

**FINAL  
WORK PLAN**

**Phase 3 Remedial Investigation  
Target Intrusive Investigation  
Culebra Water Ranges  
Flamenco Bay Water Area (MRS 03) and  
Luis Peña Channel Water Area (MRS 12)**

Culebra, Puerto Rico

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## ABBREVIATIONS AND ACRONYMS

AGM	analog geophysical mapping
AHA	activity hazard analysis
AOI	area of interest
APP	Accident Prevention Plan
ARAR	applicable or relevant and appropriate requirement
ASR	Archives Search Report
ATF	U.S. Bureau of Alcohol, Tobacco, Firearms, and Explosives
BD	Bomb Dummy
BIP	blow-in-place
BDU	Bomb Dummy Unit
BMP	best management practice
cal	caliber
CEHNC	USACE Engineering and Support Center, Huntsville
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	<i>Code of Federal Regulations</i>
CMUA	concentrated munitions use areas
CRL	Corporate Reference Library
CSM	conceptual site model
DCN	Design Change Notice
DDESB	Department of Defense Explosives Safety Board
DERP	Defense Environmental Restoration Program
DFW	definable feature of work
DGM	digital geophysical mapping
DGPS	differential global positioning system
DID	Data Item Description
DoD	U.S. Department of Defense
DOT	U.S. Department of Transportation
DQCR	daily quality control report
DQO	data quality objective
DR	Daily Report
DS	Dive Supervisor
EBS	Environmental Baseline Survey
EE/CA	Engineering Evaluation and Cost Analysis
EEG	Ellis Environmental Group, LLC
EFH	essential fish habitat

## ABBREVIATIONS AND ACRONYMS (Continued)

EM	electromagnetic <i>or</i> Engineer Manual
EMR	Experience Modification Rate
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
ESA	Endangered Species Act
EZ	Exclusion Zone
FCA	functional check area
FCR	Field Change Request
FOL	Field Operations Lead
FS	Feasibility Study
FUDS	Formerly Used Defense Site
GIS	geographic information system
GPS	global positioning system
GQCM	Geophysics Quality Control Manager
GVW	gross vehicle weight
HE	high explosive
INPR	Inventory Project Report
IVS	Instrument Verification Strip
KO	Contracting Officer
lbs.	pounds
MC	munitions constituent
MD	munitions debris
MDAS	material documented as safe
MEC	munitions and explosives of concern
MLLW	mean lower low water
MLW	mean low water
mm	millimeter
MMPA	Marine Mammal Protection Act
MMRP	Military Munitions Response Program
MPPEH	material potentially presenting an explosive hazard
MRS	Munitions Response Site
MTA	MTA Incorporated
Navy	U.S. Department of the Navy
NCR	nonconformance report
NHA	National Heritage Area

## ABBREVIATIONS AND ACRONYMS (Continued)

NHL	National Historic Landmarks Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRIS	National Register Information System
NTP	Notice to Proceed
PDT	Project Decision Team
PjM	Project Manager (TtEC)
PM	Project Manager (USACE)
PPE	personal protective equipment
PREQB	Puerto Rico Environmental Quality Board
PRDNER	Puerto Rico Department of Natural and Environmental Resources
PWS	Performance Work Statement
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
QCM	Quality Control Manager
RAC	risk assessment code
RCA	root cause analysis
RCWM	recovered chemical warfare materiel
RI	Remedial Investigation
SCUBA	self-contained underwater breathing apparatus
SHM	Safety and Health Manager
SOP	Standard Operating Procedure
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SUXOS	Senior UXO Supervisor
TCRA	time-critical removal action
T&E	threatened and endangered
TO	task order
TPP	Technical Project Planning
TP-T	Target Practice-Tracer
TtEC	Tetra Tech EC, Inc.
U.S.	United States
USACE	U.S. Army Corps of Engineers
U.S.C.	<i>U.S. Code</i>
USFWS	U.S. Fish and Wildlife Service

**ABBREVIATIONS AND ACRONYMS**  
(Continued)

UXO	unexploded ordnance
UXOQCS	Unexploded Ordnance Quality Control Specialist
UXOSO	Unexploded Ordnance Safety Officer
VSP	Visual Sample Plan

## 1.0 INTRODUCTION

### 1.1 PROJECT AUTHORIZATION

1.1.01 Tetra Tech EC, Inc. (TtEC) is the prime contractor to the United States (U.S.) Army Corps of Engineers (USACE) Engineering and Support Center, Huntsville (CEHNC) under Contract W912DY-10-D-0015, Task Order (TO) 0003. This TO was established to perform a munitions and explosives of concern (MEC) Remedial Investigation (RI)/Feasibility Study (FS) of the Culebra Water Ranges, located in Culebra, Puerto Rico. Relevant portions of the Performance Work Statement (PWS) are included as Appendix A.

1.1.02 This project falls under the Defense Environmental Restoration Program (DERP) for Formerly Used Defense Sites (FUDS). The work conducted for this project will be performed in a manner consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Sections 104 and 121; Executive Order 12580; and the National Oil and Hazardous Substances Pollution Contingency Plan. All activities involving work in areas potentially containing material potentially presenting an explosive hazard (MPPEH) will be conducted in full compliance with CEHNC, U.S. Department of Defense (DoD), U.S. Department of Army, USACE, and local requirements regarding personnel, equipment, and procedures. Activities under this PWS fall under the applicable provisions of 29 *Code of Federal Regulations* (CFR) 1910.120.

### 1.2 PROJECT PURPOSE AND SCOPE

1.2.01 The investigation activities at Flamenco Bay and the Luis Peña Channel were designed to be conducted in three phases: Phase 1, the Environmental Baseline Survey (EBS), was conducted to develop base maps to guide the following phases; Phase 2, digital geophysical mapping (DGM), was performed to assess the distribution and density of metallic items and debris fields that may be MEC; and Phase 3, an intrusive investigation (for which this Work Plan was prepared) will be performed to help determine which metallic items are MEC, and will be followed by sampling to determine if any chemical contaminants from MEC are present in sediments. The Phase 3 work will be performed at two underwater Munitions Response Sites (MRSs), MRS 03 and MRS 12. MRS 03 and MRS 12 are located offshore east and west-southwest, respectively, of the Northwest Peninsula of Culebra, Puerto Rico. MRS 03, also known as the Flamenco Bay Water Area (FUDS Project No. I02PR006812M01), and MRS 12, also known as the Luis Peña Channel Water Area (FUDS Project No. I02PR006803M01), will be referred to herein as Flamenco Bay and the Luis Peña Channel, for consistency.

1.2.02 The primary field activity performed during Phase 3 of the RI will be conducting diving and snorkeling operations with qualified unexploded ordnance (UXO) divers to intrusively investigate geophysical targets to determine the nature and extent of MEC present in MRS 03 and 12. Secondary tasks are to remove and dispose of MEC/MPPEH if safe to do so and within the guidance of the Environmental Standard Operating Procedures (SOPs) prepared by the

USACE and included as Appendix B-1. The work will be conducted in accordance with the *Supplemental Environmental Standard Operating Procedures for Endangered Species Conservation and their Critical Habitat*, February 2014 (and Addendum 1, February 2015) contained in Appendix B-1. An additional task is to perform sediment sampling for munitions constituents (MC) if MEC with its surface breached (explosive filler exposed to the environment) is discovered, or if underwater disposal is used for items that are deemed unsafe to move.

1.2.03 Diving operations will be constrained in the sensitive habitat areas that were defined because of the EBS performed at the site. Sensitive habitat is any area where contact with the bottom is not allowed according to the Environmental SOPs in Appendix B-1, which was developed by the USACE in coordination with the National Oceanic and Atmospheric Administration (NOAA), National Marine Fisheries Service (NMFS), Puerto Rico Department of Environmental and Natural Resources (PRDNER), and the U.S. Fish and Wildlife Service (USFWS). When assessing shallow areas between 3 and 4 feet deep, the targets will be investigated using either UXO-qualified snorkelers or UXO technicians on paddleboards at high tide to limit contact with coral.

### **1.3 WORK PLAN ORGANIZATION**

1.3.01 This Work Plan has been prepared in accordance with Data Item Description (DID) WERS-001.01 (Work Plans). The sections that comprise the Work Plan are discussed below.

- Section 1, Introduction, details the overall scope and objective of the project, presents the organization of the Work Plan, and presents an overview of the history and location of the site.
- Section 2, Technical Management Plan, details the organizational structure, lines of authority, and lines of communication among the investigation team.
- Section 3, Field Investigation Plan, describes the approaches to be taken for the procedures that will be implemented to complete the required fieldwork.
- Section 4, Quality Control Plan, describes TtEC's procedures for controlling and measuring the quality of work performed, including the organization, responsibilities, and policies to be implemented.
- Section 5, Explosives Management Plan, describes details for the management of explosives used to destroy MEC recovered during the project, including acquisition, receipt, storage, transportation, and inventory.
- Section 6, Environmental Protection Plan, provides general information and lists applicable requirements to protect resources and threatened and endangered (T&E) species.
- Section 7, Property Management Plan, is not applicable to this project and will serve as a placeholder section only.

- Section 8, Interim Holding Facility Siting Plan for Recovered Chemical Warfare Materiel Projects, is not applicable to this project and will serve as a placeholder section only.
- Section 9, Physical Security Plan for Recovered Chemical Warfare Materiel Project Sites, is not applicable to the project and will serve as a placeholder section only.
- Section 10, References, provides a list of references used in the preparation of this Work Plan.

1.3.02 Additional information and plans are included in this Work Plan as appendices:

- Task Order Scope of Work: Relevant portions from the PWS are included as Appendix A.
- Supplemental Environmental SOPs: The SOPs were prepared by USACE and are included as Appendix B-1; they identify procedures to follow for endangered species and critical habitat conservation during underwater investigations. SOPs covering field operations are provided in Appendix B-2.
- Points of Contact: Various points of contact are listed in Appendix C of this Work Plan.
- Accident Prevention Plan (APP): The APP is attached as Appendix D of this Work Plan. The APP describes the health and safety procedures, personal protection standards, and environmental health hazards applicable to this project.
- Dive Operations Plan: The Dive Operations Plan is attached as Appendix E of this Work Plan. It addresses the health and safety practices and controls that will be implemented by all TtEC employees participating in diving operations as part of this investigation.
- MC Quality Assurance (QA) Project Plan (QAPP): The MC QAPP is attached as Appendix F of this Work Plan. It discusses activities, requirements, and procedures for the MC-related sampling that may occur during performance of the scope of work.
- Contractor Forms and Checklists: Relevant forms and templates are provided in Appendix G, including:
  - Contractor Production Report
  - Contractor Quality Control Report
  - Preparatory Three Phases of Control Checklist
  - Initial Three Phases of Control Checklist
  - Field Change Request (FCR) Form
  - FCR/Design Change Notice (DCN) Log
  - Nonconformance Report
  - DCN
  - Visitor Log
  - Analog Geophysical Mapping (AGM) Certification Report

- Contractor Personnel Qualifications Certifications Letter: Qualification certifications of key personnel are included in Appendix H.
- Technical Project Planning (TPP) Worksheets and Documentation: Appendix I contains the TPP Worksheets and minutes from the TPP meetings.

## 1.4 PROJECT LOCATION

1.4.01 Culebra Island is located approximately 17 miles east of the island of Puerto Rico and is approximately 9 miles from the Island of Vieques (Figure 1-1). MRS 03 at Culebra contains 195 acres at Flamenco Bay and includes Flamenco Beach. The beach is ranked as one of the top 10 beaches in the world, with over 1.5 million visitors per year. The bay contains a mix of sand and shallow coral and faces northeast toward the open Atlantic Ocean. The bay is impacted by open ocean swells breaking over the shallow coral areas and seasonal weather patterns that can produce high winds and dangerous marine conditions. MRS 12 at Culebra contains 835 acres of the Luis Peña Channel Area. This site is located on the western side of the island and contains a mix of shallow and deep coral, sea grass, and sandy areas. This area is normally sheltered from the open ocean swells of the Atlantic Ocean but is impacted by seasonal weather patterns that can produce high winds and dangerous marine conditions.



**Figure 1-1. Location Map of Culebra**

## 1.5 PROJECT HISTORY

1.5.01 The Culebra Island Archipelago (including the Northwest Peninsula of Culebra and the two water-range MRSs) was used as an impact range for aerial bombs and rockets, missiles, mortars, and naval projectiles from 1903 until 1975. The southern portion of the Northwest Peninsula of Culebra lies between the two water-range MRSs. This peninsula was used as a target for aerial bombing, aerial rockets, strafing, and naval gunfire from roughly 1941 until 1975. Reportedly, most of the gunfire was fired from ships in the water east of the peninsula and directed at targets on its eastern beach and ridges and plateaus. The upland targets included white painted drums, Sherman tanks, trucks, panels, and circular targets painted on the ground. A movable cable target system was constructed in this area and was used for a short time.

1.5.02 The areas between the ridges on the peninsula were used as impact areas for conventional and napalm-laden bombs. Landing practice operations also took place on the beach areas of Flamenco Bay. Some of these exercises were accompanied by the firing of illuminating flares and white phosphorus projectiles. Although no confirming evidence has been discovered, floating target structures may also have been towed offshore into Flamenco Bay or the waters of Luis Peña Channel and used for training. The Northwest Peninsula was used for live gunnery practice between 1936 and January 1, 1972. During this period, approximately 750,000 naval rounds were fired into the Northwest Peninsula. Of these, an estimated 80 percent (600,000) were 5-inch/38 caliber (cal) and 5-inch/54 cal projectiles and an estimated 10 percent (75,000) were 3-inch/50 cal, 6-inch/47 cal, and 8-inch/55 cal gun ammunition. The balance consisted of other types of military munitions, including 16-inch/50 cal, and munitions for both mortars and howitzers. Additionally, during 1942 to 1968, approximately 320,000 naval aviation munitions (e.g., bombs and rockets) were used (dropped or fired) within the Northwest Peninsula (U.S. Navy 1973).

1.5.03 No confirming evidence has been discovered that upland targets were ever placed on the steep western slopes of the peninsula or shoreline areas to the south, however, indirect fire operations may have occurred. The steepness and inaccessibility of these slopes would have made the placement and maintenance of upland targets very difficult. It is also not known, with certainty, whether floating targets were ever used, or whether indirect fire operations may have occurred on the western side of the Northwest Peninsula in the Luis Peña Channel. Naval firing from the west is believed to have been less likely because of the relatively shallow water in many areas and restrictive reefs and small cays. In consideration of these factors, prior MEC investigations in the upland areas of the Northwest Peninsula have focused primarily on its eastern side and northern portion (including the beach and shoreline areas of Flamenco Bay), where evidence of upland targets has been found. The 1995 Archives Search Report (ASR) stated that the investigating team observed munitions at Flamenco Beach. The ASR also documented an interview with a local self-contained underwater breathing apparatus (SCUBA) dive instructor who said he spotted many underwater ordnance items around Culebra, with the

highest concentration in the Luis Peña Channel and water west of Flamenco Peninsula. It was not indicated whether these items were MEC or munitions debris (MD).

1.5.04 The Phase 1 EBS activities and the Phase 2 geophysics survey have been completed. The primary field activities performed during the EBS included acquisition of multibeam echosounder bathymetry, sidescan sonar imagery, and underwater video and still photography used to perform a benthic terrain and habitat assessment. The purpose of the EBS was to provide information to help characterize the nature and extent of sensitive marine habitats, such as coral reefs and seagrass beds, and threatened and endangered (T&E) species within the boundaries of Flamenco Bay and the Luis Peña Channel. The objective of the EBS field activities was to identify areas and boundaries of sensitive habitat and to determine where towed operations and sampling can be safely conducted without damaging these resources during the follow-on phases of the field investigation, which included the Phase 2 activities utilizing towed geophysical sensors and will include the pending Phase 3 intrusive activities. Underwater investigation activities that were conducted as part of the EBS consisted of visual observations, boat operations, and remote sensing surveys.

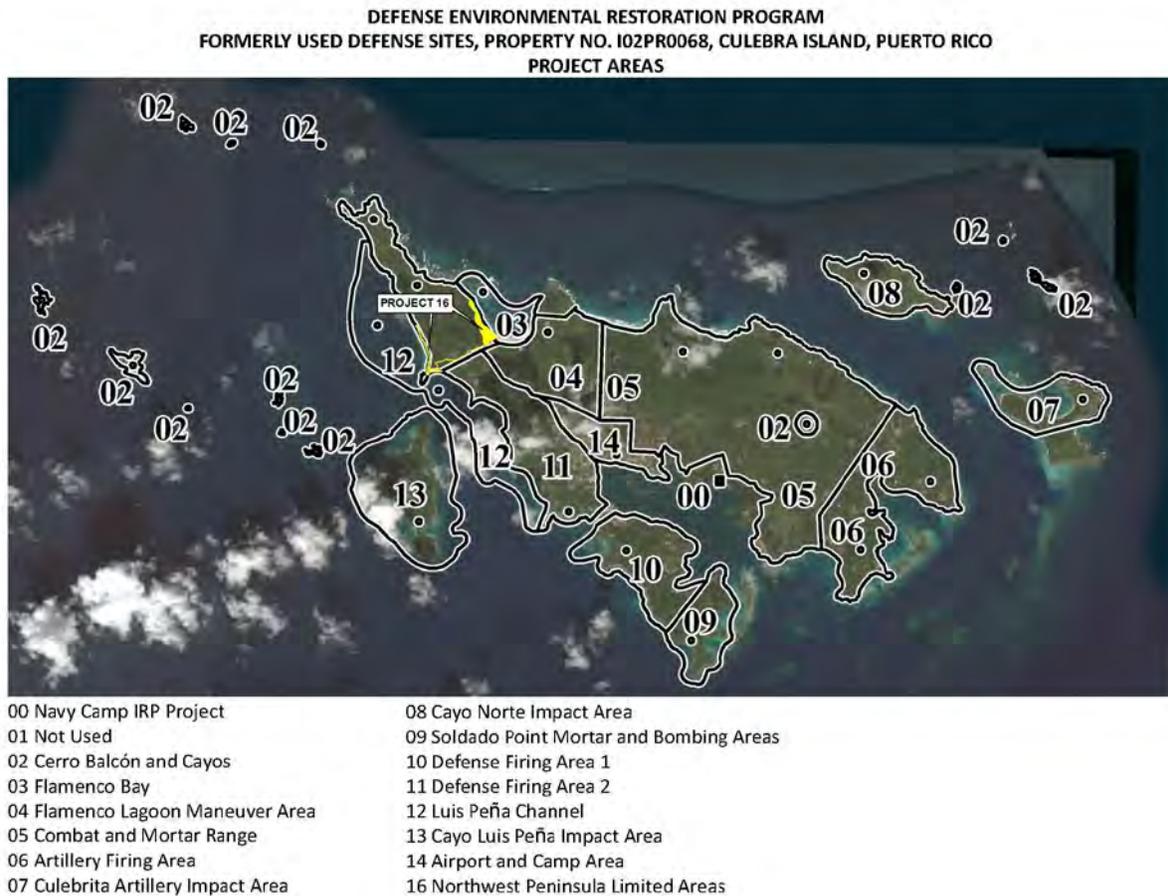
1.5.05 Data from the EBS were used to guide the Phase 2 activities that were conducted in the summer of 2017. The EBS results were used in this Work Plan to provide information and basemaps that show benthic terrain and delineations of sensitive habitats within the two MRSs. Following completion of the RI, an FS will be performed to identify and compare remedial alternatives, followed by development of a Proposed Plan that recommends a preferred remedy, and a Decision Document that identifies the selected remedy for Flamenco Bay and the Luis Peña Channel.

## **1.6 CURRENT AND PROJECTED LAND USE**

1.6.01 In 1901, Culebra's public land was placed under the control of the U.S. Department of the Navy (Navy). The island and adjacent cays were used as impact areas and firing ranges for aerial bombs and rockets, missiles, mortars, small arms, artillery projectiles, and naval projectiles by the Navy and U.S. Marine Corps from 1903 until 1975. In 1978, part of the public land was transferred to the Commonwealth of Puerto Rico and the rest to the USFWS. Lands were transferred to the Commonwealth through a quitclaim deed and a Cooperative Management Agreement signed by the Government of Puerto Rico and the U.S. Department of the Interior in 1982. The sites are currently used for all forms of water recreation and are also designated as protected wildlife habitat. These uses are expected to continue in the future.

1.6.02 The Finding and Determination of Eligibility, dated December 24, 1991, qualified 2,660 acres of Culebra Island and adjacent cays as eligible for consideration under the DERP-FUDS. However, upon subsequent review of historical material from the National Archives, it was determined that all of Culebra Island and the adjacent cays should be considered a FUDS, except the Northwest Peninsula, which is not eligible under the 1982 Quitclaim Deed and Public Law 93-166, and the tract that was controlled by the Navy after 1986. However, that was modified by

Fiscal Year 15 National Defense Authorization Act language (PL 113-291). Section 317 of PL 113-291 states the Secretary of the Army may expend funds to decontaminate certain public use areas within the Northwest Peninsula of MEC. The specific areas authorized within the Northwest Peninsula are portions of Carlos Rosario Beach, Flamenco Beach, Tamarindo Beach, the campground, and Carlos Rosario Trail. The intent is to ensure MEC are removed from these areas. This authorization does not allow cleanup of other environmental contaminants, including MC. The revised area covered by the DERP-FUDS projects for Culebra Island and adjacent cays consists of approximately 8,920 acres. Figure 1-2 shows the DERP-FUDS project areas associated with Culebra.



**Figure 1-2. DERP-FUDS Projects for Culebra**

1.6.03 The objectives of all the DERP-FUDS projects are to reduce risk to human health and the environment and reduce the hazards to public safety presented by military munitions through implementation of effective, legally compliant, and cost-effective response actions. To gather additional information that would help to determine the nature and extent of MC or MEC contamination within the Culebra Island MRSs, it was agreed by the TPP Team, comprising federal and Commonwealth of Puerto Rico agencies, to conduct underwater investigations and to prepare an RI/FS. The main objectives of the underwater investigations are to: a) characterize

and map benthic habitats within investigation areas; b) determine, identify, and map T&E species, in particular coral colonies (under Puerto Rico laws and regulations, all corals within Commonwealth waters are protected); c) gather the necessary information to determine potential effects (e.g., location of species versus location of suspected MEC) on T&E species during RIs and cleanup activities; d) determine the presence or absence of MC and MEC; e) characterize the nature and extent of MC and MEC presence; and f) determine if the MC or MEC pose an unacceptable risk to human health and the environment, which would require further considerations or a response action.

## **1.7 PREVIOUS INVESTIGATIONS**

1.7.01 This section summarizes previous investigations conducted at Culebra. Information in the following sections is taken, in part, from the Final Site Inspection Report (Parsons 2007), and includes more recent investigations that have been performed since this report was issued.

### **1.7.1 1991 Inventory Project Report**

1.7.1.01 An Inventory Project Report (INPR) was signed on December 24, 1991, establishing the Culebra Island site as a FUDS, defining the site boundaries, and assigning the FUDS Project No. I02PR006800 (USACE 1991). The Findings and Determination of Eligibility concluded that “the site, except for 63.82 acres near Flamenco Point still under control of the Navy, has been determined to be formerly used by the U.S. Department of Defense. It is therefore eligible for the Defense Environmental Restoration Program (DERP).”

### **1.7.2 1995 Archives Search Report**

1.7.2.01 The ASR was completed by the USACE Rock Island District in February 1995 (USACE 1995) 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 which the team identified MD on Cayo Botella, Cayos Geniqui, and Cayo del Agua. In addition, MD was identified on Flamenco Beach, Flamenco Peninsula, and the hillside near Cerro Balcon. The ASR listed several ordnance items verified on site by either Explosive Ordnance Disposal (EOD) personnel or the ASR field team. Table 1-1 lists MEC items previously found.

### **1.7.3 1995 Interim Remedial Action**

1.7.3.01 In 1995, MTA, Inc. (MTA) completed an interim remedial action on 3.66 acres of the Flamenco Bay Campground (MRS 02) near Flamenco Beach to dispose of MEC within 2 feet of the ground surface at the campground (MTA 1995). Work was conducted on the site between May 12 and May 26, 1995. MTA found 11 items of MEC and munitions-related scrap.

**Table 1-1. Munitions and Explosives of Concern Items Previously Identified in or Adjacent to MRS 03, MRS 12**

Item	Quantity	Notes	MRS	Reference	Location	Date
Candle, illumination, from 5-inch 38 naval projectile	1	Filled with 50% of illumination composition	2	MTA time-critical removal action (TCRA)	Northwest Peninsula Grid No. 1	1995
Bomb, practice, 25 pound, MK 76/ Bomb Dummy Unit (BDU)-33	1	Appeared spotting had functioned but too corroded to certify	2	MTA TCRA	Northwest Peninsula Grid No. 2	1995
Projectile, 40mm, M81A1 Target Practice-Tracer (TP-T)	1	Tracer present	2	MTA TCRA	Northwest Peninsula Grid No. 2	1995
Projectile, 40mm, M81A1 TP-T	1	Tracer partly burnt	2	MTA TCRA	Northwest Peninsula Grid No. 2	1995
Blind loaded projectile, 3 inch, with tracer	1	Condition not determined due to corrosion	2	MTA TCRA	Northwest Peninsula Grid No. 2	1995
Projectile, 3 inch, 50 HE	1	Armed, PD, fuze	2	MTA TCRA	Northwest Peninsula Grid No. 2	1995
Projectile, 40mm, M81A1 TP-T	1	Tracer Present	2	MTA TCRA	Northwest Peninsula Grid No. 2	1995
Fuze, Bomb Dummy (BD), from 5-inch 38 projectile	1	Tracer Residue Present	2	MTA TCRA	Northwest Peninsula Grid No. 3	1995
Fuze, BD, from 5-inch 38 projectile	1	Condition not determined due to corrosion	2	MTA TCRA	Northwest Peninsula Grid No. 4	1995
Projectile, 40mm, Bofors	1		2	MTA TCRA	Northwest Peninsula Grid No. 4	1995
Candle, illumination, from 5-inch 38 naval projectile	1	Filled with 75% of illumination composition	2	MTA TCRA	Northwest Peninsula Grid No. 4	1995
Naval gun fire, 3 inch	1	Surface, fired, unfuzed	2	EE/CA	Northwest Peninsula NP-1	1997
Rocket, 5 inch, High-Velocity Aircraft Rocket	1	Sheared on surface	2	EE/CA	Northwest Peninsula NP-11	1997
Naval gun fire, 3 inch	2	4- and 5-inch depth	2	EE/CA	Northwest Peninsula NP-12	1997
Bomb, practice, MK 23	1	Unknown depth	2	EE/CA	Northwest Peninsula NP-12	1997
Projectile, 20mm HE Incendiary	1	3-inch depth	2	EE/CA	Northwest Peninsula NP-12	1997
Fuze, sheared base		Unknown depth, number, or type	2	EE/CA	Northwest Peninsula NP-12	1997
Candle, illumination, 5 inch	3	6-inch depth	2	EE/CA	Northwest Peninsula NP-15	1997
Bomb, practice, MK 76 w/ MK 4 spotting charge	2	Unknown depth, sheared fuzes	2	EE/CA	Northwest Peninsula NP-15	1997
Naval gun fire, 6 inch	2	5-inch depth, sheared fuzes	2	EE/CA	Northwest Peninsula NP-16	1997

**Table 1-1. Munitions and Explosives of Concern Items Previously Identified in or Adjacent to MRS 03, MRS 12 (continued)**

Item	Quantity	Notes	MRS	Reference	Location	Date
Mortar, 81mm	1	7-inch depth	2	EE/CA	Northwest Peninsula NP-16	1997
Naval gun fire, 5 inch	1	7-inch depth, sheared fuze	2	EE/CA	Northwest Peninsula NP-16	1997
Naval gun fire, 3 inch	1	6-inch depth, sheared fuze	2	EE/CA	Northwest Peninsula NP-16	1997
Naval gun fire, 3 inch	1	4-inch depth, sheared fuzes	2	EE/CA	Northwest Peninsula NP-17	1997
Naval gun fire, 5 inch	1	5-inch depth, sheared fuze	2	EE/CA	Northwest Peninsula NP-17	1997
Naval gun fire, 5 inch	2	6-inch depth, sheared fuzes	2	EE/CA	Northwest Peninsula NP-17	1997
Naval gun fire, 6 inch	1	6-inch depth, sheared fuze	2	EE/CA	Northwest Peninsula NP-17	1997
Grenade, w/o fuze	1	No fuze	2	EE/CA	Northwest Peninsula NP-17	1997
Naval gun fire, 5 inch	1	Partial	2	EE/CA	Northwest Peninsula NP-17	1997
Naval gun fire, 5 inch	2	5-inch depth, no fuzes	2	EE/CA	Northwest Peninsula NP-18	1997
Candle, illumination, 5 inch	1	Surface	2	EE/CA	Northwest Peninsula NP-19	1997
Naval gun fire, 5 inch	1	Surface	2	EE/CA	Northwest Peninsula NP-20	1997
Naval gun fire, 6 inch	2	Surface, sheared fuzes	2	EE/CA	Northwest Peninsula NP-21	1997
Mortar, 81mm	1	Surface, no fuze	2	EE/CA	Northwest Peninsula NP-21	1997
Fuze, projectile base	1	Surface	2	EE/CA	Northwest Peninsula NP-21	1997
Candle, illumination, 5 inch	2	Surface, no fuze	2	EE/CA	Northwest Peninsula NP-22	1997
Naval gun fire, 3 inch	2	6-inch depth, fired fuzes	2	EE/CA	Northwest Peninsula NP-3	1997
Candle, illumination, 5 inch	2	Surface	2	EE/CA	Northwest Peninsula NP-4	1997
Candle, illumination, 5 inch	1	Unknown depth	2	EE/CA	Northwest Peninsula NP-4	1997
Naval gun fire, 5 inch	1	Fired mod 2 fuze, 8-inch depth	2	EE/CA	Flamenco Beach FB-6	1997
Projectile, 37mm HE	1	No fuze, 5-inch depth	2	EE/CA	Flamenco Beach FB-6	1997
Warhead, rocket, 5-inch	1	Sand filled with fired fuze, 4-inch depth	2	EE/CA	Flamenco Beach FB-6	1997
Candle, illumination, 5-inch	2	Flares, no fuze, 4-inch depth	2	EE/CA	Flamenco Beach FB-6	1997
Various MEC	249	Various MEC identified on Northwest Peninsula	2	MEC Construction Support, Ellis	Northwest Peninsula	2001-2002

**Table 1-1. Munitions and Explosives of Concern Items Previously Identified in or Adjacent to MRS 03, MRS 12 (continued)**

Item	Quantity	Notes	MRS	Reference	Location	Date
Candle, illumination, 5 inch	1	10-inch depth, unfuzed, magnesium filled	2	Ellis Grid Log	2029724.479N 2529724.682E	2002
Bomb, 100 pound	1	Surface, fuzed, HE	2	Ellis Grid Log	2029921.471N 25279.397E	2002
Bomb, 1,000 pound	1	12-inch depth, fuzed, HE	2	Ellis Grid Log	2029922.685N 252796.915E	2002
Candle, illumination, 5 inch	1	10-inch depth, fuzed, magnesium filled	2	Ellis Grid Log	2029922.685N 252796.915E	2002
Mortar, 81mm	1	18-inch depth, fuzed, w/p filled	2	Ellis Grid Log	2029924.127N 252920.989E	2002
Bomb, 100 pound	1	Surface, fuzed, HE, blow in place (BIP)	3	USACE, USN EOD	Flamenco Beach, underwater MRS03	2014, Jan
Bomb, 100 pound	1	Surface, fuzed, HE, BIP	3	USACE, USN EOD	Flamenco Beach, underwater MRS03	2014, Apr

Source: Parsons (2007)

#### **1.7.4 1997 Final Engineering Evaluation/Cost Analysis**

1.7.4.01 In March 1997, Environmental Science and Engineering, Inc. submitted the *Final Engineering Evaluation and Cost Analysis (EE/CA) for the Former Culebra Island Naval Facility, Culebra Island, Puerto Rico* (ESE 1997). The Engineering Evaluation (EE)/Cost Analysis (CA) investigation included surface and subsurface sample grids on Flamenco Peninsula, Isla Culebrita, Cayo Botella, Cayo del Agua, Cayo Lobo, and Cerro Balcon, where only ordnance-related scrap was identified. Items found included 20-millimeter (mm) high-explosive (HE) incendiary projectiles, MK76 practice bombs, 37mm projectiles, 5-inch rockets, 76mm projectiles, 3- to 6-inch naval projectiles, 81mm mortars, and a grenade.

#### **1.7.5 2004 UXO Construction Support**

1.7.5.01 In June 2004, Ellis Environmental Group, LLC (EEG) submitted the *Site-Specific Final Report, UXO Construction Support, Culebra Island Wildlife Refuge, Culebra Island, Puerto Rico* (EEG 2004). The report documented clearance efforts conducted by EEG on the Northwest Peninsula. Ellis performed four phases of clearance from January 2001 to February 2004. Phase 1 consisted of clearance support by clearing roadways, a wind generator foundation, and a desalination plant foundation, as well as regrading the site. Phase 2 of the construction support was not exercised due to a stop in funding for the construction project. Phase 3 included surface clearance of 70 acres of bird nesting area and 4-foot-depth subsurface clearance of roadways, firebreaks, and an observation post. Phase 4 consisted of demilitarization of scrap, construction of a fence and information kiosk, and development of public awareness information. The public awareness information included a video, UXO safety poster, and UXO safety brochure.

1.7.5.02 During the UXO construction support project, EEG excavated 6,121 holes and recovered 15,479 pounds of scrap metal and 249 UXO items. Fifteen of the 249 UXO items were found within the boundaries of the southern portion of the Northwest Peninsula principal area of interest (AOI).

#### **1.7.6 2004 Archives Search Report Supplement**

1.7.6.01 The ASR Supplement was completed by the USACE Rock Island District as an addition to the 1995 ASR (USACE 2004). This report provides details of aerial training conducted by the Navy between 1935 and 1975 and identifies range/sub-range areas. Of the identified areas, boundaries of the following sub-ranges encompass areas within or adjacent to MRSs 03 and 12:

- Water West: Part of this area is included in MRS 12. A local diver reported underwater ordnance in this area. Suspect munitions include MK II 6-inch HE projectiles.
- Water Center: This area is included in MRS 12. A local diver reported underwater ordnance in this area. Suspect munitions include MK II 6-inch HE projectiles.

- Naval Gunfire Target Area: This range was a naval gunfire and air-to-ground range with its target located on Northwest Peninsula. Munitions included general small arms, .50 cal small arms, MK80-series general purpose bombs, M1 105mm HE, MK21 8-inch armor piercing, MK5 16-inch AP, 2.75-inch rockets, and the 11.75-inch Tiny Tim rocket.
- Agua Cay: This area, also known as Water Key, is part of MRS 02 and was used as a target for bombing and rocket fire. Munitions include MK80-series general purpose bombs and 2.75-inch rockets.
- Air-to-Ground North: This target was located at the northern tip of Northwest Peninsula. Munitions used include general small arms, .50 cal small arms, MK82 500-pound 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. Munitions used include general small arms, .50 cal small arms, MK82 500-pound general purpose bombs, 2.75-inch rockets, and 11.75-inch Tiny Tim rockets.

1.7.6.02 No site visit was conducted in support of the ASR Supplement.

### **1.7.7 2005 Revised Inventory Project Report**

1.7.7.01 A Revised INPR was completed in June 2005 (USACE 2005a). The Revised INPR further clarified the military use of the island of Culebra and divided the original site, Property No. I02PR0068, into 14 separate MRSs. One hazardous and toxic waste project was identified and assigned the number 00, and 13 Military Munitions Response Program (MMRP) project areas were identified and assigned Risk Assessment Code (RAC) scores (RAC scores can range from 1 to 5; 1 being Catastrophic [worst case] and 5 identified as None [requiring no further action]). Historical documents identified these sites as having been heavily used as a Navy gunnery and bombardment area from 1934 to 1975. UXO items have been found in these locations. The risk assessment evaluates two factors, hazard severity and hazard probability, when assigning a RAC of 1 to 5. Hazard severity categories are defined to provide a qualitative measure of the worst credible event resulting from personnel exposure to various type of UXO and the probability that a hazard has been, or will be, created due to the presence and other rated factors of UXO, explosives, incendiary, pyrotechnic, radiological, or recovered chemical warfare materiel (RCWM) on a formerly used DoD site.

1.7.7.02 Based on the categories of conventional ordnance and ammunition found at these sites, MRSs 03 and 12 were each assigned a RAC of 1 (Catastrophic).

### **1.7.8 2005 Supplemental Archives Search Report**

1.7.8.01 The Supplemental ASR was completed by the USACE St. Louis District in 2005 as an addition to the 1995 ASR (USACE 2005b). The Supplemental ASR is the source of most of the historical information pertaining to site operations and identified the key areas of focus for the 2007 site inspection. This document provided a detailed summary of military activities

conducted on Culebra Island and the surrounding cays. The document summarizes planned and/or executed maneuvers and training conducted at the site, including specific time periods, locations, and munitions used.

### **1.7.9 2014 EOD Response**

1.7.9.01 Two 100 (lb.) bombs were recovered from MRS 03. In January and April 2014, U.S. Navy EOD Detachment Jacksonville responded to MRS 03 to detonate recovered MEC. During both responses, the recovered MEC was identified as a 100 lb. bomb, fuzed and containing HE.

### **1.7.10 Cultural and Archeological Resources**

1.7.10.01 The following is taken from the Final Site Inspection Report (Parsons 2007):

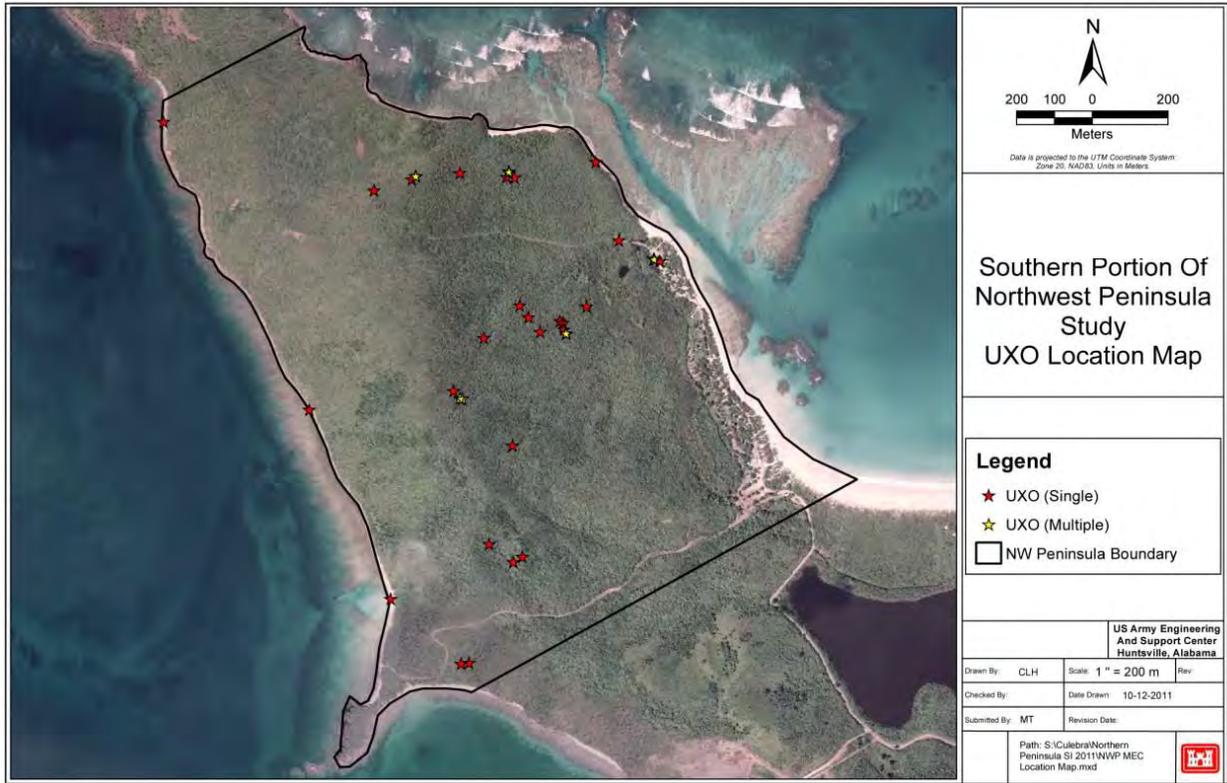
“According to the National Register Information System (NRIS), National Historic landmarks (NHL) list, National Heritage Areas (NHA) list, and National Park Service (NPS), there is only one registered cultural resource within the boundaries of the Culebra Island site. On the Isla Culebrita is an historic lighthouse called Faro Isla de Culebritas. The lighthouse is not open to the public due to building deterioration. According to the Puerto Rico State Historic Preservation Office (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. An archeological survey performed at Lower Camp in 1992 found evidence of prehistoric and historic inhabitants distributed over a half-acre area within the Lower Camp site.”

### **1.7.11 USACE’s Assessment of the Northwest Peninsula Area**

1.7.11.01 On behalf of the DoD, a Congressionally mandated study was performed by the USACE under Public Law 111-383 in 2011 to assess the presence of UXO in the portion of the Northwest Peninsula transferred to the Commonwealth of Puerto Rico. A summary of the estimate of the types and amounts of UXO, as reported in DoD (2012), is presented below.

1.7.11.02 The Northwest Peninsula was used for live gunnery practice between 1936 and January 1, 1972. During this period, approximately 750,000 naval rounds were fired into the Northwest Peninsula. Of these, an estimated 80 percent (600,000) were 5-inch/38 cal and 5-inch/54 cal projectiles and an estimated 10 percent (75,000) were 3-inch/50 cal, 6-inch/47 cal, and 8-inch/55 cal gun ammunition. The balance consisted of other types of military munitions, including 16-inch/50 cal, and munitions for both mortars and howitzers. Additionally, during 1942 to 1968, approximately 320,000 naval aviation munitions (e.g., bombs and rockets) were used (dropped or fired) within the Northwest Peninsula (U.S. Navy 1973).

1.7.11.03 Since 1995, 70 UXO items have been encountered within approximately 19 acres of the study area. This total, which includes 36 UXO items discovered during this study, equates to approximately 3.7 UXO per acre. The locations of the 36 UXO items discovered during USACE’s 2011 assessment are shown on Figure 1-3.



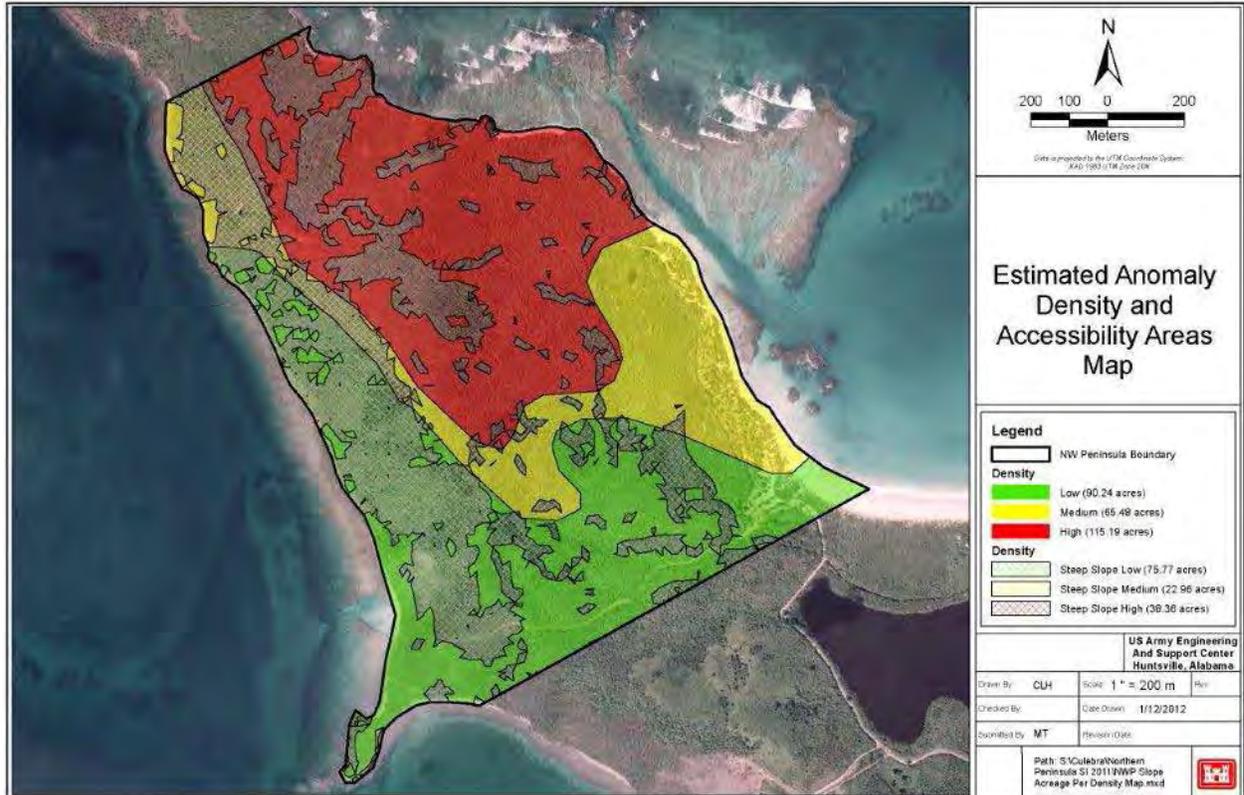
Source: DoD (2012)

**Figure 1-3. Locations of Individual or Multiple UXO Items**

1.7.11.04 The predominant military munition encountered within the study area as UXO was the 5-inch HE naval projectile. Other UXO encountered included the following types of military munitions: 2.75-inch rockets, 3-inch naval projectiles, 40mm projectiles, 75mm projectiles, 81mm mortars, 100-pound General Purpose bombs, a 500-pound General Purpose bomb, and BDU-33 practice bombs.

1.7.11.05 The USACE divided the study area into three areas, based on the number of metallic anomalies detected during the geophysical survey, the estimate of the density of those metallic anomalies within each area, and the steepness of the terrain (see Figure 1-4). The three areas reflect an estimated anomaly density of:

- Low (Green): 0 to 785 anomalies per acre
- Medium (Yellow): 786 to 1,040 anomalies per acre
- High (Red): 1,041 to 1,400 anomalies or more per acre



Source: DoD (2012)

**Figure 1-4. Estimated Anomaly Density and Accessibility Areas Map**

### 1.7.12 Environmental Baseline Survey

1.7.12.01 An EBS was conducted by TtEC in December 2012 and January 2013 as Phase 1 of the current RI. The survey included multibeam echosounder and sidescan surveys of 100 percent of the surveyable area of MRS 03 and MRS 12. A video survey was also conducted during this time. The purpose of the EBS was to determine appropriate equipment and methodologies for follow-on DGM/electromagnetic (EM) surveys (Phase 2 of the RI) and more intrusive investigations (Phase 3 of the RI) to prevent damage to T&E species and/or critical habitat.

## 1.8 INITIAL CONCEPTUAL SITE MODEL

1.8.01 A conceptual site model (CSM) is a description of a site and its environment that can be used to summarize potential sources and areas of contamination and pathways that may lead to possible exposures to human and environmental receptors. A CSM is also used to focus the design and plans for implementing the investigation of the potential source areas or areas where potential exposures may occur. The CSM is a “living document” based on existing knowledge and updated throughout the course of the project as more data become available.

1.8.02 An initial CSM was developed in relation to the MEC and MC in these two MRSs in accordance with Engineer Manual (EM) 200-1-12. One form of CSM is a flowchart that shows

the potential MEC and MC contamination, as well as the receptors that may encounter any potential contamination via various media and migration pathways. This flowchart form of CSM is presented in Figure 1-5. Given the site history presented above, the potential primary source of MEC and possibly the associated MC are the marine sediments on the floor of Flamenco Bay and in the Luis Peña Channel. MEC items may have been directly deposited in the Flamenco Bay sediments as the result of firing at floating targets, undershoots of the targets on the Northwest Peninsula, errant aerial dropping relative to the upland targets, or intentional cover fire or flares during beach landing training. To a lesser extent, some MEC may have been transported into Flamenco Bay by upland runoff and erosion. MEC in the Flamenco Bay sediments may have been subsequently transported and redistributed within the Bay by tidal forces, wave action, or localized currents. Sediment and any MEC items within it may also have been moved around by the mechanical activity of boats or beach maintenance equipment. The processes of sedimentation and scouring would be working to cover and uncover, respectively, items deposited on the surface of the sediment. These potential sources and transport processes are illustrated in the CSM presented in Figure 1-5. MEC items may also have been directly deposited in the Luis Peña Channel sediments as the result of overshoots of the targets on the Northwest Peninsula, errant aerial dropping relative to the upland targets, or firing at floating targets. Once again, some small amount of MEC may have been transported into the Luis Peña Channel by upland run-off and erosion. MEC deposited in the Luis Peña Channel sediments may have been transported locally by the same natural transport processes noted above. MEC items that were previously deposited in either MRS may have been subsequently covered over by more recent sediment deposits. Figure 1-5 also provides a preliminary indication of which exposure pathways to MEC and MC may be “complete” and warrant further assessment.

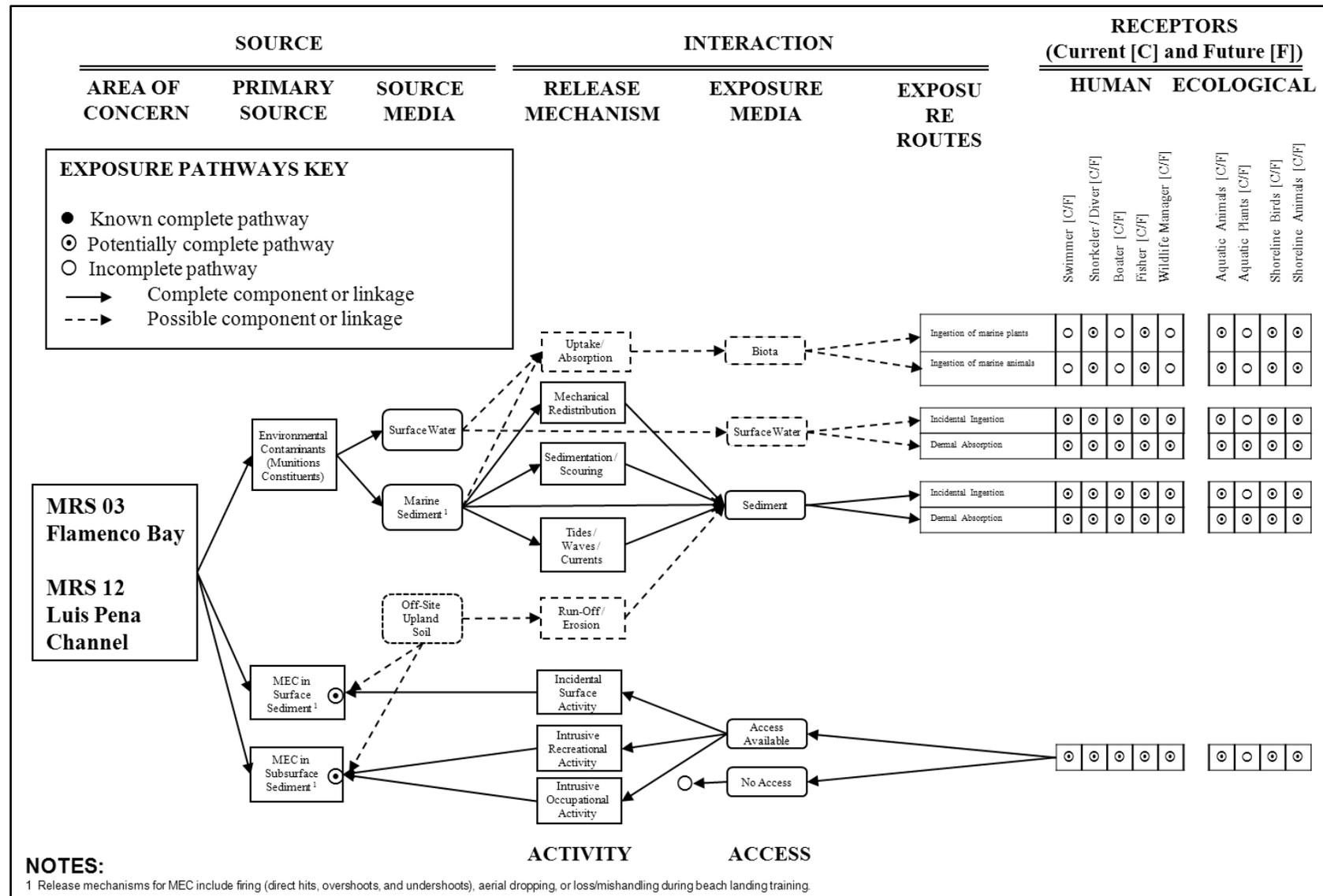
1.8.03 People may be exposed to any MEC or MC associated with items in the sediment as the result of recreational use of these waters through wading, swimming, snorkeling, fishing, diving, camping, and boating. Others may access or utilize these waters as part of the management or study of their coral and underwater ecological habitats or the plants and animal species of the shorelines. People’s exposures may be via direct contact with MEC items or MC in the sediments located in the shallow water or through contact with items by anchors or diving gear in somewhat deeper waters. Secondary exposure to MC in the surface water or that has been absorbed by biota is a possibility but is unlikely to be significant from a human health or ecological perspective.

1.8.04 Based on this CSM, MEC may be present in the sediments of Flamenco Bay and the Luis Peña Channel. No specific locations are known at this time to be concentrated MEC source areas due to the lack of prior investigation. However, locations closest to the shorelines of the Northwest Peninsula, where many training targets were located, are more likely to be where the MEC was originally deposited. In addition, the locations closest to the shorelines in both MRSs would typically be most accessible and provide the greatest opportunity for people to encounter

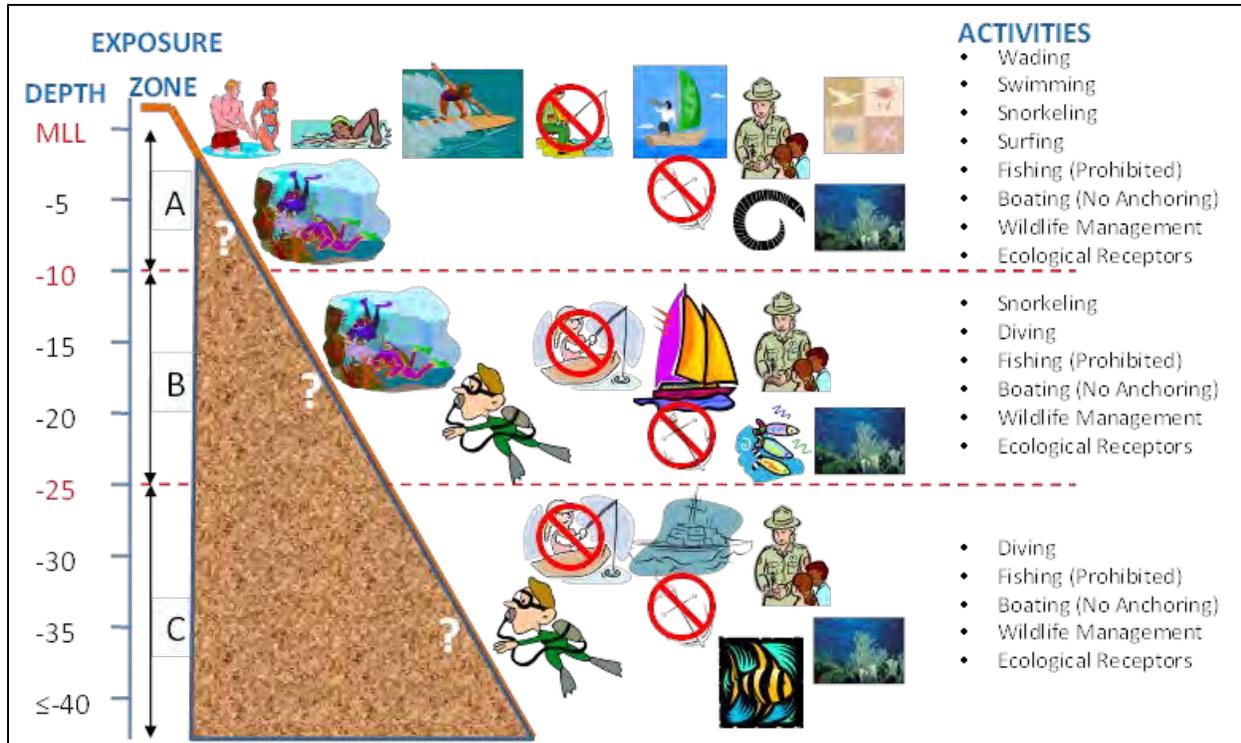
any items that are present, given the receptors listed on the CSM, and the types of activities they would be expected to engage in. Accordingly, both MRSs were divided into subareas for the in-water surveys, based on the depth of water, and agreed to by all parties during the first three TPP meetings. Three primary depth zones were defined for these MRSs using publicly available bathymetry (see Figures 1-6 and 1-7 for MRS 03 and MRS 12, respectively):

- Zone A Nearshore (mean low water [MLW] to MLW-10') – This is the depth range in which wading, swimming, snorkeling, some fishing, some boating, and some wildlife management exposures are more likely to occur. In the sandy beach areas of Zone A, the 30 feet of marine environment nearest to the beach is specifically designated as Zone A', given the even greater potential for human exposure and contact with possible MEC in this strip.
- Zone B Intermediate (MLW-10' to -25') – This is the depth range in which novice diving and less incidental fishing, boating, and wildlife management exposures are more likely to occur.
- Zone C Intermediate (> MLW-25') – This is the depth range in which more experienced diving and more specialized fishing, boating, and wildlife management exposures are more likely to occur.

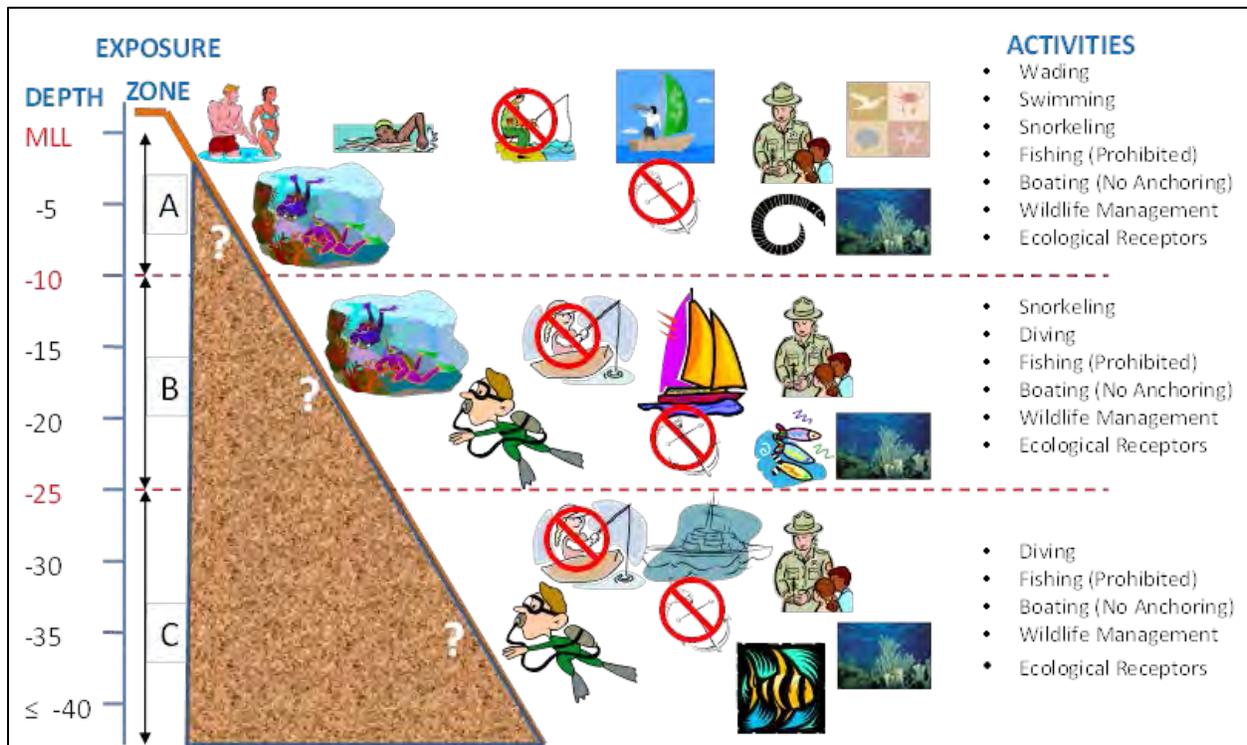
1.8.05 The CSMs will be updated as additional information becomes available and is presented to the stakeholders during the TPP meetings in support of the RI/FS project. The TPP documentation is included in Appendix I. The Phase 2 survey data are presented as Figures 3-1 and 3-2, and will be presented in the RI Report, as gridded EM data, anomaly density plots, and target lists.



**Figure 1-5. Preliminary Conceptual Site Model for Potential Exposure to MEC and MC at the Culebra Water Ranges MRS 03 and MRS 12**



**Figure 1-6. Potential Human and Ecological Receptors Culebra Water Ranges – MRS 03**



**Figure 1-7. Potential Human and Ecological Receptors Culebra Water Ranges – MRS 12**

## **2.0 TECHNICAL MANAGEMENT PLAN**

### **2.1 INTRODUCTION**

2.1.01 The purpose of the Technical Management Plan is to provide details of the organizational structure, lines of authority, and lines of communication to be used during the Phase 3 MEC investigation.

### **2.2 PHASE 3 INTRUSIVE INVESTIGATION ORGANIZATION**

2.2.01 The Phase 3 intrusive investigation organization consists of representatives from TtEC, as depicted on Figure 2-1. Appendix C lists the key points of contact for the TO for the RI. The roles of essential Phase 3 TtEC project team members are described below.

### **2.3 TETRA TECH EC, INC. PERSONNEL**

2.3.01 The Phase 3 intrusive investigation will be conducted by the personnel identified below.

#### **2.3.1 Program Management**

2.3.1.01 TtEC Phase 3 program management will be provided by the following individuals:

- The Program Manager is Kent Weingardt. The Program Manager is responsible for ensuring contract requirements are met during the performance of the TO.
- The Program Safety and Health Manager (SHM) is Jeff Streib, Certified Safety Professional. As Program SHM, Jeff is the chief resource for all matters regarding safety and industrial hygiene. He provides technical support in safety, health, environmental compliance, industrial hygiene, hazardous materials, and other technical matters. He also reviews all project APPs, Site Safety and Health Plans (SSHPs), and activity hazard analyses (AHAs) and supports the projects when there are changes and questions.
- The MMRP Program Quality Control (QC) Manager (QCM) is Eugene Mikell. Eugene is responsible for implementation/oversight of the Munitions Response QA/QC program for TtEC. He performs oversight of a full spectrum of quality tools and procedures for all munitions response projects. This includes implementing a comprehensive quality training program for TtEC QC personnel, developing QC plans and QAPPs, and reviewing project plans and reports. He supervises all UXO QC Specialists (UXOQCSs) within the TtEC Munitions Response Program.
- The Geophysics QCM (GQCM) is Elise Goggin. Elise is responsible for anomaly resolution to validate investigation results. In addition, she interfaces with the investigation team and data processors to ensure best practices and industry standards are followed, including all guidance provided in the DIDs.



### **2.3.2 Project Manager**

2.3.2.01 The Project Manager (PjM), Ian Roberts, is responsible for the strategic and tactical leadership, management, and administration of the TO and is supported at the corporate level with health and safety, project controls, quality, finance, procurement, engineering, and environmental and regulatory compliance personnel. The PjM is responsible for the managing on a day-to-day basis all project activities, monitoring the project budget, updating the status the project schedule, and ensuring project compliance.

### **2.3.3 Field Investigation Coordinator**

2.3.3.01 Fernando Pagés will serve as the Field Investigation Coordinator for the Phase 3 intrusive investigation. Fernando is based in Puerto Rico, and is familiar with the personnel and resources to ensure effective implementation of the project. The Field Investigation Coordinator is responsible for coordinating Phase 3 intrusive resources on site to support the project field investigation.

### **2.3.4 Assistant Project Manager/Field Operations Lead**

2.3.4.01 The Assistant PjM/Field Operations Lead (FOL), Mindy Johnson, is responsible for implementation of the field program. The PjM/FOL oversees day-to-day field operations for intrusive investigations, MEC disposal, and MC sampling. In addition, she will ensure that proper staffing and resources are available on site, that personnel have reviewed and understand their responsibilities, and that intrusive investigation and data collection activities are conducted in accordance with the approved plan and cited standards. The PjM/FOL reports directly to the TtEC PjM.

### **2.3.5 Field UXO Quality Control Specialist**

2.3.5.01 The Field UXOQCS is responsible for all aspects of Phase 3 project quality. This individual must ensure that the three phases of control process (discussed in Section 4.5) is implemented for all definable features of work (DFWs) and that the resulting data meet the data quality objectives (DQOs) specified in the approved plan. In exercising his responsibilities, the UXOQCS reports directly to the MMRP QCM and communicates with the project management staff.

### **2.3.6 Project UXO Safety Officer/Site Safety and Health Officer**

2.3.6.01 The UXO Safety Officer (UXOSO)/Site Safety and Health Officer (SSHO) is responsible for all aspects of health and safety on the project site. This is an especially critical role during intrusive diving operations that involve MEC investigation and demolition operations. His duties will include conducting daily safety briefings, conducting safety inspections, preparing and maintaining safety reports and documentation, and conducting initial investigations for any health and safety incident. Because this phase of fieldwork has a significant diving component, the SSHO will be a UXO dive-qualified individual. The SSHO

reports directly to the TtEC SHM. Additional duties and qualifications of the UXOSO/SSHO are contained in the APP (Appendix D).

### **2.3.7 Senior UXO Supervisor/Dive Supervisor**

2.3.7.01 The Senior UXO Supervisor (SUXOS)/Dive Supervisor (DS), Don Schwalback, is responsible for conducting the Phase 3 intrusive investigations. In fulfilling his duties, he will direct the intrusive investigation dive team to meet the daily production goals and achieve the project quality metrics. He will also be responsible for planning and conducting MEC disposal operations when MEC disposal is necessary. The SUXOS/DS will coordinate with the project UXOSO/SSHO to ensure the safety and well-being of his dive team, and with the UXOQCS to ensure the project quality metrics are achieved. The SUXOS/DS reports directly to the Assistant PjM/FOL.

### **2.3.8 UXO Divers**

2.3.8.01 The UXO divers will perform the Phase 3 intrusive investigations and MEC disposal operations under the guidance and direction of the SUXOS/DS. They are responsible for conducting the fieldwork in a safe and efficient manner and following the written guidance of the work plans, the work plan appendices, and SOPs.

### **2.3.9 Geophysics Technicians**

2.3.9.01 The geophysics technicians are responsible for database management and navigation during the project. The technicians will set up and maintain the global positioning system (GPS), prepare daily target lists, assist with placement of target buoys and markers for reacquisition, and enter the target investigation daily results. They will also support the UXOQCS in navigation for QC investigations.

### **2.3.10 Designated QC Diver**

2.3.10.01 The designated QC diver will be a diver selected from the UXO dive personnel that is Technician 3-qualified and will work under the supervision of the UXOQCS to perform QC diver duties. This will include statistical QC reinvestigations of MEC locations. The designated QC diver will not participate in the intrusive activities of the AOI he/she is conducting a second party check on.

### **2.3.11 Observers**

2.3.11.01 Each dive team performing underwater investigation work will be accompanied on the boat or from shore by qualified, trained, and experienced personnel who have had a briefing by a qualified biologist to act as observers in order to identify the presence or absence of T&E species. Training and briefings of project personnel by the project biologist and NOAA/NMFS staff will be completed prior to performing any in-water work, in accordance with the Final Supplemental SOPs for Endangered Species Conservation and their Critical Habitat during

Underwater Investigations (February 2014) and Addendum 1 (February 2015), hereafter referred to as the Environmental SOPs (see Appendix B-1).

## **2.4 COMMUNICATION AND REPORTING**

### **2.4.1 Recordkeeping**

2.4.1.01 All aspects of administering the TO must be substantiated by permanent records, such as written correspondence, notes, and photographs. It is essential to summarize important non-written communications with notes covering conferences, telephone calls, and discussions, giving the date, location, parties involved, and important topics discussed. Written correspondence is the most deliberate, as well as the most important, of the three general types of contractual communication (i.e., person to person, telephone calls, and written correspondence). All records will be filed in accordance with the project document control and records management system and in accordance with Procedure PO-08, Document Control and Records Management.

2.4.1.02 The Administrative Record for this project is stored at the Culebra Foundation on Culebra and at the USACE Antilles Office in San Juan.

### **2.4.2 Office Communications and Reporting**

2.4.2.01 The TtEC PjM is responsible for issuing the following documents throughout the duration of the TO:

- Meeting minutes (due 5 business days after a meeting)
- Records of telephone conversations (due with the Project Status Report)
- Project Status Reports (in accordance with DID WERS-016)

### **2.4.3 Field Communications and Reporting**

2.4.3.01 The following communications will be documented in a chronological communications log maintained by the on-site Assistant PjM/FOL:

- When and why work is stopped for safety reasons
- Health and safety violations
- Personnel changes and reason for changes
- Any deviations from the approved Work Plan that occur in the field (for example, equipment changes, analysis, or problems encountered)

2.4.3.02 During fieldwork, Daily Reports (DRs) will be completed to detail the personnel on site, production, equipment, lessons learned, and summaries of safety and QC tasks. During the RI, the DR will include, at a minimum, weather information at the time of survey, field instrument measurements and calibrations (if applicable), targets investigated, any problems encountered, and any Government personnel directives.

## 2.5 DELIVERABLES

2.5.01 Project deliverables will meet the schedule requirements of the project and will be prepared in accordance with the applicable DID format referenced in the PWS. Deliverables will undergo internal TtEC technical and QC reviews prior to submittal to other organizations. The primary deliverables for associated with the RI are:

- Work Plan
- Chart and target list showing MEC locations and identification
- MEC Disposal Report
- Laboratory results if MC samples are collected
- RI Report

2.5.02 The RI Report will include items presented in Table 2-1 and summarized in the sections below. The Final RI Report will also include the Instrument Verification Strip (IVS) Reports and all geophysical data (including QC/equipment testing) from Phase 2.

**Table 2-1. Summary of Data Deliverables**

Version	Product	Format
Draft	RI Report	Electronic (.pdf)
Draft Final	RI Report	Electronic (.pdf)
	RI Report	Electronic (.pdf) Paper
	Intrusive Investigation Coverage	Geotiff
Final	geographic information system (GIS) and Geophysical Data	Formatted in accordance with DID WERS-004.01, 007.01
	Target Investigation Results	Excel spreadsheet Esri shapefile

### 2.5.1 Intrusive Investigation Data

2.5.1.01 TtEC will provide: 1) the intrusive investigation data results, including mini-grid lists, grid locations, and coverage; 2) descriptions and photographs of the individual anomalies that were intrusively investigated, (e.g., projectile 5-inch remnant, Projectile Nose fuze/Mechanical Time fuze, 4.2-inch mortar fragment); 3) GIS and geophysical survey data; and 4) the number and distribution of MEC items present in the area. The areas noted as incomplete during the Phase 2 geophysics survey will be evaluated for additional DGM effort during the Phase 3 fieldwork. Where possible, analog transects will be performed, and differential global positioning system (DGPS) coordinates will be taken to supplement the Phase 2 geophysics as shown in Figure 2-2. The data text will be provided in portable document format (.pdf), data products in the form of maps, and digital data in standard GIS formats. The RI Report will document the nature and extent of MEC contamination in each MRS.

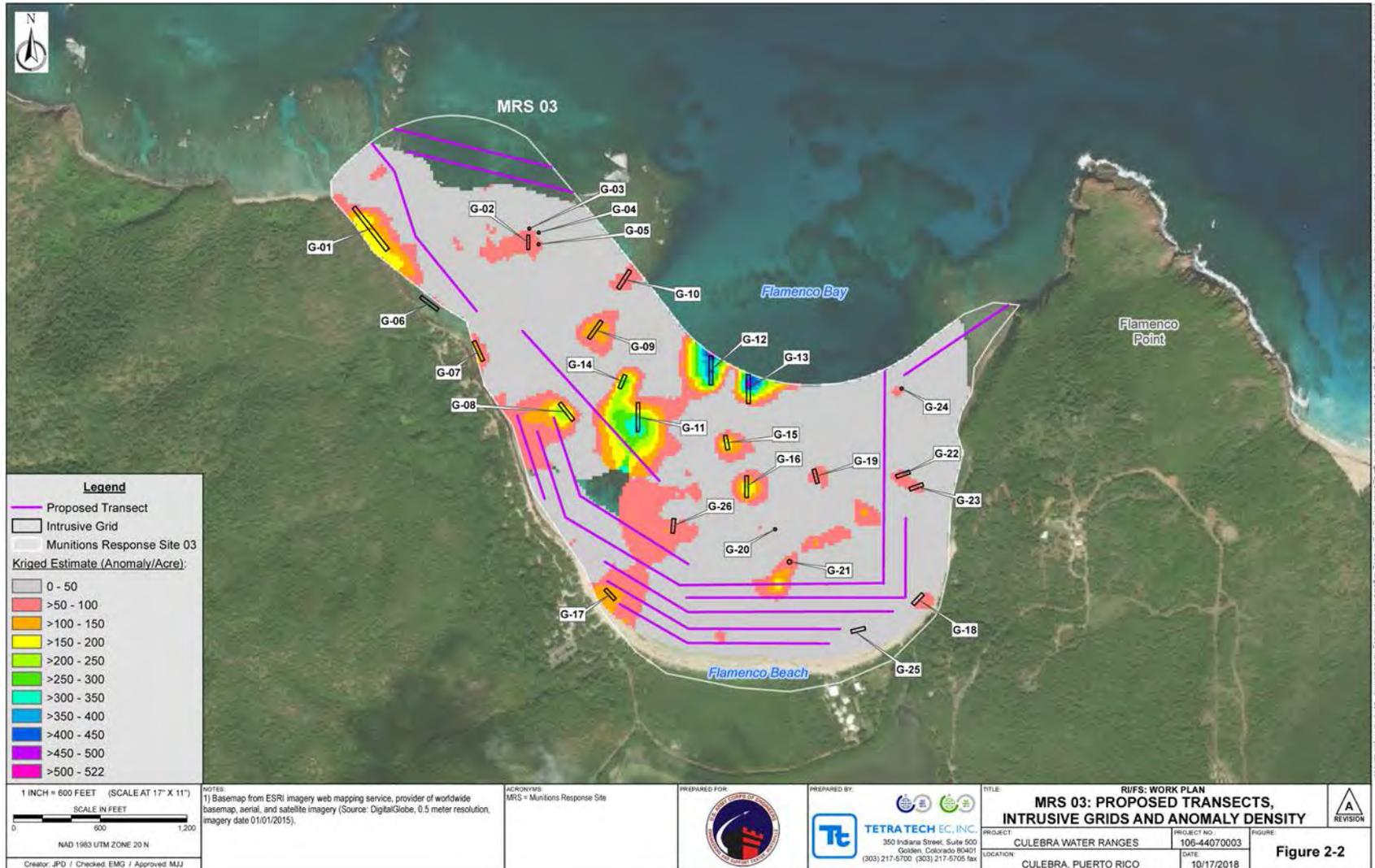


Figure 2-2. Proposed Transects

2.5.1.02 TtEC will provide the laboratory results of any MC samples that are collected during the intrusive investigation.

## **2.5.2 Intrusive Investigation Deliverables**

2.5.2.01 A combination of HYPACK, Oasis Montaj, ArcGIS and TtEC-developed software will be used to generate final data products. Charts displaying the MEC locations will be generated in the project datum at a scale appropriate for site evaluation. In addition, the intrusive results (and analog/GPS QC checks) will also be delivered via an Access database in accordance with DID WERS-004.01.

2.5.2.02 In addition to delivering the final MEC charts, as described above, the target investigation data will be provided in an Excel spreadsheet containing the MEC identification, condition, and item digital photograph.

2.5.2.03 T&E species sightings and any measures taken when present within distances of the Phase 3 field operations will be completed and submitted as described in Section 6 (Environmental Protection Plan). Daily Observer Log Sheets are a daily requirement while on the water whether a protected species is encountered or not.

2.5.2.04 Chemical data deliverables will be submitted as described in Step 5 of MC QAPP Worksheet #11.

## **2.6 SCHEDULE**

2.6.01 A project schedule for this phase of the project and associated tasks has been prepared for work planning purposes (Figure 2-3). This schedule will be updated, when necessary, and submitted to the CEHNC with the associated progress report. The included schedule is based on the submittal of the current Draft Final Work Plan, the anticipated time needed for stakeholder review, TtEC's response to comments, and preparation of Final Work Plan. Revisions to the project schedule will be included with the project status reports.

2.6.02 The normal working days will be 5 days per week, up to 10 hours per day, depending on the hours of available daylight and site conditions. The longer working hours are required for equipment setup and transit time to and from the MRSs.

## **2.7 PERIODIC REPORTING**

2.7.01 Over the course of the project, periodic reports, such as weekly/monthly project status reports and DRs, will be required to document project activities. TtEC will prepare these reports in accordance with the PWS, the applicable DIDs, and the project schedule. Specific reports associated with this RI phase are discussed in Section 2.5 of this Work Plan.

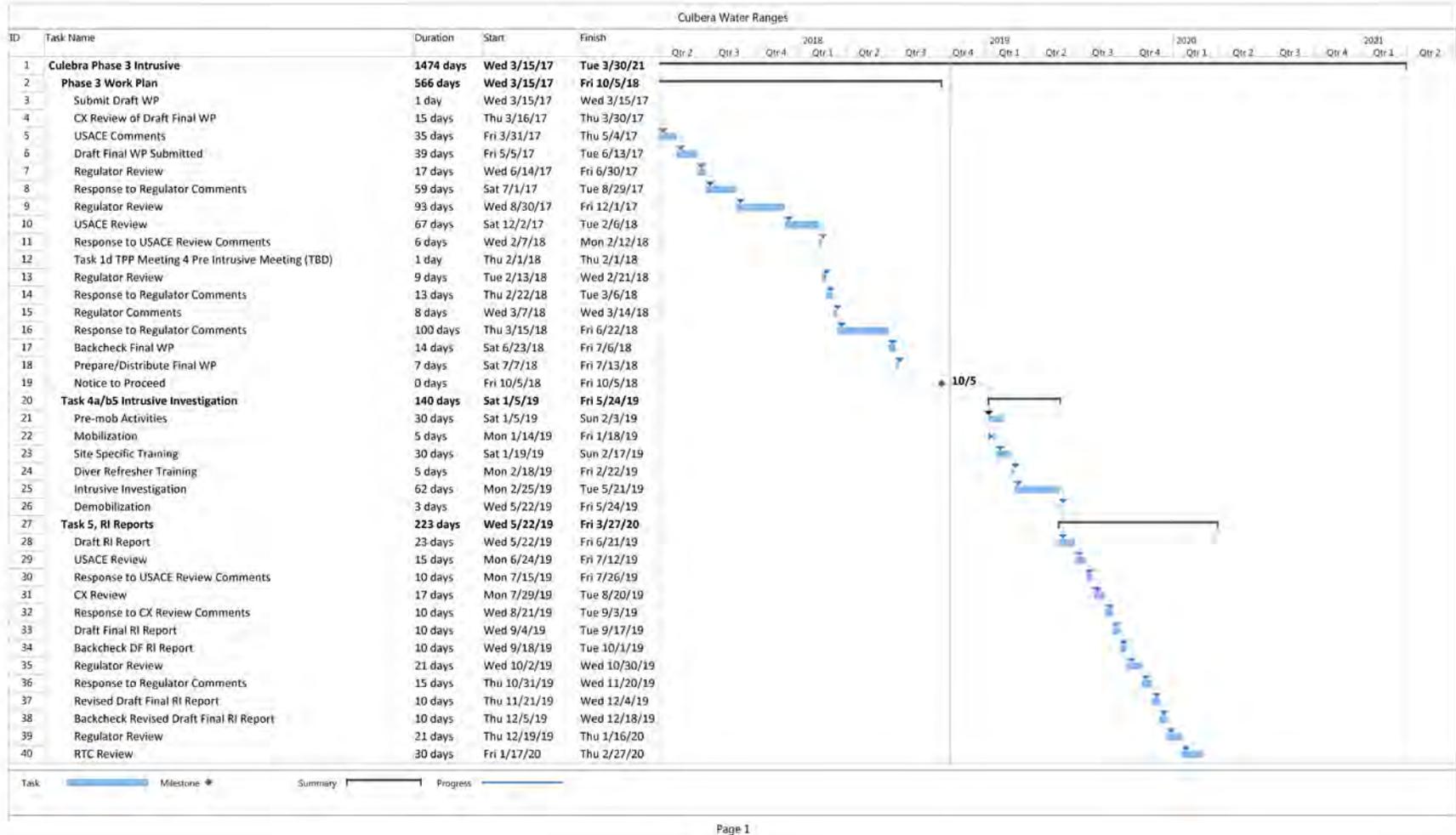


Figure 2-3. Proposed Phase 3 RI Project Schedule

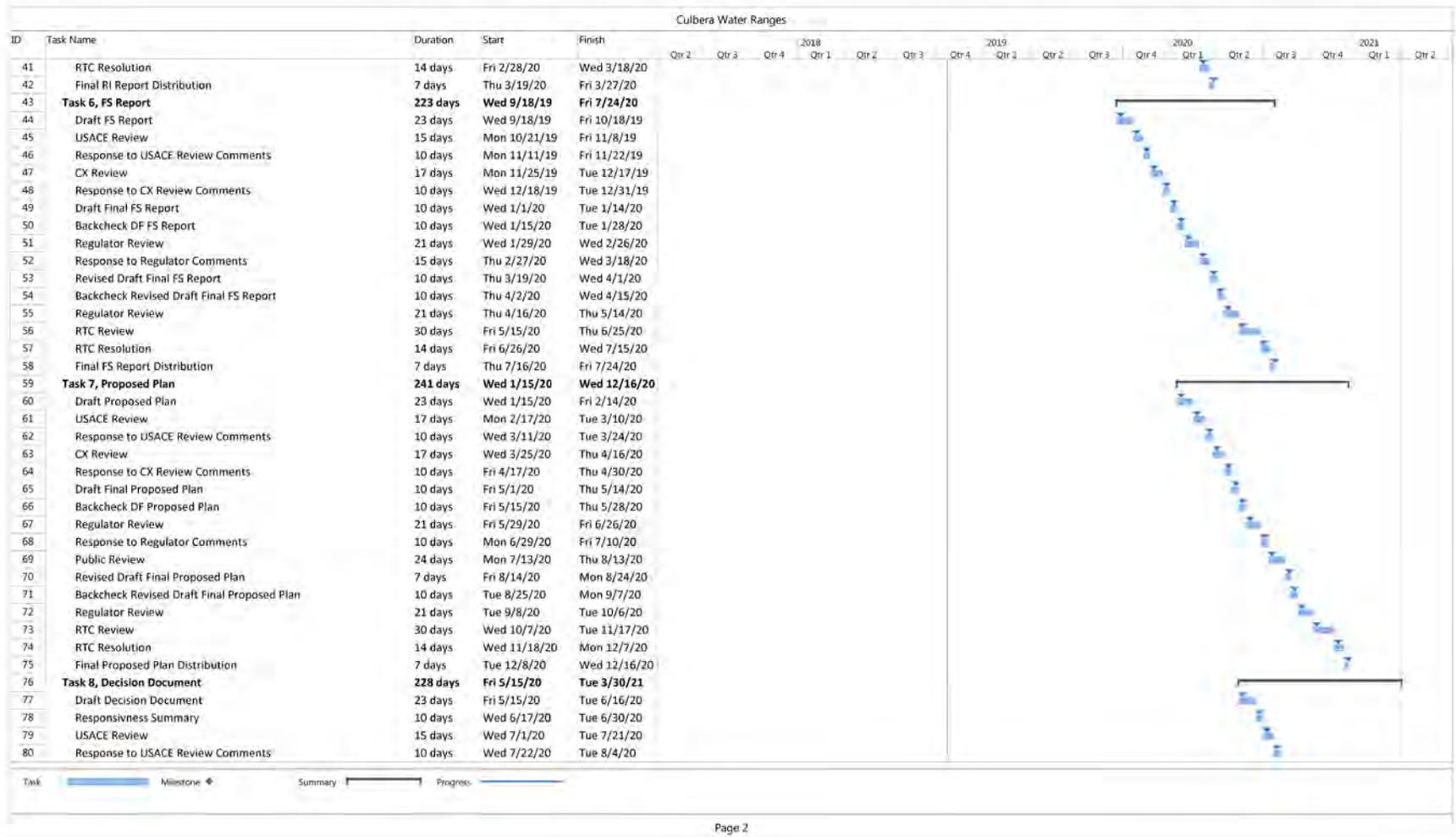


Figure 2-3. Proposed Phase 3 RI Project Schedule (continued)

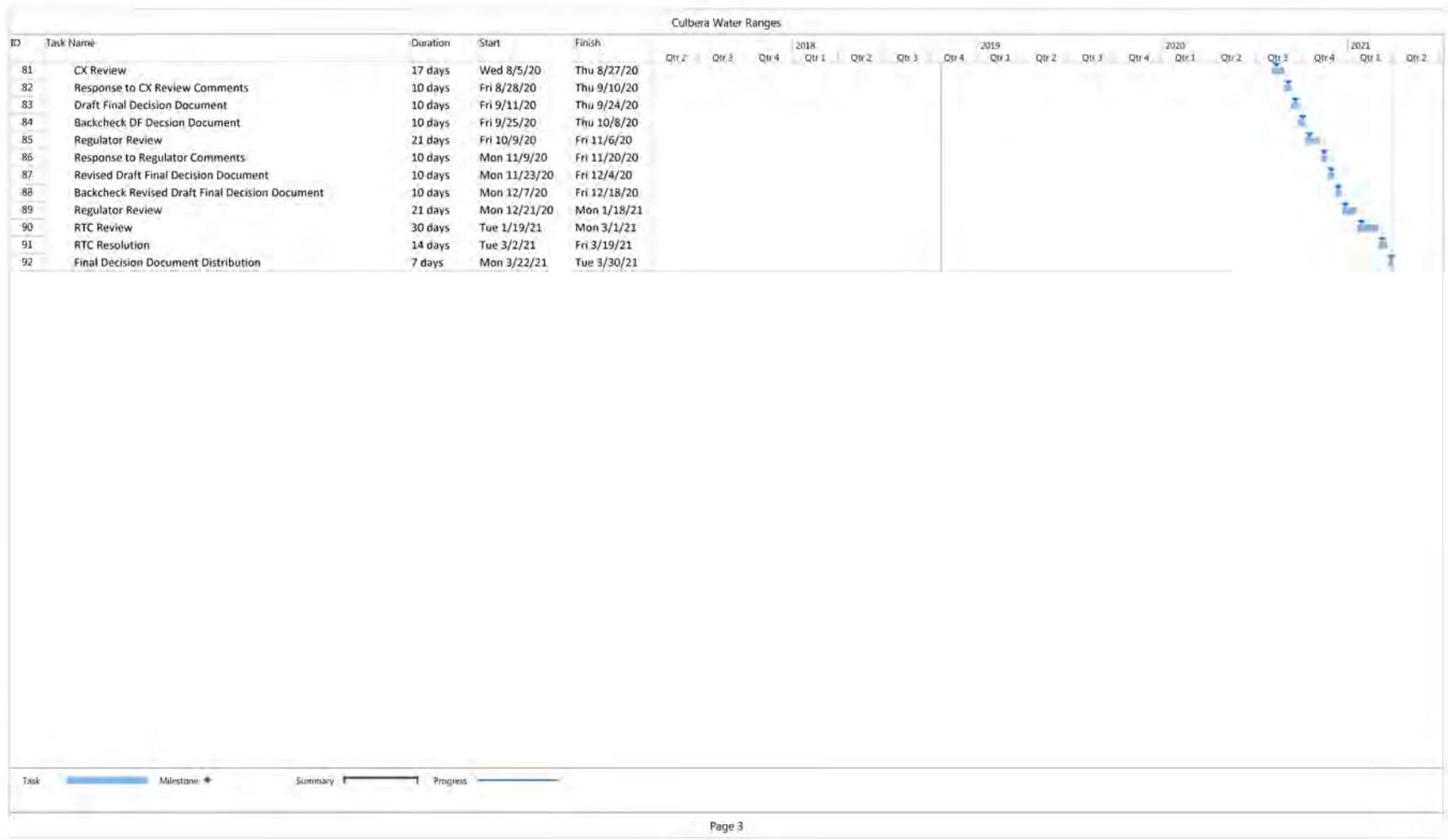


Figure 2-3. Proposed Phase 3 RI Project Schedule (continued)

## 2.8 COSTING AND BILLING

2.8.01 This TO was awarded to TtEC as a combination of firm-fixed-price tasks and cost-plus-fixed-fee tasks. The firm-fixed-price tasks are billed based on work completed in accordance with the negotiated milestones or accepted unit rates. The cost-plus-fixed-fee tasks are billed based on monthly progress. Milestones will be considered met or completed when the required QC documentation has been submitted, the QA completed, and the submittal accepted. A milestone payment schedule has been established for this TO.

## 2.9 PROJECT PUBLIC RELATIONS SUPPORT

2.9.01 Site personnel will not disclose any data generated or reviewed during this and each phase of the Task Order and will refer all requests for information concerning site conditions to the USACE Jacksonville District Project Manager (Wilberto Cubero) and the Public Affairs Specialist (Amanda Parker), with copies of such requests furnished to the CEHNC (Teresa Carpenter). Information gathered during this project is the property of the DoD, and distribution to any other source is prohibited.

## 2.10 DATA QUALITY OBJECTIVES

2.10.01 Table 2-2 presents the DQOs for the Phase 3 intrusive investigation.

**Table 2-2. Data Quality Objectives and Activities**

<b>DQO Step and Description</b>	<b>DQO Step Activity</b>
1) State the Problem <i>Define the problem that necessitates the study.</i>	Historical records and observations from previous investigations have shown that past DoD training activities involving the use of munitions (e.g. bombs, torpedoes, rockets, and projectiles) took place and may have impacted MRS 03 and 12. The residual munitions-related materials resulting from the past training activities may pose a threat to human health and/or the environment due to current or potential future exposures. MRS 03 and MRS 12 require further investigation and assessment to determine the nature and extent of the residual munitions-related materials, the likelihood and magnitude of the hazards they pose, and whether any corrective action (e.g., immediate responses, use limitations, or removal actions) are needed to mitigate the identified hazards. The current CSM is presented and discussed in Section 1.8.
2) Identify the Decision <i>Identify the decision(s) that the study will resolve.</i>	The Phase 3 investigation will be conducted to answer the following questions and support the decision-making process regarding the site: <ul style="list-style-type: none"> <li>• Do the residual MEC and munitions-related materials within MRS 03 and MRS 12 pose an unacceptable explosive hazard to people or the environment?</li> <li>• Are immediate actions necessary to protect human health or the environment from these hazards?</li> <li>• If the residual MEC and munitions-related materials within MRS 03 and MRS 12 do not pose an unacceptable explosive hazard, do they pose any other (potentially unacceptable) risk to human health or the environment, and, if so, what is the nature of that risk?</li> <li>• What is the density, nature, and vertical and horizontal extent of MEC within the MRSs?</li> </ul>

**Table 2-2. Data Quality Objectives and Activities (continued)**

<b>DQO Step and Description</b>	<b>DQO Step Activity</b>
2) Identify the Decision <i>Identify the decision(s) that the study will resolve. (continued)</i>	<ul style="list-style-type: none"> <li>• Are further remedial actions (e.g., immediate response, use limitations, or removal actions) necessary to reduce or eliminate the human health and environmental impacts of the MEC within MRS 03 and 12?</li> <li>• If necessary, which parts of the MRSs should be further evaluated in an FS?</li> </ul>
3) Identify Inputs to Decision <i>Identify data and information needed to make the study decision(s).</i>	<p>The sites are currently used for all forms of water recreation and are also designated as protected wildlife habitat. These uses are expected to continue in the future. Historical records (including emergency response reports), the results of previous studies (See CSM, Section 1.8 for list), data from the RI (Phases 1, 2, and 3), and other available sources will be used to separately compile the following information relative to the portions of the MRSs with water depths less than and greater than 10 feet mean lower low water (MLLW):</p> <ul style="list-style-type: none"> <li>• The density and distribution (vertical and horizontal) of potential munitions-related anomalies/targets</li> <li>• The source of these anomalies and what fraction of those sources are MEC</li> <li>• The density and distribution (vertical and horizontal) of MEC present</li> <li>• The types (e.g., make, model, condition) of the MEC present in the MRSs</li> <li>• The presence and indicated effectiveness of current constraints to access within the MRSs</li> <li>• The presence, nature and concentrations of any MC detected in sediments, (i.e. MEC with exposed filler or BIP procedures as used)</li> </ul> <p>The current and anticipated future uses of the MRSs</p>
4) Define the Study Boundaries <i>Define the spatial and temporal boundaries pertinent to the decision(s).</i>	<p>Figure 3-3 defines the lateral spatial boundaries of MRS 03 and MRS 12. If marine endangered species are within 25 feet (excluding corals), underwater intrusive investigation activities will be stopped and resume once the animal has departed to a safe distance of its own volition per the SOPs. Areas where the depth of water is less than 10' at MLLW and greater than 25' at MLLW will be assessed separately using the collected data, as reflected in the CSM.</p>
5) Develop the Decision Rule <i>Develop the logic for drawing conclusions from the study findings.</i>	<p>The following decision rules have been identified with respect to MEC given the site management decisions identified in Step 2 above:</p> <ul style="list-style-type: none"> <li>• If MEC or MD is found to be present within MRS 03 or MRS 12, those areas will be considered to be impacted by MEC and will be further assessed in the FS.</li> <li>• If, after the analog transect data is analyzed, it is determined that additional investigation is required, TtEC and the USACE will coordinate the placement of intrusive grids or selected targets for investigation with stakeholders prior to investigation.</li> <li>• If an area within MRS 03 or MRS 12 is found to contain MEC or MD, then an assessment will be conducted per USACE LTR dtd Jan 3, 2017, Trial Period for Risk Management Methodology at FUDS MMRP Projects.</li> <li>• If MEC/MD is located within a high- or medium-density area that does not return to background density within the current MRS boundary, this will trigger the requirement for a step-out investigation. The decision unit for step-outs will be an analog density transect designed to bound the MEC/MD contamination to +/- half the transect spacing. Up to five additional transects, spaced in a manner consistent with the Phase 2 data, will be collected to bound the contamination. If the density is still above background on the fifth transect, the area will be recommended for additional investigation.</li> </ul>

**Table 2-2. Data Quality Objectives and Activities (continued)**

<b>DQO Step and Description</b>	<b>DQO Step Activity</b>
5) Develop the Decision Rule <i>Develop the logic for drawing conclusions from the study findings. (continued)</i>	<ul style="list-style-type: none"> <li>• If investigations in a high- or medium-density mini-grid result in only one MEC and/or MD being found, and no additional evidence of MEC or MD is found, the potential for MEC will be evaluated in the FS.</li> <li>• If multiple MEC or MD items are found in the mini-grid, the high- or medium-density area will be considered a concentrated munitions use area (CMUA).</li> <li>• If no MEC or MD is found in the mini-grid, the high-density area will be labeled a non-concentrated munitions use area.</li> <li>• If, during the AOI investigation, specific MEC and anomaly densities are identified, then the remaining portion of that individual CMUA will be representative of the sample. This will be identified in the RI Report as a limitation of the data.</li> <li>• If MRS 03 or MRS 12 (or specific areas within them) exhibit no confirmed MEC or MD, and the DGM survey data indicates little or no potential for MEC, then a recommendation will be made to proceed to No Further Action with respect to potential MEC hazards in those areas.</li> <li>• If, after the analog transect data are analyzed, it is determined that additional investigation is required, TtEC and the USACE will coordinate the placement of intrusive grids with stakeholders prior to investigation.</li> <li>• If MEC are found, determine the treatment method appropriate to the item found which will protect ecological resources and minimize hazards to UXO divers.</li> <li>• DGM transect data gaps will be resolved by analog transects performed by divers.</li> </ul>
6) Specify the Limits on Decision Errors <i>Specify the decision makers' tolerance limits on measurement or decision errors.</i>	<p>The performance and acceptance criteria for all DFWs are identified in Section 4 of this plan. The following aspects of the approach will further define the quality and sufficiency of the data collected, and, in so doing, specify the limits on the acceptable decision errors associated with using that data:</p> <ul style="list-style-type: none"> <li>• All anomalies meeting the detection threshold established in the IVS will be considered possible targets for investigation. Actual target investigation will be performed in strategically placed mini-grids approved by the Project Decision Team (PDT). The location of the mini-grids will be based on the objectives of the investigation to ascertain the vertical and horizontal extent of MEC contamination.</li> <li>• Anomaly density thresholds will be defined using purpose-built tools in Visual Sample Plan (VSP) and will be based on the relative density rates observed in the Phase 2 data. High-, medium-, and low-density areas will be intrusively sampled to determine nature and extent of contamination.</li> <li>• If a medium- or high-density area is a result of a concentrated munitions use, a high percentage of the anomalies should be associated with MEC and/or MD. Based on this assumption, intrusive investigation in high-density areas does not need to be extensive. All large medium-/high-density areas will be intrusively sampled using appropriately sized mini-grids, as represented in Figures 3-1 and 3-2. All detected anomalies within the grid(s) will be intrusively investigated.</li> <li>• To prevent decision errors, the location(s) of the high anomaly density grid(s) will be selected in the area determined to be most likely to contain MEC. This determination will be made based on review of the following:                         <ul style="list-style-type: none"> <li>○ The historical records</li> <li>○ The results of the EBS</li> <li>○ The Phase 2 geophysical data and underwater video</li> </ul> </li> </ul>

**Table 2-2. Data Quality Objectives and Activities (continued)**

<b>DQO Step and Description</b>	<b>DQO Step Activity</b>
6) Specify the Limits on Decision Errors <i>Specify the decision makers' tolerance limits on measurement or decision errors.</i> <i>(continued)</i>	<ul style="list-style-type: none"> <li>• Investigations in low-density areas will be based on underwater video evidence and a consideration for areas with high potential hazard/receptor interaction.</li> <li>• If MEC is located during the step-out search, this will trigger additional step-out transects. This process will continue until the contamination has been bound or the maximum safe depth limitations have been met.</li> <li>• If marine endangered species are within 25 feet (excluding corals), underwater intrusive investigation activities will be stopped and will resume once the animal has departed to a safe distance of its own volition per the SOPs.</li> </ul>
7) Optimize the Design for Obtaining the Data <i>Identify a data collection design that is expected to satisfy the performance criteria.</i>	<ul style="list-style-type: none"> <li>• The intrusive mini-grid locations will be placed in low-, medium- and high-density areas and will overlap the locations of the digital geophysical targets reviewed and approved by the USACE Geophysicist (see Figures 3-1 and 3-2).</li> <li>• All underwater detection equipment will be tested daily prior to beginning operations and the results of the tests documented. GPS/DGPS units will be tested daily at an established monument of control point (on land) and will meet the performance criteria established in Table 4-2.</li> <li>• All intrusive data will undergo a generalized anomaly resolution process by the TtEC QC Geophysicist to ensure the dig results are reasonable based on the estimated density. Discrepancies with Phase 2 data will be discussed with the USACE.</li> <li>• Mini-grid locations will be selected based on review of the following:                             <ul style="list-style-type: none"> <li>○ The historical records</li> <li>○ The results of the EBS</li> <li>○ The Phase 2 geophysical data and underwater video</li> <li>○ Consideration for public access</li> </ul> </li> <li>• Only certified divers experienced with underwater analog detection systems will be selected to conduct underwater intrusive investigations.</li> </ul>

**2.11 FIELD OPERATION MANAGEMENT PROCEDURES**

2.11.01 This section lists the major field operation components of the intrusive investigation. Detailed descriptions and field procedures to be followed during each of these steps are presented in the subsequent chapters and appendices of this Work Plan. Field operations for Phase 3 of the RI are separated into the following primary steps:

- Mobilization
- Equipment setup and handheld instrument verification
- Intrusive investigation
- MEC disposal
- MC sediment sampling
- Demobilization

2.11.02 TtEC will manage and be responsible for all aspects of the fieldwork during the intrusive investigation phase (Phase 3 of the RI). All work will be performed in accordance with

the approved Phase 3 Work Plan and FCRs. The on-site FOL will be responsible for the on-site operations, ensuring project goals and DQOs are met and that work is conducted in a safe and effective manner. The FOL will be responsible for the management of on-site field data as they are generated.

### **2.11.1 General Approach**

2.11.1.01 The intrusive investigation will be conducted to determine the nature and extent of MEC in MRS 03 and 12. A master target list will be generated by the project geophysicists from the DGM data collected during Phase 2. The target list will be reviewed and approved by the Government project team. The master target list will be used to identify mini-grid locations for the UXO divers to investigate daily. The UXO intrusive dive team will then systematically investigate all detected targets within the mini-grids to determine the nature and extent of MEC contamination in each MRS.

2.11.1.02 MEC/MPPEH disposal will be conducted at or near the completion of the intrusive investigation, unless safety and environmental considerations dictate work stoppage and immediate disposal. If MEC is found underwater, the UXOSO/SSHO and SUXOS/DS will decide whether the item is acceptable or unacceptable to move. This determination will be made based upon the report from the UXO diver, as well as photographic evidence. MEC determined to be acceptable to move by the UXOSO/SSHO and SUXOS/DS and that does not pose a public hazard may be consolidated. A single MEC item that is deemed acceptable to move by the UXOSO/SSHO and SUXOS/DS and poses a public hazard in its current location may be relocated to the closest suitable site within the MRS for disposal. If collection points are required (they are not anticipated) during this project, the following procedures will be used:

- MEC determined to be acceptable to move will be consolidated on or within a pallet or basket at a point no less than 30 feet underwater.
- The pallet or basket will be weighted down and secured with sand stakes.
- A reference/location point will be taken with the Shark Marine Dive Tablet.
- No marker buoy will be deployed, due to public safety.
- When demolition occurs, divers will proceed to the collection point to gather MEC for disposal.

2.11.1.03 MEC that is acceptable to move but will cause an unacceptable risk to the divers due to its size and weight, may be moved remotely using a lifting balloon after the completion of the intrusive investigation phase of work per paragraph 8(f) of the Explosives Site Plan (ESP). If the MEC item is considered unacceptable to move, it may be relocated remotely using a lifting balloon per paragraph 8(f) of the ESP. Procedures for transporting MEC to a land detonation site using the raise tow beach process are addressed in Appendix B-2, SOP 1, Section 6.13.2.1.

2.11.1.04 MEC that does not pose a hazard to listed T&E species may be detonated in place, however, underwater explosive detonations (BIP, consolidated shots, or deep-water disposal) are not allowed unless Endangered Species Act (ESA) coordination between the USACE and regulatory agencies has been completed and all mitigation requirements are coordinated and in place for this activity.

2.11.1.05 For clarification purposes, the regulatory agencies include the following: Environmental Protection Agency (EPA), NOAA, USFWS, PRDNER, and the Puerto Rico Environmental Quality Board (PREQB). All diving and disposal operations will be conducted in compliance with Sections 4.3 through Sections 4.5 of Supplemental SOP for Endangered Species Conservation and Habitat Protection in Appendix B-1. *Although napalm bombs were mentioned in the site history documents (Section 1.5.02), it is anticipated that these items will not be encountered at either MRS. Napalm bombs are thin-walled munitions designed to break open on impact and would not have remained intact if they impacted the ocean.*

2.11.1.06 MC sampling will be performed if MEC with exposed explosive filler is discovered, or if BIP procedures are used. MC sediment samples will then be collected and analyzed for MC following the guidance in the MC QAPP (Appendix F).

### **3.0 FIELD INVESTIGATION PLAN**

3.0.01 Phase 3 of the RI will include intrusive investigation within the AOIs identified from the results of the Phase 2 DGM/EM survey. In addition to the intrusive investigation, the Phase 3 scope of work includes disposal of MEC/MPPEH located during the investigation, MC sediment sampling adjacent to MEC with exposed explosive filler, and pre- and post-blast sampling if BIP procedures are used for MEC that is deemed not acceptable to move. The SUXOS/DS and UXOSO/SSHO will decide whether the item is acceptable or unacceptable to move.

3.0.02 During the intrusive investigation, there will be periods when required safety exclusion zones (EZs) prevent the use of and access to the beach and water areas at both MRS 03 and MRS 12 by the public and non-essential personnel. The periods and durations of the closures will be coordinated with the local authorities through the USACE Project Manager (PM) or designated representative. The duration of fieldwork in Phase 3 will be strongly influenced by whether unfettered access is available to both sites. Schedules included in these plans are based on production days, and do not include periods where site access is restricted due to public use or delays while obtaining disposition guidance on MEC deemed not acceptable to move, based on the requirements of Errata Sheet 5, EM 385-1-97 and TtEC Work Instruction (UXOWI-11). UXOWI-11 is an internal document that outlines the steps TtEC requires before MEC is moved.

3.0.03 The data collected during the Phase 2 DGM/EM survey will be analyzed using purpose-built tools in VSP to generate maps that show areas of high metallic density, as well as individual metallic anomalies. Based on these maps, AOIs and discrete targets will be identified and selected for the Phase 3 intrusive investigation. In areas that have high-density metallic contamination, mini-grids consisting of 15-meter (0.17-acre) areas of the metallic contamination will be investigated, instead of individual anomalies. Also, guidance in the Environmental SOPs (Appendix B-1) may prevent required access to complete investigations in very shallow coral areas to comply with the no contact with coral requirement.

3.0.04 The field team will normally work five 10-hour days per week. This schedule may be modified due to hazardous marine conditions or to meet site access agreements for times when the sites will need to be closed to the public due to the need for EZs. Each work day will start with a daily safety/pre-operational brief attended by everyone on the field team. Following the safety brief, the team will complete all required daily checklists and equipment checks prior to beginning daily intrusive investigations.

3.0.05 The following sections detail the tasks and approach associated with the Phase 3 intrusive investigation.

#### **3.1 SELECTION OF TARGETS AND AREAS OF INTEREST**

3.1.01 Due to the impact of the 2017 hurricanes, intrusive investigation will be performed within strategically placed rectangular or circular mini-grids rather than discrete targets. The mini-grid

allows for some item displacement due to the impact of the hurricanes and is the most efficient way for the divers to investigate the targets in these areas, allowing the diver to remain on the bottom and search a defined area instead of reacquiring multiple targets and having to navigate from target to target. Rectangular mini-grids will be investigated using swim lanes and circular grids will be investigated using the point-radius method.

3.1.02 AOIs selected for investigation were chosen based on an analysis of the Phase 2 DGM data using purpose-built tools in VSP, and other information. Figures 3-1 and 3-2 show the results of the VSP density analysis, underwater video analysis, and mini-grid locations. Table 3-1 includes the details for each of the mini-grids. Based on the VSP analysis of the Phase 2 data, the mini-grid locations were selected by performing the following steps:

1. Grid (Kriging) the Phase 2 data in VSP.
2. Identify relative high-, medium-, and low-anomaly density areas.
  - a. Low density: < 75 anomalies per acre
  - b. Medium Density: 75-250 anomalies per acre
  - c. High Density: > 250 anomalies per acre
3. Place mini-grid in high and medium anomaly density areas, using the following information to prioritize placement:
  - a. Underwater video evidence. Grids are placed over items identified in the underwater video that are potentially MEC-related.
  - b. Distance from MRS boundary. Grids are positioned to identify if step-outs are needed where high-density areas are adjacent to the MRS boundary.
4. Place mini-grids in low density areas if the following are true:
  - a. A MEC-like item was identified in the underwater video
  - b. The area is close to the shore and has a high probability of hazard/receptor interaction.

3.1.03 The investigation plan assumes target anomalies in the identified high-density mini-grids will be intrusively investigated to the extent needed to establish the nature and extent of the munitions-related contamination in that area. A stop-dig recommendation will be communicated to USACE for approval.

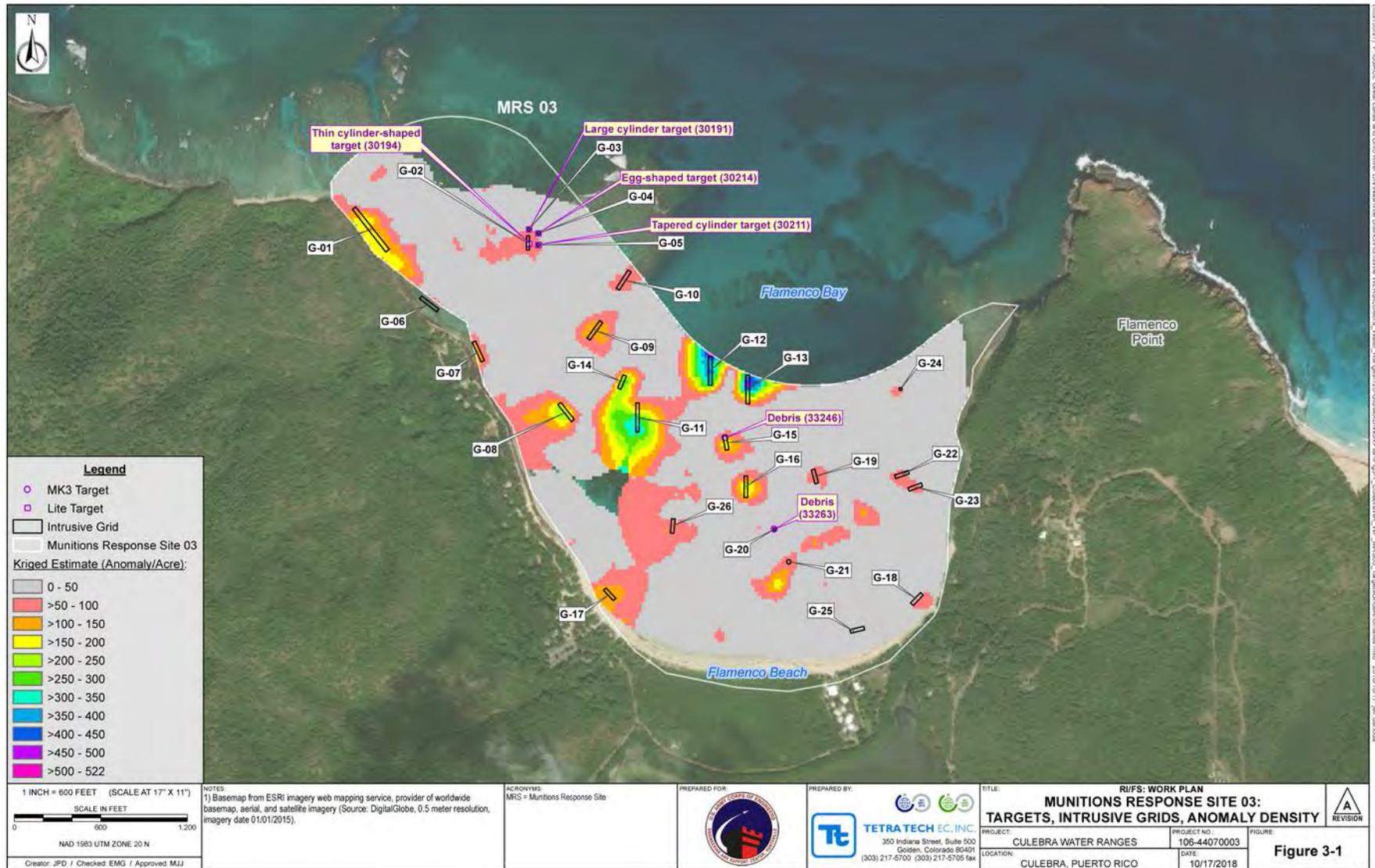


Figure 3-1. MRS 03 Density Map with Underwater Video Analysis and Mini-Grid Locations

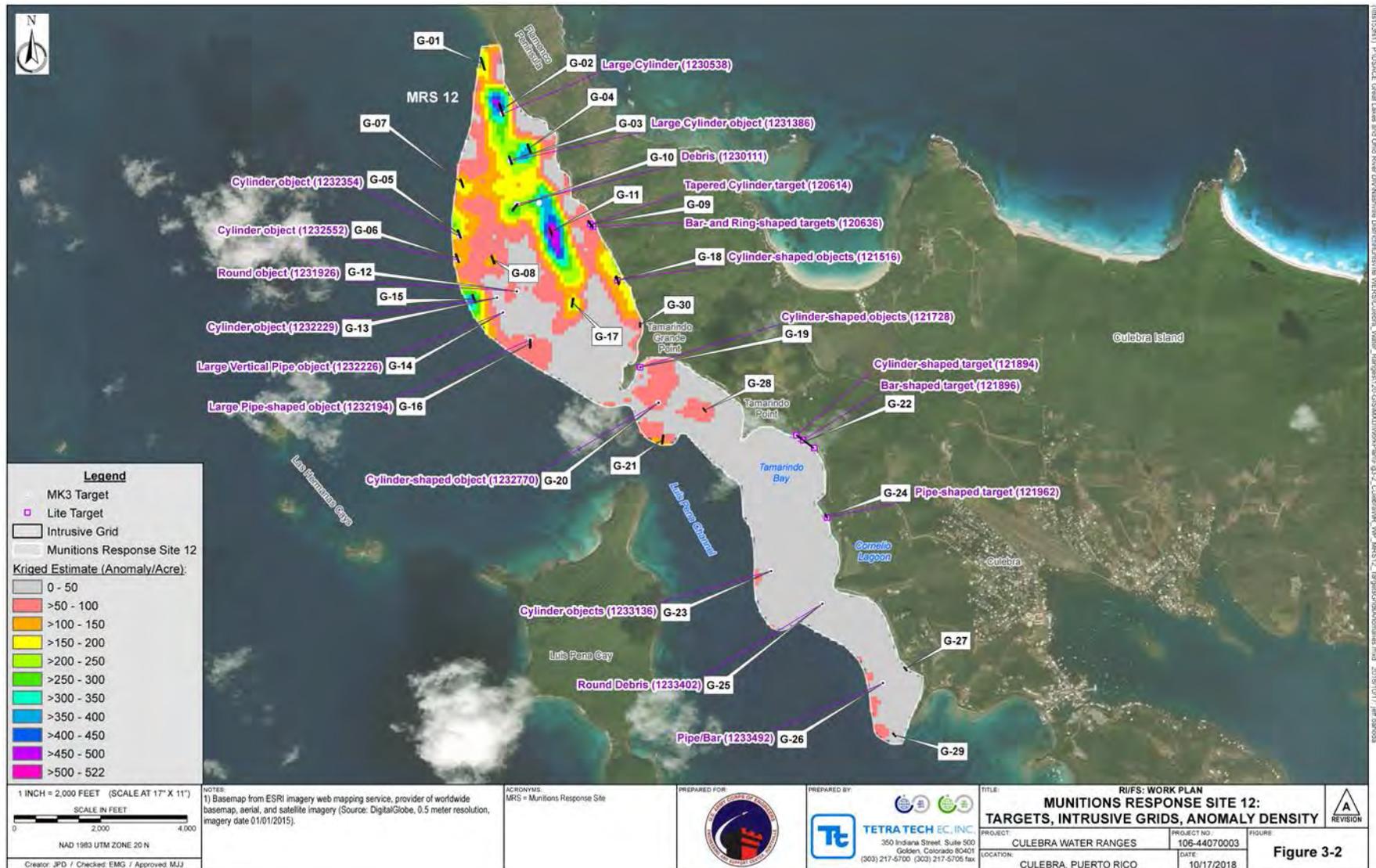


Figure 3-2. MRS 12 Density Map with Underwater Video Analysis and Mini-Grid Locations

**Table 3-1. Intrusive Mini-Grid Details**

MRS	Grid_ID	Shape	Dimensions	Area (sq. ft.)	Area (acres)
MRS-03	G-01	Rectangle	30'x375'	11250.0	0.26
MRS-03	G-02	Rectangle	20'x100'	2000.0	0.05
MRS-03	G-03	Circle	10' radius	312.6	0.01
MRS-03	G-04	Circle	10' radius	312.6	0.01
MRS-03	G-05	Circle	10' radius	312.6	0.01
MRS-03	G-06	Rectangle	25'x150'	3750.0	0.09
MRS-03	G-07	Rectangle	25'x150'	3750.0	0.09
MRS-03	G-08	Rectangle	25'x150'	3750.0	0.09
MRS-03	G-09	Rectangle	25'x150'	3750.0	0.09
MRS-03	G-10	Rectangle	25'x150'	3750.0	0.09
MRS-03	G-11	Rectangle	25'x200'	5000.0	0.11
MRS-03	G-12	Rectangle	25'x200'	5000.0	0.11
MRS-03	G-13	Rectangle	25'x200'	5000.0	0.11
MRS-03	G-14	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-15	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-16	Rectangle	25'x150'	3750.0	0.09
MRS-03	G-17	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-18	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-19	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-20	Circle	10' radius	312.6	0.01
MRS-03	G-21	Circle	15' radius	703.3	0.02
MRS-03	G-22	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-23	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-24	Circle	10' radius	312.6	0.01
MRS-03	G-25	Rectangle	25'x100'	2500.0	0.06
MRS-03	G-26	Rectangle	25'x100'	2500.0	0.06
MRS-12	G-01	Rectangle	25' x 300'	7500.0	0.17
MRS-12	G-02	Rectangle	25' x 300'	7500.0	0.17
MRS-12	G-03	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-04	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-05	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-06	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-07	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-08	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-09	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-10	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-11	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-12	Circle	10' radius	312.6	0.01
MRS-12	G-13	Circle	10' radius	312.6	0.01

**Table 3-1. Intrusive Mini-Grid Details (continued)**

MRS	Grid_ID	Shape	Dimensions	Area (sq. ft.)	Area (acres)
MRS-12	G-14	Circle	10' radius	312.6	0.01
MRS-12	G-15	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-16	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-17	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-18	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-19	Circle	10' radius	312.6	0.01
MRS-12	G-20	Circle	10' radius	312.6	0.01
MRS-12	G-21	Rectangle	25' x 200'	5000.0	0.11
MRS-12	G-22	Rectangle	10' x 500'	5000.0	0.11
MRS-12	G-23	Circle	10' radius	312.6	0.01
MRS-12	G-24	Rectangle	10' x 100'	1000.0	0.02
MRS-12	G-25	Circle	10' radius	312.6	0.01
MRS-12	G-26	Circle	10' radius	312.6	0.01
MRS-12	G-27	Rectangle	10' x 100'	1000.0	0.02
MRS-12	G-28	Rectangle	10' x 100'	1000.0	0.02
MRS-12	G-29	Rectangle	10' x 100'	1000.0	0.02
MRS-12	G-30	Rectangle	10' x 100'	1000.0	0.02

3.1.04 If no targets are detected in high- or medium-density grids, a root cause analysis (RCA) will be performed and an evaluation of the grid will occur, taking into consideration historical use of the area and characterization information. If no targets are found in a low-density grid, migration due to storms will be the assumed root cause.

### 3.2 INTRUSIVE INVESTIGATION DEFINABLE FEATURES OF WORK/TASKS

3.2.01 The intrusive investigation of MRS 03 and MRS 12 will be conducted by performing a series of tasks to determine the nature and extent of MEC contamination at these sites. The tasks will generally follow the order presented below, unless safety considerations associated with discovered MEC dictate otherwise. The Phase 3 field activities are broken down into tasks and DFWs. Most DFWs will be monitored and controlled through the three phases of control process, but some DFWs will not require continuous monitoring and will not implement all phases of control (e.g., mobilization, demobilization). The DFWs identified for the Phase 3 activities are:

- Mobilization (site-specific training, equipment receipt inspections, equipment setup and testing, documentation control and records management training, and site familiarization)<sup>1</sup>

<sup>1</sup> Does not require the three phases of control process.

- AGM Certification<sup>2</sup>
  - Reacquisition of AOIs
  - Intrusive Investigation of Targets and Areas of Interest
  - Database Management
  - MEC/MPPEH Disposal
  - Material Documented as Safe (MDAS) Management
- MC Sampling
- Documentation Control and Records Management
  - Demobilization<sup>3</sup>

### 3.2.1 Mobilization

3.2.1.01 Preparation for mobilization for Phase 3 will commence upon receipt of the Notice to Proceed (NTP). Upon receipt of the NTP, the investigation team will be notified, travel and lodging arrangements will be made, and the requisite copies of the applicable project and reference documents will be assembled and shipped to the site.

3.2.1.02 Mobilization for Phase 3 will occur after the completion of the Phase 2 DGM/EM survey, and after the DGM data are approved and target lists have been generated. When the NTP is received, TtEC will mobilize all personnel and equipment required to conduct the Phase 3 tasks. TtEC will require a 45-day period from receipt of the NTP to arrival on site to arrange the transport and shipment of equipment, secure lodging for the field team, and process the equipment through Puerto Rico Customs and Treasury.

3.2.1.03 Mobilization of the investigation team and equipment will be conducted based on the sequence of the field tasks. All field personnel will attend site-specific training upon mobilization, including T&E species recognition and avoidance procedures to follow when conducting the investigation, as required in Appendix B-1. The investigation team and support personnel will mobilize to the site and establish the field office and support facilities, receive equipment deliveries, and prepare equipment for use. Site preparation activities will include establishing support facilities, establishing docking and marine access arrangements, and establishing the investigation navigation system. The field crew will complete the installation of navigation equipment on the vessels and perform the required equipment installations and tests prior to the investigation.

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<sup>2,3</sup> Does not require the three phases of control process.

3.2.1.04 TtEC Procedure PO-19, Mobilization and Demobilization, describes the activities that should occur pertaining to the mobilization and demobilization of project sites, including the following:

- **Equipment Receipt and Inspection:** All equipment will be inspected for damage during shipment and functionality before being used. Procedure QP-06, Receiving Inspections, and PO-18, Warehouse Management, provide guidance on conducting and documenting receiving inspections.
- **Site-Specific Training:** During this task, the field team will receive equipment, set up the documentation control and records management system, and undergo site-specific and familiarization training, as outlined in the APP and EPP. The field team will also receive an endangered species brief from the USFWS in coordination with PRDNER and/or NOAA/NMFS, as appropriate. All training will be documented and verified during the DFW preparatory phase of control.
- **Equipment Setup and Testing:** This task includes the setup and testing of the GPS navigation system that will be used to reacquire the targets and locate the AOIs identified from the Phase 2 DGM survey data. The handheld analog sensors, the White's Surfmaster, used by the divers to help locate buried targets, will also be tested against a known metal object in a functional check area (FCA), both on land and in the water, to ensure the detectors are functioning correctly and provide an approximate depth of detection. In addition, diver casualty drills and familiarization dives will be conducted.

### 3.2.2 General Requirements and Procedures

3.2.2.01 The requirements in this section are applicable to all field activities, including boating activities, diving operations, target investigations, and data verification. Historical review, administrative activities, or training conducted off site are not subject to the requirements in this section. Environmental SOPs for the activities have been provided by the USACE and developed by TtEC and are presented in Appendix B-1 and B-2 of this document.

#### 3.2.2.1 Daily Briefings/Verification

3.2.2.1.01 At the beginning of each working day, the project SUXOS/DS or designee will hold a daily briefing. At a minimum, the daily briefings will include:

1. Review of safety practices and emergency procedures
2. Review and testing of communication systems
3. Review of any site-specific or applicable task-specific hazards

3.2.2.1.02 Other topics that will be discussed, as necessary, include QC, changes to the work schedule, equipment maintenance, and any other issues that may affect the activities being performed that day or in the future.

3.2.2.1.03 Prior to the start of operations, a qualified biologist will brief the investigation team on the identification and recognition of T&E species and sensitive habitats, as well as the procedures to undertake to avoid harming the T&E species and sensitive habitats. This briefing will be documented prior to the start of field activities for any personnel who have not yet had this training. The Assistant PjM/FOL and a qualified biologist will brief the investigation team on the Environmental SOPs and the points of contact to notify if any injured or stranded wildlife are spotted. A trained marine mammal observer will be in the field with the investigation team to ensure compliance with the SOPs.

3.2.2.1.04 During the daily briefing, the SUXOS or designee will discuss selected work sites and/or tasks for the day. Each investigation team member will receive the instructions necessary to perform the assigned work. Attendance at the daily briefing will be documented in the SUXOS/DS's field logbook/logsheet and/or on daily briefing forms.

### **3.2.2.2 Tailgate Briefing**

3.2.2.2.01 If the intrusive team is divided into groups working in separate areas of the site or on separate tasks, a tailgate briefing may be required during which the team lead for that activity will discuss safety hazards or mitigation measures specific to the assigned task or work area. The daily briefing at the site will fulfill the requirement for a tailgate briefing if all relevant information is presented regarding the hazards associated with all assigned work.

### **3.2.2.3 Equipment Testing and Maintenance**

3.2.2.3.01 All equipment used by the survey team will be verified to be working properly before use each day. Prior to any work being performed each day, using the White's Surfmaster PI Dual Field Detector, the UXO diver will use the FCA established near the TtEC compound as stated in Section 3.2.1.04, to conduct the test. The test will consist of passing the detector over five small steel objects, placed randomly in accordance with WERS DID 004.01 (if possible), to verify the detector is functioning properly. The functionality of navigation and detection equipment will be ensured using the calibration and QC testing discussed in Section 4.

3.2.2.3.02 All navigation equipment testing will be verified and documented in the field log book or on appropriate field forms by the FOL or designee. If any equipment requires repair or new equipment is brought on site, it must be inspected and confirmed to be operational by the FOL or designee prior to use. The SSHO will also inspect any other equipment, including marine vessels and safety equipment, to be used each day to ensure that the equipment is in proper working order. Inspections will be documented in the field logbook or on appropriate forms.

### **3.2.3 Positioning**

3.2.3.01 All positioning data for the survey will be based on real-time kinematic GPS or a MarineSTAR differential global satellite navigation system, to provide sub-meter position accuracies both horizontally and vertically.

3.2.3.02 Geodetic control at the site was established for the hydrographic and underwater video surveys. These control point locations may need to be re-established. They will facilitate GPS base station control for target reacquisition (areas with a sufficient view of the sky that are accessible for base station setup), as well as for QC points for the GPS rover systems.

### **3.2.4 AGM Certification**

3.2.4.01 Prior to beginning site MEC activities, each UXO technician will perform a one-time individual qualification/verification test in the test strip. The UXOQCS will observe this test with each UXO technician individually. Each operator must demonstrate proficiency with the White's Surfmaster PI Dual Field Detector by locating 100 percent of the items in the test strip. Individuals failing to locate any one item will fail, subject to verification that the instrument is operable. Following the first failure, the UXOQCS, SUXOS/DS, and/or Team Leader will conduct additional training with that employee. Following the training, the operator will be retested and must meet the required performance criteria. Failure to locate 100 percent of the items will result in either additional training or shifting of duties for that individual so that he/she is not performing the critical function of using the magnetometer equipment on site. No employee will perform MEC searches prior to qualifying in the test strip.

### **3.2.5 Reacquisition of AOIs**

3.2.5.01 AOIs, or mini-grids, will be reacquired in accordance with the performance metrics in Table 4-1 using the Shark Marine Dive Tablet or GPS to navigate to the location of the mini-grid in a small boat, and placing a reference buoy at the corners or center-point of the AOI. The reference buoy will be anchored with a soft sand bag anchor lowered by hand to the bottom to avoid impacts to ESA-listed corals and critical habitat. Sand utilized to fill anchors will be sourced locally from the MRS or an on-island vendor. Sand sourced from an MRS will be returned following Phase 3 operations. The reference buoys will be placed at the AOIs at the start of the day for that day's target list to limit the number of deployed buoys and to reduce the chance of the buoys moving off the mini-grid location. Mini-grid searches will be conducted using a reference buoy placed at each corner of the AOI. In shallow areas that do not have enough depth for the deployment of a reference buoy, the UXO technician(s) will use the Shark to navigate to the AOI location and investigate the AOI from the surface or by the use of a paddleboard or similar shallow draft platform.

### **3.2.6 Intrusive Investigation of Targets and Areas of Interest**

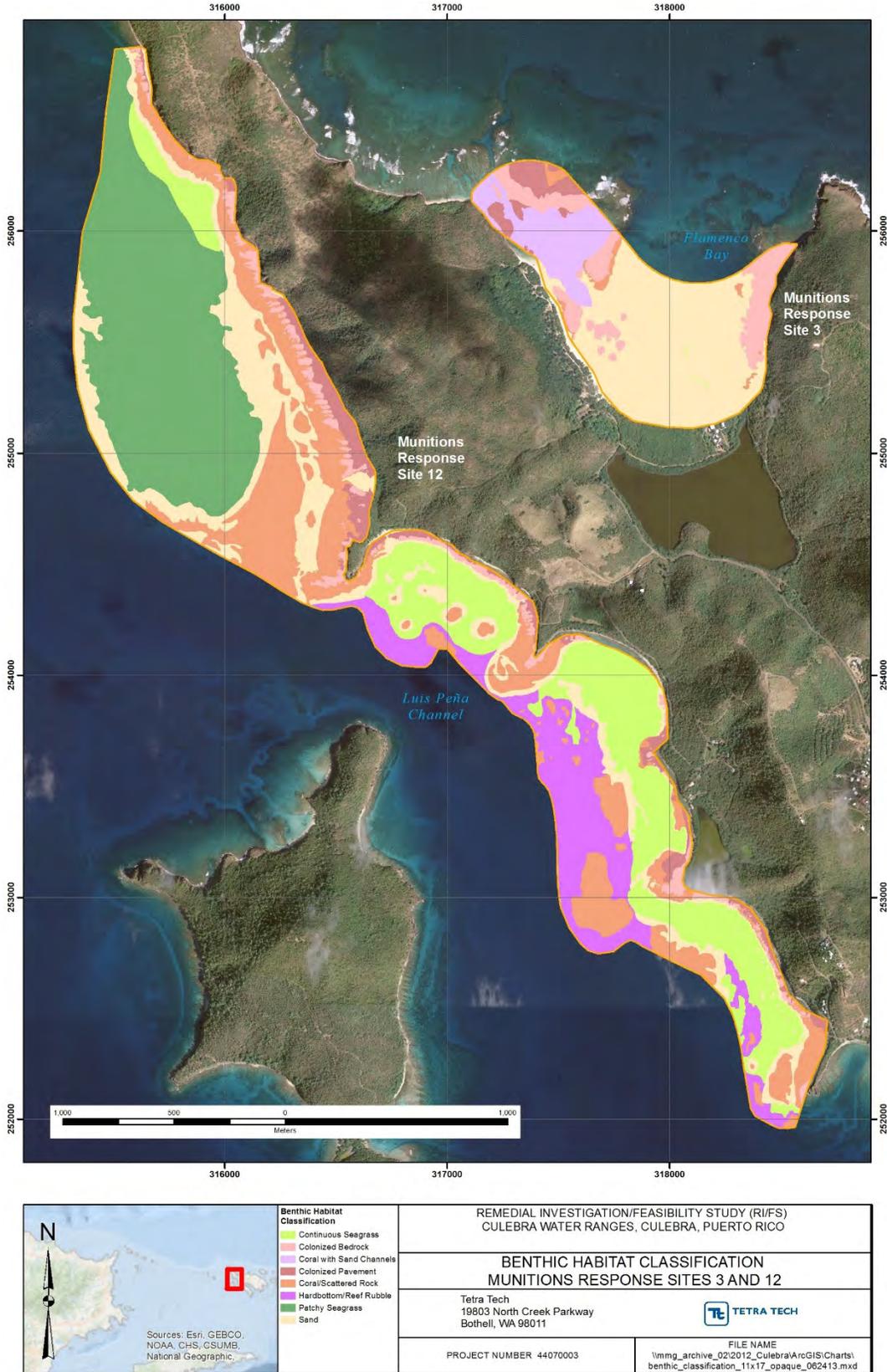
3.2.6.01 The investigation of the AOIs will be performed as described below and in accordance with the QC Plan provided in Section 4, as well as the Environmental SOPs in Appendix B-1, the APP in Appendix D, the Dive Operations Plan in Appendix E, and the intrusive QC checklists (Appendix G). The AOIs will be investigated by UXO divers qualified in accordance with DoD Explosives Safety Board (DDESB) TP 18, Minimum Qualifications for Personnel Conducting Munitions and Explosives of Concern-Related Activities (DDESB 2015).

The vertices of the approved grid locations will be provided to the field teams. In general, grids will be systematically investigated starting in the deeper, lower density areas and moving toward the shallower depths and high-density areas.

3.2.6.02 The procedures used by the intrusive investigation team to locate and identify the mini-grids will be based on the physical location and environment. Figure 3-3 shows the delineation of the benthic habitat from the Phase 1 data.

3.2.6.03 The following are general descriptions of the options available to investigate mini-grids and discrete anomalies (if required), based on depth, bottom type, and local environment:

- For rectangular mini-grids that are in water 3 to 4 feet or deeper, the investigation team will conduct a mini-grid lane search using a SCUBA diver(s) tethered to the Shark Marine Dive Tablet (Shark). The diver(s) will utilize the Shark, which includes a self-contained navigation and underwater imaging system, providing the diver(s) with location, navigation, and situational awareness. The diver(s) will use the Shark to descend to the entrance point (grid corner). Guided by the Shark, the diver(s) will then swim and search each lane within the mini-grid, performing an analog instrument-assisted visual search. As the diver(s) encounter anomalies, they will note the item's location, status, and condition and take a photograph using the Shark underwater camera. At the completion of the search, the population of MEC/MD within the mini-grid will be recorded. For areas with coral or hard substrate, the diver(s) will conduct an analog-instrument-assisted visual search; in areas with soft substrate or seagrass, the diver(s) will use the Shark for navigation and a handheld metal detector to help locate anomalies. If an anomaly is buried in a soft substrate, the diver(s) will use their hands or small hand tools to excavate down to the anomaly until an identification can be made. If the diver(s) have not reached the anomaly after excavating to a depth of 2 feet or the depth of refusal, the anomaly will be labeled in the Access database Intrusive Results table as "deeper than 24 inches". In the event the Shark cannot be used, a jack stay approach (two marker buoys with sand bag anchors placed by GPS location and a highway line between them on the bottom) may be used.
- For circular grids that are in water 3 to 4 feet or deeper, the investigation team will conduct diving operations using a SCUBA diver(s) tethered to the Shark. The diver(s) will use the Shark to descend to the center of the grid. Guided by the Shark, the diver(s) will perform a search pattern expanding around the center point until the entire circular grid is investigated. As the diver(s) encounter anomalies, they will note the item's location, status, and condition and take a photograph using the Shark underwater camera. At the completion of the search, the population of MEC/MD within the mini-grid will be recorded. If an anomaly is buried in a soft substrate, the diver(s) will use their hands or small hand tools to excavate down to the anomaly until an identification can be made. If the diver(s) have not reached the anomaly after excavating to a depth of 2 feet or the depth of refusal, the anomaly will be labeled in the Access database Intrusive Results table as "deeper than 24 inches".



**Figure 3-3. EBS Benthic Classification Areas**

- For anomalies that are located in water shallower than 3 to 4 feet, the investigation team will use either snorkeler(s) or technician(s) on a paddleboard(s) (lying down or seated in a position to ensure legs are not dangling in the water) who can investigate the anomaly from the surface, or technician(s) wading in shallow non-coral areas where contact with the bottom is not prohibited by the Environmental SOPs in Appendix B-1. A preliminary identification will be made, the item's location, status, and condition will be recorded, and a photograph will be taken using the Shark camera. For either option, the snorkeler(s)/technician(s) will be equipped with a GPS system capable of recording the target's location.
- For AOIs in water shallower than 3 to 4 feet, the investigation team will conduct mini-grid searches over areas that are delineated with GPS boundaries. The geometric shapes of these areas will be selected to correspond to the shapes of the AOIs. To investigate these areas, UXO snorkeler(s) or technician(s) on a paddleboard that can investigate the target from the surface will be used, or technician(s) wading in shallow non-coral areas where contact with the bottom is not prohibited by the Supplemental SOP for Endangered Species Conservation and Habitat Protection in Appendix B-1 will be used. A preliminary identification will be made, the item's location, status, and condition will be recorded, and a photograph will be taken. These options will be employed to ensure compliance with the Environmental SOPs regarding no contact with coral. For either option, the snorkeler(s)/technician(s) will be equipped with a GPS system capable of recording the target's location. At the completion of the search, the population of MEC/MD within the mini-grid and its status and condition will be recorded.
- If no targets are detected in high- or medium-density grids, an RCA will be performed, and the grid will be evaluated, taking into consideration historical use of the area and characterization information. Migration will be considered the root cause if no anomalies are found in a low-density mini-grid. For step-out investigations, if MEC/MD is located within a high- or medium-density area that does not return to background density within the current MRS boundary, this will trigger the requirement for a step-out investigation. The decision unit for step-outs will be an analog transect designed to bound the MEC/MD contamination to +/- half the transect spacing. Up to five additional transects, spaced in a manner consistent with the Phase 2 data, will be collected to bound the contamination. If the density is still above background on the fifth transect, the area will be recommended for additional investigation.
- The step-out investigations will consist of an analog instrument-assisted visual search for anomalies using divers with handheld all-metals detectors. The transect will be 5 feet wide and will run the length of the elevated MEC/MD density contour, guided by the Shark. In the event the Shark cannot be used, a jack stay (two marker buoys with sand bag anchors placed by GPS location and a highway line between them on the bottom) will be used to navigate and position the analog results. The diver(s) will descend along one of the marker buoys and search along the highway line, using the metal detector, to search a 5-foot swath (2.5 feet on each side of the highway line) until they reach the other

marker buoy. In the event of a jack stay approach, polypropylene highway lines will be used, and, if the bottom contains coral, diver(s) will suspend the highway line above the coral within the water column.

- If MEC is located during the step-out search, this will trigger an additional step-out transect. This process will continue until the contamination has been bound or the depth exceeds the maximum dive limit.
- Analog transects will be established and investigated using analog instrument-assisted visual search in the data gaps (see Figure 2-2). All equipment will be used in a manner to avoid physical contact with corals, as outlined in Appendix B-1, SOP 1, Addendum 1, Section 4.2.5. These transects will be conducted over the course of the field investigation. Analog transects will include the collection of density data and DGPS coordinates for targets for later evaluation by the PDT. The analog data will be analyzed, evaluated, and integrated with Phase 2 DGM data and Phase 3 intrusive results. If necessary, TtEC and the USACE will coordinate the placement of grids or target investigations with stakeholders prior to intrusive investigation.

### **3.2.7 Database Management**

3.2.7.01 The data generated each day while investigating the AOIs will be recorded on electronic tablets and a field logbook. The target data will include a reacquired GPS location of the target, photograph of items, identification features, depth of detection, general comments from the diver, and the surrounding habitat. At the end of each field day, the data will be transferred electronically to accountability logs, the Analog Access database, DGM (Intrusive results table) Access database, and appropriately reported in the Daily Production and weekly Project Status Reports and retained on the projects SharePoint site for use in developing the RI report.

### **3.2.8 MEC/MPPEH Disposal by Detonation**

3.2.8.01 MEC/MPPEH disposal operations will be conducted in accordance with the Supplemental SOP for Endangered Species Conservation and Habitat Protection in Appendix B-1, and the Phase 3 ESP. The preferred sequence of disposing of the MEC located during the intrusive investigation will be to wait until the intrusive investigation is completed and consolidate the MEC for disposal. This approach has several advantages: it will reduce the total number of explosive events, lessen the environmental impact, and reduce the inconvenience of site closures to the local community. If explosive safety dictates, investigation activities may be suspended until a MEC item is dealt with. If MEC is found underwater, the SUXOS/DS and UXOSO/SSHO will decide whether the item is acceptable or unacceptable to move. This determination will be made based upon the report from the UXO diver, as well as photographic evidence.

3.2.8.02 The preferred options for MEC disposal by detonation are:

- If MEC is found underwater, the SUXOS and UXOSO will decide whether the MEC item is acceptable or unacceptable to move. This determination will be made based upon the report from the UXO diver, as well as photographic evidence.
- MEC disposal operations will occur at the end of the intrusive investigation phase because: of the length of time required for coordination of the disposal operations with state and federal agencies; it minimizes the impact to the community, beach and surrounding waters recreational users by reducing the number of evacuations; of environmental conditions, such as high winds, extreme surf conditions, or storms, that may put the team guarding the MEC item at risk; and the location of identified MEC will only be known to the UXO dive team and USACE PDT, as the public will not be aware of their presence.
- No underwater explosive detonation (BIP, consolidated shots, or deep-water disposals) is allowed unless coordination between the USACE and regulatory agencies has been completed and all mitigation requirements are coordinated and in place for this activity. For clarification purposes, the regulatory agencies include the following: EPA, NOAA, USFWS, NMFS, PRDNER, and PREQB.
- MEC that are acceptable to move but will cause an unacceptable risk to the divers due to the size and weight of the MEC will be moved remotely by lifting balloon after the completion of the intrusive investigation. MEC determined to be unacceptable to move will be moved remotely by lifting balloon after completion of the intrusion phase of work. MEC that does not impose hazards to listed threatened or endangered species will be detonated in place. Maximum hazard distance calculated by using the Buried Explosion Module will be maintained by essential and non-essential personnel during movement of MEC and for the underwater detonation of MEC.
- Acceptable to move MEC will be processed within the beach area of the MRS boundary at a location that does not pose a hazard to listed T&E species. If acceptable to move MEC is relocated to one of the MEC demolition areas using mechanized operations (lifting balloon and tow operations), the procedures and minimum safe distances in paragraph 8(f) of the ESP will be followed.
- MEC determined to be unacceptable to move will be processed within the beach area of the MRS boundary at a location that does not pose a hazard to listed or T&E species using a lifting balloon and tow operations, per paragraph 8(f) of the ESP. Unacceptable to move MEC may be detonated in place if disposal operations do not pose a hazard to listed T&E species, following coordination and approval with state and federal agencies.

### 3.2.9 MDAS Management

3.2.9.01 MDAS is MPPEH that has been assessed and documented as not presenting an explosive hazard, and for which the chain of custody has been established and maintained. This material is no longer considered to be MPPEH. Inspection and certification of MDAS will be

conducted in accordance with EM 385-1-97. Chain-of-custody requirements are summarized below.

- The first signatory must be technically qualified and may be either a DoD employee or DoD contractor. This signatory must have performed or witnessed the initial 100 percent inspection or DDESB-approved processing of the material.
- The second signatory must be a technically qualified U.S. citizen who may be either a DoD employee or a DoD contractor and who does not report to the SUXOS/DS. For this project, the UXOQCS will act as the second inspector. This signatory must have performed or witnessed the independent 100 percent re-inspection or conducted an independent QA inspection of processed material using an approved sampling method.

3.2.9.02 MDAS items will be subjected to a certification/verification process at the collection point located at the field office. The SUXOS/DS will perform the first 100 percent inspection (certification). The second 100 percent inspection (verification) will be conducted by the UXOQCS who does not report to the SUXOS/DS. By their signatures, they will acknowledge the following statement, which will be on the form:

“THE MATERIAL LISTED ON THIS FORM HAS BEEN INSPECTED AND PROCESSED BY DDESB-APPROVED MEANS, AS REQUIRED BY DEPARTMENT OF DEFENSE POLICY, AND TO THE BEST OF OUR KNOWLEDGE AND BELIEF DOES NOT POSE AN EXPLOSIVE HAZARD”.

3.2.9.03 Following the inspection and certification process, MDAS will be stored at the project field office in locked containers until being transported to the Homeca Recycling in San Juan, Puerto Rico. MDAS will be demilitarized, either by crushing or shredding, and recycled by smelting. The recycler will provide the UXO contractor with a certificate of destruction.

### **3.2.10 MC Sampling**

3.2.10.01 MC sampling will be conducted if MEC/MPPEH is discovered with exposed explosive filler in open communication with the environment. In addition, a small statistical sample of background and pre- and post-blast sediment samples will be collected if in-water disposal operations are conducted on MEC located in suitable locations with sandy substrate. The MC sampling protocol is contained in the MC QAPP (Appendix F). This document will be used to conduct MC sampling if required.

### **3.2.11 Documentation Control and Records Management**

3.2.11.01 The PjM will establish a document control and records management system as a SharePoint site, as described in Procedure PO-08. All personnel will be trained on the system during the Operational Readiness Review or during mobilization. The system will be accessible by field personnel to post records to during the field activities, include a minimum file structure, as shown below, and will be maintained throughout the field execution. Based on the project

schedule, files (hard copy and electronic) will be transferred to the historical project files upon completion of the project.

**Minimum Task Order File Index Folders:**

- 2.0 CONTRACT TASK ORDER
- 3.0 INCOMING CORRESPONDENCE
- 4.0 OUTGOING CORRESPONDENCE
- 5.0 DELIVERABLES
- 6.0 HEALTH & SAFETY
- 7.0 QUALITY CONTROL
- 8.0 SITE SPECIFIC REQUIREMENTS
- 9.0 COMPLIANCE DOCUMENTS
- 10.0 OTHER
- 11.0 ELECTRONIC MEDIA (Laboratory Data Management)

3.2.11.02 Sub-files will be developed based on the records and documents generated during the project. If folders are not used or data are stored in a different location, for whatever reason, the system will identify the location and how the information can be accessed.

**3.2.12 Demobilization**

3.2.12.01 Demobilization will be conducted after all other Phase 3 tasks have been performed and accepted. The demobilization process will be documented using the demobilization QC checklist. Under certain circumstances, a partial demobilization may be conducted if the field team is unable to perform work due to environmental conditions (evacuation for hurricane or other natural disaster), work stoppage due to hazardous or changed conditions, or while awaiting CEHNC Contracting Officer (KO) guidance or funding. During this period, the field team will leave a small caretaker staff, and the remaining personnel will return to their home offices until work can resume.

**3.3 SOURCES AND STANDARDS**

3.3.01 The project geospatial data will include all information from the Project Site Microsoft Access project database (EM 200-1-15 [USACE 2015]). All digital GIS data will be created in an ArcView-compatible format, in accordance with GIS DID (WERS-007.01). All data will conform to the Spatial Data Transfer Standard and be Esri compliant (geodatabases). The standards are designed for computer-assisted mapping methods that must interface with other surveying firms, government contractors, and clients. Intrusive investigation coverage will be provided as a geo-referenced tagged image file format. Supporting tabular data will be provided in an American National Standards Institute Structured Query Language-compatible format, such as Microsoft Access. The GIS point, polyline, and area vector data will be provided in ArcGIS format, including geodatabases and .shp files, and will include all appropriate metadata. The final electronic submittal will also include layout files for all plates, figures, and drawings conveyed in the report.

### **3.4 FILE BACKUP**

3.4.01 The GIS data will be backed up daily and data processing progress will be documented on a data tracking spreadsheet.

### **3.5 QUALITY CONTROL**

3.5.01 QC checks will be completed in accordance with the QC Plan described in Section 4. The UXOQCS will verify the performance of these QC activities. All data will then be checked by the GQCM (see Section 4.3.2).

## 4.0 QUALITY CONTROL PLAN

### 4.1 GENERAL

4.1.01 This QC Plan has been prepared by TtEC in accordance with EM 200-1-15, the PWS, and Contract W912DY-10-D-0015, TO 0003 specifications for the performance of an RI/FS (Phase 3) at MRS 03 and MRS 12 on Culebra. All QC documentation will be submitted as part of or as supporting documentation for the Final RI Report. All hard copies of QC and project records will be kept on site and made available for CEHNC's inspection upon request. Electronic records will be maintained on a project SharePoint site for security in accordance with Procedure PO-08. To the maximum extent possible, files will be electronic.

### 4.2 TTEC PERSONNEL AND QC

4.2.01 All TtEC personnel involved in field operations at Culebra will implement this QC Plan per EM 200-1-15 and specific TtEC corporate procedures found in TtEC's Corporate Reference Library (CRL). Although the CRL is proprietary, the PjM will make all CRL references available to the CEHNC KO if requested. The CRL procedures applicable to the QC effort are listed in Table 4-1.

**Table 4-1. TtEC Corporate Procedures**

<b>Procedure Number</b>	<b>Subject</b>
PO-08	Document Control and Records Management
PO-17	Logbooks
PO-18	Warehouse Management
PO-19	Mobilization and Demobilization
PO-20	Preparation and Control of Work Plans
QP-02	Selection and Qualification of Quality Personnel
QP-06	Receiving Inspection
QP-10	Monitoring and Measuring Equipment
QP-11	Control of Nonconforming Conditions
QP-12	Corrective Action
QP-13	Surveillances
QP-17	Quality Event Reporting
QP-18	Audit Program
QPM-1	Quality Program Manual
UXO-01	Purchase, Receipt, and Accountability of Explosives

### 4.3 DUTIES AND RESPONSIBILITIES

4.3.01 Quality is the responsibility of the entire team. The team's comprehension of this QC Plan is of primary significance for quality objectives to be accomplished; thus, the training and indoctrination of the key personnel in the quality objectives will be conducted during site mobilization. The project organization is headed by the PjM, who is responsible for all phases of the work and the quality of the work. The PjM is given full authority and responsibility for project execution, and the PjM is supported by direct and indirect line managers with the functions and responsibilities outlined below.

### **4.3.1 Project Manager**

4.3.1.01 The PjM, Ian Roberts, reviews and accepts the QC Plan, implements procedures, and has direct responsibility for day-to-day operations of the project. The PjM's responsibilities include, but are not limited to:

- Implementing all applicable TtEC policies and procedures
- Reviewing all reports and documentation, prior to submitting to the client, for accuracy, grammar, and completeness
- Providing reports to the MMRP QC Manager and USACE in accordance with the DID
- Identifying the qualifications and selection of project staff and suppliers
- Ensuring the project resources are adequate to meet the project needs and perform the work
- Ensuring equipment resupply or replacement processes are in place to reduce downtime
- Establishing the project SharePoint site to control documents and manage project field records in accordance with Procedure PO-08
- Tracking and submitting all contract deliverables
- Analyzing QC failures (with Quality staff) and implementing corrective actions

### **4.3.2 Geophysics Quality Control Manager**

4.3.2.01 The GQCM, Elise Goggin, reports directly to the TtEC MMRP Program QCM and has an indirect reporting line to the PjM in terms of deliverables and requirements to comply with the PWS. The GQCM is responsible for:

- Ensuring the QC Plan is followed
- Assisting the field team and PjM in conducting root cause analyses and developing corrective actions as necessary
- Comparing intrusive results to the detected anomaly amplitude and size to support a data usability assessment
- Communicating directly with CEHNC QA representative regarding project oversight as approved by the PjM

### **4.3.3 MMRP Program Quality Control Manager**

4.3.3.01 The MMRP Program QCM, Eugene Mikell, develops and approves the QC Plan and assists in the problem resolution process. The MMRP Program QCM is responsible for:

- Establishing and maintaining the MMRP Quality Program

- Working directly with TtEC and the USACE to ensure implementation of the program and project QC Plans
- Acting as focal point for coordination of quality matters across all aspects of the project and assisting in resolving quality issues
- Suspending project activities if quality standards are not maintained
- Interfacing with USACE on quality-related items
- Performing reviews of the three phases of control reports prepared by the UXOQCS
- Conducting field audits of the QC system in accordance with Procedure QP-18 or surveillance reports in accordance with Procedure QP-13 to ensure compliance with the quality plan as described in various TtEC procedures
- Evaluating the project field team root cause analysis and corrective action (verbal, written, or electronic) for accuracy and completeness
- Directing follow-up inspections to ensure adequacy of the corrective actions

#### **4.3.4 UXO Quality Control Specialist**

4.3.4.01 The UXOQCS, is responsible for implementing all aspects of the Quality Plan during field activities. The UXOQCS' responsibilities include, but are not limited to, the following:

- Preparing daily QC reports (DQCRs) and uploading them to the records management system
- Submitting DQCRs to the PjM and MMRP Program QCM
- Ensuring equipment receipt inspections are conducted and documented
- Implementing and documenting the three phases of control process for DFWs
- Reviewing documents and records for accuracy and completeness
- Ensuring the project documentation control and records management system is established and maintained
- Establishing the FCAs for underwater analog instruments
- Implementing and documenting the results of the operator FCA to project operations beginning
- Conducting QC indoctrination training for project personnel
- Ensuring site-specific training is conducted and documented
- Ensuring daily equipment checks are conducted and documented
- Inspecting MEC/MPPEH disposal procedures

- Verifying MD as MDAS in the absence of a USACE Ordnance and Explosives Safety Specialist
- Conducting final inspections as identified in the QC Plan
- Issuing stop work requests when conditions warrant
- Identifying the need for and tracking of FCRs and nonconformance reports (NCRs)

#### **4.3.5 Senior UXO Supervisor/Dive Supervisor**

4.3.5.01 The SUXOS/DS is responsible for all operational aspects of the project, including:

- Completing daily production reports and uploading the records to the records management system
- Submitting daily reports to the PjM
- Coordinating, directing, and reporting daily field activities to the PjM
- Ensuring adequate resources (personnel and equipment) to conduct operations are serviceable and available
- Ensuring that all MEC/MPPEH is managed in accordance with SOP-1
- Managing and certifying MD in accordance with SOP-3
- Managing donor explosives in accordance with SOP-2
- Ensuring the quality of the work meets the measurement performance criteria

#### **4.3.6 Stop Work Authority**

4.3.6.01 All site TtEC personnel have the authority to stop work whenever a condition is identified that has a negative effect on the quality of the product being delivered or that is likely to impact a T&E species or habitat, as outlined in Section 6 and the Environmental SOPs in Appendix B-1.

#### **4.3.7 Stop Work Request**

4.3.7.01 A stop work request may be issued for a portion of a process, limiting the stop work request to that portion of the process that is not in compliance. The UXOQCS will document the situation and communicate the issue to the PjM and MMRP Program QCM (within 12 hours via telephone and/or email). The UXOQCS will document this action and will maintain a compilation of the stop work actions on the DQCR.

### **4.4 AUDIT PROCEDURES**

4.4.01 Audits or surveillances will be conducted, and records maintained per QPM-01, Quality Program Manual. Audits will be conducted by personnel qualified in accordance with Procedure QP-02, Selection and Qualification of Quality Personnel.

## 4.5 QC INSPECTION PROCESS

4.5.01 QC personnel on this project will implement the three phases of control (preparatory, initial, and follow-up) to ensure field activities conform to the required processes identified in Section 3 of the Work Plan.

### 4.5.1 Preparatory Phase

4.5.1.01 The UXOQCS will conduct preparatory phase inspections prior to starting the DFWs listed in Table 4-2, except for mobilization and demobilization. These inspections will include the following activities:

- Ensuring the project deliverables are finalized and available
- Ensuring that all required procurement forms for supplies and services are approved
- Ensuring that provisions have been made to provide the required QC inspection
- Ensuring that all personnel have the required certifications and training is conducted and documented
- Examining the work area to ensure that all required preliminary work has been completed and follows the approved Work Plan
- Examining physically the required materials and equipment to ensure that they are properly delivered to the site, conform to specifications, and are properly stored
- Reviewing the appropriate AHAs and SOPs to ensure that safety requirements are met
- Discussing procedures for performing the work, including potential repetitive deficiencies
- Establishing workmanship standards for the particular DFW

4.5.1.02 The UXOQCS will conduct frequent internal inspections of mobilization and demobilization activities, which will include the items listed on Table 4-2. The UXOQCS will notify the on-site USACE representative and the PjM 24 hours prior to the preparatory phase.

4.5.1.03 The issues discussed during the preparatory phase meeting will be documented on the Preparatory Inspection Checklist (Appendix G). The UXOQCS will explain the acceptable level of workmanship required to personnel performing work activities.

### 4.5.2 Initial Phase

4.5.2.01 An initial inspection will be performed at the beginning of a DFW and will include the following:

- Checking preliminary work to ensure that it follows contract requirements
- Reviewing the Inspection Checklist documenting the results of the preparatory meeting
- Verifying full contract compliance, including required control inspections

- Establishing the required level of workmanship, testing, and inspection to ensure that work meets minimum acceptable standards
- Resolving all differences
- Checking safety requirements, including compliance with and upgrading of the APP/SSHP and AHAs
- Reviewing the AHAs with project personnel

4.5.2.02 The PjM and on-site USACE representative will be notified at least 2 working days in advance of each initial phase activity. The UXOQCS will document initial inspections for each item using the Initial Inspection Checklist (Appendix G).

4.5.2.03 The initial phase inspection will be reviewed each time a new crew arrives on site or when features of the work change.

### **4.5.3 Follow-Up Phase**

4.5.3.01 During a work feature, follow-up inspections will be conducted at the frequency shown in Table 4-2 to ensure compliance with the DFW process identified in Section 3 of the Work Plan. Each follow-up phase inspection will be documented on the DQCR.

### **4.5.4 Receipt Inspection**

4.5.4.01 The UXOQCS will conduct inspections of equipment or materials prior to their use as identified in Procedures QP-06 and PO-18. These inspections will be documented on the DQCR and photographs of any rental equipment will be taken and logged as required in Procedure PO-08. Any equipment not functioning properly will be identified, tagged, and separated from operational equipment. The TtEC Warehouse Manager will be notified as described in Procedure PO-18. Any materials not meeting the requirements of the subcontract or specifications will be returned to the vendor.

### **4.5.5 Final Inspection**

4.5.5.01 A final inspection will be conducted on completed units of production, lots, or a prescribed number of targets to ensure a specified confidence level as identified in the DQOs. Any deficiencies will be documented on an NCR, and a root cause analysis will be conducted to determine if a corrective action is necessary.

#### **4.5.5.1 Equipment Calibration, Testing, and Maintenance Requirements**

4.5.5.1.01 Each operating system (man and machine) will be tested in an FCA prior to beginning fieldwork. Each operating system must meet the measurement performance criteria shown in Table 4-2. The results of each system test will be documented on the AGM Certification Report form (Appendix G).

**Table 4-2. MEC Measurement Quality Metrics**

<b>Task (DFW)</b>	<b>Measurement Data Quality Indicator</b>	<b>QC Sample and/or Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>	<b>Follow-Up Frequency</b>	<b>Action if Quality Failure Occurs</b>
Equipment setup, receipt inspections, training, FCA established (Mobilization)	Completeness and Accuracy	Review qualifications, training and equipment inspection documentation.	All site training is conducted and documented. Equipment receipt inspections are conducted and documented. All personnel are qualified for positions held.	As necessary when new resources arrive	Review all records pertinent to subject and verify completeness.
Operating System Certification (AGM Certification)	Competence	UXOQCS visual or audible notification by diver of contact.	The operating system will detect 100% of known anomalies within the function check area.	Initially before beginning fieldwork	Check instrument for functionality, replace batteries, and retest operating system.
Daily Shark or GPS Check (Reacquire)	Accuracy	UXOQCS visual observation of coordinates against known coordinates.	Shark or GPS readings within 1 foot of known coordinate.	Daily when used	Check instrument for functionality, replace batteries, and retest operating system. Remove instrument from service if needed.
AOI Coordinates Marking (Reacquire)	Accuracy	UXOQCS verifies Shark or GPS rover operator digitally records location. GQCM verifies coverage of AOI.	Reacquired location is within 1 meter of interpreted location.	Daily Per AOI	Reacquire AOI coordinates or center point until metric is achieved.

**Table 4-2. MEC Measurement Quality Metrics (continued)**

<b>Task (DFW)</b>	<b>Measurement Data Quality Indicator</b>	<b>QC Sample and/or Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>	<b>Follow-Up Frequency</b>	<b>Action if Quality Failure Occurs</b>
Daily Operating System checks (Intrusive)	Accuracy	UXOQCS visual or audible notification by diver(s) of contact.	Instrument detects anomalies within 1 meter.	Daily when used	Check instrument for functionality, replace batteries, and retest operating system until function is in compliance with measurement performance criteria. Remove analog instrument from service if needed.
AOI Investigation (Intrusive)	Completeness	UXOQCS or designated QC diver conducts second-party check.	The diver(s) will cover 100% of the AOI (rectangular or circular grid).	10% of AOIs investigated each day	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate. If appropriate, conduct root cause analysis and develop corrective action.
AOI Investigation (Intrusive)	Completeness	UXOQCS or designated QC diver conducts second-party check.	The diver(s) will recheck 10% of each AOI. The grid will be accepted if all munitions-related targets in the QC sample are identified and recorded in the target list (tablet). Based on the intrusive results of a QC diver-identified target, if a target is identified that was not previously identified and recorded in the tablet, and is either MEC, or any metal the size and mass of a 37mm projectile, less than 9 times the diameter deep is found, the grid will fail.	10% of AOIs investigated each day	Evaluate nonconformance, identify corrective action and re-inspect the AOI.

**Table 4-2. MEC Measurement Quality Metrics (continued)**

<b>Task (DFW)</b>	<b>Measurement Data Quality Indicator</b>	<b>QC Sample and/or Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>	<b>Follow-Up Frequency</b>	<b>Action if Quality Failure Occurs</b>
Database Review (Database Management)	Completeness and Accuracy	UXOQCS reviews database for compliance with USACE DID's. GQCM reviews 100% of the dig results.	All dig results resolved or explained. Results will be compared to the DGM data to ensure they are consistent.	UXOQCS at project start. GEO QC for each AOI	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate.
Positive Identification of Ordnance (MEC/MPPEH Disposal)	Accuracy	UXOQCS verifies classification of 100% of MEC/MPPEH.	All MEC/MPPEH correctly classified.	Each MEC/MPPEH item recovered	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate. If appropriate, conduct root cause analysis and develop corrective action.
MEC/MPPEH Accountability (MEC/MPPEH Disposal)	Completeness	UXOQCS reviews MEC/MPPEH accountability log.	All MEC/MPPEH tracked from discovery to disposal and documented in accordance with SOP 1.	Weekly	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate. If appropriate, conduct root cause analysis and develop corrective action.
Correct reclassification of MDAS (MDAS Management)	Correctness	UXOQCS visually inspects 10% of MDAS.	No MDAS incorrectly classified.	10% of MDAS collected each day	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate. If appropriate, conduct root cause analysis and develop corrective action.

**Table 4-2. MEC Measurement Quality Metrics (continued)**

<b>Task (DFW)</b>	<b>Measurement Data Quality Indicator</b>	<b>QC Sample and/or Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>	<b>Follow-Up Frequency</b>	<b>Action if Quality Failure Occurs</b>
Documentation of MDAS (Data and MDAS Management)	Correctness and Completeness	UXOQCS reviews documents.	No MDAS incorrectly classified.	100% of all MDAS documents	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate. If appropriate, conduct root cause analysis and develop corrective action.
Subcontractor Evaluations (Subcontract Compliance)	Completeness	UXOQCS reviews subcontract requirements.	Compliance with subcontract.	As needed	Contact PjM and project procurement agent if noncompliance is identified.
Files System (Documentation Control and Records Management)	Completeness and Accuracy	UXOQCS reviews 100% of MEC/MPPEH and MDAS documents; reviews team logbooks, and documents on DQCR and in logbook.	100% of MEC/MPPEH records accurate. All MDAS documents correct in accordance with Engineer Manual 385-1-97. Logbooks complete and legible.	Weekly	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate. If appropriate, conduct root cause analysis and develop corrective action.
File System (Documentation Control and Records Management)	Completeness	UXOQCS reviews the system weekly to ensure all project personnel are uploading field records to the file system and correctly filing the records.	Compliance with the established project file structure. No records or folders outside of the file structure.	Weekly	Evaluate nonconformance or deficiency and determine if an NCR or deficiency notice is appropriate. If appropriate, conduct root cause analysis and develop corrective action.

**Table 4-2. MEC Measurement Quality Metrics (continued)**

<b>Task (DFW)</b>	<b>Measurement Data Quality Indicator</b>	<b>QC Sample and/or Activity to Assess Measurement Performance</b>	<b>Measurement Performance Criteria</b>	<b>Follow-Up Frequency</b>	<b>Action if Quality Failure Occurs</b>
Verify all site restoration is complete, equipment prepared for return shipment (Demobilization)	Completeness	UXOQCS verifies shipping documents are complete and correct; inspects site with USACE representative, and ensures no deficiencies are unresolved.	Shipping documentation correct, and final site inspection conducted with USACE Contracting Officer Representative or designee.	Not applicable	Correct any errors or conditions prohibiting final shipment or site acceptance.

*Note:* MC sampling performance metrics are included in the MC QAPP in Appendix F.

#### **4.5.5.2 Daily Equipment Checks**

4.5.5.2.01 Every instrument operator will check his/her equipment (e.g., GPS or analog sensor) daily for proper functionality. The operator will test the analog sensor on known anomalies in an established FCA. The Shark or GPS operator will check the equipment at an established monument or control point and record digitally within the equipment test point. If the instrument does not function properly in accordance with manufacturer's criteria, the instrument operator will notify the SUXOS/DS and UXOQCS. Daily instrument checks will be documented in the team logbook and the in the DQCR, and in the Access database as well.

4.5.5.2.02 The FCA area will include small, medium, and large ISOs buried at 9 to 11 times the diameter of the ISO.

#### **4.5.5.3 Records**

4.5.5.3.01 The UXOQCS will maintain calibration and maintenance records concerning instrument calibration, maintenance, and operator qualification at the TtEC project office and on the project document control and records management system, as described in Section 4.5.5.8. These records will be part of the QC record. All management (SUXOS/DS, UXOSO/SSHO, and UXOQCS) and team leaders will maintain a logbook to document the activities of the individual team members. Logbooks will be managed in accordance with Procedure PO-17. It is not anticipated that any equipment used for this project will require calibration in the laboratory sense.

#### **4.5.5.4 Maintenance**

4.5.5.4.01 The UXOQCS will supervise the maintenance and inspection of all other equipment, including vehicles, radios, monitoring equipment, dive equipment, and any personal protective equipment (PPE). The UXOQCS will maintain the records for all such maintenance and inspection activities in the project document and records system.

#### **4.5.5.5 QC Records**

4.5.5.5.01 The UXOQCS will maintain all QC records, inspection reports, instrument calibration/maintenance records, instrument operator qualification records, training certificates, etc. These records will be maintained in the project document and records management system for examination by the CEHNC On-Site Ordnance and Explosives Safety Specialist and other authorized government representatives.

#### **4.5.5.6 Layout of Work**

4.5.5.6.01 Search points and areas will be established once the Phase 2 DGM data are collected and processed, QC and QA checks are conducted, and the AOIs selected. It is anticipated that mini-grids (from Phase 2 DGM data) will be identified as part of the intrusive investigation.

#### **4.5.5.7 Subcontractor QC**

4.5.5.7.01 Caribbean Marine Services has been identified to provide diving and logistics support services during this phase of operations. Evaluation of subcontract requirements will be performed and documented by the UXOQCS. All subcontractor evaluations will be input into TtEC's Supplier Qualification Module.

#### **4.5.5.8 Document Control and Records Management**

4.5.5.8.01 The PjM will establish a document control and records management system on a SharePoint site, as described in Procedure PO-8 and as previously noted in Section 3.1.2.11.01 of this Work Plan. All personnel will be trained on the system during the Operational Readiness Review or during mobilization. The system will be accessible by field personnel to post records to during the field activities, include a minimum file structure, as shown in Section 3.2.11.01, and will be maintained throughout the field execution. Based on the project schedule, files (hard copy and electronic) will be transferred to the historical project files upon completion of the project.

4.5.5.8.02 Sub-files will be developed based on the records and documents generated during the project. If folders are not used or data are stored in a different location, for whatever reason, the system will identify the location and how the information can be accessed.

#### **4.5.5.9 Data Management**

4.5.5.9.01 The GQCM will review 100 percent of the AOI dig results in the database to determine if the anomaly is adequately resolved (digital response reading consistent with recovered debris). A second-party check of the AOI will be conducted to verify the status of the AOI as described in Table 4-2.

### **4.6 DEFICIENCIES AND NONCONFORMANCE**

4.6.01 Deficiencies and nonconforming conditions will be managed in accordance with Procedures QP-11, Control of Nonconforming Conditions, and QP-12, Corrective Action. Deficiencies discovered during inspection or other project QC functions will be documented in the DQCR. Nonconforming conditions will be documented on an NCR. All deficiencies will be resolved prior to completion of the project and in the timeliest manner possible. The DQCR will include a report on each deficiency/nonconforming condition and the corrective action(s) completed and closed out for the day. A corrective action is required for deficiencies if the root cause analysis suggests a corrective action is necessary, and based on the following:

- Nonconformances identified by the UXOQCS
- Management assessments
- Audits performed by Program QA/QC in accordance with project-specific plans
- Inspections of TtEC, performed by the client or regulatory agencies

#### **4.6.1 QC Responsibilities**

4.6.1.01 It is the responsibility of all personnel on the project to report deficiencies and nonconforming conditions to their supervisors or managers as soon as they are identified. Deficiencies and nonconforming conditions should be considered opportunities to improve the process. Should these conditions occur, notification will be made to the CEHNC Contracting Officer Representative within 24 hours.

4.6.1.02 The determination of the root cause of a deficiency or nonconformance is an integral part of the QC process. The depth and extent of the root cause analysis depends on the situation. It may be as simple (i.e., minor) as an overlooked step or procedure, or it could be a complicated process. Input will be obtained as necessary from field personnel and technical advisors in order to identify the factors leading to the problem. The root cause analysis is the responsibility of the PjM, with the assistance of project QC staff. Criteria considered in the analysis will include:

- Staff qualifications and training
- Adequacy of procedures
- Adequacy of equipment
- Adequacy of QC measures
- Root cause

#### **4.6.2 Corrective Action**

4.6.2.01 Following the root cause analysis, the PjM and SUXOS/DS will conduct an analysis of potential solutions (i.e., corrective actions) to determine which remedy could most effectively correct the problem. The process will include all appropriate personnel and will be documented via meeting notes and information listed in the proper sections of the NCR form. Potential remedies considered may include:

- Supplemental personnel training
- Changes of equipment or modification of equipment currently in use
- Acquisition of supplemental equipment
- Implementation of new procedures or modification of existing procedures
- Rework of the deficient process or a portion of the process
- Changes in QC procedures

4.6.2.02 It is the PjM's responsibility to select the appropriate corrective action to implement. However, all parties involved prior to implementation should agree on this decision. Successful implementation of corrective action will be documented on the NCR and tracked. The GQCM will verify through the follow-up phase surveillance activities whether the corrective action

implemented has corrected the deficiency/nonconforming condition and is sufficient to prevent a recurrence.

4.6.2.03 Once the USACE PDT and the KO have determined that a significant corrective action or field change is required, the USACE PM will notify the regulators via email. It is anticipated that the corrective action/change notification and any supporting documentation, as necessary, will be provided within 48 hours to the regulators.

#### **4.7 FIELD CHANGE REQUESTS**

4.7.01 Site personnel will document changes to the approved plans in the field using the FCR form (Appendix G) and in accordance with Procedure PO-20, Preparation and Control of Work Plans. At a minimum, the following information will be documented in the FCR form:

- Project name
- Contract TO number
- FCR number
- Documents to which a change is requested (including revision number if applicable)
- Description of the item or condition for which the change is requested
- Reason for the change
- Recommended disposition
- Cost and schedule implication of the change, if any
- Approval of disciplines
- Approval of the PjM, SUXOS/DS, UXOQCS, and MMRP Program QCM, and concurrence from the USACE.

4.7.02 The PjM may discuss with the USACE proposed changes to the work plan to determine if they support the change prior to internal coordination and approval but must notify the Project QC Specialist and Program Manager prior to discussions. The PjM will submit all proposed Work Plan changes to the CEHNC PM after internal approval, who will request concurrence from the PDT before forwarding them to the KO for approval. No process or work will be modified until the FCR is approved internally and externally. Once approved, the Assistant PjM/FOL and UXOQCS will conduct, at the earliest opportunity, training and briefings of all field personnel on the approved document changes. This training on changes to existing documents could occur during the daily safety meetings or as a more formal presentation.

#### **4.8 LESSONS LEARNED**

4.8.01 Lessons learned will be captured, documented, and submitted internally using Procedure QP-17, Quality Event Reporting. The UXOQCS will include lessons learned on the DQCR. The PjM will recap all such lessons learned in the RI.

#### **4.9 CONTROL OF CONTRACT SUBMITTALS**

4.9.01 The PjM will ensure all contract submittals (e.g., Work Plan, Weekly and Monthly Reports, Records of Meetings and Conversations, Accident Reports, and Final Report) are prepared in compliance with the PWS. The PjM will verify conformance of all submittals with the current DIDs.

## 5.0 EXPLOSIVES MANAGEMENT PLAN

### 5.1 GENERAL

5.1.01 This Explosives Management Plan was prepared for execution of the Culebra TO 003 Phase 3 Intrusive Investigation. In the event MEC is recovered, the demolition explosives used for the disposal of the recovered MEC will be provided by a local vendor (Alba Explosives) on an as-needed basis. In the event of adverse weather conditions that prohibit the use of delivered on-call commercial explosives, TtEC has a cooperative agreement with USA Environmental, Inc. to store the donor explosives in a magazine overnight. Specific procedures for accountability with respect to explosives received and used during the intrusive investigation are provided in SOP 2, Purchase Receipt Accountability of Explosives, located in Appendix B-2.

### 5.2 LICENSES AND PERMITS

5.2.01 A copy of the following licenses and permits will be maintained on site by the SUXOS/DS and made available, upon request, to any federal, state, or local authority:

- Certification of Permit, List of Representatives/Agents Authorized to Order Explosive Materials, and Statement of Intended Use
- A copy of TtEC Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) Manufacturer of High Explosives License, 9-WA-033-20-6F-00135; a copy of this license is provided as Exhibit 5-1

### 5.3 ACQUISITION

5.3.01 The PjM or designee will ensure executed copies of a current Certification of Permit, List of Representatives/Agents Authorized to Order Explosive Materials, and Statement of Intended Use are submitted, along with the purchase request for explosives (see Exhibit 5-2), to the responsible TtEC procurement official. A copy of the Personal Declaration of Fitness to Receive, Control, and Use Explosives signed by the assigned SUXOS/DS is provided as Exhibit 5-3.

Table 5-1 includes a list of explosives and the estimated quantities TtEC plans to purchase for this project in the event MEC is recovered. TtEC will purchase the minimum required quantities of explosives from our approved vendor(s) as needed.

**Table 5-1. Anticipated Donor Explosives**

Item	Quantity
1-pound pentolite booster	Based on MEC located during investigation
Jet perforators	Based on MEC located during investigation
Shock Tube	Based on MEC located during investigation
Detonation Cord	Based on MEC located during investigation
Electric detonators	Based on MEC located during investigation

**Exhibit 5-1. TtEC's ATF License**

U.S. Department of Justice Bureau of Alcohol, Tobacco, Firearms and Explosives		<b>Federal Explosives License/Permit</b> (18 U.S.C. Chapter 40)	
In accordance with the provisions of Title XI, Organized Crime Control Act of 1970, and the regulations issued thereunder (27 CFR Part 555), you may engage in the activity specified in this license or permit within the limitations of Chapter 40, Title 18, United States Code and the regulations issued thereunder, until the expiration date shown. <b>THIS LICENSE IS NOT TRANSFERABLE UNDER 27 CFR 555.53.</b> See "WARNINGS" and "NOTICES" on reverse.			
Direct ATF Correspondence To ATF - Chief, FELC 244 Needy Road Martinsburg, WV 25405-9431	License/Permit Number <b>9-WA-033-20-8F-00135</b>		
Chief, Federal Explosives Licensing Center (FELC) <i>Christopher L. Reers</i>	Expiration Date <b>June 1, 2018</b>		
Name TETRA TECH EC, INC.			
Premises Address (Changes? Notify the FELC at least 10 days before the move.) <b>19803 NORTH CREEK PARKWAY                  BOTHELL, WA 98011-</b>			
Type of License or Permit <b>20-MANUFACTURER OF EXPLOSIVES</b>			
Purchasing Certification Statement The licensee or permittee named above shall use a copy of this license or permit to assist a transferor of explosives to verify the identity and the licensed status of the licensee or permittee as provided by 27 CFR Part 555. <u>The signature on each copy must be an original signature.</u> A faxed, scanned or e-mailed copy of the license or permit with a signature intended to be an original signature is acceptable. The signature must be that of the Federal Explosives Licensee (FEL) or a responsible person of the FEL. I certify that this is a true copy of a license or permit issued to the licensee or permittee named above to engage in the business or operations specified above under "Type of License or Permit."		Mailing Address (Changes? Notify the FELC of any changes.) TETRA TECH EC, INC. 19803 NORTH CREEK PARKWAY BOTHELL, WA 98011-	
Licensee/Permittee Responsible Person Signature  Printed Name	Position/Title  Date		
Previous Edition is Obsolete: TETRA TECH EC, INC. 19803 NORTH CREEK PARKWAY 98011 WA 98011-0000 June 1, 2018 20-MANUFACTURER OF EXPLOSIVES			

**Federal Explosives License (FEL) Customer Service Information**

Federal Explosives Licensing Center (FELC) 244 Needy Road Martinsburg, WV 25405-9431	Toll-free Telephone Number: (877) 283-3352 Fax Number: (304) 616-4401 E-mail: FELC@atf.gov	ATF Homepage: www.atf.gov
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**Change of Address (27 CFR 555.54(a)(1)).** Licensees or permittees may during the term of their current license or permit remove their business or operations to a new location at which they intend regularly to carry on such business or operations. The licensee or permittee is required to give notification of the new location of the business or operations not less than 10 days prior to such removal with the Chief, Federal Explosives Licensing Center. The license or permit will be valid for the remainder of the term of the original license or permit. (The Chief, FELC, shall, if the licensee or permittee is not qualified, refer the request for amended license or permit to the Director of Industry Operations for denial in accordance with § 555.54.)

**Right of Succession (27 CFR 555.59).** (a) Certain persons other than the licensee or permittee may secure the right to carry on the same explosive materials business or operations at the same address shown on, and for the remainder of the term of, a current license or permit. Such persons are: (1) The surviving spouse or child, or executor, administrator, or other legal representative of a deceased licensee or permittee; and (2) A receiver or trustee in bankruptcy, or an assignee for benefit of creditors. (b) In order to secure the right provided by this section, the person or persons continuing the business or operations shall furnish the license or permit for that business or operations for endorsement of such succession to the Chief, FELC, within 30 days from the date on which the successor begins to carry on the business or operations.

(Continued on reverse side)

**Cut Here ✂**

<b>Federal Explosives License/Permit (FEL) Information Card</b>	
License/Permit Name: <b>TETRA TECH EC, INC.</b>	
Business Name:	
License/Permit Number: <b>9-WA-033-20-8F-00135</b>	
License/Permit Type: <b>20-MANUFACTURER OF EXPLOSIVES</b>	
Expiration: <b>June 1, 2018</b>	
Please Note: Not Valid for the Sale or Other Disposition of Explosives.	

## Exhibit 5-1. TtEC's ATF License (continued)

### WARNINGS

1. As provided in Title XI of the Organized Crime Control Act of 1970 (U.S.C. § 842(i)), it is unlawful for any person who (1) is under indictment for, or has been convicted in any court of, a crime punishable by imprisonment for a term exceeding 1 year, (2) is a fugitive from justice, (3) is an unlawful user of, or addicted to any controlled substance (as defined in section 102 of the Controlled Substances Act (21 U.S.C. 802)), (4) has been adjudicated as a mental defective or has been committed to a mental institution, to ship, transport, or receive any explosive materials in interstate or foreign commerce, (5) is an alien, other than an alien who is lawfully admitted for permanent residence (as that term is defined in section 101(a)(20) of the Immigration and Naturalization Act), or meets any other exception under section 842(i)(5), (6) has been discharged from the armed forces under dishonorable conditions, or (7) having been a citizen of the United States, has renounced the citizenship of that person.
2. Federal Regulation 27 CFR 555.53 - Licensees and permits issued under this part are not transferable to another person. In the event of the lease, sale, or other transfer of the business or operations covered by the license or permit, the successor must obtain the license or permit required by this part before commencing business or operations.
3. Alteration or Changes to the License or Permit. Alterations or changes in the original license or permit or in duplications thereof violates 18 U.S.C. 1001, an offense punishable by imprisonment for not more than 5 years and/or a fine of not more than \$250,000.

### NOTICES

1. Any change in trade name or control of this business or operations MUST be reported within 30 days of the change to the Chief, Federal Explosives Licensing Center (FELC), 244 Needy Road, Martinsburg, WV 25405-9431. (27 CFR 555.56-555.57). A licensee or permittee who reports a Change of Control must, upon expiration of the license or permit, file an ATF Form 5400.13/5400.16.
2. Under § 555.46, Renewal of License/Permit, if a licensee or permittee intends to continue the business or operations described on a license or permit issued under this part during any portion of the ensuing year, the licensee or permittee shall, unless otherwise notified in writing by the Chief, FELC, execute and file with ATF prior to the expiration of the license or permit an application for a license or permit renewal, ATF Form 5400.14/5400.15 Part III, in accordance with the instructions on the form, and the required fee. In the event the licensee or permittee does not timely file an ATF Form 5400.14/5400.15 Part III, the licensee or permittee must file an ATF Form 5400.13/5400.16 as required by § 555.45, and obtain the required license or permit before continuing business or operations. A renewal application will automatically be mailed by ATF to the "mailing address" on the license or permit approximately 60 days prior to the expiration date of the license or permit. If the application is not received 30 days prior to the expiration date, the licensee or permittee should contact the FELC.  
Note: The user-limited permits are not renewable.
3. This license or permit is conditional upon compliance by you with the Clean Water Act (33 U.S.C. § 1341(a)).
4. THIS LICENSE OR PERMIT MUST BE POSTED AND KEPT AVAILABLE FOR INSPECTION (27 CFR 555.101).

ATF Form 5400.14/5400.15 Part I  
Revised October 2011

### Federal Explosives License (FEL) Customer Service Information (Continued from front)

**Discontinuance of Business (27 CFR 555.61)(27 CFR 555.128).** Where an explosives materials business or operations is succeeded by a new licensee or permittee, the records prescribed by this subpart shall appropriately reflect such facts and shall be delivered to the successor, or may be, within 30 days following business discontinuance, delivered to the ATF Out-of-Business Records Center, 244 Needy Road, Martinsburg, WV 25405, or to any ATF office in the division in which the business was located. Where discontinuance of the business is absolute, the records shall be delivered within 30 days following the business discontinuance to the ATF Out-of-Business Records Center, 244 Needy Road, Martinsburg, WV 25405, or to any ATF office in the division in which the business was located.

Explosive materials must be stored in conformance with requirements set forth in 27 CFR, Part 55. It is unlawful for any person to store any explosive materials in a manner not in conformity with these regulations.

**TO REPORT LOST OR STOLEN EXPLOSIVES, YOU MUST IMMEDIATELY NOTIFY ATF:  
CALL TOLL FREE - (888) ATF-BOMB**

✂ Cut Here

Federal Explosives Licensing Center (FELC) Toll-free number: (877) 283-3352  
244 Needy Road Fax number: (304) 616-4401  
Martinsburg, WV 25405-9431 E-mail: FELC@atf.gov

#### ATF Hotline Numbers

Arson Hotline: 1-888-ATF-FIRE (1-888-283-3473)  
Bomb Hotline: 1-888-ATF-BOMB (1-888-283-2662)  
Report Illegal Firearms Activity: 1-800-ATF-GUNS (1-800-283-4867)  
Firearms Theft Hotline: 1-888-930-9275  
Report Stolen, Hijacked or Seized Cigarettes: 1-800-659-6242  
Other Criminal Activity: 1-888-ATF-TIPS (1-888-283-8477)

**Exhibit 5-2. Certification of License**

	TETRA TECH EC, INC.	<b>CERTIFICATION OF LICENSE</b>	
<b>LIST OF REPRESENTATIVES/AGENTS AUTHORIZED TO ORDER EXPLOSIVE MATERIALS AND STATEMENT OF INTENDED USE</b>			
<p>Tetra Tech EC, Inc. (TtEC) is licensed as a “Manufacturer of High Explosives”, (9-WA-033-20-2F-00135), pursuant to 27 CFR 555.41. Attached is a copy of the license.</p> <p>In accordance with 27 CFR 55.103(b), TtEC authorizes employees listed below to purchase and receive explosive materials on behalf of the Corporation and pursuant to the restrictions contained herein.</p>			
<b>NAME</b> _____ _____	<b>ADDRESS</b> _____ _____	<b>DATE OF BIRTH</b> _____ _____	<b>PLACE OF BIRTH</b> _____ _____
<p>Purchases of explosives by the aforementioned employee(s) are to be made from an U.S. Bureau of Alcohol, Tobacco, Firearms and Explosives Licensed or Permitted individual/entity only.</p> <p>The following information is provided to address requirements of 27 CFR 555.103 (b):</p> <ul style="list-style-type: none"> <li>- Intended Use: <u>Destruction of Munitions and Explosives of Concern (MEC)</u></li> <li>- Tax ID Number: 25-1902191</li> <li>- Principal Business Location: 1000 American Rd, Morris Plains, NJ 07950</li> <li>- Local Business Location: TBD</li> </ul> <p>This certification is valid from the date indicated below to the completion of the work at the Culebra project site, Puerto Rico, or December 6, 2017, whichever occurs first.</p>			
<b>APPROVAL:</b>			
_____ David A. Keller, Vice President UXO Operations		_____ Date	
<p><b>Attachments:</b></p> <p>(1) Signed Certified Copy of License Number 9-WA-033-20-2F-00135</p> <p>(2) Personal Declaration of Fitness to Receive, Control and Use Explosives</p>			

**Exhibit 5-3. Personal Declaration of Fitness to Receive, Control, and Use Explosives**

 <b>TETRA TECH EC, INC.</b>	<b>PERSONAL DECLARATION OF FITNESS TO                  RECEIVE, CONTROL AND USE                  EXPLOSIVES</b>	
<b>CERTIFIED STATEMENT BY EMPLOYEE DESIGNATED TO PURCHASE                  EXPLOSIVES</b>		
<b>QUESTION</b>	<b>YES</b>	<b>NO</b>
Are you a fugitive from Justice?		
Are you an unlawful user of, or addicted to, marijuana or any depressant or stimulant drug or narcotic drug?		
Have you been convicted in any court of a crime punishable by imprisonment for a term exceeding one year?		
Are you under charges in an indictment or information in any court for a crime punishable by imprisonment for a term exceeding one year?		
Have you been adjudicated mentally defective or been committed to a mental institution?		
Are you classified as an alien to the United States? If yes, see provision 555.26 (c) (5).		
Have you been discharged from the U.S. armed forces under dishonorable conditions?		
Have you renounced you United States citizenship?		
Are you under 21 years of age?		
<b>CERTIFICATION</b>		
I hereby declare that I am authorized to purchase explosive(s) under federal law and have answered "no" to each of the above questions. I understand that a person who cannot certify that the above are not applicable is prohibited by Federal Law from shipping, using or transporting any explosive in interstate or foreign commerce or from receiving any explosive which has been shipped or transported in interstate or foreign commerce. I also understand that the making of any false oral or written statement or the exhibiting of any false or the exhibiting of any false or misrepresented identification with respect to this transaction is a crime punishable as a felony.		
<b>NAME:</b> _____	<b>SIGNATURE:</b> _____	<b>DATE:</b> _____
<b>ADDRESS:</b> _____ _____		
<b>DATE OF BIRTH:</b> _____		

## **5.4 ACQUISITION SOURCES**

5.4.01 TtEC intends to purchase explosives from a local commercial source on an as-needed basis and will obtain a Puerto Rico blast permit.

## **5.5 INITIAL RECEIPT**

5.5.01 The SUXOS/DS will be responsible for the initial receipt of all explosive materials. Upon receipt, the SUXOS/DS will document the actions taken for inventory. The SUXOS/DS will also be designated as the Demolition Supervisor. The Demolition Supervisor will be accountable for all explosive documentation, including receipt of explosives, expenditures, and returns (if any). Upon receipt, the Demolition Supervisor will inventory and maintain all documentation concerning the demolition material. By signing a receipt document, the Demolition Supervisor assumes custody of and accountability for the explosive materials.

## **5.6 ACCOUNTABILITY**

### **5.6.1 Initial Receipt Inventories**

5.6.1.01 Upon initial receipt of explosives, a complete inventory will be conducted, with the following information provided for each type of explosive recorded on the TtEC explosives accountability record form in SOP 2 (Attachment 3) in Appendix B-2:

- Date of acquisition
- Name or brand name of manufacturer
- Manufacturer's marks of identification
- Quantity (applicable quantity units, such as pounds of explosives, number of detonators)
- Description (e.g., dynamite, C4, shape charges, perforators)
- Name, address, and explosive license number of the person from whom the explosive materials were received

5.6.1.02 The UXOQCS will initiate QC checks (per Section 4).

### **5.6.2 Reconciling Discrepancies in Quantities**

5.6.2.01 Before signing for explosives, the SUXOS/DS will conduct a 100 percent inventory. The quantities annotated on the receipt document or bill of lading must agree with those counted in the 100 percent inventory. If these quantities do not match, the SUXOS/DS will contact the vendor, advise the vendor the discrepancy, and convey what actions are intended. The SUXOS/DS will sign only for the quantity of explosives received. Actual quantities received must be indicated on all copies of the shipping documents prior to signing.

### **5.6.3 Closeout Inventory**

5.6.3.01 Upon completion of all explosive operations, when all explosives have been used or returned to the supplier, a closeout inventory (see Attachment 3 of SOP 3, located in Appendix B-2) will be conducted and recorded in the same manner as the initial receipt inventory described above. The primary representative/agent will send the original closeout inventory, a copy of all magazine inventory cards, and explosives purchase orders to the TtEC Munitions Response Operations Manager for maintenance in TtEC's ATF central files.

## **5.7 RECORDKEEPING**

### **5.7.1 Central Files**

5.7.1.01 Copies of all correspondence, certifications, invoices, and current inventories related to explosives used on the Culebra project will be maintained at the project site by the SUXOS/DS. Copies of all correspondence and certifications will be maintained by the TtEC Munitions Response Operations Manager. At the completion of each munitions response, original documents related to explosive operations, inventories, invoices, and accountability will be transferred to the TtEC Munitions Response Operations Manager. Copies of these documents will be maintained in the project files. These files must be maintained for a minimum of 5 years (per 27 CFR 555.121).

## **5.8 TRANSPORTATION**

5.8.01 Transportation of explosives to the demolition site will be performed as described in the following sections. Safety is always the primary consideration during explosives transportation operations. TtEC will ensure all site personnel, the public, and the environment are protected at all times from the effects of blast, fire, fragmentation, and toxic releases.

### **5.8.1 Vehicle Operators**

5.8.1.01 If required, explosives vehicle operators will be TtEC employees who have valid commercial driving licenses and are trained to accommodate the hazards inherent in transporting explosives. TtEC will observe all U.S. Department of Transportation (DOT) and local requirements. TtEC will designate in writing the explosive vehicle operators.

### **5.8.2 Responsibilities**

5.8.2.01 TtEC employees will segregate the explosives identified for transport by type and load the materials only into vehicles meeting the regulations of 49 CFR and applicable local laws. The SUXOS/DS will provide oversight during loading. TtEC personnel will block, brace, and transport the explosives to the demolition site. Prior to movement, the driver will inspect the explosives transport vehicle to ensure the load is properly secured. Detonators and explosives will remain separated always. This will be accomplished by using separate vehicles or placing the detonators in a specially designed container, such as an MK 663 or IME 22 container.

Explosives will not be transported in the cab of a vehicle. Explosives-laden vehicles will not be left unattended. Explosive materials will not be transported through any prohibited tunnel or subway or over any prohibited bridge, roadway, or elevated highway. Explosive materials will not be carried or transported in or on a public conveyance nor be transferred from one motor vehicle to another on any public road without informing the fire and police departments involved. In the event of a breakdown or collision, the local fire and police departments will be promptly notified regarding the location and type of cargo. Explosive materials will be transferred from the disabled vehicle to another vehicle under proper and qualified supervision.

5.8.2.02 Only authorized persons will be permitted on a motor vehicle transporting explosive materials. No person is permitted to ride on or in the cargo compartment. No person will smoke or carry a lighted cigarette, cigar, or pipe within 25 feet of a motor vehicle containing explosives, oxidizing materials, or flammable materials. No person will drive, load, or unload a motor vehicle transporting explosive materials in a careless or reckless manner.

### **5.8.3 Vehicle Requirements**

#### **5.8.3.1 Safety Considerations**

5.8.3.1.01 Vehicles used for the transportation of explosives will be suitable to carry the load and be in good mechanical condition. The transportation of explosive materials in open-bodied vehicles, which depend on a fire-resistant tarpaulin cover for protection, is not permitted. When a vehicle with an open body is used to transport explosive materials, the explosives will be loaded into a portable magazine or closed metal container securely fastened to the truck bed. All vehicles used for the transportation of explosive materials will have tight wood floors. Any exposed spark-producing metal on the inside of the body, portable magazine, or closed container, will be covered with wood or other non-sparking material to prevent contact with the explosive materials. Exposed spark-producing metal need not be covered in a vehicle transporting only blasting agents.

#### **5.8.3.2 Fire Extinguishers**

5.8.3.2.01 Each vehicle transporting explosive materials will be equipped with fire extinguishers as follows:

- Trucks with a rating of less than 14,000 pounds (lbs.) gross vehicle weight (GVW) will have a minimum of two extinguishers with a total fire extinguisher rating of at least 4-A: 20-B: C.
- Trucks with a rating of over 14,000 lbs. GVW and tractor-semi-trailer units will have two or more extinguishers with a total fire extinguisher rating of at least 4-A: 70-B: C.
- Only fire extinguishers listed or approved by a nationally recognized fire equipment testing laboratory will be used on vehicles carrying explosive materials. The

extinguishers should be designed, constructed, and maintained to permit visual determination of whether they are fully charged.

- Extinguishers will be located where they will be accessible for immediate use.
- Extinguishers will be examined and recharged periodically in accordance with the manufacturer's recommendations.
- Fire extinguishers will never be shipped. All fire extinguishers will be purchased and disposed locally.

### **5.8.3.3 Vehicle Inspections**

5.8.3.3.01 Motor vehicles used for transporting explosive materials will be inspected each day before use to determine if they are in a proper condition for the safe transportation of explosives. Vehicle inspections will ensure:

- The fire extinguishers are fully charged and ready for use
- All electrical wiring is protected and fastened to prevent short circuiting
- Chassis, motor, pan, and underside of body are reasonably clean and free of excess oil and grease
- Fuel tanks, feed lines, and crossover lines are secure and have no leaks
- Brakes, lights, horns, windshield wipers, defrosters, and the steering apparatus are functioning properly
- Tires are properly inflated and are free of defects

### **5.8.3.4 Tires**

5.8.3.4.01 Tires will be checked for proper inflation and general conditions after each 2 hours of travel or 100 miles, whichever comes first, and at every stop. Flat or overheated tires will be removed from the vehicle immediately. Removed tires will be kept far enough away from the vehicle so that spontaneous ignition of the tire will not endanger the vehicle or its cargo. These tires will neither be placed on the vehicle until they have cooled down below dangerous temperatures nor be used again until the cause of the overheating has been corrected.

### **5.8.3.5 Prohibited Cargo**

5.8.3.5.01 No metal, tools, oils, matches, firearms, electric storage batteries, flammable substances, acids, oxidizing materials, or corrosive compounds will be carried on the body of any motor vehicle transporting explosive materials, except as permitted by DOT regulations.

## **5.9 RECEIPT PROCEDURES**

### **5.9.1 SUXOS/DS**

5.9.1.01 The SUXOS/DS will initially receive explosives from a commercial vendor. The SUXOS/DS will issue explosives to the Demolition Supervisor and document this transaction on the Explosives Accountability Record forms. The SUXOS/DS will maintain these Explosives Accountability Record forms and include them in the Final RI Report.

### **5.9.2 Authorized Individuals**

5.9.2.01 The TtEC Vice President, UXO Operations will issue a Certificate of Permit, List of Representatives/Agents Authorized to Order Explosive Materials, and Statement of Intended Use. This certificate will designate those persons who are authorized to receive and use explosives on this project. For this project, this person is the Demolition Supervisor. Other personnel, such as the UXOSO/SSHO and the CEHNC on-site Ordnance and Explosives Safety Specialist, will be granted access on an escorted basis by the SUXOS/DS to perform their inspection duties.

### **5.9.3 Certificate of End Use of Explosives**

5.9.3.01 The Demolition Supervisor will certify that the amount of explosives used was for the intended purpose. The Demolition Supervisor will record the use of the explosives on the Explosive Disposal Log form found in Appendix B-2 (SOP 1, Attachment 5).

### **5.9.4 Procedures for Reconciling Receipt Documents and Proposed Intervals**

5.9.4.01 The SUXOS/DS will issue explosives to the Demolition Supervisor UXO Technician III in charge of the MEC disposal. Upon receipt, the Demolition Supervisor will conduct a 100 percent inventory of issued explosives. The quantities listed on the Explosive Disposal Log will match the quantities reflected on the initial receipt inventory. If these quantities do not agree, the Demolition Supervisor will bring this discrepancy to the immediate attention of the SUXOS/DS.

## **5.10 LOST, STOLEN, OR UNAUTHORIZED USE OF EXPLOSIVES**

5.10.01 Upon discovering lost, stolen (or attempted break-in), or unauthorized use of explosives, the SUXOS/DS will document the circumstances and immediately notify the following:

- CEHNC PM, Teresa Carpenter (Tel: 256-808-6031)
- CEHNC KO, Janice Jamar (Tel: 256-895-1343)
- TtEC PjM, Ian Roberts (Tel: 303-243-4583)

- TtEC Program Manager, Kent Weingardt, PE, PMP (Tel: 619-471-3532)
- TtEC Vice President, UXO Operations, David Keller (Tel: 425-482-7749)

## **5.11 RETURN OF UNEXPENDED DONOR EXPLOSIVES**

5.11.01 The DS will return any unused explosives to the SUXOS/DS, who, in turn, will return them to the vendor and annotate the transaction as a receipt on the Explosives Accountability Record.

## **5.12 FORMS**

5.12.01 The Explosives Accountability Record form and the Explosive Disposal Log form are located in Appendix B-2 (SOP 2, Attachment 2, and SOP 1, Attachment 5, respectively).

## 6.0 ENVIRONMENTAL PROTECTION PLAN

### 6.1 INTRODUCTION

6.1.01 This EPP was prepared in accordance with DID MR-005-12, the PWS, and the Environmental SOPs developed by the USACE (Appendix B-1). The purpose of this EPP is to establish the procedures for avoiding, minimizing, and mitigating potential impacts to natural and cultural resources during RI field activities, and comply with substantive requirements of applicable or relevant and appropriate requirements (ARARs). This EPP describes sensitive natural resources specifically MRS 03 and MRS 12 and sets forth methods to protect and conserve those resources during the RI field activities. Section 6.13 of this EPP includes a description of the waste that is anticipated to be generated during Phase 3 of the RI and how TtEC will manage the waste.

6.1.02 Phase 1 of the RI (the EBS) included photographing and collecting video and performing bathymetry surveys to document benthic site conditions, define and delineate benthic and coral reef habitats, identify sensitive or critical habitat areas, and document features of the underwater environment in these two MRSs. Phase 2 re-collection of the RI (digital geophysical mapping and video surveying), which commenced on June 19, 2017, was completed on August 23, 2017, included EM surveys to identify anomalies that may be MEC/MPPEH. Information from the EBS and data from the Phase 2 re-collection activities were considered during preparation of the EPP for the Phase 3 RI.

6.1.03 Flamenco Bay is a shallow bay comprising approximately 195 acres that extends up the east side of the Northwest Peninsula and the west side of Flamenco Point. Flamenco Bay is currently used for recreational swimming, diving, and snorkeling activities. The Luis Peña Channel is made up of waters that comprise the Luis Peña Water Refuge, approximately 835 acres of water along the west coast of Culebra from the Northwest Peninsula to Scorpion Point. Luis Peña Channel comprises the Luis Peña Channel Natural Reserve, which was designated a no-take fishery reserve by PRDNER in 1999; the reserve is co-managed by PRDNER and a management board comprised of stakeholder representatives, with funding assistance from the NOAA Coral Reef Conservation Program<sup>4</sup>.

6.1.04 Where impacts to sensitive biological resources cannot be avoided, this EPP outlines potential measures that can be implemented to mitigate such impacts. These mitigation measures were developed based on a site-specific analysis that addresses unique concerns for work within and along the beaches of the Culebra Water Ranges and incorporates best management practices (BMPs) and guidelines that have been implemented for intensive field programs previously performed by other MMRP contractors on Culebra. Several SOPs for conservation of

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<sup>4</sup> See Canal de Luis Peña Natural Reserve, Culebra, Puerto Rico, Management Board Agreement; January 2014; online at: [https://docs.lib.noaa.gov/noaa\\_documents/CoRIS/Canal\\_de\\_Luis\\_Pena\\_Agreement\\_2014.pdf](https://docs.lib.noaa.gov/noaa_documents/CoRIS/Canal_de_Luis_Pena_Agreement_2014.pdf).

endangered species and their critical habitat during underwater investigations were developed by USACE, and are listed below:

- Final Supplemental SOP for Endangered Species Conservation and their Critical Habitat during Underwater Investigations, dated February 2014; this SOP included three additional SOPs:
  - Final SOP for Endangered Species Conservation and their Critical Habitat during Underwater Investigations, dated April 2012 (Appendix A of the 2014 SOP).
  - Addendum to the 2008 SOP (contains mainly terrestrial based species information), dated April 2011 (Appendix B of the April 2012 SOP).
  - Final SOP for Endangered Species Conservation and their Habitat, dated July 2008 (Appendix A of the April 2012 SOP).
- Addendum 1 to the Final Supplemental SOP for Endangered Species Conservation and their Critical Habitat during Underwater Investigations, dated February 2015
  - On January 22, 2018, NMFS published a final rule in the Federal Register (FR) (83 FR 2916) to list the giant manta ray (*Manta birostris*) as threatened under the ESA
  - On January 30, 2018, NMFS published a final rule in the FR (83 FR 4153) to list the oceanic whitetip shark (*Carcharhinus longimanus*) as a threatened species under the ESA.

6.1.05 These SOPs are referenced throughout the EPP and are included in this Work Plan as Appendix B-1. As stated in Section 4.6 of the 2012 SOP, the July 2008 SOP and its 2011 Addendum remain in effect. The February 2014 SOP is meant to supplement, not replace, previous SOPs; it provides the most up-to-date information regarding listed corals and several additional guidelines.

6.1.06 The following are some of the sources that were consulted to identify biological and cultural resources known to exist or potentially to exist at the Culebra Water Ranges site:

- 2012 SOPs (including sub-appendices A and B) (Appendix B-1)
- 2014 Supplemental SOPs (February 2014 and Addendum 1, February 2015) for Endangered Species Conservation and their Critical Habitat during Underwater Investigations, including Sub-Appendices A-E) (Appendix B-1)
- Ecological Services in the Caribbean (website) (USFWS 2011a)
- Draft Stock Assessment: West Indian Manatee (*Trichechus manatus*) Puerto Rico Stock (Antillean subspecies, *Trichechus manatus manatus*) (USFWS 2009)
- Draft Site Inspection Report, Northwest Peninsula of Culebra (Parsons 2011)

- Culebra National Wildlife Refuge (website) (USFWS 2008)
- PRDNER website (<http://www.drna.gobierno.pr/>)
- Draft Puerto Rico Coastal and Estuarine Land Conservation Plan (PRDNER 2010b)
- Elkhorn Coral (website) (NMFS 2011a)
- Sea Turtles (website) (NMFS 2011b)
- FR. Final Rule. Endangered and Threatened Wildlife and Plants: Final Listing Determinations on Proposal to List 66 Reef-Building Coral Species and to Reclassify Elkhorn and Staghorn Corals (NMFS 2014)
- Resource Category 1 Designation: The Seagrass Beds of Culebra Island, Puerto Rico (USFWS 1992)
- Environmental Protection Plan, Non-Time-Critical Removal Action, Municipality of Culebra, Puerto Rico Final Work Plan (EEG 2006)
- 2012-2013 Field Data Collection Report for EBS (TtEC 2013)
- National Wetlands Inventory website (<http://107.20.228.18/Wetlands/WetlandsMapper.html>)
- NRIS, National Register of Historic Places
- List of National Historic Landmarks (NHL) – NHL Program
- List of NHAs, National Heritage Areas Program
- Coastal Zone Management Program (NOAA)
- NMFS
- National Marine Sanctuaries and Marine Protected Areas (NOAA)

## 6.2 APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

6.2.01 This project is being performed as part of a FUDS program. Through a site inspection (Parsons 2007), it was determined that MRSs 03 and 12 warranted further investigation under the MMRP. FUDS response activities are conducted in accordance with the DERP statute (10 U.S. Code [U.S.C.] Section 2701 et seq.), CERCLA (42 U.S.C. Section 9601 et seq.), Executive Orders 12580 and 13016, and the National Contingency Plan (40 CFR Part 300). An RI/FS is being performed by TtEC for the two MRSs that comprise the Culebra Water Ranges. The Phase 3 RI field activities are the subject of this EPP.

6.2.02 The identification of ARARs is an iterative process that must be considered throughout the CERCLA process. As such, the list of identified requirements and their relevance may change as more information is obtained during the RI/FS process. The RI is used to ascertain site conditions and types and extents of contamination. Site remedies are not evaluated until the FS.

During the RI, limited ARARs that potentially directly relate to site activities have been determined. Federal ARARs are presented in paragraph 6.2.06; however, coordination with appropriate Commonwealth of Puerto Rico agencies, such as PRDNER and the PREQB, are appropriate for determining requirements and practices that are protective of the environment during this RI and have been included in this EPP.

6.2.03 Federal laws and regulations with substantive requirements must be considered for identification of site-specific ARARs during the RI. ARARs can be:

- Chemical-specific (governing the level or extent of site remediation relative to a specific constituent)
- Location-specific (pertaining to existing site features and location)
- Action-specific (pertaining to proposed site remedies and implementation of the selected site remedy)

6.2.04 Chemical-specific ARARs are not addressed in this EPP because these will not come into play until the FS (if MC are found during sediment sampling and are compared to DQOs that the survey team determines for the FS evaluation). Limited location- and/or action-specific ARARs are listed for the RI. Paragraph 6.2.06 contains the ARARs for the RI.

6.2.05 Following are some notes regarding the ARARs for the RI:

- Chapter 4 of the EPA guidance document titled *CERCLA Compliance with Other Laws Manual, Part II* (EPA 1989) states that “While EPA interprets CERCLA §121(e) to exempt lead agencies from obtaining Federal, State, or local permits (or documents similar to permits) or from complying with the administrative requirements for on-site remedial activities, it is strongly recommended that lead agencies, nevertheless, consult as specified with administering agencies for on-site actions. The administering agencies have the expertise to determine the impacts of a remedial action on particular aspects of the environment and what steps should be taken to avoid and mitigate adverse impacts.”
- EPA guidance recommends that the lead federal agency consult with the state when identifying state ARARs for removal actions (EPA 1988). In essence, the CERCLA/National Oil and Hazardous Substances Pollution Contingency Plan requirements for removal actions, found at 40 CFR 300.515, provide that the lead federal agency request that the state identify chemical-, location-, and action-specific state ARARs upon completion of site characterization activities. At the present time, Puerto Rico-specific ARARs are not identified because site characterization has not been completed. The purpose of the RI is to characterize the site.

6.2.06 Federal ARARs for Phase 3 of the RI are described below:

1. **50 CFR 17 or 50 CFR 226, Endangered Species Act of 1973, as amended, and 16 U.S.C. 1531 et seq. (50 CFR 402).** Several threatened species of coral are known to be present in MRS 03 and 12. In addition, several T&E species of turtle, including critical

habitat for several species, are present in these MRSs. Several T&E whale species may also be present, as well as several T&E fish species. On land, there is one species of tree, one reptile species, and one cactus species listed. These T&E species, including candidate species, are described in Section 6.3 below, and a summary list is provided in Table 6-1. Substantive requirements of this regulation are that on-site activities must be conducted in a manner that does not result in a take of these species and actions must not destroy critical habitat. No takes are authorized, and penalties may be issued to personnel whose actions result in a “take.” Personnel on this project will be trained to recognize these species and their critical habitats, as well as understand the actions to take to minimize potential for a take to occur and prevent destruction of critical habitat; they will also be informed that penalties may be imposed on persons whose action results in a take.

2. **Migratory Bird Treaty Act; 16 U.S.C. 701-712.** This act makes it unlawful to (or attempt to) pursue, hunt, take, capture, or kill any migratory bird, part, nest, egg, or product. All but a few bird species naturally occurring in the U.S. are protected under this act. On-site activities must be conducted in a manner that does not result in a take of these species.
3. **Marine Mammal Protection Act of 1972 (MMPA); 16 U.S.C. 1361, 50 CFR 12.** This act makes it unlawful for any person or federal agency to take (harass or kill) any marine mammal on the high seas, in U.S. waters, or on land under the jurisdiction of this act. On-site activities must be conducted in a manner that does not result in a take of these species.

### **6.3 ENDANGERED AND THREATENED SPECIES**

6.3.01 Threatened and endangered species listed under the ESA, by the NMFS and USFWS, that are known to occur or have the potential to occur on land and in the waters around Culebra Island and adjacent cays include the following: two endangered and two threatened sea turtles; seven threatened hard corals; five endangered marine mammals, including four whales that may be present during certain times of the year around Culebra, though they are not likely present in the shallower waters of these MRSs; two endangered plants; two endangered terrestrial reptiles that are not likely to be found in areas of work for the Culebra Water Ranges due to the location and project tasks to be performed; and, finally, four threatened fish (scalloped hammerhead shark, giant manta ray, oceanic whitetip shark, and Nassau grouper) all of which have been found in the waters around Puerto Rico and the U.S. Virgin Islands. All of these species are included in Table 6-1, below.

6.3.02 The T&E species discussed above and listed in Table 6-1 (other than roseate tern and brown pelican), are described in Section 3.0 of the 2012 SOP, in Appendix B of the 2012 SOP, or in the February 2014 SOP (including Addendum 1, dated February 2015), along with photographs typical of the species and identification of breeding/nesting behaviors and critical habitat designations. Reptile and plant (terrestrial) species are addressed in Appendix B to the

2012 SOP in Appendix B-1. All project personnel will be fully briefed by a qualified staff member (e.g., project biologist) on the requirements associated with this EPP, the 2012 SOP (including Appendices A and B), and the 2014 SOP (and its February 2015 Addendum 1) prior to beginning the RI to raise awareness and protect T&E species and sensitive or critical habitats. The potential for civil and criminal penalties to be issued to individuals who harm, harass, or kill T&E species will be emphasized. These documents, including this EPP, will be available to all survey teams during the RI/FS.

6.3.03 Logs detailing endangered or threatened species sightings in both terrestrial and marine habitats, as required in Section 4.1.6 (Reports) of Appendix A (SOPs for Endangered Species Conservation and their Habitat) of the Environmental SOPs (Appendix B-1), will be maintained during the RI.

**Table 6-1. Listed or Proposed Threatened or Endangered Species**

Common Name	Scientific Name	Group	Status <sup>1/</sup>	Distribution
Loggerhead Sea Turtle	<i>Caretta</i>	Reptile	T	Coastal Zones
Green Sea Turtle	<i>Chelonia mydas</i>	Reptile	T, CH	Coastal Zones
Leatherback Sea Turtle	<i>Dermochelys coriacea</i>	Reptile	E, CH	Coastal Zones
Hawksbill Sea Turtle	<i>Eretmochelys imbricate</i>	Reptile	E, CH	Coastal Zones
Brown Pelican	<i>Pelecanus occidentalis</i>	Bird	D, MP	Coastal Zones, No Nesting
Roseate Tern	<i>Sterna dougallii</i>	Bird	T	Coastal Areas and Offshore Cays, Nesting
Culebra Giant Anole	<i>Anolis roosevelti</i>	Reptile	E, CH	Arboreal forest
Virgin Islands Tree Boa	<i>Epicrates monensis granti</i>	Reptile	E	Forest and Shrublands
Wheeler's peperomia	<i>Peperomia sheeleri</i>	Tree	E	Mesic, Semi-Evergreen Forest
[No Common Name]	<i>Leptocereus grantianus</i>	Cactus	E	Subtropical Dry Forest, Rock Substrate
Antillean Manatee	<i>Trichechus manatus</i>	Mammal	E	Coastal Zones
Elkhorn Coral	<i>Acropora palmata</i>	Invertebrate	T, CH	Coral Reefs
Staghorn Coral	<i>Acropora cervicornis</i>	Invertebrate	T, CH	Coral Reefs
Lobed Star Coral	<i>Orbicella annularis</i>	Invertebrate	T	Coral Reefs
Mountainous Star Coral	<i>Orbicella faveolata</i>	Invertebrate	T	Coral Reefs
Boulder Star Coral	<i>Orbicella franksi</i>	Invertebrate	T	Coral Reefs
Pillar Coral	<i>Dendrogyra cylindrus</i>	Invertebrate	T	Coral Reefs
Rough Cactus Coral	<i>Mycetophyllia ferox</i>	Invertebrate	T	Coral Reefs
Blue Whale	<i>Balaenoptera musculus</i>	Mammal	E	Oceans
Sperm Whale	<i>Physeter macrocephalus</i>	Mammal	E	Oceans
Sei Whale	<i>Balaenoptera borealis</i>	Mammal	E	Oceans
Fin or Finback Whale	<i>Balaenoptera physalus</i>	Mammal	E	Oceans
Humpback Whale	<i>Megaptera novaeangliae</i>	Mammal	D	Oceans
Scalloped Hammerhead Shark <sup>2/</sup>	<i>Sphyrna lewini</i>	Fish	T	Oceans
Giant Manta Ray	<i>Manta birostris</i>	Fish	T	Oceans
Whitetip Shark	<i>Carcharhinus longimanus</i>	Fish	T	Oceans
Nassau Grouper	<i>Epinephelus striatus</i>	Fish	T	Coral Reefs

**Notes:**

<sup>1/</sup> E=Endangered; T=Threatened; CH=Critical Habitat; D=Delisted due to Recovery; MP= Monitoring Plan; Proposed=May be subject to listing as endangered or threatened, but not listed at the present time;

<sup>2/</sup> Central and Southwest Atlantic District Population Segment. Under consideration for critical habitat by NMFS, although they may be present in the Caribbean, they are not specifically known to utilize habitat around Culebra.

Sources:

NMFS 2011a, b, c; USFWS 2011b; NMFS 2014; Environmental SOPs (see Appendix B-1)

6.3.04 Chapter 9 of the ESA prohibits the taking of listed species without acquiring a special exemption. There is no authorized take of any listed species during this project and no exemptions will be granted. Individuals whose actions result in a take may be subject to penalties under the ESA. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. If any take does occur, work will stop immediately, and the take will be reported. Under terms of Sections 7(b)(4) and 7(o)(2) of the ESA, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided such taking is in compliance with an incidental take statement.

## **6.4 CRITICAL HABITAT DESIGNATIONS**

6.4.01 On Culebra, critical habitat designations for several listed species have been made, as described below (USFWS 2011b; NMFS 2008).

6.4.02 Hawksbill Sea Turtle: On Culebra, critical habitat designation has been made for areas of beachfront on the north shore of the island from mean high tide inland to a point 150 meters from shore at Playa Resaca, Playa Brava, and Playa Larga. These critical habitat areas are not within the survey areas of Flamenco Bay or the Luis Peña Channel, though these turtles may be present.

6.4.03 Elkhorn and Staghorn Coral: The NMFS has designated critical habitat for Elkhorn and Staghorn corals in Puerto Rico that encompasses the entire island and associated cays of Culebra. Coral is discussed further in Section 6.6.1.

6.4.04 Green Sea Turtle: On Culebra, critical habitat designation has been made in the waters surrounding the island of Culebra from the mean high-water line seaward to 3 nautical miles (5.6 kilometers). The surrounding islands and cays are also critical habitat for green sea turtles. Seagrass beds, such as those in the Luis Peña Channel, provide shelter and food for green sea turtles. Seagrass beds are discussed further in Section 6.6.2.

6.4.05 Culebra Giant Anole: On Culebra, critical habitat designation has been made under the ESA for most of the remaining forests on Culebra Island, comprising Monte Resaca, Punta Flamenco, Playa Resaca, and Playa Brava.

## Methods to Avoid or Minimize Impacts to T&E Species

6.4.06 Site personnel will coordinate closely with the USACE representative, as well as federal and Commonwealth of Puerto Rico environmental agencies, as required in the Environmental SOPs included as Appendix B-1 of this Work Plan. Site personnel will be trained on how to avoid and minimize potential impacts to listed species and their habitat, and TtEC will follow all of the requirements included in the SOPs in Appendix B-1. There is no authorized take of any of these species during the Phase 3 fieldwork. In accordance with the ESA, the SOPs were developed to avoid takes and to minimize impacts to T&E species listed, including their critical habitats (where identified), during underwater investigations, including operations related to removal and disposal/treatment of MEC on Culebra Island or in the waters surrounding Culebra Island. If a take occurs, work must stop immediately, and the take must be reported.

6.4.07 Site personnel will follow the requirements included in the SOPs to avoid and/or minimize possible impacts to T&E species and their habitats. Measures to avoid or minimize possible impacts that TtEC will follow during this work are included in Section 4.0 of the February 2014 Supplemental SOP (and its sub-appendices), Section 4.0 of the 2012 SOP, as well as in both Appendices A and B of the 2012 SOP.

6.4.08 Section 4.1.5 of the April 2014 SOP will be followed. TtEC will maintain a log detailing T&E species sightings in terrestrial and marine habitats. The log will include, but not be limited to, the following information: date and time; location coordinates using a GPS unit; species; one or more photographs, if possible; and any actions taken (e.g., species identification and distance from working area, reasons to cease operation, reasons to determine that operation may be resumed, among others) during the work period. All data will be provided to USACE to be shared with the TPP Team. Appendix B of the 2014 SOP includes a guide listing the minimum information required for the Daily Observer Log Sheet.

6.4.09 Descriptions of and specific measures to be taken for protection of various species, listed below, are identified in the following sections of this EPP:

- Marine mammals, including manatees and sea turtles (Section 6.5)
- Coral reefs and seagrass beds (Sections 6.6.1 and 6.6.2)
- Nesting birds (Section 6.6.3)
- Terrestrial endangered plants (Section 6.11)
- Terrestrial endangered reptiles (Section 6.6.4)
- Shark zone of influence calculations for in-water detonation/BIP activities (Section 6.6.5)

6.4.010 The PRDNER has jurisdiction over every resource in Puerto Rico (marine and terrestrial). Project activities will be coordinated with the PRDNER Bureau of Fisheries and Wildlife. In addition, other agencies also have jurisdiction regarding endangered species and

must be coordinated with/consulted as appropriate, if not coordinated through the PRDNER. The coordinating official on T&E species on Culebra is the Chief of the USFWS, Caribbean Field Office in Boquerón for species under their jurisdiction (sea turtles inland, manatees, birds, and terrestrial species). For aquatic species (sea turtles in water, corals, and marine mammals), the Coordinating Official for NMFS has jurisdiction. For activities being conducted adjacent or within the Culebra National Wildlife Refuge, the Refuge Manager also has jurisdiction.

6.4.011 In the event that a T&E species is harmed or incidentally taken during the RI/FS activities, work will stop, and the TtEC PjM will notify the USACE PM and the PREQB Lead Regulatory Agency, and others will be notified as required (e.g., PRDNER, Refuge Manager, NOAA Coordinating Official, USFWS). Following this EPP and the 2014 SOP and its three appended SOPs for work in Flamenco Bay or the Luis Peña Channel will help minimize potential impacts to T&E species and minimize harm to sensitive or critical habitat areas.

## **6.5 MARINE MAMMALS AND SEA TURTLES**

6.5.01 Several listed marine species (whales, sea turtles, and manatee) could be present in the offshore or potentially nearshore areas around Culebra. The MMPA protects all marine mammals and prohibits the take of marine mammals in U.S. waters and by U.S. citizens on the high seas. Additionally, six species (sperm, sei, fin, blue, and humpback whales, and the West Indian manatee) are listed as endangered under the ESA (see Table 6-1). All these species are managed by NMFS, with the exception of West Indian manatee (*Trichechus manatus*), which is managed by the USFWS. A subspecies of the West Indian manatee, the Antillean manatee (*Trichechus manatus manatus*), occurs in Puerto Rico and is endangered. The following paragraphs describe these species and the sections of the Environmental SOPs that contain further information.

6.5.02 Whale species listed in Table 6-1 (T&E species), as well as other species that are not endangered or threatened but are protected under the MMPA, may be present at times, though their presence around Culebra, especially in the two water ranges, is not likely and work activities are not likely to impact the species. Whales are addressed in Sections 3.6 through 3.10 of the 2012 SOP. The SOPs include procedures to follow to minimize potential impacts to marine mammals from project activities.

6.5.03 Manatees have been reported irregularly in Culebra Island through the years, the individuals usually staying only for a couple of weeks. Although Culebra Island has available habitat, it lacks fresh water, which may hinder a longer stay by manatees (USFWS 2009). Manatees are described in Section 3.5 of the 2012 SOP.

6.5.04 Several species of T&E sea turtles—the loggerhead sea turtle (described in Section 3.1 of the 2012 SOP), green sea turtle (described in Section 3.2 of the 2012 SOP), leatherback sea turtle (Section 3.3 of the 2012 SOP), and the hawksbill sea turtle (described in Section 3.4 of 2012 SOP)—may be present in the waters around Culebra. Seagrass beds (see Section 6.6.2, below)

and coral reefs (see Section 6.6.1, below) are an important habitat for sea turtles for foraging and feeding. Seagrass beds are designated as critical habitat for the green sea turtle, as is the area surrounding Culebra to 3 nautical miles offshore, including surrounding islands and cays. Damage to seagrass beds and coral reefs must be avoided during field activities and extra vigilance is required when operating boats near these habitats as potential contact with sea turtles is more likely. In addition, during breeding season, turtles make nests and lay eggs on beaches on Culebra Island and the adjacent cays, making them susceptible to boating activities being performed in shallow water or on beaches during particular times of the year.

6.5.05 One major threat to sea turtles includes destruction and alteration of nesting and foraging habitats. Turtles are also vulnerable in their pelagic stages as juveniles and adults, when they may be caught in fishing nets, struck by boats, or caught in debris.

6.5.06 All of the general and specific conservation measures in Section 4.0 of the 2012 SOP will be followed during the RI. Specific conservation measures are identified in Section 4.2 (Staging Area Sea Turtle Nesting Monitoring), Section 4.4 (Marine Mammals and Sea Turtles Avoidance Measures), and Section 4.3 (Coral and Seagrass Avoidance Measures). In addition, Section 4.5 (Diving Operations and Equipment) will also be followed during the RI activities (when diving/snorkeling operations are included in RI activities) to avoid harming sea turtles and marine mammals and habitat during these activities. Some site activities performed in the Luis Peña Channel may require coordination and scheduling around dates of high green sea turtle activity if the seagrass beds are within the work area. Additional procedures are included in Appendix A to the 2012 SOP. Where information is provided in more than one location in these SOPs, the most stringent requirement is to be followed.

6.5.07 If staging areas are required in beach areas, beach surveys will be conducted as a key component of sea turtle protection. TtEC will coordinate with the PRDNER Endangered Species Division (Mr. Carlos Diez) to select staging areas on beaches that will minimize potential impacts to sea turtles and their nests from onshore or nearshore survey activities. Based on activities being conducted, nest monitoring will be performed in accordance with Section 4.2 of the 2012 SOP and Beach Monitoring and Designation of Beach Zones sections in Appendix A of the 2012 SOP (as applicable). The standard beach monitoring protocol will include having the Project Biologist perform morning beach patrols to identify the potential presence of new nests prior to and during the nesting season. The priorities for the beach monitoring protocol are to identify and record nesting behavior (tracks), site selection (sand, vegetation, and borderline), and threats to hatch success (predators, poachers, seawater, and desiccation). As part of the protocol, if sea turtle nests are found, the Project Biologist, his/her supervisor, and/or monitoring personnel will communicate daily with the USFWS Boquerón Endangered Species Specialist and the Culebra Islands National Wildlife Refuge Manager. Communications will help ascertain whether new nests have been identified and their locations within the work area.

6.5.08 When it is not nesting season, the Project Biologist or appropriately trained personnel will conduct morning beach surveys prior to crews commencing daily activities to determine whether sea turtle nesting has occurred. The same priorities for the protocols associated with the nesting season, described above, will be followed.

6.5.09 To document the observed marine mammals and sea turtles, the wildlife observers will report the marine mammals and sea turtles seen during the survey in logs, noting the direction of transit when applicable. These logs will be included as part of the final RI report.

6.5.010 Any collisions with or sighting of injured or incapacitated marine mammals or sea turtles will be reported immediately to the USACE, USFWS, NMFS, and PRDNER, as required in Section 4.4.12 of the 2012 SOP.

6.5.011 Section 4.4 of the 2014 SOPs includes requirements that will be followed specifically for MEC/MPPEH disposal/detonation and conservation measures and includes measures for the observation for the presence of sea turtles, sea turtle nests, and signs of recent sea turtle activity by qualified and experienced personnel, in addition to the above requirements. Daily beach surveys will be conducted by qualified personnel to determine whether sea turtles are using beaches within the MRS. All MEC/MPPEH detonations will be performed during daylight hours.

6.5.012 Section 4.5 of the 2014 SOPs includes requirements that will be followed for in-water MEC/MPPEH disposal/detonation and conservation measures. Whenever possible, the MEC/MPPEH detonation will be performed on land if the items are considered safe to move. All MEC/MPPEH detonations will be performed during daylight hours and under conditions of good visibility to ensure that the EZ is clear of marine mammals and sea turtles. No detonation will occur when protected marine species (marine mammals, sea turtles and corals) are known or suspected within the EZ. The EZ delineation will also consider the potential level of acoustic impacts following the Young's (1991) equation in Appendix E of the 2014 SOP. Section 4.5.4 of the 2014 SOP includes procedures to follow post-detonation, including inspections and reporting requirements should impacts to listed species be observed.

6.5.013 All observed stranding of protected marine species should be reported to the appropriate hotline, regardless of whether the stranding is the result of a detonation or another component of the project, as stated in Section 4.5.5 of the 2014 SOP.

## **6.6 SENSITIVE ENVIRONMENTS AND HABITATS**

6.6.01 The Culebra National Wildlife Refuge comprises approximately 1,510 acres, and includes 22 islands and rocks, in addition to the four tracts on the main island of Culebra and associated cays, including Luis Peña. The refuge is well known as a nesting site for a variety of seabirds and preserves important habitat for endangered sea turtles.

6.6.02 Conservation priority areas for Culebra include all the lagoons and beaches on Culebra, the Flamenco Peninsula, all cayos and cays around Culebra, and the Canal Luis Peña Natural

Preserve. Flamenco Point, the Northwest Peninsula, and all beaches are managed by the USFWS or PRDNER for wildlife conservation and recreational use.

6.6.03 Flamenco Bay includes the tourist areas most visited in Culebra and endangered turtle nesting areas. The Luis Peña Channel is in the Marine Natural Reserve and has coral reef barriers and endangered turtle nesting areas.

6.6.04 The following sections address the varieties of sensitive environments that may be found in the Culebra Water Ranges.

### **6.6.1 Coral Reefs**

6.6.1.01 The PRDNER, through the Bureau of Fisheries and Wildlife Program, is responsible for conservation and management of coral reefs in Puerto Rico under Law 147, July 15, 1999 (Law for the Protection, Conservation, and Management of Coral Reefs in Puerto Rico). At the national level, this coral reef program is part of the Coral Reef Initiative under Executive Order 13809 (Coral Reef Protection), which seeks to “preserve and protect the biodiversity, health, heritage, and social and economic value of U.S. coral reef ecosystems and the marine environment.” USACE is coordinating effects to ESA-listed species (including seven threatened corals) and designated habitat associated with DERP-FUDS activities in Puerto Rico (including the Culebra Water Ranges) with the NMFS Office of Protected Resources headquarters in Silver Spring, Maryland.

6.6.1.02 Elkhorn coral (*Acropora palmata*) and staghorn coral (*Acropora cervicornis*) are both coral species in the genus *Acropora*. The NMFS designated critical habitat in Puerto Rico for both elkhorn and staghorn corals in November 2008, and, in May 2006, NMFS listed both species as threatened; this listing was retained in the 2014 NMFS final rule. Staghorn and elkhorn coral are two of the three most important Caribbean corals in terms of their contribution to reef growth and fish habitat. Other corals, including boulder star coral (*Orbicella franksi*), mountainous star coral (*Orbicella faveolata*), pillar coral (*Dendrogyra cylindrus*), rough cactus coral (*Mycetophyllia ferox*), and lobed star coral (*Orbicella annularis*), may also be present, are listed as threatened, and provide essential habitat for fish and reef structure that is protective of inner lagoons and cays.

6.6.1.03 Coral reefs in the Luis Peña Channel have been documented since 1927 (Valdéz-Pizzini et al. 2008). Most of these reefs are patch reefs (Pagán-Villegas et al. 1999) and fringing reefs (Vicente 1995) and have maintained an extensive development of coral communities healthier than the vast majority of reef communities around Puerto Rico (Hernández-Delgado 2000; Hernández-Delgado and Sabat 2000).

6.6.1.04 Since 1980, populations have collapsed throughout their range from disease outbreaks, with losses compounded locally by hurricanes, increased predation, bleaching, elevated temperatures, and other factors. These species are also particularly susceptible to damage from sedimentation.

6.6.1.05 Threats to coral reefs include:

- Disease, such as white band disease
- Hurricanes
- Predation
- Bleaching
- Algae overgrowth
- Sedimentation
- Temperature and salinity variation
- Low genetic diversity

6.6.1.06 Descriptions, including photographs, of listed corals are included in Sections 3.11 through 3.13.5 of Appendix A of the Environmental SOPs (see Appendix B-1 of this Work Plan).

## 6.6.2 Seagrass Beds

6.6.2.01 The Culebra seagrass beds have been proposed by the USFWS for designation as Resource Category 1 because these areas are unique and irreplaceable on a national or eco-regional level. Seagrass beds are considered a habitat area of particular concern as a subset of essential fish habitat (EFH) in the U.S. Caribbean under the Magnuson-Stevens Fishery Conservation and Management Act because they provide important ecological functions and/or are especially vulnerable to degradation. Collaboration with NMFS is required for federal projects that may have adverse impacts upon EFH and species and/or critical habitat as designated under the ESA. Seagrass beds are extensive in the Luis Peña Channel (Hernández-Delgado 2003a), comprising the most abundant marine habitat in the Luis Peña Channel (Hernández-Delgado et al. 2002). These beds are part of the designated critical habitat for green sea turtles around Culebra and its surrounding islands and cays. Projects undertaken must not decrease the integrity of this designated critical habitat. The EBS performed prior to the RI identified the location and extents of these seagrass beds so that subsequent survey activities can avoid, or, in the case of intrusive activities, minimize damage to these beds. Coordination and collaboration with PRDNER is required for any activity occurring within a seagrass bed.

6.6.2.02 The following information is excerpted from Resource Category 1 Designation: The Seagrass Beds of Culebra Island (USFWS 1992).

“There are about 49 species of plants that have become fully adapted to marine environments. These species are called seagrasses because of their external morphological similarity to terrestrial grasses. These marine flowering plants have undergone very little speciation since and represent less than 1 % of the 250,000 flowering plants known worldwide. Although little speciation has

occurred, seagrasses have developed a necessary adaptation called hydrophilic pollination. There is no equivalent of insect pollinators in aquatic plants.

The association of seagrasses with other tropical or subtropical, shallow marine systems (mangroves and coral reefs) has been known to exist since Cretaceous times. However, recent seagrass bed systems developed as the continental and insular shelves became flooded during the Holocene transgression following the Wisconsinian Glaciation. Seagrass beds have therefore accumulated and trapped vast amounts of sediments, created and modified shorelines, and probably sustained large turtle, manatee, and fish populations within the West Indian tropics for long periods of time. Seagrass beds continue to keep pace with rising sea levels and fulfill physical and biological functions which ensure the ecological integrity of our coastlines.

There are 4 species of seagrasses within the Culebra archipelago: turtle grass (*Thalassia testudinum*), manatee grass, shoal grass (*Halodule wrightii*), and sea vine (*Halophila decipiens*). Turtle and manatee grasses are usually found growing together in shallow, protected environments with unconsolidated substrates. Manatee grass occurs as monotypic stands in wave-exposed sandy bottoms. *H. decipiens* is usually found in deeper water but may occur in shallow, turbid water. Shoal grass, with or without manatee grass, is usually found colonizing blowouts or other barren exposed bottoms. *Ruppia maritima* (widgeon grass) is found only in very shallow semi-enclosed lagoons where salinities of 25 parts per thousand or less may be found because low salinities are required for *Ruppia* to reproduce sexually. On the other hand, extremely high salinities exclude seagrasses from Flamenco Lagoon, the largest lagoon in Culebra.”

6.6.2.03 The seagrass beds of the Culebra archipelago support a large juvenile population of green turtles and are identified as critical habitat for this species.

6.6.2.04 Coral and seagrass avoidance measures are included in Section 4.3 (Coral and Seagrass Avoidance Measures) of the 2012 SOP, as well as the 2014 (February 2015 Addendum 1) SOP (see Appendix B-1 of this Work Plan). These measures will be followed at all times during the RI/FS activities. Notifications to the Office of Protected Resources will be made in accordance with Section 4.3.9 of the 2012 SOP should any coral be damaged or injured. Any activities causing the damage will be ceased and the coral will be left in place. If any boat runs aground, the boat operator will follow the procedures in Section 4.3.10 of the 2012 SOP. Diving operation procedures are included in Section 4.5 of the 2012 SOP.

6.6.2.05 Section 4.3 of the 2014 SOP specifically addresses intrusive underwater investigation and MPPEH relocation conservation measures that will be performed to minimize

impacts to listed species and habitats, including specific measures for different bottom types (hard bottom, seagrass beds, areas where corals are present, etc.). Section 4.3.4 of the 2014 SOP specifies that UXO divers/snorkelers investigating anomalies within seagrass areas must be careful to maintain root systems as much as possible. Pre- and post-investigation photographs will be taken and will include a measurement of the area investigated (length, width, depth). Should intact plugs of seagrass be removed, they will be replanted following the removal of the anomaly. If the target (MEC, MD, or non-munitions-related debris) can be identified in environmentally sensitive areas (hard bottom, seagrass beds, areas where corals are present, etc.) without fully excavating it, photographic documentation and measurements will be recorded, and no further investigation will be conducted to completely excavate the target. However, if further investigation is required to identify the target, a focused approach based on the fuze locations for the suspected specific ordnance could be conducted, as follows:

- Cut the seagrass on three sides and roll each side up to identify the ordnance.
- After work is completed, the excavated area is filled with sand, if necessary, and the seagrass is rolled back into place and staked with biodegradable stakes to enable the grass to reestablish quickly.
- If the conditions do not permit the application of this method, the area will be photographed, the location will be documented, and TtEC will provide the USACE with an approximate square footage of seagrass that was unable to be returned to its original position.

6.6.2.06 Section 4.5 of the 2014 SOP specifically addresses in-water detonation/BIP conservation measures. If TtEC performs these operations, all the requirements of the SOP will be followed. Section 4.5.4 of the 2014 SOP includes procedures to follow post-detonation, including inspections and reporting requirements should impacts to coral and hardbottom habitat be observed.

6.6.2.07 Appendix C of the 2014 SOPs includes a Recommended Coral Relocation and Reattachment Protocol that will be followed to minimize impacts to coral species (non-listed corals and listed coral species) when considering the potential effects to these species prior to MEC/MPPEH removal or disposal operations. ESA-listed corals will be documented and left in place until formal coordination with the USACE is concluded.

### **6.6.3 Nesting Areas for Birds**

6.6.3.01 The cays and coastal areas of Culebra are known nesting areas for shorebirds and seabirds, with abundant suitable habitat amongst the rocky shores and cliffs and associated coastal vegetation. The largest seabird nesting colony occurs at Peninsula Flamenco, where 30,000 to 40,000 sooty tern pairs nest. Most of the nesting for birds occurs in the spring and summer months (February through September), though birds may reside year-round. Migratory

birds also frequent Culebra along routes of migration, and the Culebra National Wildlife Refuge areas provide a haven for these species.

6.6.3.02 Fifteen species of seabirds nest on 14 islands and cays of the Culebra Archipelago, and a further 12 species occasionally visit the archipelago and surrounding waters at various times of the year (as shown in Table 2 in Appendix D of the 2014 SOP). The Culebra National Wildlife Refuge is one of the most important reserves in the Caribbean for seabirds. Seabird areas, including seabird observation and nesting periods for the Flamenco Peninsula and the Luis Peña Cay (and other island and cays around Culebra), are listed in Table 3 in Appendix D of the 2014 SOP, and include the following migratory species for these two locations where the Phase 3 RI will be performed:

- Sooty tern schedule
- Audubon's shearwater
- White-tailed tropicbird
- Red-billed tropicbird

6.6.3.03 One species of seabird, the roseate tern, is listed as threatened under the ESA; although it is not listed as observed or nesting in the two areas where the Phase 3 RI will be performed, it could be present in the project area. The brown pelican, which also could be present in the areas where the Phase 3 RI is being performed, was delisted due to recovery, but is a species that is being monitored.

6.6.3.04 Boating operations may be performed near shore where nesting birds are present, which could cause disturbance to nesting birds if present. In addition, the detonation of MEC could impact seabirds. Prior to detonation, a qualified observer will observe for listed and protected seabirds in accordance with Section 4.4.6 and 4.4.7 of the 2014 SOP (based on the listings included in Appendix D of the 2014 SOP), and TtEC will implement the requirements listed in this section if species are observed.

#### **6.6.4 Terrestrial Reptiles**

6.6.4.01 Two endangered and/or threatened species of reptile are present on Culebra and its adjacent cays. Species include the Culebra giant anole (*Anolis roosevelti*) and the Virgin Islands tree boa (*Epicrates monensis granti*). Sections 2.1 and 2.2 of Appendix B to the 2012 SOP contain information and photographs of these species. Critical habitat has been designated for the Culebra giant anole at Monte Resaca, Punta Flamenco, Playa Resaca, and Playa Brava. No critical habitat has been designated for the Virgin Island tree boa on Culebra. Impacts to these species are not likely during the RI when work will be performed on water, though, during travel to and from the sites, or when MEC/MPPEH detonation is conducted on land, these species could be encountered. Sections 3.0, 3.2, and 3.3 of Appendix B to the 2012 SOP will be followed to avoid impacts to these species during the work, and Section 4.1.5 of the 2014 SOP will be

followed for logging T&E species sightings in terrestrial and marine habitats. The Project Biologist will brief employees at project start so that these species can be recognized and avoided. All sightings of these species will be recorded on a daily log and reported to the USACE. If the Culebra giant anole is sighted during any field activities, the USACE and USFWS must be notified immediately, as specified in Appendix B to the 2012 SOP, as these reptiles are extremely rare.

### **6.6.5 Fish Acoustical Impacts**

6.6.5.01 Shark acoustic impacts are not anticipated during the Phase 3 RI activities. Although there are no data that indicate scalloped hammerhead sharks or giant manta rays utilize habitat around Culebra, these fish have been found to be present in areas around Puerto Rico and the U.S. Virgin Islands according to information received after the NMFS listing of the sharks and giant manta rays as threatened. However, these fish species (like sharks and rays) that lack swim bladders are considered less sensitive to sound and likely only detect particle motion and not sound pressure. Acoustic impact calculations for fish, from Appendix E in the 2014 SOPs, will be used to establish zones of influence for sharks, giant mantas, and other fish, including the threatened Nassau grouper, during in-water detonation/BIP activities.

## **6.7 WETLANDS**

6.7.01 There are no freshwater wetlands in Culebra. Estuarine and marine wetlands, including conservation priority area lagoons, are the wetland types that could potentially be impacted by work during the RI. Marine wetlands represent 27 percent of the total wetland resources in Puerto Rico. Seagrass beds are included in this category of wetland, and are described in Section 6.6.2, above. Long stretches of beach and shore habitats, along with associated buffer areas, are becoming increasingly rare due to agriculture and recreational or commercial activities and development. The principal habitats of concern in Puerto Rico's coastal and estuarine environment are: shoreline, wetland, and adjacent coastal upland areas. Each of these habitats provides a key contribution to the ecological integrity of the overall coastal environment, and "ecological significance" is determined by the quality of existing natural habitats, the diversity of species present, and the existence of T&E species (PRDNER 2010a).

6.7.02 The USFWS Wetlands Online Mapper was used to identify wetlands within the Culebra Water Ranges. There are several marine and estuarine wetland areas identified in small bays along the Luis Peña Channel of the main island of Culebra, and there are extensive seagrass beds in the Luis Peña Channel (Hernández-Delgado 2002; Valdéz-Pizzini et al. 2008). Extensive areas of Flamenco Bay are identified as estuarine or marine wetlands. These sensitive areas were delineated as part of the RI/FS performed by TtEC so that they can be protected during work activities.

6.7.03 It is anticipated that impacts to wetlands will not occur during the Phase 3 RI because conservation measures will be followed for performing work near seagrass beds, as specified in

the SOPs in Appendix B-1. To the maximum extent practicable, sandy substrate underwater MEC disposal sites will be chosen based on safety considerations. When items are deemed safe to move, the MEC/MPPEH will be relocated for disposal on land rather than in water. In addition, MEC/MPPEH detonation sites performed on beaches will not be located in lagoon areas.

## **6.8 CULTURAL AND ARCHAEOLOGICAL RESOURCES**

6.8.01 The NRIS, NHL list, NHA list, and the National Park Service list one registered property, Faro Isla de Culebritas, that is part of the Lighthouse System of Puerto Rico. This lighthouse is not within the areas where activities will be performed during the RI. There are known prehistoric sites on Culebra Island (USFWS n.d.); however, these are documented to be on land and not in the areas where the RI will be conducted. A literature assessment by Valdés-Pizzini et al. (2008) showed that there is not extensive information about cultural and archaeological resources for the Luis Peña Channel Reserve.

6.8.02 During the EBS (Phase 1 of the RI), no potential cultural and archaeological artifacts were identified during site activities. During Phase 2 of the RI, no data from geophysical surveys, photographs, or video identified potential cultural or archaeological items or structures. If any suspected cultural or archaeological items are found during the Phase 3 RI, the location will be marked, a photograph will be taken (if possible), and the CEHNC PM will be notified of the finding. Work in the immediate area of an artifact will be halted until a Qualified Person, typically the State Historic Preservation Officer, can inspect the item.

## **6.9 WATER RESOURCES**

6.9.01 Groundwater on Culebra is scarce and only known to occur in alluvial deposits and in fractures in volcanic and plutonic rocks. Average annual rainfall is 30 to 50 inches, and all aquifer recharge comes from direct rainfall. The public water supply on Culebra comes from a desalination plant located near Lower Town, and from water pumped through a sub-sea pipe system from the main island via Vieques. In some households, municipal water is supplemented with rooftop cisterns or groundwater for non-drinking water uses. There are no permanently flowing surface water streams on Culebra (Parsons 2011).

6.9.02 Groundwater and freshwater resources will not be adversely impacted by project activities and are not the focus of the RI. Care will be exercised to minimize adverse impacts to estuarine or marine wetlands, and to preserve sensitive habitats and ecologically and economically important marine and estuarine water resources.

## **6.10 COASTAL ZONES**

6.10.01 The management of the coastal zone was adopted on July 12, 1978, as the Coastal Land Use Plan of Puerto Rico. The lead agency for coastal zone management in Puerto Rico is the PRDNER, whose primary responsibility is to protect the natural resources of Puerto Rico. The Planning Board is the government agency responsible for administering the certification

process with the Federal Support Program. The NMFS also has jurisdiction in coastal zones. The Coastal Zone of Culebra as described in the Puerto Rico Coastal Zone Management Program (PRDNER 2008) as “a strip of land one thousand linear meters inland, measured from the coastline, as well as the additional distance necessary to incorporate key natural systems of the coastal environment. In addition, it includes the territorial waters of Puerto Rico and the corresponding submerged lands (three marine leagues, 9 nautical miles or 10.35 land miles), the islands of Vieques, Culebra, Mona, Monito, Desecheo, Caja de Muertos and all keys and small islands within them.” All project activities taking place are considered to be within the Coastal Zone.

6.10.02 In order to access the MRSs, work crews and equipment typically must be transported by boat. In addition, sonar and marine geophysical detection equipment and diving/snorkeling operations will be used during the RI. Any anchorage areas will be carefully examined following procedures in the 2014 Supplemental SOP, and its appendices, to protect coral reefs and seagrass beds. The EBS was performed to help characterize the benthic environment and delineate sensitive habitats and coral reef areas so that provisions to avoid adverse impacts can be planned for during the Phase 2 and Phase 3 RIs. Information from bathymetric surveys, snorkel surveys, and remotely operated vehicle photographic documentation collected during Phases 1 and 2 of the RI have been used to further delineate sensitive habitats and procedures to avoid damage to these resources. Information contained in the 2014 Supplemental SOP, and its appendices, will be followed to ensure that anchorage of boats or grounding of boats, snorkeling and diving operations, and MEC/MPPEH investigation, removal, and detonation operations consider sensitive coral reefs and seagrass bed habitat so that impacts to these resources can be limited to the extent practicable during the Phase 3 RI.

6.10.03 TtEC will utilize public or private docks for launching boats. TtEC will not be landing boats onto beaches unless required for consolidation of MEC/MPPEH, and will avoid damaging coral reefs, turtle and bird nesting areas, and seagrass beds during this work, as outlined in Sections 6.4 through 6.6 of this EPP and the referenced SOPs. Coordination with the USFWS and PRDNER on this project, as well as meeting regulations or other requirements of the PRDNER during the RI, will ensure this project adheres to coastal zone management objectives and marine and estuarine water resources. Munitions disposal operations, if they occur during Phase 3 of the RI, will be performed in accordance with well-established procedures included in the Work Plans and the Environmental SOPs in Appendix B-1, and through coordination with various agencies.

## **6.11 TREES AND SHRUBS**

6.11.01 The MEC/MPPEH processing and disposal/detonation site will be established on a beach to provide convenient access by UXO removal teams working in the offshore waters and to minimize disturbance of vegetation and protected species on Culebra. TtEC will utilize existing docks, roads, trails, and paths whenever possible, and will limit any disturbance of trees

in the vicinity of beaches used for MEC/MPPEH disposal. When feasible, all demolition events will be covered with sandbags to mitigate the blast effects and to reduce the risk of shrapnel being ejected.

6.11.02 Appendix B of the 2012 SOP, Section 2.3, contains information on Wheeler's peperomia (*Peperomia wheeleri*) and *Leptocereus grantianus*, an unnamed species of spineless cactus, both of which are considered endangered. Information contained in these sections, as well as the mitigation measures in Sections 3.0 and 3.4 of this appendix, will be communicated to project personnel by the Project Biologist so that these species can be avoided if there is potential for impact through vegetation disturbance in areas where these species may be present. In addition, association of other canopy species may be an indicator of the potential presence of the Wheeler's peperomia, and attention will also be paid to these types of forest canopies. If any of these species are present where work will be conducted or along an intended travel route, the route will be adjusted so that these species are not contacted. Reporting of any finds of these species in work areas or paths will be logged and reported to the USACE as required in Section 4.1.5 and Appendix B to the 2014 Supplemental SOP.

## **6.12 EXISTING WASTE DISPOSAL SITES**

6.12.01 There are no known munitions waste disposal sites within the Culebra Water Ranges of Flamenco Bay or the Luis Peña Channel. MEC was used during training exercises and is considered MEC. Discarded military munitions, which are military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal, are not known to be present in these MRSs.

## **6.13 PROJECT WASTE MANAGEMENT**

6.13.01 The following sections describe wastes that may be generated during the Phase 3 RI and the disposition of these wastes. Wastes will be managed, transported, and disposed of in accordance with federal and Commonwealth of Puerto Rico regulations and requirements. No hazardous waste is anticipated to be generated during the Phase 3 RI. The demolition and demilitarization of MEC/MPPEH will follow all applicable DoD requirements and TtEC procedures described in this Work Plan.

### **6.13.1 Unexploded Ordnance**

6.13.1.01 It is anticipated that MEC/MPPEH, if discovered during the Phase 3 RI, will be identified, photographed, and: 1) left in place with the position documented; 2) moved to a land-based area for detonation using donor explosives; or 3) blown in place or moved to an in-water area for detonation using donor explosives. No underwater explosive detonations (BIP, consolidated shots, or deep-water disposals) are allowed unless ESA coordination between the USACE regulatory agencies has been completed and all mitigation requirements are coordinated and in place for this activity. For clarification purposes, the regulatory agencies include the following: EPA, NOAA, USFWS, NMFS, PRDNER, and PREQB.

6.13.1.02 Phase 3 of the RI includes the use of surface vessels and divers, and potential use of donor explosives for detonation of MEC/MPPEH within MRS 03 and MRS 12. Underwater detonation is only allowed if the results of the ESA coordination are completed prior to completion of the Phase 3 RI and any mitigation requirements have been evaluated by the USACE with concurrence by the regulatory agencies. For clarification purposes, the regulatory agencies include the following: EPA, NOAA, USFWS, NMFS, PRDNER, and PREQB. These sites are public recreational areas with no restrictions on use or activities. There is a potential for MEC contact or exposure during Phase 3 field activities. When the investigation determines that USACE and regulatory agencies' approved disposal activities for the MEC are warranted (i.e., the explosive hazard poses a considerable risk to site receptors), this Work Plan and its conservation measures will be followed and coordinated with the TPP Team.

### **6.13.2 Munitions Debris**

6.13.2.01 Section 3.1.2.7 of this Work Plan address the inspection, documentation, processing, and disposal of MD. MD that does not pose a risk will be designated or reclassified to MDAS and transported off Culebra for final disposal.

### **6.13.3 Common Trash**

6.13.3.01 Common trash, such as food wastes, food containers, and office-related trash, will be collected from boats daily and disposed of in the office trash receptacle. This receptacle will be regularly picked up and disposed of in a local sanitary waste facility, as arranged with the municipality of Culebra.

### **6.13.4 Vehicle and Boat Maintenance Fluids**

6.13.4.01 Project vehicle and boat maintenance (e.g., oil changes), if required during the project, will be performed by TtEC personnel, or a vendor on Culebra. Disposal and/or recycling of waste materials will be performed in accordance with local rules and regulations.

### **6.13.5 Sanitary Wastes**

6.13.5.01 Sanitary wastes from boats equipped with U.S. Coast Guard-approved marine sanitation devices, and grey water from hand washing will be regularly pumped out by an approved vendor at a public or private dock.

### **6.13.6 Investigation-Derived Waste**

6.13.6.01 Investigation-derived waste, such as used disposable sampling equipment and used disposable PPE used by samplers processing sediment samples for analysis, will be managed as nonhazardous waste. These materials will have had only incidental contact with sediments that are not likely to be contaminated at levels that would be regulated for disposal and will not contain MC (at levels considered to be explosive). This investigation-derived waste will, therefore, be bagged and disposed of with the common trash listed in Section 6.13.3.

## **6.14 WASTE TRANSPORTATION AND DISPOSAL**

6.14.01 Waste profile sheets are not anticipated to be required, based on the anticipated wastes that will be generated during the RI, because no special waste or hazardous waste will be generated.

6.14.02 If required (e.g., if unanticipated contaminated wastes are discovered and require special waste disposal and TtEC is directed by the USACE to handle the waste as described in Section 6.15), profile sheets will be coordinated with the intended facility based on its waste acceptance criteria. Waste profile sheets will be submitted for review and signature by the USACE representative. If the disposal facility issues permits for receiving waste, the permit will accompany the waste to the disposal facility when shipped.

6.14.03 Likewise, based on the wastes that are anticipated to be generated during the RI, manifests will not be required, though straight bills of lading may be used to track shipments or for payment purposes.

6.14.04 Munitions are regulated for transportation on public roads, though, during the RI, there will be no transportation of MEC items from their in situ locations to any land-based disposal area via roadways. Based on DOT hazardous material regulations, no other wastes listed above are regulated for transport on public roadways. As such, these wastes may be self-transported to the disposal/recycling facility or a local solid waste vendor affiliated by contract for disposal to the intended facility by contract.

6.14.05 All waste generated during field activities will be properly containerized and disposed of in accordance with all applicable federal and Puerto Rico regulations and through approved channels.

6.14.06 Solid waste facilities will be chosen based on their waste handling permit and waste acceptance criteria. Wastes will only be sent to facilities that are operating in compliance with their permits and applicable federal and Puerto Rico regulatory requirements.

## **6.15 CONTINGENCY FOR UNANTICIPATED WASTE**

6.15.01 If unanticipated wastes are generated during project activities, TtEC will notify the PjM and SHM, as well as the USACE PM, to determine the proper and safe course of action to properly characterize, containerize, transport, and dispose of the waste, and this EPP will be amended as required. The plan must ensure that trained personnel are identified, and that, in accordance with the DOT hazardous material regulations, appropriate sampling and analysis requirements, containerization requirements, waste storage requirements, and proper shipping descriptions are identified so that waste profile sheets and manifests can be prepared to send the waste to appropriately licensed and permitted facilities, and ensure that the paperwork is completed from point of generation to disposal in accordance with federal and Puerto Rico regulations.

6.15.02 If a waste is discovered during the RI and the waste is not related to project activities, TtEC will notify the PjM, SHM, and the USACE PM. The USACE PM will determine proper federal and local agency notifications to make. TtEC will not handle the waste if it is not generated as part of the project, unless the change management requirements of the contract task order are updated.

6.15.03 Depending on the status of the USACE generator (large-, small-, or conditionally exempt small-quantity generator), hazardous waste disposal (if hazardous wastes are generated) must occur within the required time frames specified under the regulations (e.g., large-quantity generators have fewer than 90 days and small-quantity generators have fewer than 180 days from accumulation start date).

6.15.04 TtEC will also notify the client representative, the KO, as the Generator of Record, to ensure provisions are made for signature of the waste profile sheet, land disposal restriction, and uniform hazardous waste manifest, and to determine the generator category and disposal time frame requirements. TtEC personnel cannot sign any of these Generator of Record documents as TtEC or as Agents of the Government, unless designated specifically in the contract agreement.

## **6.16 IMPACT MINIMIZATION MEASURES**

6.16.01 Impact minimization procedures, in addition to those discussed throughout this EPP, will include briefing all on-site personnel on applicable health and safety issues, as well as the need for minimizing impacts on sensitive biological resources, as outlined in this EPP. Methods for recognizing, avoiding, and minimizing potential impacts on the plant and animal species and habitats of concern will be stressed during the on-site training.

6.16.02 Close coordination with environmental resource agencies before and during the project will help ensure impacts to sensitive environments, critical habitats, T&E species, as well as impacts to recreational activities, are minimized throughout this project.

6.16.03 Areas disturbed during the RI activities will be kept to the minimum required to accomplish the project tasks.

## **6.17 BURNING**

6.17.01 Burning of materials within or around the Culebra Water Ranges will not be performed during the RI, other than those required for MEC/MPPEH demolition operations.

## **6.18 DUST AND AIR POLLUTION CONTROL**

6.18.01 Widespread dust control is not anticipated to be required on this project because much of the project takes place on the water. However, control of fugitive dust on the project may include BMPs, such as keeping speeds down on dirt or gravel roads to minimize generation of dusts, and housekeeping efforts to prevent buildup of dirt or mud on boat decks, equipment, docks, and ramps to prevent the dirt or mud from drying out and causing dust in work areas.

6.18.02 Other emissions sources include vehicles and boats used to transport personnel. All vehicles and equipment will be in good working order, inspected, and will meet applicable vehicle emissions requirements. Vehicles will not be left idling for extended periods of time.

## **6.19 SPILL CONTROL PLAN**

6.19.01 Reporting of spills to state agencies will occur only after discussions with the TtEC PjM and CEHNC PM. Spills on the water are immediately reportable.

### **6.19.1 Spill Potential**

6.19.1.01 Due to the nature of the operations, a spill of pollutants to the environment could occur. The most likely spill is a spill of fuel to water, which could occur during operation of boats, primarily during refueling operations. Refueling operations, however, will not be performed on the water, other than at the dock. Refueling will be performed following BMPs, including slowing down when filling fuel tanks; knowing the size of the tank, and avoiding topping off the tank. Fuel collars, absorbent pads, and fuel/air separators are tools that can be used to help avoid spills or to contain excess fuel that has accidentally spilled. A fuel collar is a doughnut of absorbent material that fits around the fueling nozzle and catches splashes or drips during refueling. Absorbent pads can be used to wipe up excess fuel or to capture fuel from leaks. A fuel/air separator can prevent the escape of fuel from the air vent during filling.

6.19.1.02 In addition, boats will be maintained in proper working order and subject to a preventative maintenance schedule. Boat operators will also conduct a pre-launch boat inspection every day, as specified in the APP/SSHP (Appendix D).

6.19.1.03 In the event of a spill, the largest quantity of pollutant (gasoline) that can reasonably be lost at any one time during refueling is 10 gallons of fuel. If a leak of fuel or other fluids, such as hydraulic or transmission fluid, occurs on a boat, field personnel will promptly attempt to plug the hole and/or turn off pumps, if safe to do so, and will contain the spilled fuel on deck using sorbent pads.

6.19.1.04 If the spill occurs on the ground, the material spilled will be bermed with dirt so that the fluid does not spread along the ground surface. Any spills originating from small containers (e.g., fuel cans) will be contained by the use of absorbent materials. Any spill cleanup materials will be contained and managed for disposal according to federal and Puerto Rico regulations.

### **6.19.2 Other Preventive Spill Control Measures**

6.19.2.01 Containers of liquids containing petroleum products (e.g., gas or diesel) or other chemicals with potentially hazardous constituents (paints, lubricants, etc.) will be kept closed when not in use, maintained in original containers with labels affixed, and will be kept in appropriate storage areas (e.g., flammable storage cabinets).

6.19.2.02 TtEC plans to conduct all fueling, maintenance, and repair of vehicles and boats off site. This practice will decrease the amount of pollutants that need to be stored on the site. Those

liquids of a hazardous nature that are absolutely necessary to conduct field operations will be stored in the minimum required quantities.

6.19.2.03 Any spills originating from small containers (e.g., fuel cans) will be contained by the use of absorbent materials.

### **6.19.3 Emergency Spill Response and Notification**

6.19.3.01 The procedures described below will be followed in the event of a spill on site.

6.19.3.02 All spills, leaks, and fires involving oil or hazardous substances must be reported to the PjM and the SHM, as well as the client representative and the National Response Center. The person reporting the leak or spill is required to provide the following information:

- His/her name
- Location of spill and facility number, if known
- Number of injured personnel and nature of injuries, if known
- Substance spilled
- Estimated amount spilled
- Extent of spill
- Estimated rate at which the substance is currently being released
- Estimated time the spill occurred
- Any other pertinent information

6.19.3.03 Minor and major spill procedures are outlined below.

#### **6.19.3.1 Minor Spill Procedure**

6.19.3.1.01 A minor spill would involve no immediate threat to human health or the environment (e.g., not cause sheen or discoloration on the water), cause minimal property damage, be readily cleaned up by TtEC crewmembers, be a known substance, and not exceed the reportable quantity for that material. In the event of a minor spill, the appropriate response action is for the responsible person to notify the client and the PjM, as well as the National Response Center, and supply the responders with as much information as possible. In the case of a spill of contaminated or hazardous materials, the procedures described below will be followed:

- Stop the source of the spill if safe to do so (e.g., upright a container, shut off valve, etc.).
- Notify a supervisor (FOL, SSHO).
- Notify the PjM, SHM, and client and relay pertinent information (to be performed by the SSHO or FOL). Notify the National Response Center, U.S. Coast Guard, and PREQB as required (contact information for agencies is included in Section 6.19.3.3).

- Identify protective clothing or equipment required to respond.
- Contain the spill.
- Neutralize and/or solidify any product.
- Transfer material into appropriate waste containers as directed by the FOL or PjM.
- Transfer the waste to the appropriate storage area for management and disposal at the direction of the FOL or PjM.
- Document the incident.

### **6.19.3.2 Major Spill Procedure**

6.19.3.2.01 In the event of a major spill where human health and/or the environment is at risk (e.g., spill is to a surface water, persons are injured, there is a risk of fire or explosion from the materials, material spilled is not known, the spilled material is more than can be reasonably handled with on hand resources in a few minutes time, or spills that have or are likely to enter a storm drain or other conveyance), the procedures outlined below will be followed:

- Treat the spill as an emergency (a spill to surface water may not constitute an immediate hazard to workers; however, any spill to surface water is agency reportable).
- Isolate the spill area, shut down equipment if safe to do so, and evacuate upwind.
- Prevent others from entering the area.
- Call 911 if anyone is injured, at risk, or there is a fire or explosion.
- Notify the FOL and/or SSHO.
- Notify the PjM, SHM, and client immediately and relay pertinent information (to be performed by SSHO or FOL). Notify the National Response Center, U.S. Coast Guard, and PREQB (contact information for agencies is included in Section 6.19.3.3).
- If the source of spill is not unknown, and other hazards are not likely to exist (e.g., fires, exposures, or explosions), assess the extent of spill and identify potential pathways of dispersion. Cover or isolate these pathways in advance of the spill, if feasible, but only if exposures can be avoided.
- Note type, amount, and location of material released. Provide Safety Data Sheets to response personnel.

### **6.19.3.3 Agency Contact Information for Spills**

6.19.3.3.01 In the event of a reportable spill, TtEC will notify the agencies listed below immediately following notification of the PjM and CEHNC PM:

- U.S. Coast Guard Sector San Juan (1-787-289-2041)

- National Response Center (1-800-424-8802)
- PREQB (1-787-767-8031)

## **6.20 STORAGE AREAS AND TEMPORARY FACILITIES**

6.20.01 A temporary office facility and equipment storage space will be provided for use (location is to be determined).

## **6.21 ACCESS ROUTES**

6.21.01 Existing roads will be used to access and transport personnel to dock facilities.

## **6.22 CONTROL OF WATER RUN-ON AND RUN-OFF**

6.22.01 Other than beaches used for demolition of MEC/MPPEH, this investigation involves work within marine waters rather than land-based activities. There will not be any drainage patterns altered by site activities, and, therefore, mitigation procedures will not be required to control water run-on or run-off. Furthermore, TtEC will not conduct any activities that would result in discharging pollutants into waterways or waterbodies. Spill prevention practices and response procedures will be in place to minimize the chances for spills and releases. Waste management and disposal will comply with federal and Puerto Rico regulations.

## **6.23 DECONTAMINATION OF EQUIPMENT**

6.23.01 The need for decontamination of equipment is not anticipated on this project.

## **6.24 MINIMIZING AREAS OF DISTURBANCE**

6.24.01 Boating activities will be performed to the extent required to locate anomalies and support divers and snorkelers who are investigating and moving MEC considered safe to move, as described in this Work Plan. TtEC will minimize harm that could occur as a result of direct contact with coral reefs, seagrass beds, and marine mammals or sea turtles. Work areas will be planned in advance so that appropriate resource agencies can review the plans, and to ensure that scheduled activities will cause minimal potential for impact to the environment. Reviews of maps, charts, and aerial photographs will help ensure that the areas worked in are minimally disturbed, and sensitive areas (coral reefs and seagrass beds) can be avoided. Equipment checks will be performed daily before and during work to ensure data collection is completed with a minimal amount of potential rework. Boat trips to and from the launch will be minimized to the extent possible through proper pre-trip planning to minimize boat traffic overall, and the most direct routes with the least potential for impacts to coral reefs and seagrass beds will be used to access the work areas.

## **6.25 POST-ACTIVITY CLEANUP**

6.25.01 Following completion of daily work and the project, all boats and equipment will be properly secured and stowed. Periods of potential severe weather will require paying attention to securing and stowing of gear as required to minimize the potential for damage or materials to be

dispersed by wind or rain. Cleaning of boats will only be conducted in a designated onshore location and laydown area. Trash and sanitary waste will be removed and placed in designated waste receptacles. All waste will be properly disposed of prior to demobilization from the project.

## **7.0 PROPERTY MANAGEMENT PLAN**

7.0.01 There is no government-furnished property for this project and no property management plan is required.

## **8.0 INTERIM HOLDING FACILITY SITING PLAN FOR RCWM PROJECTS**

8.0.01 Section 8 is not applicable to this project and will serve as a placeholder section only.

## **9.0 PHYSICAL SECURITY PLAN FOR RCWM PROJECT SITES**

9.0.01 Section 9 is not applicable to the project and will serve as a placeholder section only.

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