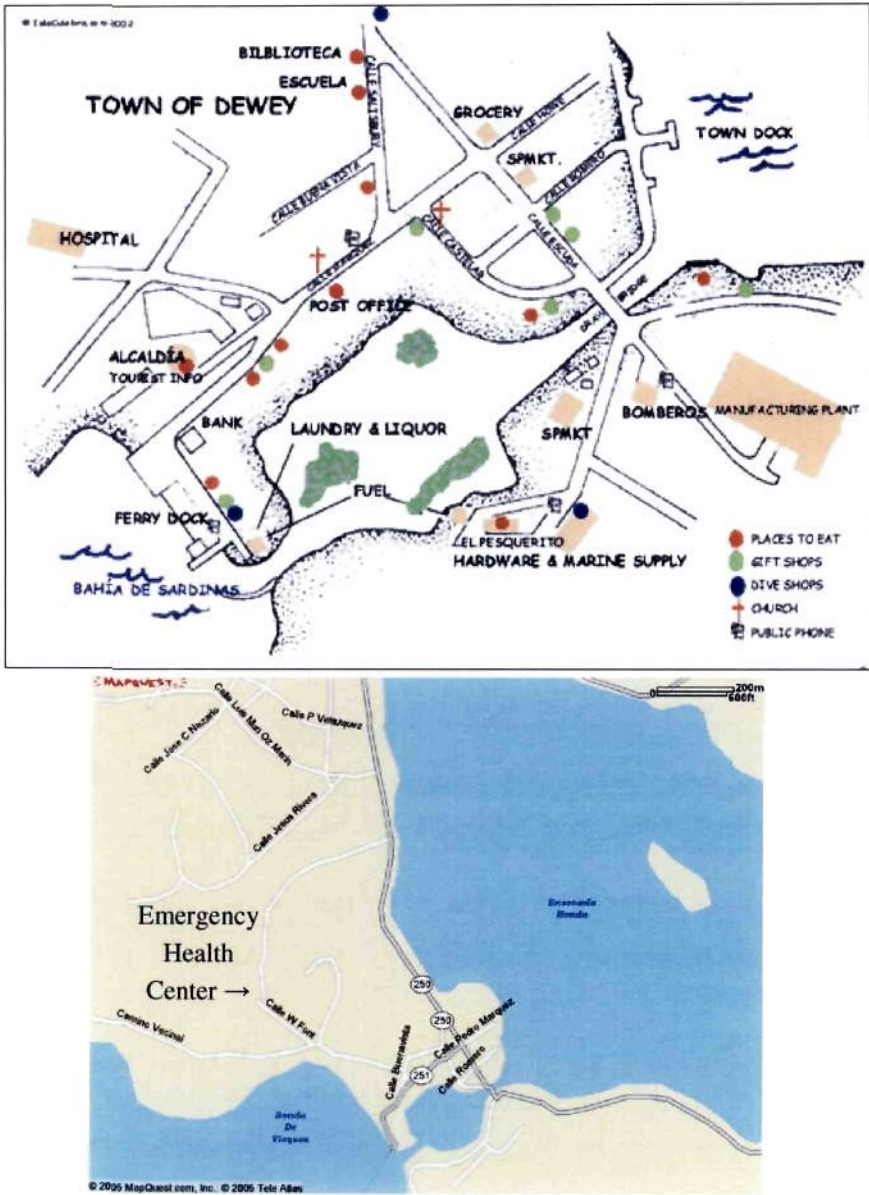
Table 6.1
Emergency Telephone Numbers
Culebra Island, Puerto Rico

Culebra Community Emergency Health Center	(787) 742-0001
Poison Control Center	1-800-222-1222
Culebra Police Department	911 (emergency) (787) 742-3501
Culebra Fire Department	911 (emergency) (787) 742-3530
U.S. Coast Guard Rescue Coordination Center, San Juan	(787) 289-2042
Project Safety and Health Manager Ed Grunwald	(678) 969-2394 (678) 429-6887 (cell)
MEC Technical Director Michael Short	(678) 969-2451
Field Team Leader Nancy Heflin	(678) 969-2362 (303) 960-8797
UXO Technician Rick White	(843) 810-0150 (cell)
CESAJ FUDS Manager / Project Manager Ricardo Vazquez	(904) 232-1649
USACE MMRP SI Project Manager Chris Cochran	(256) 895-1696 (256) 990-0888 (cell)

Figure 6.1

Driving Directions: Culebra Island site
 to
 Culebra Community Emergency Health Center
 West Front St
 Culebra, PR 00775
 (787) 742-0001

Follow local roads to the Town of Dewey via Carr 250. After reaching the town of Dewey follow Calle Pedro Marquez west toward the ferry dock. Turn right onto Calle Front. Just past the post office. Follow straight onto Calle West Front and arrive at the Culebra Community Emergency Health Center.



6.4 PHYSICAL HAZARDS

The following physical hazards may be encountered during the conduct of the SI at the Culebra Island site. Please refer to the PAPP in the PWP for details regarding these hazards.

- Underground Utility Hazards
- Severe Weather
 - High Winds
 - Heavy Rains / Flash Flooding
 - Hurricanes
 - Lightning
- Heat Stress

6.5 BIOLOGICAL HAZARDS

The following biological hazards may be encountered during the conduct of the SI at the Culebra Island site. Please refer to the PAPP in the PWP for details regarding these hazards.

6.5.1 Insect and Arachnid Bites and Stings

- Spiders;
- Bees, wasps;
- Fire Ants;
- Chiggers; and
- Ticks

6.5.2 Poisonous Plants

- Poison Ivy;
- Poison Oak;
- Poison Sumac; and
- Trumpet Vine
- Manchineel Tree (Manzanillo Tree)

Attachment 6-1
Certifications of Task Hazard Assessment

ACTIVITY HAZARD ANALYSIS


Activity: MOBILIZATION/DEMobilIZATION

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
Install/Dismantle equipment	Slips, trips, and falls	Worker shall be aware of potential slippery surfaces and tripping hazards. If power tools are necessary, extension cords shall not be permitted to traverse high traffic areas (use battery operated tools if possible). Potential slip, trip, and fall hazards will be discussed during the daily toolbox meeting.
	Cold and heat stress injuries	SSHO will implement heat stress/cold injury control program.
	Biological hazards	Workers will avoid hazardous plants, snakes, and insects. Site workers that encounter potential "Hanta Virus" locations shall adhere to procedures described in the Programmatic Site Safety and Health Plan.
	Tools	Hand and power tools shall be used in accordance with manufacturer's instructions. Hand and power tools shall be inspected, tested, and determined to be in safe operating condition before use by the operator of the tool. Tools having defects shall be taken out of service until repaired.
	Vehicle operation in work area	Site personnel operating vehicles will possess a current driver's license. A Ground guide will be used when: 1) the point of operation is not in full view of the vehicle operator, 2) when the vehicle is backed more than 100 ft, 3) when the terrain is hazardous, 4) when two or more vehicles are backing in the same area.
	Eye and Hearing protection	Level D protection will be worn while operating tools (includes safety glasses). Hearing protection will be used when noise level exceed 85dBA.
	Back injury	Proper lifting techniques will be reviewed by the SSHO. A hand truck shall be used to lift objects greater than 50lbs (two workers may be used to lift heavy objects (>50lbs) when the object can be easily gripped [i.e., have handles or grip hold]).

Equipment to be used: Common hand tools and vehicles

Inspection Requirements: All equipment will be inspected by workers prior to use. If during inspection or during use, equipment fails to function properly, the equipment shall be turned in for repair/ replacement. If power tools are used, tools designed to accommodate guards shall be equipped with such guards. All guards must be functional before tool is used.

Training Requirements: All Site personnel will be current in their OSHA HAZWOPER training (received 40-hr initial training and 8-hr refresher training within past 12 months) and be enrolled in a medical monitoring program. Operators will be trained in the safe use of required equipment and in the proper use of personal protective equipment. UXO Personnel must be certified as EOD-trained. SSHO will provide a review of proper lifting techniques and potential slip, trip, and fall hazards.

Approver Signature:  Date: 10/10/2006
 Ed Grunwald, Project Safety and Health Officer

ACTIVITY HAZARD ANALYSIS

Activity: SAMPLE COLLECTION AND PACKAGING

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
Surface soil collection	Contact with hazardous chemicals	All personnel will don a modified level D ensemble. Personnel will be familiar with the potential chemical hazards that may be encountered during soil sampling.
	Unplanned Detonation	UXO awareness training provided by SSHO. Only UXO technicians will handle MEC items. Intrusive operations will stop if MECs are encountered (only UXO technician has expertise to examine or confirm MEC).
	Slips, trips, and falls	Worker shall be awareness of potential slippery surfaces and tripping hazards. Potential slip, trip, and fall hazards will be discussed during the daily toolbox meeting.
	Cold and heat stress injuries	SSHO will implement heat stress/cold injury control program.
	Hand tools	The tool users will inspect the tools that they will use. No damaged equipment will be used until repaired or replaced.
	Biological hazards	Site personnel that encounter biological hazards will adhere to procedures described in this plan, and take precautions to prevent injuries from biological hazards. Site workers that encounter potential "Hanta Virus" locations shall adhere to procedures described in the Programmatic Site Safety and Health Plan.
	Back injury	Workers will be instructed in proper shoveling and auguring techniques. A hand truck shall be used to lift sample containers greater than 50lbs (two workers may be used to containers (>50lbs) when the objects can be easily gripped [i.e. have handles or grip hold]).
Surface water sample collection	Contact with hazardous chemicals	All personnel will don a modified level D ensemble. Personnel will be familiar with the potential chemical hazards that may be encountered during surface water sampling.
	Unplanned Detonation	UXO awareness training provided by SSHO. Only UXO technicians will handle MEC items.
	Slips, trips, and falls	Worker shall be awareness of potential slippery surfaces and tripping hazards. Potential slip, trip, and fall hazards will be discussed during the daily toolbox meeting.
	Cold and heat stress injuries	SSHO will implement heat stress/cold injury control program.
	Hand tools	Sampling tools shall be used, inspected and maintained in accordance with manufacturer's instructions. No damaged equipment will be used until repaired or replaced. Personnel shall be familiar with proper operation of equipment.

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
	Biological hazards	Site personnel that encounter biological hazards will adhere to procedures described in this plan, and take precautions to prevent injuries from biological hazards. Site workers that encounter potential "Hanta Virus" locations shall adhere to procedures described in the Programmatic Site Safety and Health Plan.
	Back injury	Proper lifting techniques will be reviewed by the SSHO. A hand truck shall be used to lift sample containers greater than 50lbs (two workers may be used to containers (>50lbs) when the objects can be easily gripped [i.e. have handles or grip hold]).
	Boating accident	Personnel collecting samples from a boat shall utilize a Type III, Type V work vests, or better U.S. Coast Guard approved international orange personal flotation device in addition to appropriate dermal protection and PPE (gloves, non-slip boots, and safety goggles,). Samplers will be familiar with the proper operation of the boat. Passengers will remain seated will boat is being operated. Sampling operations will only occur during daylight hours. Manually operated boats shall not be used where waters are rough or swift. Boats will be inspected prior to each use.
Sediment Sampling	Contact with hazardous chemicals	All personnel will don a modified level D ensemble. Personnel will be familiar with the potential chemical hazards that may be encountered during sediment sampling.
	Unplanned Detonation	UXO awareness training provided by SSHO. Only UXO technicians will handle MEC items.
	Slips, trips, and falls	Worker shall be awareness of potential slippery surfaces and tripping hazards. Potential slip, trip, and fall hazards will be discussed during the daily toolbox meeting.
	Cold and heat stress injuries	SSHO will implement heat stress/cold injury control program.
	Back injury	Proper lifting techniques will be reviewed by the SSHO. A hand truck shall be used to lift sample containers greater than 50lbs (two workers may be used to lift containers (>50lbs) when the objects can be easily gripped [i.e. have handles or grip hold]).
	Hand tools	Sampling tools shall be used, inspected and maintained in accordance with manufacturer's instructions. No damaged equipment will be used until repaired or replaced. Personnel shall be familiar with proper operation of equipment.

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
	Boating accident	Personnel collecting samples from a boat shall utilize a Type III, Type V work vests, or better U.S. Coast Guard approved international orange personal flotation device in addition to appropriate dermal protection and PPE (gloves, non-slip boots, and safety goggles). Samplers will be familiar with the proper operation of the boat. Passengers will remain seated will boat is being operated. Sampling operations will only occur during daylight hours. Manually operated boats shall not be used where waters are rough or swift. Boats will be inspected prior to each use.
Groundwater sample	Contact with hazardous chemicals	All personnel will don appropriate dermal protection and PPE (i.e. gloves, eye protection, etc). Personnel will be familiar with the hazards associated with potential chemical that may be encountered in soils.
	Slips, trips, and falls	Worker shall be awareness of potential slippery surfaces and tripping hazards. Potential slip, trip, and fall hazards will be discussed during the daily toolbox meeting.
	Hand tools	Hand tools shall be used, inspected and maintained in accordance with manufacturer's instructions. No damaged equipment will be used until repaired or replaced. Personnel shall be familiar with proper operation of tool.
	Back injury	Proper lifting techniques will be reviewed by the SSHO. A hand truck shall be used to lift sample containers greater than 50lbs (two workers may be used to lift containers (>50lbs) when the objects can be easily gripped [i.e. have handles or grip hold]).
	Biological hazards	Site personnel that encounter biological hazards will adhere to procedures described in this plan, and take precautions to prevent injuries from biological hazards. Site workers that encounter potential "Hanta Virus" locations shall adhere to procedures described in the Programmatic Site Safety and Health Plan.
	Cold and heat stress injuries	SSHO will implement heat stress/cold injury control program.
Sample packaging	Contact with hazardous chemicals	All personnel will don appropriate dermal protection and PPE (i.e. gloves, eye protection). Personnel will be familiar with the hazards associated with chemical that may be encountered (sample preservatives, solvents, UXO constituents).
	Biological hazards	Site personnel that encounter biological hazards will adhere to procedures described in this plan, and take precautions to prevent injuries from biological hazards. Site workers that encounter potential "Hanta Virus" locations shall adhere to procedures described in the Programmatic Site Safety and Health Plan.
	Back injury	Proper lifting techniques will be used during debris removal. A hand truck shall be used to lift objects greater than 50lbs (two workers may be used to lift heavy objects (>50lbs) when the object can be easily gripped [handles]).
	Hand tools	The tool users will inspect the tools that they will use. No damaged equipment will be used until repaired or replaced. Personnel shall be familiar with proper operation of tool.

Equipment to be used: shovel, hand auger, boat, samplers

Inspection Requirements: An inspection of PPE by workers will be conducted before each use. Equipment will be inspected daily by workers prior to use in accordance with the manufacturer's instructions. If during inspection or during use, equipment fails to function properly, equipment is to be turned in for repair/replacement.

Training Requirements: All on-site personnel will be current in OSHA training in accordance with 29 CFR 1910.120 (HAZWOPER), and be enrolled in a medical monitoring program in accordance with 29 CFR 1910.120(f). UXO Personnel must be certified as EOD-trained. If boats are used for surface water sampling personnel shall be familiar with the proper operation of the vessel. Personnel in charge of packaging and shipping will have completed DOT Hazmat packaging and shipping training.

Approver Signature: _____



Date: 10/10/2006

Ed Grunwald, Project Safety and Health Officer

ACTIVITY HAZARD ANALYSIS

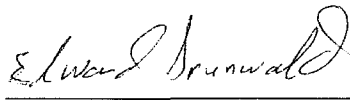
Activity: EMERGENCY RESCUE

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
Treat injured personnel	Contact with blood borne pathogen	At least two members of field team will be current in their CPR/First aid training. First aid/CPR trained personnel will be familiar with the blood borne pathogen program and will utilize appropriate PPE when handling injured personnel. CPR/First aid trained personnel shall be familiar with emergency response procedures and the location of the nearest medical center.
	Slips, trips, and falls	Worker shall be awareness of potential slippery surfaces and tripping hazards. Potential slip, trip, and fall hazards will be discussed during the daily toolbox meeting.
	Cold and heat stress injuries	SSHO will implement heat stress/cold injury control program.
	Biological hazards	Site personnel have received blood-borne pathogen training during site-specific training.

Equipment to be used: First aid kit

Inspection Requirements: At least one Type II, 16unit first aid kit will be available onsite. The first aid kit will be inspected daily to ensure that it is fully stocked.

Training Requirements: At least two members onsite will hold current certification in first aid and CPR. CPR/First aid trained personnel will also be current in OSHA training in accordance with 29 CFR 1910.120 (HAZWOPER), and be enrolled in a medical monitoring program in accordance with 29 CFR 1910.120(f). CPR/First aid trained personnel will also receive UXO awareness as a component of their site-specific training.

Approver Signature:  Date: 10/10/2006
 Ed Grunwald, Project Safety and Health Officer

ACTIVITY HAZARD ANALYSIS

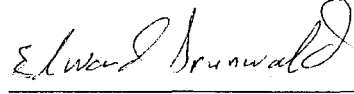
Activity: MOTOR VEHICLE OPERATIONS

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
Pre-operations inspection	Failure to identify and correct mechanical problems that may degrade vehicle safety	Prior to operation of vehicle. The driver shall check, at a minimum, brakes, steering mechanism, seat and shoulder belts, lights, signals, wipers, horn, back-up alarm (if applicable), mirrors, glass, and fluids. If cargo is being transported, restraints to prevent movement shall be employed. Vehicles with safety/ mechanical problems shall be removed from service until repaired.
Safe operation of vehicle.	Accident	Vehicle operator shall possess a current valid driver's license for the equipment being used. Seat belts and shoulder restraints shall be used by all vehicle occupants. Operator will obey posted speed limit and be vigilant for unsafe road conditions (reduced speed during rain or snow storms).
Vehicle Maintenance and Repair	Improper vehicle maintenance or repair	Vehicle maintenance and repair shall be performed IAW manufacturer's instruction and schedule. Maintenance and repairs are only to be performed by qualified mechanics.

Equipment to be used: Automobile or pick-up truck.

Inspection Requirements: Vehicles will be inspected daily by the operator to ensure that the vehicle is in safe operating condition and free of apparent damage that could cause failure while in use.

Training Requirements: All vehicle operators will receive defensive driving training. Operators will be current in OSHA training in accordance with 29 CFR 1910.120 (HAZWOPER), and be enrolled in a medical monitoring program in accordance with 29 CFR 1910.120(f).

Approver Signature:  Date: 10/10/2006
 Ed Grunwald, Project Safety and Health Officer

Vehicle Inspection Checklist

Vehicle Inspection, ON-SITE			
This form must be filled out for any motor vehicle.			
DRIVERS NAME		LICENSE NUMBER	
COMPANY			
TYPE OF VEHICLE		VEHICLE NUMBER	
INSPECTION DATE/TIME		INSPECTOR	
PART INSPECTED	SAT.	UNSAT.	COMMENT
HORN			
STEERING SYSTEM			
WIPERS			
COUPLING DEVICE (IF APPLICABLE)			
MIRRORS			
FIRE EXTINGUISHERS (10 ABC, 2 EACH)			
FUILDS (OIL, WIPER, COOLANT)			
REFLECTORS			
EMERGENCY FLASHERS			
LIGHTS			
ELECTRIC WIRING			
FUEL SYSTEM			
EXHAUST SYSTEM			
BRAKE SYSTEM			
SUSPENSION			
CARGO SPACE/ CARGO RESTRAINS			
TIRES, WHEELS, RIMS			
TAILGATE			
SEAT / SHOULDER BELTS			
INSPECTION RESULTS (INSPECTOR INITIALS)			
ACCEPTED:			
REJECTED:			
REMARKS			
INSPECTORS SIGNATURE/DATE			

ACTIVITY HAZARD ANALYSIS


Activity: **BOATING OPERATIONS**

Principal Steps	Potential Safety/Health Hazards:	Recommended Controls
Transportation of personnel/equipment	Capacity of Boat	Do not exceed the passenger or weight limits as designated on Capacity Plate of vessel. The number of personnel on boat shall not exceed the number of personal floatation devices (PFD) aboard. Distribute the load evenly fore and aft as well as either side of vessel. Fasten gear to prevent shifting or missile hazards. Personnel will have boating safety briefing prior to boarding. No smoking on boat. All open cabin launches or motorboats will be equipped with "kill switches".
	Float Plan (required if boating activity to exceed 4 hours in length).	Plan to be filed with field team leader or SI Project Manager including the following information: A. Vessel information (make/model of boat), B. Personnel on-board, C. Activity to be performed, D. Expected time of departure, route and expected time of return, and E. Means of communication.
	Cold and heat stress injuries	SSHO will implement heat stress/cold injury control program.
	Slips, trips, and falls	Worker shall be aware of potential slippery surfaces and tripping hazards. Water fuel should be mopped or wiped up when possible. Potential slip, trip, and fall hazards will be discussed during the daily toolbox meeting.
	Man Overboard	Prior to leaving dock ensure that there is one PFD for each boat member. While underway all personnel will remain seated, no standing in boat.
	Mooring	Observe Skippers instructions. Remain seated while mooring. Designated personnel to secure mooring lines to chocks, once secure, personnel will disboard boat one at a time, members on dock w to assist others with equipment while disboarding. Untie mooring lines from chocks and toss on boat deck and away from skipper and/or crew
	Fueling	Prior to refueling, close all hatches. No smoking is permitted while refueling and turn off engine. At a minimum, water craft that are less than 26 feet in length will have one fire extinguisher, if craft is 26 feet or more in length two fire extinguishers are required. Check for spilt fuel, if found clean up immediately.

Equipment to be used: Type I life preservers (1/passenger or crew), Fire extinguisher, cell phones and/or two way radios, air horn, GPS, gaff hook.

Inspection Requirements: All PFDs will be inspected by crew prior to leaving dock. Fire extinguishers to be inspected at least on a monthly basis.

Training Requirements: Skipper will be familiar with federal boating regulations.

Approver Signature: 

Date: 10/10/2006

Ed Grunwald, Project Safety and Health Officer

**Attachment 6-2
CPR/First Aid Certifications**

Field Team Leader CPR/First Aid*

CPR and AED
For Lay Rescuers in the
Community and Workplace

Nancy Heflin

has successfully completed and competently performed the
required knowledge and skill objectives for a course in:

Adult CPR/AED **CHAMCP/AED** Infant CPR

(Knowledge and skill not assessed if crossed out above)

American Safety & Health Institute
an association of professional safety and health educators

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A WORLD OF EXPERIENCE
in health and safety at your service

2005
Issue 2, 2005/06

Basic Life Support
for the Community and Workplace

ASHI APPROVED CERTIFICATION CARD

David Castaldini
(Last name, first name, middle initial)

(Signature)
Holder's Signature

Aug. 7, 06 **Aug. 7, 08**
Date Completed Expiration Date

770-654-2491 **Southern Safety**
Training Center Phone No. Training Center Name

Successful completion of this card holder has met objective knowledge and skill objectives of the course and the satisfaction of an ASHI authorized instructor. Successful completion does not guarantee future performance nor imply state certification or licensure. Program content is based upon American Heart Association's, Inc. Guidelines for CPR and ECC (Current on 03/08) and other evidence-based treatment recommendations. Rate this program online at www.ashiweb.org or call (800) 248-5101.

Basic First Aid
For First Aid Providers
in the Community and Workplace

Nancy Heflin

has successfully completed and competently performed the
required knowledge and skill objectives for a course in:

Professional First Aid Adult First Aid **Universal First Aid**

(Knowledge and skill not assessed if crossed out above)

American Safety & Health Institute
an association of professional safety and health educators

St John
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in health and safety at your service

2005
Issue 2, 2005/06

Basic Life Support
for the Community and Workplace

ASHI APPROVED CERTIFICATION CARD

David Castaldini
(Last name, first name, middle initial)

(Signature)
Holder's Signature

770-654-2419 **Southern Safety**
Date Completed Training Center Name

Aug. 7, 06 **Aug. 7, 08**
Expiration Date Training Center Phone No.

Successful completion of this card holder has met objective knowledge and skill objectives of the course and the satisfaction of an ASHI authorized instructor. Successful completion does not guarantee future performance nor imply state certification or licensure. Program content is based upon recommendations of the 2005 National Fire Protection Association's (NFPA) Fire Protection Handbook (NFPA 1001) and other evidence-based treatment recommendations. Rate this program online at www.ashiweb.org or call (800) 248-5101.

Sampling Lead CPR/First Aid*



Together, we can save a life

This recognizes that
ERICH STEDMAN
has completed the requirements for
**COMMUNITY FIRST AID AND
SAFETY**
conducted by
Mississippi Gulf Coast
Date completed **03/29/2006**
The American Red Cross recognizes this certificate
as valid for **3** year(s) from completion date.



Together, we can save a life

This recognizes that
ERICH STEDMAN
has completed the requirements for
ADULT, INFANT AND CHILD CPR
conducted by
Mississippi Gulf Coast
Date completed **03/29/2006**
The American Red Cross recognizes this certificate
as valid for **1** year(s) from completion date.

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APPENDIX A
TPP DOCUMENTATION



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Technical Project Planning Memo:

Subject: FUDS Military Munitions Response Program (MMRP) Documentation of Technical Project Planning Team Concurrence for Site Inspection Phase

Site: *Culebra Island FUDS, I02PR0068, Culebra Island, PR*

Contract: Contract Number W912DY-04-D-0005, Delivery Order 0008

This document is intended to record the conduct of Technical Project Planning (TPP) for the *Culebra Island* site. The Project Team members listed below indicated concurrence with the Site Inspection (SI) Technical Approach as developed during the TPP meetings held in the U.S. Army Corps of Engineers (USACE) Jacksonville District (CESAJ) office in San Juan, PR on February 28, 2006 and at the US Fish and Wildlife Service (USFWS) office in Culebra, PR on March 1, 2006. An initial Technical Approach (as presented) was developed using the collaborative experience of Parsons and USACE technical experts in conjunction with available site information to include the 1991 Inventory Project Report (INPR), 1995 Archives Search Report (ASR) and associated documentation, 1995 Time Critical Removal Action (TCRA), 1997 Engineering Evaluation/ Cost Analysis (EE/CA), 2004 ASR Supplement, 2005 INPR, 2005 Supplemental ASR, and other pertinent documents and interviews. The Project Team discussed and refined the initial Technical Approach during the course of the TPP meeting yielding a Final Technical Approach for implementation at the *Culebra Island* site. The Project Team's agreed upon Final Technical Approach is documented herein and detailed in the Draft Site-Specific Work Plan (SS-WP). The Draft SS-WP has been submitted to the Project Team members for review to ensure the key aspects of the TPP Meeting resolutions were fully captured. The details of the TPP meeting are included in this TPP Memorandum document to include sample location maps, revised TPP Worksheets, and revised Conceptual Site Model (CSM).

The *Culebra Island* site, comprised of approximately 7,300 acres, was utilized as a Navy and Marines training area for aerial bombing, ground maneuvers, artillery, torpedo, and mortar firing intermittently from 1903 to 1975. Munitions known to have been used on site include:

- Small Arms, .30 cal, .45 cal, and .50 cal;
- 25 lb to 2000 lb general purpose High Explosive (HE) bombs and various practice bombs;
- 5-inch Zuni and Practice, 2.75-inch HE, 11.75-inch Tiny Tim Rocket;
- Submarine Mines and Navy General Torpedo;



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- 20mm HE Incendiary (HEI), 37mm, 40mm, 75mm, 81mm, 105mm HE, 155mm, 3-inch, 5-inch, 6-inch HE, 7-inch, 8-inch, 12-inch, and 16-inch Armor Piercing (AP); and
- 3-inch HE and Practice, 4.2-inch HE mortar.

Training was not limited to a single area and land use for each area varied for different time periods. While several portions of the island and cays have known impact areas with confirmed Munitions and Explosives of Concern (MEC), other areas were identified as likely containing MEC. Historical documents identified many areas where MEC is likely to be found. Because of extensive military use of Culebra and the surrounding cays the project team identified only three areas where training would not have occurred. These areas include the cantonment area at Lower Camp, the hillside just northwest of the town of Dewey and the south side of Culebrita near the historic light house. These features were present throughout the time period of military use; therefore, it is unlikely that these areas would contain munitions related contamination.

Based on the existing body of data for this site the SI primary project objective (recommend No Department of Defense Action Indicated (NDAI) or Remedial Investigation/Feasibility Study (RI/FS) is already known. Due to the confirmed presence MEC in several of the project areas, suspect MEC presence in the remaining areas, and the presence of potentially complete exposure pathways in most of the areas, it was agreed by the Project Team that at this time the SI approach for the *Culebra Island* site will proceed in a manner to support a focused follow-on RI/FS. A time critical removal action (TCRA) will be recommended by the site visit team for any area of the site if evidence to support such an action is identified during the SI field effort. If a TCRA recommendation is made it will be done shortly after or during the field work and the recommendation will also be documented in the SI report.

The Project Team has agreed that the SI data collection efforts will focus on placement of Munitions Constituent (MC) sampling locations in and around areas that represent the highest likelihood for the presence of MC contamination, such as the target or impact areas. Ambient sample locations were also selected, in areas believed to be free of MC contamination, to provide data for comparison of metals concentrations in cases where metals exceed the established screening criteria.

Twenty-five shallow (4 to 6 inches) soil samples and four shallow sediment samples will be collected from site locations agreed to by the Project Team with maximum bias as discussed above. Three additional soil samples were selected to be representative of ambient conditions. The enclosed CSM Map depicts the locations selected by the Project Team during the TPP meeting. Given the lack of accessible water source pathways, collection of water samples (either groundwater or surface water) was not deemed warranted by the Project Team at the SI phase. All samples, except sample #13, (inclusive of those selected for ambient purposes) will be analyzed for MC compounds to include explosives constituents and metals. Sample #13 will be analyzed for lead and antimony only to screen for MC associated with the small arms range located near the airport. In the absence of MC contamination (based on comparison to agreed upon soil



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screening levels and ambient sample comparison) the Project Team concurs that additional MC sampling during the RI/FS may not be warranted.

Qualitative Reconnaissance (QR) will be conducted to primarily focus on known impact areas but will also include representative areas outside the primary impact areas to further evaluate the presence of MEC. The QR will implement the use of Minelab Metal Detectors (or equivalent), global positioning systems (GPS), personal data assistants (PDAs), and digital photography in an integrated format. The QR and MC field effort will be conducted so as to minimize any inconvenience to activities planned by the landowners, as well as endangered species that may be present on the property. Procedural details of the field work are provided in a Draft Site-Specific Work Plan ([SS-WP], an addendum to the Programmatic Work Plan [PWP]). The U.S. Army Corps of Engineers, Jacksonville District will secure the Rights-of-Entry (ROE) from the property owners to allow access for QR and sampling.

The Reserve Forces Facilities Authorization Act of 1974 prohibits federal funding for the clean up the Flamenco Peninsula portion of Culebra Island (Figures 1 and 2). Section 204(c) of the Act, referred to as public law 93-166, addressed the use of federal funds for environmental cleanup on Culebra Island:

Notwithstanding any other provisions of law, the present bombardment area on the island of Culebra shall not be utilized for any purpose that would require decontamination at the expense of the United States. Any lands sold, transferred, or otherwise disposed of by the United States as a result of the relocation of the operations referred to in subsection (a) [ship-to-shore and other gun fire and bombing operations of the U.S. Navy] may be sold, transferred, or otherwise disposed of only for public park or public recreational purposes.

The SI will not be conducted on the portion of Culebra (Northwest Peninsula) referred to in PL 93-166 and shown on Figures 1 and 2.

In addition to the Project Team determinations stated above, the following issues and resolutions are noted:

- The Project Team concurs with the Technical Approach (anticipated RI/FS) as revised at the TPP meeting on February 28, 2006 inclusive of number, type, and location of samples, as well as sampling methodology and laboratory analyses. A total of 28 surface soil samples and 4 sediment samples will be collected. Three of the twenty-eight surface soil samples (#16, #22, and #27, as depicted on the CSM) are planned to be used as ambient samples for comparison of metals. The Project Team concurs that the site does not support accessible groundwater; thus collection of samples from these media was not deemed warranted at the SI phase.
- The Project Team agrees that the exact soil sampling locations will be left to the professional judgment of the Field Team after navigating to the location depicted on the SS-WP Addendum maps. The sampling locations will serve as a starting point to assist the Field Team in finding conditions indicative of MEC and MC

contamination and will represent the fallback sample location in the absence of biased field locations.

- A windshield tour of the site location was conducted on March 1, 2006. Significant vegetation is noted in most areas. Topographically the site contains steep sea cliffs, moderate hills, and significant rock accumulations. Vegetation is extremely restrictive with dense underbrush including hardwood trees and thorned bushes. Some pruning will be required for the Field Team to access soil sample locations. Access to this site is obtained by unimproved roads requiring four-wheel drive vehicles. Satellite phones will be employed by the field team as cell phone communication is sporadic at best. Photographs of site conditions were taken and will be presented in the SS-WP Addendum. Due to the proximity of the site to the ocean, significant winds were also noted and will require the field team to dress accordingly. Soil is present across the majority of the site thus collection of soil samples will be in accordance with the PWP.
- The Project Team concurs with the use of EPA Region IX residential soil PRGs for explosives (post meeting discussion with PREQB resulted in a decision to use only EPA Region IX PRGs because Region II does not have established Soil Screening Criteria). A table presenting these values will be included in the SS-WP. Metals concentrations will be compared to site ambient metals concentrations obtained from the three samples (#16, #22 and #27) collected from outside of the impact areas. The Commonwealth of Puerto Rico background metals information will not be used for comparison due to differences in the geology of Culebra and that of Puerto Rico.
- The likelihood of elevated metals concentrations in soil samples was recognized by PREQB due to the presence of volcanic rock and soil. Therefore, elevated metals concentrations will not necessarily signify the need for additional sampling or RI/FS by itself but will be evaluated in conjunction with other SI findings.
- The Project Team agreed that no ocean water areas would be investigated as part of the SI. The SI will only evaluate land portions of the site; however the SI will recommend that a detailed study of the hazards associated with MEC presence in the ocean be evaluated as part of the RI/FS.
- The TPP Project Team agreed that analysis of groundwater for MC and the presence of perchlorate should not be conducted as part of this SI. Human exposure pathways to groundwater are not complete. There are no wells onsite or in the vicinity of the site. Due to the small size and annual desiccation of most surface water bodies on the island, the Project Team believes that it is more likely that potential MC contamination would be present in lagoon sediment and not in the water itself. Four sediment samples from lagoons in Project Areas 04, 05 and 07 will be collected in lieu of collecting water samples from standing water, natural springs, or wells.



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- The Project Team did not identify any site specific issues requiring an expedited project schedule or document reviews for this site.

All QR and MC results will be fully documented in a SI Report for the Project Team and other stakeholder review. The SI Technical Approach described above will not be modified without consultation and agreement by the Project Team whose names appear below.

Mr. Ricardo Vazquez
USACE, Jacksonville District
FUDS Project Manager

Ms. Yarissa Martinez
Puerto Rico EBQ
Project Manager

Ms. Chris Cochran
USACE MMRP SI Project Manager
Southeast and Pacific Geographic Region

Ms. Susan Silander
US Fish and Wildlife Service

Mr. Mike Gooding
USACE MMRP SI Technical Manager
Southeast and Pacific Geographic Region

Mr. Felix Lopez
US Fish and Wildlife Service

Ms. Heidi Novotny
USACE, HTRW CX
FUDS TPP Facilitator

Ms. Migdalia Martinez
USACE Real Estate Section

Mr. Bill Veith
USACE, MM CX
FUDS TPP Facilitator

Mr. Don Silkebakken
Parsons
Program Manager

Mr. Ivan Acosta
USACE, Jacksonville District

Ms. Laura Kelley
Parsons
Deputy Program Manager

Mr. Noel Acevedo Mindez
USACE Jacksonville District
Legal Counsel

Ms. Nancy Heflin
Parsons
Field Team Leader

TPP Team		EM 200-1-2, Paragraph 1.1.1	
Decision Makers			
Customer	USACE Jacksonville District (CESAJ)		
Project Manager	Ricardo Vazquez, CESAJ		
Regulators	Puerto Rico Environmental Quality Board (EQB), Yarissa Martinez		
Primary Stakeholders	Municipality of Culebra, US Fish and Wildlife Service (USFWS), Puerto Rico Department of Natural Resources (DNR), Commonwealth of Puerto Rico, Puerto Rico Port Authority		
Data Types	Data Users	Data Gatherer	
Demographics/Land Use	Risk, Responsibility, and Compliance Perspectives	Parsons (Senior Scientist, Risk Specialist)	
Site Conditions	Remedy Perspective	Parsons (Geologist, Senior Scientist)	
Munitions and explosives of concern (MEC)	Risk and Remedy Perspectives	Parsons (UXO Technician III or higher, Risk Specialist, Senior Scientist)	
Munitions constituents (MC)	Risk and Remedy Perspectives	Parsons (Chemist, Risk Specialist, Senior Scientist)	
Archaeology	Compliance and Remedy Perspectives	CESAJ, Parsons (Staff Scientist, Senior Scientist)	
Endangered Species	Risk and Compliance Perspectives	CESAJ, Parsons (Staff Scientist, Risk Specialist)	
CUSTOMER'S GOALS		EM 200-1-2, Paragraph 1.1.2	
Area of Concern (AOC)	Contaminant Issues	Future Land Use	Site-specific Closeout Goal (if applicable)
Project Area 02	MC/MEC	1, 2, 5	TBD
Project Area 03 (Water Area)	MC/MEC	1	TBD
Project Area 04	MC/MEC	1, 2, 3, 4, 5	TBD
Project Area 05	MC/MEC	1, 2	TBD
Project Area 06	MC/MEC	1, 2	TBD
Project Area 07	MC/MEC	1, 5	TBD
Project Area 08	MC/MEC	1, 2	TBD
Project Area 09	MC/MEC	1, 2	TBD
Project Area 10	MC/MEC	1, 2	TBD
Project Area 11	MC/MEC	1, 2	TBD
Project Area 12 (Water Area)	MC/MEC	1, 5	TBD
Project Area 13	MC/MEC	1, 5	TBD
Project Area 14	MC/MEC	1, 2	TBD
1 Recreational, 2 Residential, 3 Commercial, 4 Industrial, 5 Wildlife			
Site Closeout Statement			
The site will be as safe as possible for humans, the environment, and the anticipated future land use with respect to munitions and explosives of concern (MEC) and munitions constituents (MC).			
Customer's Schedule Requirements			
Site Inspection and Reporting Complete by March, 2007			
Customer's Site Budget			
Site Inspection and Reporting: Fully Funded through SI			

IDENTIFY SITE APPROACH		
EXISTING SITE INFORMATION & DATA EM 200-1-2, Paragraph 1.1.3 and 1.2.1		
Attachment(s) to Phase I TPP Memorandum	Located at Repository	Preliminary Conceptual Site Model
Preliminary Assessment (Archives Search Report [ASR] #1, ASR #2, ASR Supplement, EE/CA)	Municipality of Culebra offices and PIRS website	No
Site-Specific SI Work Plan	Final will be added to repository at Municipality of Culebra offices.	Yes
POTENTIAL POINTS OF COMPLIANCE EM 200-1-2, Paragraph 1.2.1.3		
Determination of absence or presence of MEC/MC		
If MC is detected, comparison against background levels and Soil Screening Levels (SSLs) as identified in "Site Constraints and Dependencies" below to determine if further MC evaluation during RI/FS is warranted.		
Avoidance of sensitive conditions: wetlands, endangered species, archaeological sites		
MEDIA OF POTENTIAL CONCERN EM 200-1-2, Paragraph 1.2.1.4		
Qualitative review of MEC presence.		
Quantitative screening of MC in soil and/or sediment		
SITE OBJECTIVES EM 200-1-2, Paragraph 1.2.2		
Collection of sufficient MC data to determine if concentrations warrant further study or action, based on applicable comparison criteria.		
Eliminate from further consideration those releases that pose no significant threat to public health or the environment.		
Collection of sufficient data to perform MRSPP scoring and EPA to conduct MC-related HRS		
Completion of the SI.		
<i>See Programmatic and Site-Specific Work Plan</i>		
<i>See Attached Worksheets Developed by the Project Team</i>		
REGULATOR AND STAKEHOLDER PERSPECTIVES EM 200-1-2, Paragraph 1.2.3		
Regulators	Community Interests	Others
1) EQB concerned that Agent Orange may have been used on Cayo Lobo	1) The wildlife refuge is concerned about the effects of intrusive activities on managed plant and animal species	1) Flamenco Peninsula is highest level of concern for the community but it is not being addressed.
2) EQB noted that even though they are absent at this TPP meeting #1, other agencies they should still afford the opportunity to participate.	2) One meter clearance on beach for sea turtle nests and relocating sea turtle nests.	
PROBABLE REMEDIES EM 200-1-2, Paragraph 1.2.4		
Removal Action following RI/FS characterization		
Institutional Controls following RI/FS characterization		
NDAI		
EXECUTABLE STAGES TO SITE CLOSEOUT EM 200-1-2, Paragraph 1.2.5		
Site Inspection (SI)		
Remedial Investigation/Feasibility Study (RI/FS)		
Proposed Plan		
Decision Document		
Remedial Design (RD)		
Remedial Action (as necessary)		
5-year Review		
Time Critical Removal Action (as required)		

IDENTIFY CURRENT PROJECT		
SITE CONSTRAINTS AND DEPENDENCIES		EM 200-1-2, Paragraph 1.3.1
<u>Administrative Constraints and Dependencies</u>		
Rights of Entry (ROE)		
Cultural Resources		
Funding beyond the SI		
Concurrent planning programs		
Scheduling		
<u>Technical Constraints and Dependencies</u>		
Property owner/leaseholder site activities (Site access)		
MEC avoidance screening of MC sample locations for safety		
Cultural Resources		
Topography/vegetation		
Environmentally sensitive areas		
<u>Legal and Regulatory Milestones and Requirements</u>		
Consistent with CERCLA and NCP		
Public, stakeholder and regulatory involvement and review of key documents (see schedule)		
Funding beyond the SI		
Soil screening levels as agreed upon by the Project Team to include the EPA Region IX Residential PRGs.		
CURRENT EXECUTABLE STAGE		EM 200-1-2, Paragraph 1.3.3
TPP Technical Memorandum		
Site-Specific Work Plan		
Site Inspection		
SI Report Recommendation		
<i>See Attached Worksheets Developed by the Project Team</i>		
Basic (For Current Projects)	Optimum (For Future Projects)	Excessive (Objectives that do not lead to site)
Site Reconnaissance	RI/FS or NDAI	

Acronyms

- AOC - Area of Concern
- CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act
- CESAJ - USACE Jacksonville District
- EPA - Environmental Protection Agency
- EQB - Environmental Quality Board
- HRS - Hazard Ranking Scoring
- MC - Munitions Constituents
- MEC - Munitions and Explosives of Concern
- MRSP - Munitions Response Site Prioritization Protocol
- NCP - National Contingency Plan
- NDAI - No Department of Defense Action Indicated
- RD - Remedial Design
- RI/FS - Remedial Investigation / Feasibility Study
- ROE - Right of Entry
- SI - Site Inspection
- SSL - Soil Screening Level
- TPP - Technical Project Planning
- USACE - US Army Corps of Engineers
- USFWS - US Fish and Wildlife Service

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 02**

PAGE 1 of 13

Northwest Peninsula, Cerro Balcon, Mortar Range & Adjacent Cayos including Shark Rock, Plada Cay, Whale Rock, Pajarito Cay, Cross Cay, Black Rock, Agua Cay, Mono Cay, Verba Cay, Los Gemelos, Fungy Bowl, The Washer, Flamenco/Northwest Peninsula, and Dolphin Head.

PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a			Description	Source ^c	Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d
Number	Executable Stage ^b							
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA	Modified QR - visual inspection via boat			
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil sample #28 on Cayo Lobo? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.			
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation ____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

MC - Munitions Constituents

IAW - In accordance with

SAP - Sampling and Analysis Plan

LU - Land Use

SSL - Soil Screening Level

MEC - Munitions and Explosives of Concern

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 03 (Water Area)**
 Flamingo Bay Water Area
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d
Number	Executable Stage ^b		Description				
	Current	Future					
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA	No Recon will be conducted		
2							
3							

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

IAW - In accordance with

LU - Land Use

MEC - Munitions and Explosives of Concern

MC - Munitions Constituents

SAP - Sampling and Analysis Plan

SSL - Soil Screening Level

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 04**
 Flamingo Lagoon Maneuver Area
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d	
Number	Executable Stage ^b		Description					Source ^c
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil sample # 11 or sediment samples #3 and #4? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2
 b Refer to EM 200-1-2, Paragraph 1.2.5
 c For example, Meeting with Customer/stakeholder/Regulator, State Regulation_____
 d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.
 ASR - Archives Search Report MC - Munitions Constituents
 IAW - In accordance with SAP - Sampling and Analysis Plan
 LU - Land Use SSL - Soil Screening Level
 MEC - Munitions and Explosives of Concern

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 05**
Mortar and Combat Range Area

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PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a			Description	Source ^c	Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d
Number	Executable Stage ^b							
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples #12, 14, 15, 17, 18, or 19 or sediment sample #1? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

IAW - In accordance with

LU - Land Use

MEC - Munitions and Explosives of Concern

MC - Munitions Constituents

SAP - Sampling and Analysis Plan

SSL - Soil Screening Level

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 06**
 Artillery Firing Area

PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a			Description	Source ^c	Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d
Number	Executable Stage ^b							
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples #20, or 21? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

MC - Munitions Constituents

IAW - In accordance with

SAP - Sampling and Analysis Plan

LU - Land Use

SSL - Soil Screening Level

MEC - Munitions and Explosives of Concern

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 07**
 Culebrita Artillery Impact Area including Cayo Botella and Culebrita Strafing Range
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a			Description	Source ^c	Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d
Number	Executable Stage ^b							
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples #22, 25 or 26 or sediment sample #2? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2
 b Refer to EM 200-1-2, Paragraph 1.2.5
 c For example, Meeting with Customer/stakeholder/Regulator, State Regulation____
 d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report MC - Munitions Constituents
 IAW - In accordance with SAP - Sampling and Analysis Plan
 LU - Land Use SSL - Soil Screening Level
 MEC - Munitions and Explosives of Concern

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 08**
 Cayo Norte Impact Area
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d	
Number	Executable Stage ^b		Description					Source ^c
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil/Sediment sampling	Is there any MC present in soil samples #23 or #24 or SED #5? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation_____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

MC - Munitions Constituents

IAW - In accordance with

SAP - Sampling and Analysis Plan

LU - Land Use

SSL - Soil Screening Level

MEC - Munitions and Explosives of Concern

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 09**
 Soldado Pt. Mortar and Bombing Areas including Rifle Range South.
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d	
Number	Executable Stage ^b		Description					Source ^c
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples #9 or 10? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

IAW - In accordance with

LU - Land Use

MEC - Munitions and Explosives of Concern

MC - Munitions Constituents

SAP - Sampling and Analysis Plan

SSL - Soil Screening Level

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 10**
 Defensive Firing Area #1

PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a			Description	Source ^c	Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d
Number	Executable Stage ^b							
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples # 7 or 8? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

MC - Munitions Constituents

IAW - In accordance with

SAP - Sampling and Analysis Plan

LU - Land Use

SSL - Soil Screening Level

MEC - Munitions and Explosives of Concern

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 11**
 Defensive Firing Area #2
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d	
Number	Executable Stage ^b		Description					Source ^c
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples # 3, 4, 5, 6 or 27? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2
 b Refer to EM 200-1-2, Paragraph 1.2.5
 c For example, Meeting with Customer/stakeholder/Regulator, State Regulation ____.
 d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report
 IAW - In accordance with
 LU - Land Use
 MEC - Munitions and Explosives of Concern

MC - Munitions Constituents
 SAP - Sampling and Analysis Plan
 SSL - Soil Screening Level

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 12 (Water Area)**
 Luis Bena Channel Water Areas
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d
Number	Executable Stage ^b		Description				
	Current	Future					
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA	No Recon will be conducted		
2							
3							

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____,

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

IAW - In accordance with

LU - Land Use

MEC - Munitions and Explosives of Concern

MC - Munitions Constituents

SAP - Sampling and Analysis Plan

SSL - Soil Screening Level

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 13**
 Cayo Luis Pena Impact Area
 PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d	
Number	Executable Stage ^b		Description					Source ^c
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples #1 or 2? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

IAW - In accordance with

LU - Land Use

MEC - Munitions and Explosives of Concern

MC - Munitions Constituents

SAP - Sampling and Analysis Plan

SSL - Soil Screening Level

PROJECT OBJECTIVES WORKSHEET

SITE: **Project Area 14**
 Airport and Camp Area including Airfield Rifle Range.

PROJECT: **Culebra Island, Puerto Rico**

Site Objective ^a				Data Needs	Data Collection Methods	Data User(s)	Project Objective Classification ^d	
Number	Executable Stage ^b		Description					Source ^c
	Current	Future						
1	Yes		Determine presence/lack thereof of MEC	ASR #1, ASR #2, EE/CA #1, EE/CA #2, TCRA, Recon	Are there any MEC? If so, what type, where, and hazard posed. Future LU.	Qualitative Reconnaissance	Risk and Remedy Perspectives	Basic
2	Yes		Determine if the concentration of MC is high enough to pose a risk to human health or the environment	Soil sampling	Is there any MC present in soil samples #13 or 16? If present what is it, to what degree is it present, is it above the background metals concentrations for metals or the established criteria for explosives, and if so is action required? Future LU.	Sample collection IAW SAP	Risk and Remedy Perspectives	Basic
3								
4								

a Refer to EM 200-1-2, Paragraph 1.2.2

b Refer to EM 200-1-2, Paragraph 1.2.5

c For example, Meeting with Customer/stakeholder/Regulator, State Regulation _____.

d Classification of project objectives can only occur after the current project has been identified. Refer to EM 200-1-2, Paragraph 1.3.3.

ASR - Archives Search Report

MC - Munitions Constituents

IAW - In accordance with

SAP - Sampling and Analysis Plan

LU - Land Use

SSL - Soil Screening Level

MEC - Munitions and Explosives of Concern

MEC DATA QUALITY OBJECTIVE WORKSHEET

SITE: Culebra Island, Puerto Rico

PROJECT: MMRP Site Inspection / FUDS Project No. I02PR0068

DQO STATEMENT NUMBER: 1 of 4

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate presence/lack thereof of MEC
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	MEC, Munitions debris
4	Media of Interest	N/A
5	Required Locations or Areas	All of the Project Areas 2 – 14.
6	Number of Samples Required	N/A
7	Reference Concentration of Interest or Other Performance Criteria	QR on Project Areas: 04 – 12, and 14. No QR on Project Areas: 03 and 13 and portions of 02. Some Project Areas to be observed from boats as shown in the Culebra CSM.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	Qualitative Reconnaissance with magnetometer (Minelab)
9	Analytical Method	N/A

* Refer to EM 200-1-2, Paragraph 4.2.1

MC DATA QUALITY OBJECTIVE WORKSHEET

SITE: Culebra Island, Puerto Rico

PROJECT: MMRP Site Inspection / FUDS Project No. I02PR0068

DQO STATEMENT NUMBER: 2 of 4

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Evaluate presence/lack thereof of MC
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, Remedy
3	Contaminant or Characteristic of Interest	See Tables 1, 2 and 3.
4	Media of Interest	Surface Soil, and sediment.
5	Required Sampling Locations or Areas and Depths	As determined by the Project Team, see Figures 3A, 3B, 3C, and 3D. Biased locations based on locations of the various ranges, and ambient locations taken in areas thought to be free of any possible range contamination. Depth is 4 – 6 inches.
6	Number of Samples Required	28 surface soil samples, four sediment samples, plus associated QA/QC samples.
7	Reference Concentration of Interest or Other Performance Criteria	EPA Region IX Residential PRGs (see Table 1, 2, and 3.)
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	Composite samples in accordance with the PSAP and PSAP Addendum
9	Analytical Method	Explosives - SW8321A; Metals (except mercury) SW6010B or SW6020; Mercury - SW7471A

* Refer to EM 200-1-2, Paragraph 4.2.1

MRSPP DATA QUALITY OBJECTIVE WORKSHEET

SITE: Culebra Island, Puerto Rico

PROJECT: MMRP Site Inspection / FUDS Project No. I02PR0068

DQO STATEMENT NUMBER: 3 of 4

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Completion of MRSPP Scoring sheets
Intended Need Requirements:		
2	Data User Perspective(s)	Risk and remedy
3	Contaminant or Characteristic of Interest	Explosives, chemical, and health hazards, if any, associated with SVT findings.
4	Media of Interest	Surface Soil, groundwater, and sediment
5	Required Sampling Locations or Areas and Depths	IAW MC DQO
6	Number of Samples Required	IAW MC DQO
7	Reference Concentration of Interest or Other Performance Criteria	Completion of Explosive Hazard Evaluation (EHE) Tables 1 - 10, Chemical Hazard Evaluation (CHE) Tables 11 - 20, and Health Hazard Evaluation (HHE) Tables 21 - 25.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	N/A
9	Analytical Method	N/A

* Refer to EM 200-1-2, Paragraph 4.2.1

HRS DATA QUALITY OBJECTIVE WORKSHEET

SITE: Culebra Island, Puerto Rico

PROJECT: MMRP Site Inspection / FUDS Project No. I02PR0068

DQO STATEMENT NUMBER: 4 of 4

DQO Element Number*	DQO Element Description*	Site-Specific DQO Statement
Intended Data Use(s):		
1	Project Objective(s) Satisfied	Collection of EPA HRS MC-related information
Intended Need Requirements:		
2	Data User Perspective(s)	Risk, compliance, and remedy
3	Contaminant or Characteristic of Interest	IAW MC DQO
4	Media of Interest	Surface Soil, groundwater, and sediment
5	Required Sampling Locations or Areas and Depths	IAW MC DQO
6	Number of Samples Required	IAW MC DQO
7	Reference Concentration of Interest or Other Performance Criteria	Results of the MC findings in order for EPA to complete the MC-related HRS scoring.
Appropriate Sampling and Analysis Methods:		
8	Sampling Method	IAW MC DQO
9	Analytical Method	IAW MC DQO

*Refer to EM 200-1-2, Paragraph 4.2.1

APPENDIX B
CONCEPTUAL SITE MODELS

**CONCEPTUAL SITE MODEL
CULEBRA ISLAND, PUERTO RICO**

Subsite/Range	Acreage*	Suspect Past DoD Activities	Potential MEC/MD Presence	MEC/MD Found Since Closure	Previous Investigation/Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	Field Sampling/Qualitative Reconnaissance
MUNITIONS RESPONSE									
SITE (MRS) 02									
NORTHWEST PENINSULA, CERRO BALCON, MORTAR RANGE & ADJACENT CAYOS RAC 1									
SHARK ROCK / CAYO TIBURON	1	Training Range; FLEX #2 1936, 75mm Impact Area and Impact Area #1 FLEX #5 1939, Artillery Firing near Mosquito Bay toward Culebrita, Whale Rock, Cayo Botella, Cayo Tiburon and Cayos Geniqui. Fire was not directed at NE Cay;	Mk 82, General Purpose Bomb, 500 lbs; 5-inch, Rocket, Zuni ⁽⁴⁾ 75mm ⁽⁵⁾	None Documented	None	FWS - Wildlife Refuge Protected area for seabirds.	Inaccessible-Difficult Terrain	Possible – Receptor present but with difficulty, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.
PALADA CAY / CAYO GENIQUI	11	Training Range; FLEX #2 1936, 75mm Impact Area and Impact Area #1; FLEX #5 1939, Artillery Firing near Mosquito Bay toward Culebrita, Whale Rock, Cayo Botella, Cayo Tiburon and Cayos Geniqui. Fire was not directed at NE Cay; Impact area for Torpedo Range on north end of Culebrita.	Mk 82, General Purpose Bomb, 500 lbs; 5-inch, Rocket, Zuni; Torpedo, Gen, Navy ⁽⁴⁾	PA Site Visit Team observed an Mk 14/15 bomb fin. Navy divers reported finding a Mk 27 HE torpedo east of Cayos Geniqui in January 1983	None	FWS - Wildlife Refuge Protected area for Brown and Red Footed Boobies.	Publicly Accessible Natural Barriers TBD	Yes - MEC at surface and subsurface, access available.	Modified QR through visual recon from boat, QR if access to land is available.
WHALE ROCK	<1	FLEX #5 1939, Artillery Firing near Mosquito Bay toward Culebrita, Whale Rock, Cayo Botella, Cayo Tiburon and Cayos Geniqui. Fire was not directed at NE Cay;	Unknown	None Documented	None	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Possible – Receptor present, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.
PAJARITO CAY	3	Impact Area	Unknown	None Documented	None	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Possible – Receptor present, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.
CROSS CAY / CAYO LOBO	38	Training Range	Small Arms, General; 50 cal. Machine Gun; Mk 81 Mk 82 Mk 83 Mk 84, GP; 2.75-inch, Rockets MKI ⁽⁴⁾	1997 EE/CA confirmed the presence of MEC.	1997 EE/CA	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Yes - MEC at surface and subsurface, access available.	Soils Sample #28 / QR
BLACK ROCK/ EL MONO	0.3	Unknown - Possible Impact Area	Unknown	None Documented	None	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Possible – Receptor present, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.
AGUA CAY / CAYO DE AGUA	6	Training Range	Mk 81 Mk 82 Mk 83 Mk 84, GP; 2.75-inch, Rockets General ⁽⁴⁾	PA Site Visit Team found HE bomb fragments. Aerial Bombardment has observable ordnances. ⁽⁷⁾	1997 EE/CA confirmed the presence of MEC.	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Yes - MEC at surface and subsurface, access available.	Modified QR through visual recon from boat, QR if access to land is available.
MONO CAY	1	1924 75mm Target Area	75mm ⁽⁵⁾	None Documented	None	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Possible – Receptor present, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.
YERBA CAY	4	Unknown - Possible Impact Area	Unknown	None Documented	None	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Possible – Receptor present, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.
TWIN ROCKS / LOS GEMELOS	0.5	Training Range; 1922 7-inch, 8-inch and 3-inch Guns, 155mm, 75mm, 37mm Guns;	Mk 81 Mk 82 Mk 83 Mk 84, GP; 5-inch, Rocket, Zuni; 5-inch, Practice Rocket, Mk 8 ⁽⁴⁾ 7-inch, 8-inch, 3-inch, 155mm, 75mm, 37mm ⁽⁵⁾	None Documented	None	FWS – Wildlife Refuge Protected area for seabirds.	Inaccessible-Difficult Terrain	Possible – Receptor present but with difficulty, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.

CONCEPTUAL SITE MODEL, CONTINUED
CULEBRA ISLAND, PUERTO RICO

Subsite/Range	Acreage*	Suspect Past DoD Activities	Potential MEC Presence	MEC Found Since Closure	Previous Investigation/Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	Field Sampling/Qualitative Reconnaissance
FUNGY BOWL / ALCARAZZA	7	Training Range; 1922 7-inch, 8-inch and 3-inch Guns, 155mm, 75mm, 37mm Guns;	Mk 81 Mk 82 Mk 83 Mk 84, GP; 5-inch, Rocket, Zuni ⁽⁴⁾ 7-inch, 8-inch, 3-inch, 155mm, 75mm, 37mm ⁽⁵⁾	High density of Ordnance with difficult and dangerous terrain. ⁽⁷⁾	None	FWS – Wildlife Refuge Protected area for Masked Boobies, Sooty Terns, Bridled Terns, Noddy Terns, and Zenaida.	Inaccessible-Difficult Terrain	Yes - MEC at surface and subsurface, access available.	Modified QR through visual recon from boat, QR if access to land is available.
THE WASHER	1	1922 7-inch, 8-inch and 3-inch Guns, 155mm, 75mm, 37mm Guns;	7-inch, 8-inch, 3-inch, 155mm, 75mm, 37mm ⁽⁵⁾	None Documented	None	FWS – Wildlife Refuge	Publicly Accessible Natural Barriers TBD	Possible – Receptor present, Source TBD.	Modified QR through visual recon from boat, QR if access to land is available.
FLAMENCO/ NORTHWEST PENINSULA	572	Naval Gunfire Target Area – Training Range; Air to Ground North – Training Range; Air to Ground South – Training Range; 1934 Fleet Problem XV, .30 cal, 3-inch anti-aircraft, 6-inch gun batteries, 75mm batteries, 6-inch naval weapons; FLEX #1 12-inch AP, 5-inch FN, 5-inch Com, 5-inch HE, 5-inch Ship, 6-inch FN, 4-inch Shrapnel, 3-inch HE, 3-inch Shrapnel; FLEX #2 July 1936 Demolition, 14-inch projectile, and 12-inch shell also demolition of 3-inch shell and 100-lb bomb near Stream Point; FLEX #4 1938 .50 cal and 81mm mortar, HE and practice fired at Stream Point; FLEX #5 1939 Aircraft Bombing and Machine Gun Range; Shore Bombardment at several targets along shoreline, Target 14 located mid-peninsula used for napalm and ariel bombing with inert bombs and rockets. ⁽⁷⁾	Naval Gunfire Target--Small Arms, General; .50 cal. Machine Gun; Mk 81 Mk 82 Mk 83 Mk 84, GP; 105mm, HE, M1; 8-inch, AP, Mk 21; 16-inch, AP, Mk 5; 2.75-inch, Rockets General; Rocket, 11.75-inch, Tiny Tim, Mk 1 mod 0. ⁽⁴⁾ Air to Ground North and South – Small Arms, General; .50 cal. Machine Gun; Mk 82, General Purpose bomb, 500 lbs; 2.75-inch, Rockets General; Rocket, 11.75-inch, Tiny Tim, Mk 1 Mod 0 ⁽⁴⁾ 3-inch, 6-inch and 75mm ⁽⁵⁾ 12-inch AP, 5-inch FN, 5-inch Common, 5-inch HE, 5-inch Ship, 6-inch FN, 4-inch Shrapnel, 3-inch HE, 3-inch Shrapnel ⁽⁵⁾ 14-inch projectile, 12-inch shell, 3-inch shell and 100-lb bomb ⁽⁵⁾ .50 cal and 81mm mortar, HE and practice ⁽⁵⁾	PA Site Visit Team found part of an 11.75-inch Tiny Tim Aerial Rocket and a 5-inch rocket imbedded in the hillside. During Clearance at Flamenco Bay Camp Ground 11 MEC items were located and destroyed including, several 3-inch and 5-inch projectiles, a 25lb practice bombs, and three 40mm.	Time Critical Removal Action on 3.66 acres comprising the Flamenco Bay Campground, 11 MEC items were recovered. 1997 EE/CA confirmed the presence of MEC in other areas outside Northwest Peninsula.	FWS – Wildlife Refuge, DNR, private residence, hotels, campground, and beaches.	Publicly Accessible, Recreational users.	Yes - MEC at surface and subsurface, access available.	No QR or MC Sampling; <u>Public Law 93-166</u> (1973) DoD funds can not be used for MEC/ MC decontamination on Northwest Peninsula.
DOLPHIN HEAD/ CERRO BALCON	30	FLEX #4 1938 .30, .50 cal and 81mm mortar, HE and practice fired at Surf Bay; direct fire and indirect fire at Combat Range No. 1 and the southern slope of Dolphin Head, and slope of hill northwest of Dolphin Head.	3-inch, Mortar, HE, MK1; 4.2-inch, Mortar, HE, M329A1 ⁽⁴⁾ .30 cal, .50 cal and 81mm mortar, HE and practice ⁽⁵⁾	1935 a young boy was killed playing with UXO found at this range. PA Site Visit Team found fragments of a 3-inch or 4.2-inch mortar round.	Current ongoing Removal Action.	Private ownership, grazing	Publicly Accessible	Yes - MEC at surface and subsurface, access available.	Modified QR through visual recon from boat, QR if access to land is available.
MRS 03 FLAMINGO BAY WATER AREA RAC 1	195 (water)	FLEX #5 1939 75mm shrapnel firing position south of Flamingo Lagoon to the mouth of Flamingo Bay.	75mm Shrapnel ⁽⁵⁾	Errant munitions observed in the bay.	None	Recreational Boating, Scuba Diving, Swimming.	Publicly Accessible	Possible – MEC in the water, access restricted by water.	No QR or sampling in bay area. Restricted by water.
MRS 04 FLAMINGO LAGOON MANEUVER AREA RAC 1	550	FLEX #4 1938, Combat Range No. 2 direct fire .30 and .50 cal., 81mm mortars, and smoke and indirect fire target at Combat Range #2; FLEX #4 1938 .50 cal and 81mm mortar, HE and practice fired at Surf Bay and Flamingo Beach; FLEX #5 1939 75mm shrapnel firing position south of Flamingo Lagoon to the mouth of Flamingo Bay.	.30 cal, .50 cal, and 81mm mortars ⁽⁵⁾ .50 cal and 81mm mortar, HE and practice ⁽⁵⁾ 75mm Shrapnel ⁽⁵⁾	None Documented	None	TBD	Publicly Accessible	Possible – Receptor present, Source TBD.	Soil Sample #11 and Sediment Samples #3 and #4 / QR

CONCEPTUAL SITE MODEL, CONTINUED
CULEBRA ISLAND, PUERTO RICO

Subsite/Range	Acreage*	Suspect Past DoD Activities	Potential MEC Presence	MEC Found Since Closure	Previous Investigation/Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	Field Sampling/Qualitative Reconnaissance
MRS 05 MORTAR AND COMBAT RANGE AREA RAC 1	2812	Possible 1924 Anti-Aircraft Fire on hills 325,310,200, 650, 204,108, and 191; FLEX #4 Target at Combat Range #1 and .50 cal 81mm mortars on beaches F7 and F8 between Carenero Pt. and Pt. Cabras; FLEX #4 1938 .30, .50 cal and 81mm mortar, HE and practice fired at surf Bay; direct fire and indirect fire at Combat Range No. 1 and the southern slope of Dolphin Head, and slope of hill northwest of Dolphin Head; FLEX #5 1939 Combat Range #1 and #2, Anti-Boat Gun Firing at Carenero Point.	.50 cal 81mm mortars ⁽⁵⁾ .30 cal, .50 cal and 81mm mortar, HE and practice ⁽⁵⁾ 75mm possible	Interviews indicate that a dud was found in this area that later killed Mr. Ricardo's brother Alberto. ⁽³⁾	None	Private ownership, grazing	Publicly Accessible	Yes - MEC at surface and subsurface, access available.	Soil Samples #12, #14, #15, #17, #18 and #19/ Sediment Sample #1/ QR
MRS 06 ARTILLERY FIRING AREA RAC 3	826	1914 3-inch Battery; FLEX #2 1936, 37mm gun position, Mosquito Bay shoreline; FLEX #5 1939, Artillery Firing near Mosquito Bay toward Culebrita, Whale Rock, Cayo Botella, Cayo Tiburon and Cayos Geniqui. Fire was not directed at NE Cay; Beach Defensive Area #1 and #2 and AA Range into water near Area 06; FLEX #5 1939, 37mm rounds fired from beach at Mosquito Bay to moving target in water between Point Vaca and Snapper Shoals and shrapnel rounds fired at a floating target at Yellow Shoals.	3-inch, 37mm ⁽⁵⁾	One stray practice 20mm found on eastern Culebra Island within 1.5 mile radius of Culebrita-20mm Target. ⁽³⁾	None	Private ownership, grazing, Residential	Publicly Accessible	Yes - MEC at surface and subsurface, access available.	Soil Samples #20, and #21/ QR
MRS 07 CULEBRITA ARTILLERY IMPACT AREA RAC 1	375								
LADRONE CAY / CAYO BOTELLA	N/A	Training Range; 1924 75mm target area; FLEX #2 1936, 75mm Impact Area and Impact Area #1.	Mk 82, General Purpose Bomb, 500 lbs; 5-inch, Rocket, Zuni ⁽⁴⁾ 75mm ⁽⁵⁾	PA Site Visit Team observed expended practice bomb and fragments from HE bombs.	1973 EOD Search found expended Mk 76 and Mk 106 practice bombs. Items were left in place. 1997 EE/CA confirmed the presence of MEC.	FWS - Wildlife Refuge	Publicly Accessible	Yes - MEC at surface and subsurface, access available.	Modified QR through visual recon from boat, QR if access to land is available.
CULEBRITA ISLAND	598	Training Range; FLEX #2 1936, 75mm Impact Area and Impact Area #1; FLEX #5 1939, Artillery Firing near Mosquito Bay toward Culebrita, Whale Rock, Cayo Botella, Cayo Tiburon and Cayos Geniqui. Fire was not directed at NE Cay; Lighthouse on Southern side of the island.	Small Arms, General; .50 cal. Machine Gun; 20mm HEI, MkI ⁽⁴⁾ 75mm ⁽⁵⁾	1997 EE/CA confirmed the presence of MEC.	1997 EE/CA.	FWS - Wildlife Refuge, Recreational boating area.	Publicly Accessible	Yes - MEC at surface and subsurface, access available.	Soil Samples #22, #25 and #26, Sediment Sample #2/ QR
MRS 08 CAYO NORTE IMPACT AREA RAC 3	306	FLEX #2 1936, Artillery Impact Area # 2.	Unknown	None Documented	None	1 part-time resident eastern side	Publicly Accessible Natural Barriers TBD	Possible - Possible MEC at surface and subsurface, access available.	Soil Samples #23 and #24/ QR

CONCEPTUAL SITE MODEL, CONTINUED
CULEBRA ISLAND, PUERTO RICO

Subsite/Range	Acreage*	Suspect Past DoD Activities	Potential MEC Presence	MEC Found Since Closure	Previous Investigation/Clearance Actions	Post-DoD Land Use and Current Land Use	Potential Receptors	Potential Source and Receptor Interaction	Field Sampling/Qualitative Reconnaissance
MRS 09 SOLDADO PT. MORTAR AND BOMBING AREAS RAC 2	328	1914 5-inch battery; FLEX #1 1935, .30, .45 and .50 cal, 37, 75 and 155mm, 3-inch T.M.; FLEX #2 1936, 30-lb frag, 100-lb HE, and 1000 lb bombs; Possible 1924 Anti-Aircraft Fire on hill 200; FLEX #5 1939 Marine Defensive Area #1 and Aircraft Bombing and Machine Gun Range; 1938 Mortar Firing from Boats to Shore.	5-inch ⁽⁵⁾ .30 cal, .45 cal, .50 cal, 37mm, 75mm, 155mm, 3-inch T.M. ⁽⁵⁾ 30-lb frag bomb, 100-lb HE bomb, 1000 lb bomb ⁽⁵⁾	None Documented	None	DNR, Residential, Frequent anchoring of boats.	Publicly Accessible	Possible – Receptor present, Source TBD.	Soil Samples #9 and #10/ QR
RIFLE RANGE SOUTH – UNDETERMINED LOCATION (BELIEVED TO BE LOCATED NEAR COALING STATION)	N/A	Small Arms Range	Small Arms, General ⁽⁴⁾	None Documented	None	DNR, Residential	Publicly Accessible	Possible – Receptor present, Source TBD.	QR visual survey for evidence of use as a rifle range.
MRS 10 DEFENSIVE FIRING AREA #1 RAC 2	547	Possible 1924 Anti-Aircraft Fire on hill 325; FLEX #5 1939 Marine Defensive Area #1. May have dropped mortars on beach from high ground.	Unknown	None Documented	None	Residential, Commercial, Industrial	Publicly Accessible	Possible – Receptor present, Source TBD.	Soil Samples #7 and #8/ QR
MRS 11 DEFENSIVE FIRING AREA #2 RAC 1	719	1922 155mm gun firing point for fire toward Mono Cay; Possible 1924 Anti-Aircraft Fire on hill 310; FLEX #4 Target at Firewood Bay beach barrage firing; FLEX #5 1939 Marine Defensive Area #2; FLEX #7 1941 Training with 5-inch anti-aircraft projectiles and 6-inch flat nose projectiles at beach targets in Seine Bay and Firewood Bay.	155mm, 5-inch anti-aircraft projectiles, 6-inch flat nose projectiles ⁽⁵⁾	Munitions reported in water near Project Area 11 (Project Area 12).	None	Residential, Commercial, Industrial, Frequent anchoring of boats.	Publicly Accessible	Possible – Receptor present, Source TBD.	Soil Sample #3, #4, #5, #6 and #27 / QR
MRS 12 LUIS PENA CHANNEL WATER AREAS RAC 1	835 (water)	FLEX #5 1939 Marine Defensive Area #2	Unknown	Munitions reported in the channel area. Many imbedded in coral.	None	Recreational Boating, Scuba Diving, Swimming.	Heavy recreational use	Possible – Confirmed MEC in the water but access is restricted by water.	No QR or Soil Sampling. Restricted by water.
MRS 13 CAYO LUIS PENA IMPACT AREA RAC 1	864	1924 Impact Area 155mm GPF and 75mm AA, machine gun tanks, 37mm, 8-inch and 6-inch naval guns, seaplanes; FLEX #5 1939 Aircraft Bombing and Machine Gun Range; Helicopter Pad.	155mm GPF, 75mm AA, 37mm, 8-inch and 6-inch naval ⁽⁵⁾ Napalm ⁽⁶⁾	Ordnance reported in water surrounding Cayo Luis Pena.	None	FWS and DNR	Recreational use	Possible – Receptor present, Source TBD.	Soil Samples #1 and #2 / QR
MRS 14 AIRPORT AND CAMP AREA RAC 3	416	Airport, Camp, Possible Small Arms Range	Unknown	None Documented	None	Airport Authority	Publicly Accessible	No – Access available; however, not MEC/MC is present.	Soil Sample #16/ QR
AIRFIELD RIFLE RANGE	22	Small Arms Range	Small Arms, General ⁽⁴⁾	None Documented	None	City and private ownership, some housing and undeveloped land.	Publicly Accessible	Possible – Receptor present, Source TBD.	Soil Sample #13. Will fall back to map location if range is not identified / QR
TOTAL	9460								

*Number represents actual acreage for each individual subsite/range. Total acreage, accounts for overlap of subsite/ranges, and does not include areas in open water.

Source
1 = Private account - nonconfirmed
2 = EOD response
3 = 1995 ASR
4 = 2004 ASR supplement
5 = 2005 Supplemental Archives Search Report (Final)
6 = Revised INPR 2005
7 = April 22, 1991 - Letter Kelly Wolcott, Refuge Manager to Ivan Acosta, USACE.
8 = Other government correspondence

DNR = Department of Natural Resources
DoD = Department of Defense
EE/CA = Engineering Evaluation / Cost Analysis
EOD = Explosives Ordnance Disposal
FWS = U.S. Fish and Wildlife Service
HE = High explosive

HEI = High explosive incendiary
MEC = Munitions and explosives of concern
PA = Preliminary Assessment
SI = Site Inspection
UXO = Unexploded Ordnance

PRE-MC SAMPLING CONCEPTUAL SITE EXPOSURE MODEL

Site: Culebra Island, PR

Completed By: Parsons

Date Completed: 10-Oct-06

(5) Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, or "C/F" for both current and future receptors.

(1) Check the media that could be directly affected by the release.

(2) For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Briefly list other mechanisms or reference the report for details.

(3) Check exposure media identified in (2).

(4) Check exposure pathways that are complete or need further evaluation.

Media	Transport Mechanisms	Exposure Media	Exposure Pathways	Current & Future Receptors										
				Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Ecological ⁽²⁾						
<input checked="" type="checkbox"/> Surface Soil (0-2 ft bgs)	Direct release to surface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration or leaching to subsurface <i>check soil</i> <input checked="" type="checkbox"/> Migration or leaching to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Runoff or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input checked="" type="checkbox"/> Other (list): <u>Fugitive Dust</u>	<input checked="" type="checkbox"/> soil	<input checked="" type="checkbox"/> Incidental Soil Ingestion <input checked="" type="checkbox"/> Dermal Absorption of Contaminants from Soil	C/F	C/F	C/F	C/F	C/F						
<input checked="" type="checkbox"/> Subsurface Soil (0-15 ft bgs)	Direct release to subsurface soil <i>check soil</i> <input checked="" type="checkbox"/> Migration to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Other (list):	<input checked="" type="checkbox"/> groundwater⁽¹⁾	<input type="checkbox"/> Ingestion of Groundwater <input type="checkbox"/> Dermal Absorption of Contaminants in Groundwater											
<input type="checkbox"/> Groundwater	Direct release to groundwater <i>check groundwater</i> <input type="checkbox"/> Volatilization <i>check air</i> <input type="checkbox"/> Flow to surface water body <i>check surface water</i> <input type="checkbox"/> Flow to sediment <i>check sediment</i> <input type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list):	<input checked="" type="checkbox"/> air⁽¹⁾	<input type="checkbox"/> Inhalation of Outdoor Air <input type="checkbox"/> Inhalation of Indoor Air <input checked="" type="checkbox"/> Inhalation of Fugitive Dust	C/F	C/F	C/F	C/F	C/F						
<input checked="" type="checkbox"/> Surface Water	Direct release to surface water <i>check surface water</i> <input type="checkbox"/> Volatilization <i>check air</i> <input checked="" type="checkbox"/> Sedimentation <i>check sediment</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list):	<input checked="" type="checkbox"/> surface water⁽¹⁾	<input type="checkbox"/> Ingestion of Surface Water <input checked="" type="checkbox"/> Dermal Absorption of Contaminants in Surface Water	C/F	C/F	C/F	C/F	C/F						
<input checked="" type="checkbox"/> Sediment	Direct release to sediment <i>check sediment</i> <input checked="" type="checkbox"/> Resuspension, runoff, or erosion <i>check surface water</i> <input checked="" type="checkbox"/> Uptake by plants or animals <i>check biota</i> <input type="checkbox"/> Other (list):	<input checked="" type="checkbox"/> sediment	<input checked="" type="checkbox"/> Direct Contact with Sediment	C/F	C/F	C/F	C/F	C/F						
		<input checked="" type="checkbox"/> biota⁽¹⁾	<input checked="" type="checkbox"/> Ingestion of Wild Foods											C/F

(1) This media will not be evaluated as part of the SI; however, if MC is identified during the SI it will be considered an indicator that this media should be evaluated during the RI.

(2) The TPP team agreed to use human health values as an initial screening criteria. Ecological Screening criteria will be used in accordance with the White Paper on Ecological Screening in the SI.

APPENDIX C
SITE PHOTOGRAPHS



Photo 1: Cayo Lobo



Photo 2: Northwest Peninsula



Photo 3: Luis Pena Cayo facing southwest over Northwest Peninsula.



Photo 4: Flamenco Beach and part of the Flamenco Lagoon.



Photo 5: Culebrita facing east from Culebra



Photo 6: Northeast Cay from Culebra



Photo 7: Mesquite acacia or thorny bush on Culebra.



Photo 8: "Danger! Unexploded Ordnance" sign on fence at Northwest Peninsula.



Photo 9: Firewood Bay facing north on western coast of Project Area 11. Posting at entrance show no fishing or fires are allowed.



Photo 10: Flamenco Beach, a popular destination for locals and tourist alike. Photo taken facing northwest toward Northwest Peninsula.



Photo 11: View of Snug bay (bottom of picture) and Snug Bay with Scorpion Point jetting into the water. Stream Point is seen in the distance along with Luis Pena Cayo on the left side of the picture.



Photo 12: Town of Dewey as seen from the air. Seine Bay and Snug Bay shown in the foreground and Great Harbor in the background.