Final

Quality Assurance Project Plan
Expanded Site Inspection of UXO 16 Adjacent to Solid Waste Management Unit 4

Atlantic Fleet Weapons Training Area – Vieques
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

Contract Task Order 006

April 2014

Prepared for:

Department of the Navy
Naval Facilities Engineering Command
Atlantic Division

Prepared under:

Navy CLEAN 8012 Program
Contract No. N62470-11-D-8012

Prepared by:

Virginia Beach, Virginia

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Executive Summary

This Quality Assurance Project Plan (QAPP) describes the Expanded Site Inspection (SI) that will be performed within a portion of UXO 16, located adjacent to Solid Waste Management Unit (SWMU) 4, at the former Naval Ammunition Support Detachment (NASD) in Vieques, Puerto Rico. SWMU 4 was used for the thermal and explosive destruction of retrograde and surplus munitions, fuels, and propellants from 1969 through 1979 and may have periodically been used as far back as the late 1940s. These Open Burn/Open Detonation (OB/OD) activities likely resulted in ejection of munitions and explosives of concern (MEC)/material potentially presenting an explosive hazard (MPPEH) and related debris directly into the waters of UXO 16. Additionally, MEC/MPPEH and related debris may have reached UXO 16 via overland transport from SWMU 4. Data collected during historical investigations at SWMU 4 indicate over 90 percent of the MEC/MPPEH at SWMU 4 were 20mm projectiles.

The objectives of the ESI are to:

- Determine if/where a release of hazardous material (i.e., MEC/MPPEH) from past Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related activities occurred
- Determine whether the suspected release, if confirmed, warrants further investigation or action in accordance with the planned and/or likely land use

The ESI approach described in this QAPP was jointly developed by the Naval Facilities Engineering Command (NAVFAC) Atlantic Division, U.S. Environmental Protection Agency (USEPA) Region 2, the Commonwealth of Puerto Rico Environmental Quality Board (PREQB), and the United States Fish and Wildlife Service (USFWS). The Navy, USEPA, PREQB, and USFWS work jointly as the Vieques Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Environmental Restoration Program (ERP) Technical Subcommittee.

The Expanded SI activities will include an underwater visual survey for potential MEC/MPPEH on the seafloor and an instrument-aided survey and excavation of subsurface anomalies detected on the seafloor across nearly 200 acres offshore of SWMU 4. This QAPP will help ensure that the data collected and compiled are scientifically sound, of known and documented quality, and suitable to meet the objectives listed above.

NOTE: THIS SUMMARY IS PRESENTED IN ENGLISH AND SPANISH FOR THE CONVENIENCE OF THE READER. EVERY EFFORT HAS BEEN MADE FOR THE TRANSLATIONS TO BE AS ACCURATE AS REASONABLY POSSIBLE. HOWEVER, READERS SHOULD BE AWARE THAT THE ENGLISH VERSION OF THE TEXT IS THE OFFICIAL VERSION.

NOTA: ESTE RESUMEN SE PRESENTA EN INGLÉS Y EN ESPAÑOL PARA LA CONVENIENCIA DEL LECTOR. SE HAN HECHO TODOS LOS ESFUERZOS PARA QUE LA TRADUCCIÓN SEA PRECISA EN LO MÁS RAZONABLEMENTE POSIBLE. SIN EMBARGO, LOS LECTORES DEBEN ESTAR AL TANTO QUE EL TEXTO EN INGLÉS ES LA VERSIÓN OFICIAL.

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Resumen Ejecutivo

Este Plan de Garantía de Calidad del Proyecto (QAPP por sus siglas en inglés) describe la Inspección Expandida del Sitio (SI por sus siglas en inglés) que se llevará a cabo dentro de una porción de UXO 16, localizada junto a la Unidad de Manejo de Desperdicios Sólidos 4 (SWMU 4, por sus siglas en inglés), en el antiguo Destacamento de Apoyo de Municiones Navales (NASD, por sus siglas en inglés) en Vieques, Puerto Rico. SWMU 4 fue usado para la destrucción térmica y con explosivos de municiones usadas y sobrantes, combustibles, y propulsores desde 1969 hasta 1979 y pudo haber estado en uso periódicamente desde fines de la década de los cuarenta. Las actividades de Quema Abierta/Detonación Abierta (OB/OD, por sus siglas en inglés) probablemente dieron lugar a la expulsión de municiones y explosivos de preocupación (MEC por sus siglas en inglés)/material que potencialmente presenta una amenaza relacionada a explosivos (MPPEH por sus siglas en inglés) y escombros directamente en las aguas de UXO 16. Adicionalmente, MEC/MPPEH y los escombros relacionados pudieron haber llegado a UXO 16 por medio de transporte terrestre desde SWMU 4. Los datos que se obtuvieron durante las investigaciones históricas de SWMU 4 indican que más del 90 por ciento de MEC/MPPEH en SWMU 4 son proyectiles de 20mm.

Los objetivos del ESI son:

- Determinar si/dónde ha ocurrido el escape de materiales peligrosos (es decir, MEC/MPPEH) proveniente de actividades pasadas relacionadas con la Ley de Respuesta, Compensación, y Responsabilidad Ambiental (CERCLA por sus siglas en inglés)
- Determinar si el escape que se sospecha, si es confirmado, amerita más investigación o acción de acuerdo con el uso planificado y/o probable para los terrenos

El alcance del ESI que se describe en este QAPP fue desarrollado conjuntamente entre el Comando de Ingeniería de Instalaciones Navales, División del Atlántico (NAVFAC por sus siglas en inglés), la Agencia de Protección Ambiental de los Estados Unidos Región 2 (USEPA por sus siglas en inglés), la Junta de Calidad Ambiental de Puerto Rico (JCA), y el Servicio de Pesca y Vida Silvestre de los Estados Unidos (USFWS por sus siglas en inglés). La Marina, USEPA, JCA y USFWS trabajan conjuntamente como el Subcomité Técnico (ERP por sus siglas en inglés) de CERCLA.

Las actividades del SI Expandido incluirán un monitoreo visual debajo del agua para determinar la presencia de MEC/MPPEH en el fondo marino, y un monitoreo usando instrumentos y la excavación de las anomalías detectadas debajo de la superficie del fondo marino a través de casi 200 acres fuera de la orilla de SWMU 4. Este QAPP ayudará a asegurar que los datos obtenidos son científicamente defendibles, de una calidad conocida y documentada, y adecuados para alcanzar los objetivos que se listan arriba.

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QAPP Worksheets

Attachments

Tables

Figures

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Abbreviations and Acronyms

AM	Activity Manager
CA	corrective action
CD	compact disk
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CLEAN	Comprehensive Long-term Environmental Action Navy
CSM	Conceptual site model
DDESB	Department of Defense Explosive Safety Board
DNER	Puerto Rico Department of Natural and Environmental Resources
EOD	Explosive Ordnance Disposal
ESI	Expanded Site Inspection
ESS	explosives safety submission
ESTCP	Environmental Security Technology Certification Program
GIS	geographic information system
GPS	Global Positioning System
HASP	Health and Safety Plan
MEC	munitions and explosives of concern
mm	millimeter
MPPEH	munitions potentially presenting explosive hazard
MRP	Munitions Response Program
NASD	Naval Ammunition Support Detachment
NAVFAC	Naval Facilities Engineering Command
NETOPS	Naval Engineering Training and Operating Procedure and Standard
NMFS	National Marine Fisheries Services
NOAA	National Oceanic Atmospheric Administration
OB/OD	open burn/open detonation
PDA	personal digital assistant
PM	Project Manager
POC	point of contact
PQO	project quality objective
PREQB	Puerto Rico Environmental Quality Board
QA	quality assurance
QAMS	Quality Assurance Management Section
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QC	quality control
RI	Remedial Investigation
RPM	Remedial Project Manager
SAP	Sampling and Analysis Plan
SI	Site Inspection
SOP	standard operating procedure
SWMU	solid waste management unit
UFP	Uniform Federal Policy
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance

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QAPP Worksheet #1—Title and Approval Page

Final

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Prepared by:

CH2MHILL

Virginia Beach, Virginia

G. Brett Doerr for

John Tomik
CH2M HILL – Vieques Title II Quality Assurance Lead

Tim Garretson

Tim Garretson
CH2M HILL – Vieques Munitions Response Technical Lead

GREEN.MICHAEL.DAVID.1042977876

Mike Green
NAVFAC Mid-Atlantic – Munitions Response Program Quality Assurance Officer

CLOE.KEVIN.R.1229533947

Daniel Hood
NAVFAC Atlantic – Remedial Project Manager

Daniel Rodriguez
USEPA Region 2 – Remedial Project Manager

Wilmarie Rivera
PREQB – Remedial Project Manager

Susan Silander
USFWS – Remedial Project Manager

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QAPP Worksheet #2—QAPP Identifying Information

Site Name/Number: UXO 16 –Area adjacent to SWMU 4

Operable Unit: Not Applicable

Contractor Name: CH2M HILL

Contract Number: N62470-11-D-8012, Contract Task Order 006

Contract Title: Comprehensive Long-term Environmental Action Navy (CLEAN) 8012

1. **This Quality Assurance Project Plan (QAPP) was prepared in general accordance with the requirements of:**

   - Uniform Federal Policy – Quality Assurance Project Plans (USEPA, 2005). Note: Not all worksheets are applicable when analytical samples are not to be collected
   - United States Environmental Protection Agency (USEPA) *Guidance for Quality Assurance Project Plans (QAPPs)*
   - USEPA QA/G-5, QAMS (USEPA, 2002)
   - USEPA *Guidance on Systematic Planning Using the Data Quality Objectives Process* (USEPA, 2006)

2. **Identify regulatory program:**

   Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

3. **This QAPP is specific to:**

   The offshore area adjacent to SWMU 4 within the former Naval Ammunitions Support Detachment (NASD).

4. **List dates of scoping sessions that were held:**

Scoping Session	Date
Technical Subcommittee Meeting	5/9/2012
Technical Subcommittee Meeting	8/20/2013
Technical Subcommittee Meeting	1/16/2014

5. **List dates and titles of any SAP documents written for previous site work that are relevant to the current investigation.**

Title	Date
Draft Final Quality Assurance Project Plan, Underwater Site Inspection, Selected Areas of UXO-16 Former Anchorage Areas and Offshore Area in the Vicinity of Former OB/OD Area	May 2012

6. **List organizational partners (stakeholders) and connection with lead organization:**

   Puerto Rico Environmental Quality Board (PREQB) – regulatory stakeholder
   United States Environmental Protection Agency Region 2 – regulatory stakeholder
   United States Fish and Wildlife Service (USFWS) – Vieques National Wildlife Refuge manager
   National Marine Fisheries Services (NMFS) – regulatory stakeholder
   National Oceanic And Atmospheric Administration (NOAA) – regulatory stakeholder
   Department of Natural and Environmental Resources (DNER) – regulatory stakeholder

QAPP Worksheet #2—QAPP Identifying Information (continued)

7. Lead organization (see Worksheet #7 for detailed list of data users):

Department of the Navy – Lead Agency

8. If any required SAP elements or required information are not applicable to the project or are provided elsewhere, then note the omitted SAP elements and provide an explanation for their exclusion below:

The worksheets that are not applicable to a Site Inspection of potential munitions and explosives of concern (MEC)/munitions potentially presenting an explosive hazard (MPPEH) are excluded from this QAPP, which are the worksheets pertaining to sample collection and analysis. It is not anticipated that MEC/MPPEH identified will require detonation. As a result, this phase of the project does not involve the collection of samples from the site. If MEC/MPPEH is found that does require detonation, it will be moved to the east end of Vieques for detonation; no post-detonation samples will be collected during the ESI.

UFP-QAPP Worksheet #	Required Information	Included or Excluded
A. Project Management		
Documentation		
1	Title and Approval Page	Included
2	Table of Contents SAP Identifying Information	Included
3	Distribution List	Included
4	Project Personnel Sign-Off Sheet	Included
Project Organization		
5	Project Organizational Chart	Included
6	Communication Pathways	Included
7	Personnel Responsibilities and Qualifications Table	Included
8	Special Personnel Training Requirements Table	Included
Project Planning/Problem Definition		
9	Project Planning Session Documentation (including Data Needs tables) Project Scoping Session Participants Sheet	Included
10	Problem Definition, Site History, and Background. Site Maps (historical and present)	Included
11	Site-Specific Project Quality Objectives	Included
12	Measurement Performance Criteria Table	Excluded
13	Sources of Secondary Use Data and Information Secondary Use of Data Criteria and Limitations Table	Excluded
14	Summary of Project Tasks	Included
15	Reference Limits and Evaluation Table	Excluded
16	Project Schedule/Timeline Table	Included
B. Measurement Data Acquisition		
Sampling Tasks		
17	Sampling Design and Rationale	Included
18	Sampling Locations and Methods/ SOP Requirements Table Sample Location Map(s)	Excluded

QAPP Worksheet #2—QAPP Identifying Information (continued)

UFP-QAPP Worksheet #	Required Information	Included or Excluded
19	Analytical Methods/SOP Requirements Table	Excluded
20	Field Quality Control Sample Summary Table	Excluded
21	Project Sampling SOP References Table Sampling SOPs	Excluded
22	Field Equipment Calibration, Maintenance, Testing, and Inspection Table	Excluded
Analytical Tasks		
23	Analytical SOPs Analytical SOP References Table	Excluded
24	Analytical Instrument Calibration Table	Excluded
25	Analytical Instrument and Equipment Maintenance, Testing, and Inspection Table	Excluded
Sample Collection		
26	Sample Handling System, Documentation Collection, Tracking, Archiving and Disposal Sample Handling Flow Diagram	Excluded
27	Sample Custody Requirements, Procedures/SOPs Sample Container Identification Example Chain-of-Custody Form and Seal	Excluded
Quality Control Samples		
28	QC Samples Table Screening/Confirmatory Analysis Decision Tree	Excluded
Data Management Tasks		
29	Project Documents and Records Table	Included
30	Analytical Services Table Analytical and Data Management SOPs	Excluded
C. Assessment Oversight		
31	Planned Project Assessments Table Audit Checklists	Excluded
32	Assessment Findings and Corrective Action Responses Table	Excluded
33	Quality Assurance (QA) Management Reports Table	Excluded
D. Data Review		
34	Verification (Step I) Process Table	Excluded
35	Validation (Steps IIa and IIb) Process Table	Excluded
36	Validation (Steps IIa and IIb) Summary Table	Excluded
37	Usability Assessment	Excluded

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QAPP Worksheet #3—Distribution List

QAPP Recipients	Title	Organization	Telephone Number (optional)	E-mail Address or Mailing Address	Draft	DF	Final
Kevin Cloe	Vieques Remedial Project Manager (RPM)/ Lead Agency Point of Contact (POC) for investigations	Navy	757-322-4736	kevin.cloe@navy.mil	A		A
Daniel Hood	Vieques RPM/No project-specific role/Lead Agency POC for munitions removal	Navy	757-322-4630	daniel.r.hood@navy.mil	CL		CL
Madeline Rivera	Vieques Environmental Restoration Program Site Manager /On-island Coordination	Navy	757-286-6457 (c)	llamasmad@gmail.com	A		A
Mike Green	Quality Assurance Officer	Navy	757-202-0865 (c)	Mike.green@navy.mil	A		A
Bonnie Capito	Librarian and Records Manager/ Final document archiving	Navy	757-322-4785	bonnie.capito@navy.mil			A
John Tomik	Title II QA Lead	CH2M HILL	757-671-6259	john.tomik@ch2m.com	A	A	A
Brett Doerr	Contractor Activity Manager/Navy contractor primary POC	CH2M HILL	757-671-6219	brett.doerr@ch2m.com	A	A	A
Bill Hannah	Environmental Investigation Lead	CH2M HILL	757-671-6277	Bill.hannah@ch2m.com	A	A	A
Tim Garretson	Senior Munitions Specialist	CH2M HILL	757-287-5222 (c)	Tim.Garretson@ch2m.com	A		A
Phil Fitzwater	Onsite QA Lead	CH2M HILL	787-741-4792 (w)	Phillip.Fitzwater@ch2m.com	A		A
Craig Lilyestrom	Vieques RPM/Regulatory agency POC	DNER	787-999-2200 x 2689	craig.lilyestrom@drna.gobierno.pr	A		A
Julio Vazquez	Vieques RPM/ Regulatory agency secondary POC	USEPA	212-637-4323	vazquez.julio@epa.gov	A		A
Daniel Rodriguez	Vieques RPM/Regulatory agency primary POC	USEPA	787-741-5201 787-671-9879 (c)	rodriguez.daniel@epa.gov	A		A
Jose Font	Caribbean Environmental Protection Division Director	USEPA	787-977-5814	Font.jose@epa.gov	CL		CL

QAPP Worksheet #3—Distribution List (continued)

QAPP Recipients	Title/Project Role	Organization	Telephone Number (Optional)	E-mail Address or Mailing Address	D	DF	F
Tom Hall	Technical Support Consultant for USEPA/USEPA; contractor primary POC	TechLaw	501-753-7987	thall@techlawinc.com	A		A
Laura Vélez-Vélez	President/No project-specific role	PREQB	787-767-8056	lauravelez@jca.gobierno.pr	CL		CL
Wilmarie Rivera	Vieques RPM/ Regulatory agency POC	PREQB	787-767-8181 (x6141) (w) 787-365-8573 (c)	wilmarierivera@jca.gobierno.pr	A		A
Katarina Rutkowski	Technical Support Consultant for Environmental Quality Board (PREQB)/PREQB contractor primary POC	TRC	860-298-6202	krutkowski@trcsolutions.com	A		A
Jim Pastorik	Technical Support Consultant for PREQB// PREQB	UXO Pro, Inc.	703-582-1718	jim@uxopro.com	A		A
Mike Barandiaran	Refuge Manager/No project-specific role	USFWS	787-741-2138	Mike_barandiaran@fws.gov	A		A
Susan Silander	Vieques RPM/Caribbean Islands Refuges Supervisor/land management agency POC	USFWS	787-851-7258 (x38)	susan.silander@fws.gov	CD		CD
Marelisa Rivera	Deputy Field Supervisor/No project-specific role	USFWS	787-851-7297 (x 206) (w) 787-510-5207 (c)	marelisa_rivera@fws.gov	A		A
Lisamarie Carrubba	Technical Project Manager	NMFS	787-851-3700	Lisamarie.carrubba@noaa.gov	A		A
Diane Wehner	Regional Resource Coordinator/ Technical input and draft document review	NOAA	732-872-3030	diane.wehner@noaa.gov	A		A
Colleen McNamara	N/A	RAB	787-380-2545	lacolina@hughes.com		A	
Stacie D. Notine	N/A	RAB	N/A	N/A		HC	
Jorge Fernandez Porto	N/A	RAB	787-726-2839	jfporto@onelinkpr.net		CD	
Lirio Marquez D'Acunti	N/A	RAB	787-726-2839	liriomarquez@gmail.com		N	

Notes:

A=All	CL=Cover Letter
D=Draft	CD=Compact Disc
DF=Draft Final	HC=Hard Copy
F=Final	N=None

QAPP Worksheet #4—Project Personnel Sign-Off Sheet (used for internal distribution)

Name	Organization/Title/Project Role	Telephone Number (optional)	Signature/email receipt	QAPP Section Reviewed	Date QAPP Read
Brett Doerr	CH2M HILL/ Contractor Activity Manager/ Navy contractor primary POC, Quality Assurance Officer (QAO)/SAP review	757-671-6219			
John Tomik	CH2M HILL/Title II QA Lead	757-671-6259			
Phillip Fitzwater	CH2M HILL/Onsite QA Lead	787-741-4792			
Bill Hannah	CH2M HILL/Environmental Investigation Lead	757-671-6277			
Mark Orman	CH2M HILL/Contractor Health and Safety Lead/ Health and Safety Officer	414-847-0597 414-712-4138 (c)			
Tim Garretson	CH2M HILL/Senior Technical Reviewer	757-287-5222 (c)			

Note: CH2MHILL will maintain the signed signature page with the project files.

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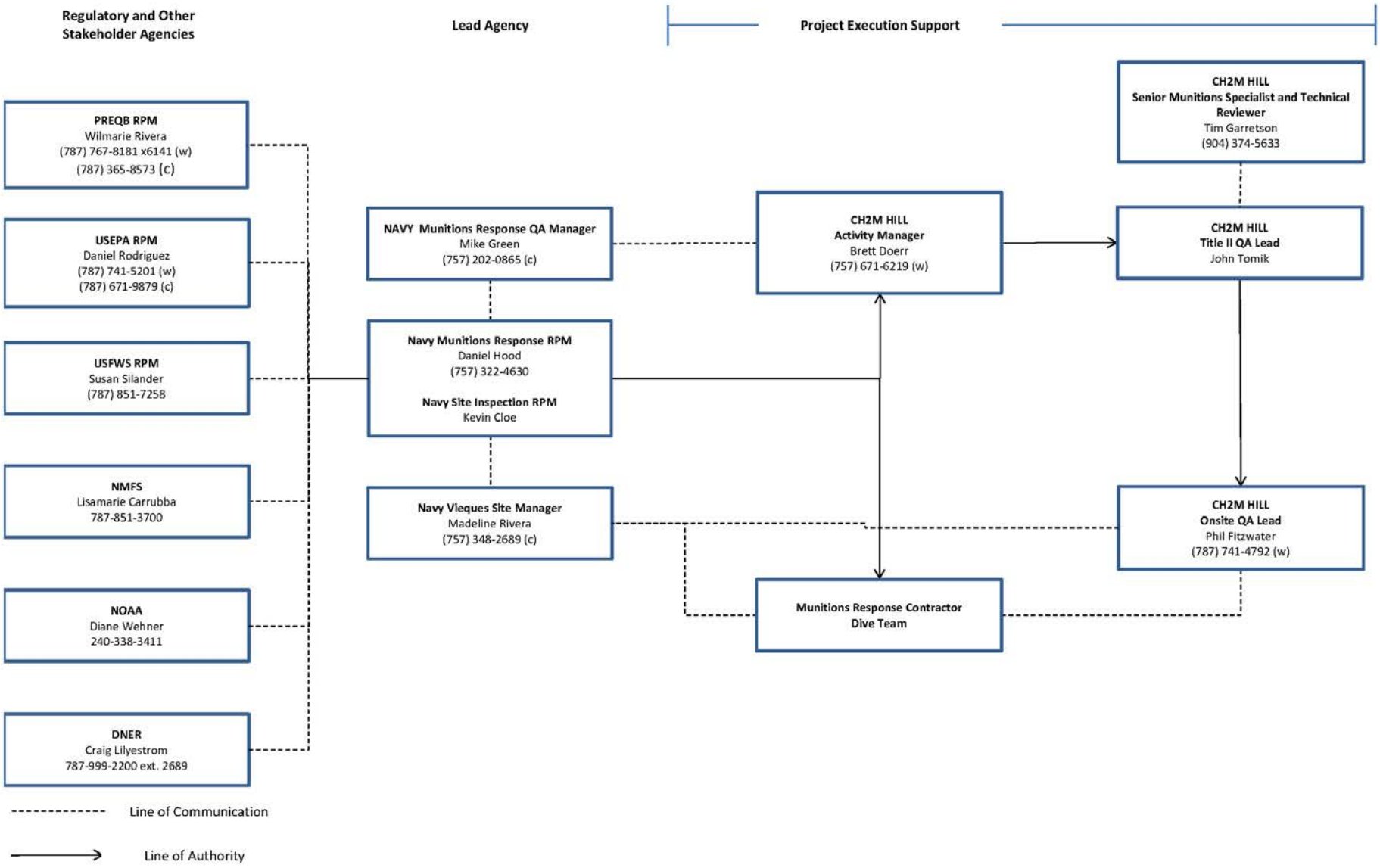
QAPP Worksheet #5—Project Organizational Chart



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QAPP Worksheet #6—Communication Pathways

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Communication to/from Navy (e.g., submission of SAP for review; receipt of regulatory comments, etc.). Stop Work notices to regulators, notifying regulators of QAPP changes of deviations, significant issues and necessary corrective actions by phone or e-mail within 2 weeks of notification of Navy RPM	Navy RPM	Daniel Hood/ Kevin Cloe	757-322-4630/ 757-322-4736	Primary POCs for Navy (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external points of contact.
Onsite communication to/from Navy (e.g., daily updates	Navy Site Manager	Madeline Rivera	757-348-2689	Primary Navy POC for on-island staff (via e-mail, telephone, or in person)
Communication to/from USEPA (e.g., receipt of QAPP for review; submission of USEPA comments)	USEPA RPM	Daniel Rodriguez	787-741-5201 787-671-9879 (cell)	Primary POC for USEPA (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external points of contact.
Backup to Daniel Rodriguez	USEPA RPM	Julio Vazquez	212-637-4323	See above.
Communication to/from PREQB (e.g., receipt of QAPP for review; submission of PREQB comments)	PREQB RPM	Wilmarie Rivera	787-767-8181 (x6141)	Primary POC for PREQB (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external points of contact.
Communication to/from USFWS (e.g., receipt of QAPP for review; submission of USFWS comments)	USFWS RPM	Susan Silander	787-851-7258 (x38)	Primary POC for USFWS (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other internal or external points of contact.
Communication to/from NOAA (e.g., receipt of QAPP for review; submission of NOAA comments to USEPA)	NOAA POC	Diane Wehner	732-872-3030	Primary POC for NOAA (via e-mail, telephone, or in person); communication primarily through USEPA.
Communication to/from NMFS (e.g.,, receipt of QAPP for review; submission of NMFS comments; input regarding marine threatened and endangered species	NMFS POC	Lisamarie Carrubba	787-851-3700	Primary POC for NMFS (via e-mail, telephone, or in person).
Navy Quality Assurance (QA)/Quality Control (QC) input	Navy Quality Assurance Officer (QAO)	Mike Green	757-202-0865	Provides review comments to Navy contractor on pre-draft SAP. Provides overall Navy guidance via direct communication with Navy contractor QAO, as warranted.
Communication to/from Navy RPM for project requirements and scheduling	UXO Dive Supervisor/Organization TBD	TBD	TBD	Primary POC for UXO dive team; can delegate communication to other staff, as appropriate.
Communication to/from Navy contractor (e.g., submission of QAPP for review; receipt of regulatory comments, updates on project progress, communication of stakeholder expectations, etc.). Stop work notices to Navy RPM, notifying Navy RPM of QAPP changes or deviations, significant issues or corrective actions.	CH2M HILL Activity Manager	Brett Doerr	757-671-6259	Primary POC for Navy contractor (via e-mail, telephone, hardcopy, or in-person, as warranted); can delegate communication to other contractor staff, as appropriate.

QAPP Worksheet #6—Communication Pathways (continued)

Communication Drivers	Responsible Affiliation	Name	Phone Number	Procedure
Project administration and logistics	CH2M HILL Title II QA Lead	John Tomik	757-671-6259	Direct communication (via e-mail, telephone, hardcopy, or in-person, as warranted) to/from Navy contractor project staff to ensure appropriate QA implementation.
Munitions technical input/guidance	CH2M HILL Senior Munitions Specialist	Tim Garretson	757-287-5222 (c)	Direct communication with Title II QA Lead on technical aspects related to the field work and report preparation.
Health and safety expectations and procedures	CH2M HILL Health and Safety Officer	Mark Orman	414-847-0597 414-712-4138 (cell)	Review of Health and Safety Plan (HASP). Direct communication (via e-mail, telephone, hardcopy, or in-person, will be notified within 24 hours of incident) to/from Navy contractor project staff to ensure implementation of appropriate health and safety procedures.
Daily Field Progress Reports	Organization and/or CH2M HILL Title II QA Lead	Phillip Fitzwater	787-741-4792	Direct communication to/from Navy and CH2M HILL staff, including other Title II QA staff to ensure QA oversight implemented appropriately.

QAPP Worksheet #7—Personnel Responsibilities Table

Name	Title	Organizational Affiliation	Responsibilities
Daniel Hood/Kevin Cloe	Vieques RPMs/POCs	Navy	Oversight of munitions response and investigation activities implemented under this QAPP
Mike Green	QAO	Navy	Navy QA and provide oversight of UXO divers to ensure they are completing work in accordance with QAPP
Madeline Rivera	Vieques Site Manager	Navy	On-island Navy liaison; provides logistical support for implementation of munitions response program activities under this SAP
TBD	UXO Dive Supervisor	TBD	Leads survey and executes field activities; ensures onsite compliance with QAPP; communicates any deviations from QAPP.
Brett Doerr	Activity Manager	CH2M HILL	Responsible for coordination of CH2M HILL's munitions response activities at Vieques; assists in data evaluation and interpretation; reviews report.
Phillip Fitzwater	Onsite QA Lead	CH2M HILL	Responsible for ensuring appropriate QA procedures are implemented in field
John Tomik	Title II QA Lead	CH2M HILL	Coordinates QA staffing; monitors project performance; ensures QA work is done in accordance with QAPP.
Tim Garretson	Senior Munitions Specialist	CH2M HILL	As the technical lead, supports decision making with respect to MEC investigations and procedures.

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QAPP Worksheet #8—Special Personnel Training Requirements Table

Project Function	Specialized Training By Title or Description of Course	Training Provider	Training Date	Personnel / Groups Receiving Training	Personnel Titles / Organizational Affiliation	Location of Training Records / Certificates
Underwater dive operations	Training specified by Naval Engineering Training and Operating Procedure and Standard (NETOPS) #4-Dive Safety OSHA 40 hr HAZWOPER CPR Training Annual Diving Physical Qualification/Training Dive (within 6 months of project) As per EM 385 1-1 Section 30, Diving Operations	---	Prior to investigation activities	Dive team	UXO Contractor	Resume, as demonstrated experience and qualifications, and copies of certifications
Underwater dive operations	Identification of Federally Listed Species and Sensitive Habitat as per SOP-2	CH2MHILL Biologist NMFS Biologist	During initial days of field investigation	Dive team	UXO Contractor	Resume, as demonstrated experience and qualifications, and copies of certifications
Underwater dive operations/identification of MEC/MPPEH	UXO Qualified Technician (DDESB Technical Paper 18	---	Prior to investigation activities	Dive team	UXO Contractor	Resume, as demonstrated experience and qualifications, and copies of certifications

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QAPP Worksheet #9a—Project Scoping Session Participants Sheet

Project Name: Underwater Site Inspection Select Areas of UXO 16	
Projected Date(s) of Sampling: July 2012	**Site Name:** UXO 16, Former Anchorage Areas and Area Adjacent to SWMU 4
Project Manager (PM): Tim Wenk	**Site Location:** Vieques, Puerto Rico
Dates of Session: May 9,2012 **Scoping Session Purpose:** Concur on Site Inspection objectives and approach	

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
John Tomik	Activity Manager (AM) (former)	CH2M HILL	757-671-6259	john.tomik@ch2m.com	Navy contractor primary POC
Tim Garretson	Munitions Response Technical Lead	CH2M HILL	904-374-5633	Tim.garretson@chh2m.com	CH2MHILL Vieques MR Technical Lead
Daniel Rodriguez	Vieques Remedial Project Manager (RPM)	USEPA	787-741-5201 787-671-9879 (cell)	rodriguez.daniel@epamail.gov	Primary USEPA Point of Contact (POC)
Sandy Martinez	Meeting Facilitator	Fulton Communications	702-834-5877	fultoncom@fultoncom.com	Project Facilitator
Kevin Cloe	Vieques RPM	Navy	757-322-4736	kevin.cloe@navy.mil	Primary Navy POC
Daniel Hood	Vieques RPM	Navy	757-322-4630	daniel.r.hood@navy.mil	Navy POC for munitions related items
Bill Hannah	Technical Support	CH2M HILL	757- 671-6277	bill.hannah@ch2m.com	Technical Input
Dan Waddill	Vieques Program Coordinator	Navy	757-322-4815	dan.waddill@navy.mil	No project-specific role
Wilmarie Rivera	Vieques RPM	PREQB	787-767-8181 x 6141	wilmarierivera@jca.gobierno.pr	Primary PREQB POC.
Richard Henry	Vieques RPM	USFWS	732-906-6987	richard_henry@fws.gov	Primary USFWS POC/No project-specific role
Angela Carpenter	Environmental Specialist	U.S. EPA	212-637-4435	carpenter.angela@epa.gov	Special Projects
Julio Vazquez	RPM	USEPA	212-637-4311	vazquez.julio@epa.gov	USEPA POC West Vieques sites
Doug Murray	Navy Ordnance Environmental Support Manager	NOSSA	301-744-5630	douglas.murray1@navy.mil	Navy Review of Munitions Safety
Tom Hall	MEC Support Contractor to EPA	TechLaw	501-753-7987	thall@techlawinc.com	Technical input and review of munitions related items on behalf of EPA
Jim Pastorick	Technical Support Contractor to PREQB	UXO Pro Inc.	703-582-1718	jim@uxopro.com	Technical input and review of munitions related items on behalf of EQB

QAPP Worksheet #9a—Project Scoping Session Sheet (continued)

The following is a summary of the main points during the scoping session for the Underwater SI from the May 9, 2012 Environmental Restoration Program/ Munitions Response Program Technical Subcommittee Meeting.

John Tomik/CH2M HILL led the discussion on the proposed approach for the UXO 16 Underwater Site Inspection at four underwater inspection areas. He presented approach for conducting the site inspection, which includes an instrument aided visual inspection of the offshore area in the vicinity of the former OB/OD area and three anchorage areas along transects three feet wide, spaced 50 feet apart. The inspection covers 20-30 miles of transects for each area. The team discussed if the transect approach was appropriate for the type of MEC items (predominantly 20mm) found at the former OB/OD Area. The scope of work will be presented in more detail in a UFP QAPP. Because there are no environmental sampling proposed, the plan will include only those worksheets that are applicable.

Daniel Hood added that he will be meeting with the Navy EOD divers, who will be conducting the underwater site inspection in order to review the scope of work with them and assess how much of the site inspection they can complete within the two-week period they will have available during July. Based on the level of work proposed the divers may not be able to complete the entire scope of work.

Danny Rodriguez indicated that the proposed scope of work may not delineate the nature and extent of a Remedial Investigation. Daniel Hood agreed and indicated the objective of the site inspection is to assess whether or not MEC is present at each area and to develop a plan based on the collected information.

Doug Murray indicated that an Explosives Safety Submission will be required if the EOD divers will be hand excavating the identified metallic anomalies. The explosives safety submission (ESS) will provide safety procedures to minimize explosive safety risks during the inspection. Doug indicated he could approve the plan by July.

Based on the schedule of the Navy EOD divers and the abbreviated scope of work it was requested that the regulators provide a 30 day review period for the document. Jim Pastorick and Tom Hall indicated they would be available to review the document within the 30 day period.

Daniel Hood asked who EPA's RPM will be for the underwater investigation area. Angela Carpenter responded that EPA is still evaluating this and does not currently have one identified. Daniel added that because UXO 16 is such a large area, a naming nomenclature is currently being developed to subdivide the site.

Action Items

Navy/CH2M HILL – Proceed with preparing the UFP QAPP.

Navy/CH2MHILL – Proceed with the preparation of an ESS, as a separate document, to allow for subsurface hand excavation of anomalies identified.

Regulators review UFP QAPP and provide comments within 30 days of receipt of the document.

Update

The Navy intended to proceed forward with UFP QAPP in accordance with the path forward discussed during the May 2012 Technical Subcommittee meeting. However, due to a last minute scheduling conflict, the Navy EOD team was unable to perform the work. This required that the onsite UXO contractor to perform a portion of the site inspection. In addition, the original QAPP was updated (i.e., conceptual site model added, ESI approach modified, etc.); therefore, the July 2012 scoping session is obsolete.

QAPP Worksheet #9b—Project Scoping Session Participants Sheet

Project Name: Underwater Site Inspection Select Areas of UXO 16	
Projected Date(s) of Sampling: mid-2014	**Site Name:** UXO 16, Former Anchorage Areas and Area Adjacent to SWMU 4
Project Manager (PM): John Tomik	**Site Location:** Vieques, Puerto Rico
Dates of Session: October 20, 2013 **Scoping Session Purpose:** Brainstorm Means of Accelerating Work and Final Decisions	

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Brett Doerr	Activity Manager (AM)	CH2M HILL	757-671-6219	brett.doerr@ch2m.com	Navy contractor primary POC
Tim Garretson	Munitions Response Technical Lead	CH2M HILL	904-374-5633	Tim.garretson@chh2m.com	CH2MHILL Vieques MR Technical Lead
John Tomik	Project Manager (PM)	CH2M HILL	757-671-6259	John.Tomik@ch2m.com	Project Manager
John Martin	Ecological Risk Assessor	CH2M HILL	352-384-7122	John.Martin@ch2m.com	Ecological Risk Assessment Lead
Laura Vélez-Vélez	President	PREQB	787-767-8056	lauravelez@jca.gobierno.pr	No project-specific role
Daniel Rodriguez	Vieques Remedial Project Manager (RPM)	USEPA	787-741-5201 787-671-9879 (cell)	rodriguez.daniel@epamail.gov	Primary USEPA Point of Contact (POC)
Kevin Cloe	Vieques RPM	Navy	757-322-4736	kevin.cloe@navy.mil	Primary Navy POC
Daniel Hood	Vieques RPM	Navy	757-322-4630	daniel.r.hood@navy.mil	Navy POC for munitions related items
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Bill Hannah	Technical Support	CH2M HILL	757- 671-6277	bill.hannah@ch2m.com	Technical Input
Dan Waddill	Vieques Program Coordinator	Navy	757-322-4815	dan.waddill@navy.mil	No project-specific role
Wilmarie Rivera	Vieques RPM	PREQB	787-767-8181 x 6141	wilmarierivera@jca.gobierno.pr	Primary PREQB POC
Katarina Rutkowski	Technical Support Contractor Human Health Risk Assessment Lead	TRC	860-298-6202	krutkowski@trcsolutions.com	Technical input and review of human health risk aspects on behalf of EQB. Primary TRC POC

QAPP Worksheet #9b—Project Scoping Session Participants Sheet (continued)

Project Name: Underwater Site Inspection Select Areas of UXO 16	
Projected Date(s) of Sampling: mid-2014	**Site Name:** UXO 16, Former Anchorage Areas and Area Adjacent to SWMU 4
Project Manager (PM): John Tomik	**Site Location:** Vieques, Puerto Rico
Dates of Session: October 20, 2013 **Scoping Session Purpose:** Brainstorm Means of Accelerating Work and Final Decisions	

Name	Title	Affiliation	Phone #	E-mail Address	Project Role
Richard Henry	Vieques RPM	USFWS	732-906-6987	richard_henry@fws.gov	Primary USFWS POC
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Angela Carpenter	Environmental Specialist	U.S. EPA	212-637-4435	carpenter.angela@epa.gov	Special Projects
Julio Vazquez	RPM	USEPA	212-637-4311	vazquez.julio@epa.gov	USEPA POC West Vieques sites
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Marelisa Rivera	Deputy Field Supervisor/No project-specific role	USFWS	787-851-7297 (ext. 206) (w) 787-510-5207 (c)	marelisa_rivera@fws.gov	
Tom Hall	MEC Support Contractor to EPA	TechLaw	501-753-7987	thall@techlawinc.com	Technical input and review of munitions related items on behalf of EPA
Don Shaw	USAE Vieques Project Manager	USAE	813-846-9138 (cell)	dshaw@usaetampa.com	Project Manager - USAE
Jim Pastorick	Technical Support Contractor to PREQB	UXO Pro Inc.	703-582-1718	jim@uxopro.com	Technical input and review of munitions related items on behalf of EQB

QAPP Worksheet #9b—Project Scoping Session Sheet (continued)

The following are the key points and actions pertinent to this QAPP of the discussion on how to accelerate work and decisions for various sites:

Key Points

Wilmarie Rivera/PREQB stated that the Governor of Puerto Rico wants SWMU 4 to be a priority, including the surrounding water. Laura Vélez-Vélez requested the team re-evaluate SWMU 4 (including the surrounding water) as a high priority area.

Action Items

Navy/CH2M HILL – Re-evaluate the underwater (UXO 16) approach adjacent to SWMU 4 to potentially accelerate the work and decisions.

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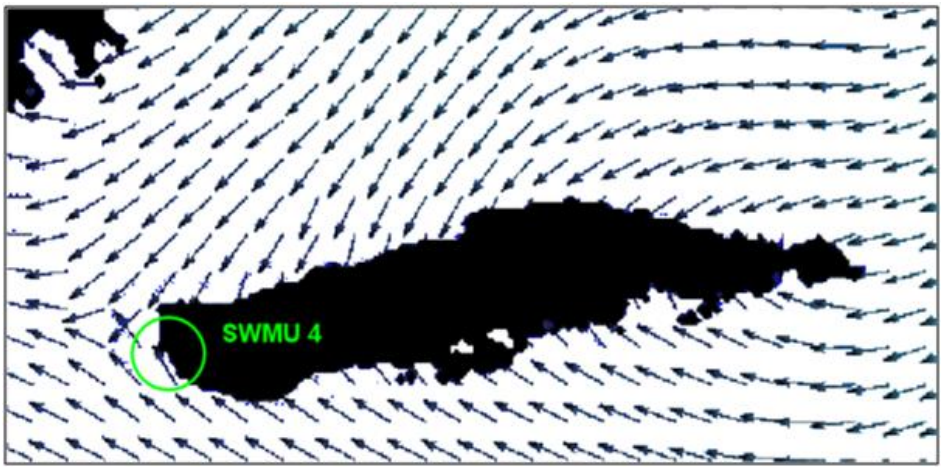
QAPP Worksheet #10—Conceptual Site Model

General historical information regarding the former Naval Ammunition Support Detachment (NASD), including UXO 16, can be found in the Fiscal Year 2014 Site Management Plan (CH2M HILL, 2013). The location of the area of UXO 16 adjacent to SWMU 4 is shown in **Figures 1** and **2**. The historical information and conceptual understanding of sources, release and transport mechanisms, and potential exposures to MEC/MPPEH pertinent to and providing the rationale for the Expanded Site Inspection (ESI) covered by this QAPP are provided below.

- SWMU 4 was used for the thermal and explosive destruction of retrograde and surplus munitions, fuels, and propellants from 1969 through 1979 and may have periodically been used as far back as the late 1940s. The Open Burn/Open Detonation (OB/OD) operations were conducted in 16 man-made, earthen-bermed pits (**Figure 2**) that have since become overgrown with vegetation. Fuels, propellants, and explosives waste material were burned and/or detonated.
- The SWMU 4 site boundary was established with a radius of 3,000 feet from the center of the detonation pits, taking into consideration the maximum fragmentation distance of the kick out from the munitions detonations (about 2,500 feet) and adding a safety margin (about 500 feet). This radius extends approximately 2,000 feet offshore to the west of the former detonation pits (**Figure 2**), encompassing 195 acres of UXO 16.
- As demonstrated in **Table 1**, over 90 percent of the MEC/MPPEH recovered during investigation and interim actions at SWMU 4 were 20mm projectiles. MEC/MPPEH classified as greater than 30mm to 40mm were generally found within a 1,000-ft radius of the OB/OD pits; however, less than 8 percent of the MEC/MPPEH recovered were larger than 30mm. No MEC/MPPEH has been found beyond the 2,500-ft arc.
- The primary release and transport mechanism from the OB/OD pits to UXO 16 would have been ejection of MEC/MPPEH and related debris directly into the waters of UXO 16. A potential past, but relatively insignificant now (since OB/OD operations ceased approximately 35 years ago), release and transport mechanism would have been ejection of MEC/MPPEH and related debris to the surrounding terrestrial area and overland transport to UXO 16, primarily via the main ephemeral stream at the site (**Figure 2**).
- Once in UXO 16, transport of MEC/MPPEH and related debris is governed primarily by wave/current action and water depth.
  - In the nearshore, munitions-related items may move due to the effects of waves (which predominantly move south to north adjacent to SWMU 4) and the dynamic nature of the sediment (including the beach). The wave climate in Vieques is typically with predominant easterly Trade Winds. As these waves travel to shallow water and approach SWMU 4, the direction of the waves is modified by refraction due to the bathymetry and diffraction from headlands, as shown below (CariCOOS).



QAPP Worksheet #10—Conceptual Site Model (continued)

  - Beyond the depth of closure (depth beyond which wave action would not affect sediment transport), waves would not affect munitions-related item movement except under extreme conditions. This depth is approximately 10 to 12 feet adjacent to SWMU 4. While the depth of closure adjacent to SWMU 4 will be measured during the planned beach dynamics study, for the purposes of the ESI, estimates of the depth of closure are sufficient. The depth of closure at SWMU 4 was estimated using a formula by Hallermeier (1981) with estimates from wave measurements from a comparable locale (St. Thomas) and wave transformation coefficients derived from observations during a site visit.

- The potential receptors that have the highest likelihood of encountering MEC/MPPEH posing a relatively high explosive hazard (considering the types of MEC/MPPEH found at SWMU 4) in UXO 16 adjacent to SWMU 4 are recreational users (waders/swimmers) utilizing the beach area at SWMU 4. This is because:
  - most of the people in the water adjacent to SWMU 4 would likely fall into this category (versus boaters/divers/snorkelers)
  - these receptors are more likely to encounter the seafloor when wading/walking/resting
  - these receptors would likely be within the portion of UXO 16 where wave action could affect munitions-related item movement, primarily because the depth to bottom in that area is less than 10 to 12 feet and is within a few hundred feet of the shoreline
  - the anticipated density of MEC/MPPEH increases closer to the shoreline, as demonstrated by the data collected at SWMU 4
  - MEC/MPPEH is more mobile where there is a sandy bottom and the depth is shallow enough for wave action to mobilize sediment (and thereby MEC/MPPEH)
  - the deeper areas (further from the shoreline) of UXO 16 would have a significantly smaller percentage of human receptors, less likely coming in contact with MEC/MPPEH, a smaller percentage of MEC/MPPEH, and the vast majority of MEC/MPPEH that they may come in contact with would be 20-mm projectiles, which have a relatively low explosive hazard

- In July 2012, in general accordance with the Draft Final Quality Assurance Project Plan (CH2M HILL, 2012), an SI covering approximately 7 percent (14 acres) of the 195-acre offshore "arc," as shown in **Figure 3.**
  - 14 transects spaced approximately 50 feet apart, extending approximately 600 to 800 feet from the shore
    - Included the delta area produced by discharge from the main ephemeral stream
    - 100 percent visual survey of sea floor within the 14 acres
      - Two MPPEH identified (20-mm projectile; expended M123 Series Photoflash cartridge base section)
      - One additional MPPEH identified outside of survey area during habitat evaluation (40-mm flare base section)
      - All three MPPEH were removed
    - All-metals detector used along each transect (approximately 3-ft width) to identify subsurface anomalies
      - Number of subsurface anomalies recorded for each 200-ft segment of each transect
      - 72 metallic anomalies detected; no MEC/MPPEH; mostly cultural debris

- **Figures 4 through 6** portray the conceptual site model (CSM) of UXO 16 described above. **Figure 4** identifies five zones of varying exposure potential (relative to each other); **Figure 5** contains photographs of the SWMU 4 shoreline adjacent to UXO 16; **Figure 6** shows the projected density (from "kick outs") of MEC/MPPEH with distance from the OB/OD pits, based on the historical data collected during munitions removal activities at SWMU 4. The key zones represented in **Figure 4** of the CSM are:

QAPP Worksheet #10—Conceptual Site Model (continued)

- The area of highest exposure potential (Zone A, shaded in blue) is where the main ephemeral stream discharges to the ocean, and includes its delta
  - Zone where the past release and transport mechanisms overlap (direct insertion/discharge from land via the ephemeral stream)
  - Zone of maximum beach access from land [current and planned] due to proximity to road
  - Zone of maximum access to wading due to presence of sandy bottom and absence of coral/rock outcroppings
  - Zone where wave action moves sediment and, potentially MEC/MPPEH
  - Zone where the estimated kick out density of MEC/MPPEH is up to 15/acre (**Figure 6**)
  - Zone is bounded on the east by the shoreline (photos D, E, F in **Figure 5**), west by the depth of closure, north by coral/rock outcroppings that extend into the nearshore environment and may limit northward transport, and south by a shallow reef
- The area of moderate exposure potential (Zone B, shaded in green) is adjacent to Zone A, in the predominant direction of wave motion and sediment transport
  - Zone where wave action and sediment transport may move MEC/MPPEH from Zone A (or already in Zone B), but may be hindered by rocky bottom, which would tend to trap munitions-related items
  - Zone of potential future beach access from land due to proximity to planned road
  - Zone recreational users may utilize for swimming, but wading would be difficult/impossible due to abundance of coral and rock outcroppings and lack of a sandy bottom
  - Zone where the estimated kick out density of MEC/MPPEH is up to 15/acre adjacent to Zone A, but less than 5/acre for much of the zone (**Figure 6**)
  - Zone is bounded on the east by the shoreline (photos A, B, C in **Figure 5**), west by the depth of closure, north by the rocky point (headland) which would limit transport and tend to trap munitions-related items, and south by Zone A
- An area of relatively low exposure potential (Zone C, shaded in pink) adjacent to Zone A, in the opposite direction of wave motion and sediment transport
  - Zone with a relatively lower potential for MEC/MPPEH to be located due to distance from the OB/OD pits (estimated kick out density of less than 5/acre, as shown in **Figure 6**) and the southerly wave direction, and to be moved around because the presence of the coral reef would tend to trap munitions-related items
  - Zone recreational users may utilize for snorkeling/diving due to the presence of the coral reef, but wading would be difficult/impossible due to the abundance of coral and lack of a sandy bottom
  - Beach adjacent to Zone C not accessible by walking from beach adjacent to Zone A, not readily accessible by land due to distance from road, and bounded by high cliffs (**photos G, H, I in Figure 5**)
  - Zone is bounded on the east by the shoreline, west by the depth of closure, north by Zone A, and south by the 2,500-ft arc
- An area of relatively low exposure potential (Zone D, shaded in orange) adjacent to Zone A, in the cross-shore wave direction
  - Zone where cross-shore transport could occur beyond the depth of closure only during extreme conditions, such as hurricanes
  - Zone where the estimated kick out density of MEC/MPPEH is up to 15/acre (Figure 6)
  - Zone where the mobility of MEC/MPPEH would be relatively low due to depth of water and general absence of wave effects on sediment (and potentially MEC/MPPEH) mobility (except under extreme conditions)

QAPP Worksheet #10—Conceptual Site Model (continued)

- Zone recreational users would utilize at a lower frequency due to the water depth (> 12 feet) and distance from shore (> 400 feet); could be used for snorkeling/diving from a boat, but not for wading and not likely swimming/snorkeling from shore
- Zone is bounded on the east by Zone A (and the depth of closure) and on all other sides by open water outside the zone of closure

– The area of very low exposure potential (Zone E, shaded in purple) in the open water outside the depth of closure

- Zone recreational users would utilize at a very low frequency due to the water depth and distance from shore (generally further and deeper than Zone C, especially coming from Zone A); could be used for snorkeling/diving from a boat, but not for wading and not likely swimming/snorkeling from shore
- Zone where the estimated kick out density of MEC/MPPEH is less than 5/acre (Figure 6)
- Zone where the presence and mobility of MEC/MPPEH would be relatively low due to the distance from OB/OD pits, depth of water, and absence of wave effects on sediment (and potentially MEC/MPPEH) mobility
- Zone is bounded on the east by the depth of closure and on all other sides by the 2,500-ft arc

QAPP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements

General Problems to Address

Based on the former OB/OD activities at SWMU 4, there is a potential for MEC/MPPEH to have been released from the OB/OD pits and dropped/deposited into the offshore environment (UXO 16) or on the ground at SWMU 4 and transported to UXO 16, primarily via the main ephemeral stream. Both of these release and transport mechanisms are historical. Currently, the only transport mechanism of potential significance is transport within the offshore environment due to wave action.

Initial SI activities confirmed the presence of munitions-related items, including MPPEH, but the activities were conducted within only a portion of UXO 16. Therefore, the specific objective of the ESI is to complete the SI activities started in 2012. More broadly, the objective of the SI (and ESI) is "release assessment," which is intended to:

- Determine if/where a release of hazardous material (i.e., MEC/MPPEH) occurred from past Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)-related activities occurred
- Determine whether the suspected release, if confirmed, warrants further investigation or action in accordance with the planned and/or likely land use

Environmental Questions to be Answered

- Is there MEC/MPPEH offshore from SWMU 4 as a result of past OB/OD activities at SWMU 4, with particular emphasis on areas where potential future human exposure is highest?
- If MEC/MPPEH is identified, is further investigation and/or action warranted?

Who will use the data?

- The Navy, USEPA, EQB, DNER, USFWS, NOAA, and NMFS will use the data collected to answer the questions above.

For what will the data be used?

- To answer the questions above.
- May also be used to help make land use and associated control determinations.

What types of data are needed?

- In order to answer the environmental questions listed above, the following data are beneficial and/or are necessary:
  - The presence, distribution, and relative quantities of MEC/MPPEH within the various zones shown in **Figure 7**. These data will be gathered in accordance with the Standard Operating Procedure (SOP) 1: Underwater Data Collection in UXO 16 Adjacent to SWMU 4 in Attachment A. In general, they are:
    - Visual observations and instrument-aided survey for subsurface anomalies along transects (see Worksheet #17 for description of percent coverages of each of the zones). The exact orientation and spacing of the transects are primarily for relative comparison purposes. Since the objective of the study is to determine if MEC/MPPEH are present and if additional study or action is warranted, what is most important is the percent coverage of each zone, not the orientation and spacing of transects, especially since these will be influenced by sea conditions (e.g., coral reefs, currents) and biased based on field observations to areas more likely to contain MEC/MPPEH (e.g., sand channels).
      - GPS coordinates of surface MEC/MPPEH and subsurface anomalies
      - Photograph and written description of all items recovered
      - Reason if any subsurface anomaly is not investigated, including any that are below about 1 foot (which is the maximum depth of excavation of anomalies due to safety and logistics)

QAPP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

- ♦ Location and description of underwater obstructions or other important features, such as threatened and endangered species, that could affect the current and/or future investigations and/or actions.

- Subsurface anomaly data will be to a maximum depth of approximately 9 inches because this is the technological limitation of the all-metals detector for 20-mm projectiles, which represented over 90 percent of the MEC/MPPEH found at SWMU 4.
- Water visibility will be observed in order to determine if the underwater survey will be conducted on any given day. A 50-ft visibility is the minimum for conducting the underwater survey.
- Position location, water depth, and the physical and biological surroundings description data for each munitions-related item, both on and beneath the sediment surface, will be collected to help evaluate the distribution and potential for mobility and direct contact.
- Additional data need descriptions and collection techniques are described in Worksheet #14, SOP-1 and SOP-2; sample design rationale is provided in Worksheet #17.

How "good" do the data need to be in order to support the environmental decision?

- In that the purpose of the SI/ESI is to determine if a release has occurred that warrants further investigation and/or action and recognizing the limitations of underwater detection techniques (relative to land-based detection techniques), the quality of data that will be generated using visual and instrument-aided (all-metals detector and Global Positioning System [GPS]), and the margin of error inherent to those techniques, will be sufficient for the intended use. If the data are collected in accordance with SOP 1, then the data should be "good enough" to support the environmental decision. However, it is possible that even if there are deviations from the SOP, the data will be "good enough" to support the environmental decision. If there are deviations, they will be discussed, together with their impact on the ESI objectives in the SI/ESI Technical Memorandum.
- Ultimately, the Vieques Technical Subcommittee will evaluate the collective data and make a determination of whether the data quantity and quality is sufficient to meet the SI/ESI objectives or if additional data are warranted to achieve the necessary quantity and/or quality.
- Performance functionality will be performed, as applicable, on equipment in accordance with manufacturers' recommendations and procedures. Equipment not performing in accordance with the manufacturers' specifications will either be repaired or replaced prior to data collection.

How much data should be collected?

- See Worksheet #17 for the quantity of data that will be collected by zone shown in **Figure 7**. The quantity of data sufficient for meeting the objectives of the SI/ESI is not an absolute; rather it is a subjective determination. In addition, the quantity of data to be collected varies by zone based on the amount/type of MEC/MPPEH potentially present, the relative exposure potential based on likely and/or anticipated land use, and the potential mobility of sediment/MEC/MPPEH (which can also affect exposure potential).
- Sample design rationale is provided in Worksheet #17. See also the project quality objectives further below.

Where, when, and how should the data be collected/generated?

- The data will be collected within the zones shown in **Figure 7** using the procedures discussed in Worksheet #14 and SOP-1. Worksheet #17 discusses the rationale for data collection in each of the zones. Based on the Fiscal Year 2014 Site Management Plan (CH2M HILL, 2013), it is anticipated the data will be collected in mid-2014. The actual date may vary depending on funding and specialty diver availability, weather and sea conditions, etc.

QAPP Worksheet #11—Project Quality Objectives/Systematic Planning Process Statements (continued)

Who will collect and generate the data? How will the data be reported?

- The data will be collected by UXO technician divers.
- The data will be compiled and presented to/discussed with the Vieques Technical Subcommittee and NMFS (with respect to threatened and endangered species), along with recommendations based on evaluation of the data. In addition, data collection activities will be coordinated with NMFS and DNER to ensure potential impacts to threatened and endangered species are avoided. If the Vieques Technical Subcommittee concurs that the quantity and quality of data are sufficient to achieve the SI/ESI objectives, an SI/ESI Technical Memorandum will be prepared that documents the data collection activities, summarizes the data collected, and provides the data evaluation, conclusions, and recommendations. The Technical Memorandum will be included as an appendix to the Remedial Investigation (RI) Sampling and Analysis Plan (SAP).

How will the data be archived?

- The data will be archived in accordance with Navy Guidance and Navy CLEAN contract terms.

List the Project Quality Objectives (PQOs) in the form of if/then qualitative and quantitative statements

- If the data are collected in accordance with this QAPP (e.g., percent coverages by zone are met, data are collected when visibility is at least 50 feet, instruments perform in accordance with manufacturer's specifications, SOP-1 procedures are followed), the ESI objectives will be met and the data will be sufficient for answering the environmental questions. Otherwise, representatives of the Vieques Technical Subcommittee will convene and determine if the objectives were met even though deviations from the QAPP occurred or if additional data are needed.
- If no MEC/MPPEH are identified and the quantity and/or quality of the data are sufficient to satisfy the SI/ESI objectives, then:
  - A SAP scoping session will be held by the Vieques Technical Subcommittee to plan the RI approach
  - The SI/ESI Technical Memorandum will be prepared as described above and included as an appendix to the RI SAP
  - The SI/ESI information will be used to establish LUC protocol for UXO 16 adjacent to SWMU 4 in support of FWS' land use plan for SWMU 4
- If no MEC/MPPEH are identified and the quantity and/or quality of the data are not sufficient to satisfy the SI/ESI objectives, then:
  - A scoping session will be held by the Vieques Technical Subcommittee to plan the additional SI/ESI data collection approach
  - Additional data collection will be performed as described above, under this QAPP, and the process will return to the first PQO statement
- If MEC/MPPEH are identified, then:
  - A SAP scoping session will be held by the Vieques Technical Subcommittee to plan the RI approach (including filling any MEC/MPPEH data gaps identified in the SI/ESI data)
  - The SI/ESI Technical Memorandum will be prepared as described above and included as an appendix to the RI SAP
  - If any of the MEC/MPPEH identified was left in place (i.e., was not possible or safe to remove), an interim removal action (which may comprise or include controls) will be planned and implemented
  - The SI/ESI information and interim removal action will be used to establish LUC protocol for UXO 16 adjacent to SWMU 4 in support of FWS' land use plan for SWMU 4

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QAPP Worksheet #14—Summary of Project Tasks

- This worksheet defines the project tasks. A more detailed description of the project tasks are described in the Definable Features of Work (DFOW) to be completed that are presented in SOP-1, Table 1. During the performance of the work, a Quality Control program will be implemented which includes:1) defining the project quality objectives (summarized in Worksheet #11); 2) identifying pass/fail criteria for the DFOW and what actions will be taken if failure occurs (SOP-1,Table1); and 3) establishing a three-phase quality control process to monitor the quality control; a Preparatory Phase, an Initial Phase, and a Follow-up Phase. Production work will not be performed until Preparatory and Initial Phases have been completed successfully. The specific tasks to be completed for each of these tasks are identified in SOP-1, Table 1.
- Coordination with DNER, FWS and National Marine Fisheries Service (NMFS) regarding threatened and endangered species avoidance
  - Prior to mobilization, the protocol mitigation measures for protection of threatened and endangered species during the SI/ESI, as described in SOP-2, will be discussed and concurred upon with FWS, DNER and NMFS
  - As indicated in SOP-2, threatened and endangered species avoidance training and oversight of the dive team, as applicable, will be conducted
- Mobilization
  - Coordinate with Navy UXO dive team to ensure mutual understanding of underwater survey objectives, scope, protocol, endangered species protection, and proper qualifications/certifications/licenses
  - Procure necessary equipment for underwater survey
  - Set up personal digital assistants (PDAs), the data collection instruments, with investigation area map
- Detector-Aided Visual Survey
  - Refer to Worksheet #17 for the survey areas and rationale
  - See SOP-1: Standard Operating Procedure - Underwater Data Collection in UXO 16 adjacent to SWMU 4 for the processes that will be followed to conduct the detector-aided visual survey
  - On a frequent basis (approximately daily) the data collected in the PDAs will be uploaded to the munitions response web-based Geographical Information System (GIS)
  - During the visual survey, the mitigation measures for minimizing impacts to threatened and endangered species of sea turtles and coral will be implemented, as described in SOP-2
  - If MEC/MPPEH are found and can be moved and moved safely, they will be removed during the SI/ESI and consolidated on the east end of Vieques or at SWMU 4 where they will be detonated in general accordance with the approach outlined in the Technical Memorandum Controlled Detonation of Munitions and Explosives of Concern at SWMU 4 (CH2M HILL, 2010). If moved to the east end of Vieques, no post-detonation samples will be collected during the ESI.
  - As noted in Worksheet #11, if MEC/MPPEH are found than cannot be moved or moved safely, an interim removal action (which may comprise or include controls) will be planned and implemented
- SI/ESI Data Compilation and Evaluation
  - The data collected during the SI (2012) and ESI will be compiled and evaluated to determine:
    - If sufficient quantity and quality of data were collected
    - If the SI/ESI objectives were met
    - Whether an interim removal action is warranted
    - Recommendations for the RI objectives and approach
    - LUC protocol for UXO 16 adjacent to SWMU 4 in support of FWS' land use plan for SWMU 4

QAPP Worksheet #14—Summary of Project Tasks (continued)

- Vieques Technical Subcommittee Meeting
  - The Vieques Technical Subcommittee will convene to review the SI/ESI findings and determine if the objectives were met (including whether data of sufficient quantity and quality were collected) and scope additional activities accordingly.
- SI/ESI Technical Memorandum
  - The SI/ESI Technical Memorandum will be prepared in accordance with the process described in Worksheet #11.

QAPP Worksheet #16—Project Schedule/Timeline

The ESI will be implemented in general accordance with the schedule provided in the Fiscal Year 2014 Site Management Plan (CH2M HILL, 2013), amended as necessary with concurrence among the stakeholder agencies, and/or with consideration of sea, visibility, and weather conditions, specialty diver availability, and coordination with stakeholder agencies (e.g., NMFS). The primary milestones for the ESI are:

Initiate Field Work:	July 2014
Submit Draft SI/ESI Technical Memorandum:	February 2015

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QAPP Worksheet #17—Sampling Design and Rationale

This worksheet provides the rationale for the key elements of the instrument-aided visual survey of the study area. The details of conducting the instrument-aided visual survey are provided in SOP 1. **Figure 7** shows the study area layout, including the approximate area coverage within each zone, which is discussed below. It should be noted that the approximate transect spacings provided below are only for the purposes of demonstrating the relative densities of transects; actual transects will not likely be uniformly spaced due to field conditions encountered.

Transects

- Orientation
  - Inside depth of closure line (Zones A, B, C)
    - Approximately parallel to the depth contours because munitions-related items mobility and sand channels would likely align with depth contours, thereby increasing likelihood of finding items and characterizing density
  - Outside depth of closure line (Zones D, E)
    - Same orientation for convenience (less-frequent shifting to new transects)
- Spacing (Coverage*)
  - Zone A (Approximately 25 % coverage)
    - Results in approximately 30-ft transect spacing**
    - Zone of highest human exposure potential
  - Zone B (Approximately 15 % coverage)
    - Results in approximately 50-ft transect spacing**
    - Zone of moderate human exposure potential
  - Zones C, D (Approximately 10 % coverage)
    - Results in approximately 80-ft transect spacing **
    - Zone of relatively low human exposure potential
  - Zone E (Approximately 5 % coverage)
    - Results in approximately 130-ft transect spacing**
    - Zone of low human exposure potential

* Historically, MEC/MPPEH SIs conducted on the former VNTR have satisfied their objectives with approximately 5% coverage; the percent coverages listed above are based on the exposure potential, transport, and other information detailed for each zone in Worksheet #10. As noted previously, the transect spacings provided are for relative comparison purposes; the percent coverages that will be achieved are the goals for each zone since the transect spacings will be adjusted as necessary (e.g., presence of shallow and/or threatened/endangered coral) and warranted (e.g., identification of sand channels).

** Will be conducted when visibility is at least 50 feet; divers can sweep approximately 3 feet on either side of transect with metal detector

QAPP Worksheet #17—Sampling Design and Rationale (continued)

Other Considerations

Modeling and associated studies have indicated that munitions items in marine environments tend to migrate to inter-reef sand channels (where present) and, once in the sand channels, tend to stay within them (Jenkins *et. al.*, 2012). Therefore, if any sand channels are visually identified during the ESI, the survey area will be adjusted and/or expanded to include the extent of the visually identifiable sand channels.

Subsurface Anomaly Location/Identification

- Instrumentation
  - Due to the various munitions types managed at SWMU 4, an all-metals detector will be used locating subsurface anomalies
  - Detector has capability of detecting the smallest anticipated MEC/MPPEH item (20-mm projectile) to an approximate depth of 9 inches, which is the technological limit for 20-mm projectile
- Excavation
  - Although the all-metals detector technological limit for a 20-mm projectile is approximately 9 inches, anomaly excavations will be performed up to 1 foot below the seafloor, which is the practical limit of excavation with no/minimal unintentional contact with any MEC/MPPEH present.
  - If the source of an anomaly is found to be deeper than 1 foot, the anomaly identifier and location will be recorded as having a source deeper than 1 foot beneath the seafloor that was not characterized or removed

QAPP Worksheet #29—Project Documents and Records Table

Document/Record/Data	Where Maintained
• Field Log Books (see SOP-1 for information to be collected in log books) • QAPP • GPS data • Item description data • Photographs • Meeting Agendas, Minutes, presentations, etc., as applicable • SI/ESI Technical Memorandum	• CH2M HILL will maintain all hardcopy documents/records/data and electronic data for the project duration; will be archived at project closeout in accordance with Navy CLEAN contract requirements • Electronic data will be retained in the Vieques MR database • Copies of QAPP, meeting agendas, minutes, presentations, and SI/ESI Technical Memorandum will be provided to the stakeholder agencies

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Tables

Table 1

Munitions and Explosives of Concern (MEC) Identified and Recovered at SWMU 4

Quality Assurance Project Plan Expanded Site Inspection of UXO 16 Adjacent to SWMU 4

Former Vieques Naval Training Range

Vieques, Puerto Rico

MEC Type	Number Found
Projectiles, 20mm high explosive (HE)	1,585
Cartridges, 20 mm Target Practice	335
Photoflash cartridge, M123A1	33
Incendiary mixture from incendiary bomb	25
Booster for bomb fuze	21
Fuze, bomb MK 230	19
Primer, Percussion M33	15
Rocket warhead, MK2	6
Projectile, 20mm armor piercing	6
Projectiles, 30mm HE	6
CAD	5
Fuze, bomb MK 243	4
Nose fuze for bomb	4
20mm incendiary	4
Projectile, Fuze base,MK 48	3
Projectile FuzeNose M25	3
Signal, Illumination , Ground (also referred to as slap flare)	3
Projecile, 3" illumination	3
Propelling charge	3
Rocket motor, 5" HVAR	2
White phosporous canister	2
Rocket Motor Propellant	2
2.75" rocket motor	2
Projectile, 3" HE	2
M904 nose fuze	2
Rocket, 5" inert, practice	2
Fuze, VT M517	1
Bomb, incendiary AN-M52	1
Photoflash cartridge, M112	1
Igniter, M23 WP	1
3" projectile signal cartridge	1
Rocket, 4.5"SAP	1
Rocket, 5" HE	1
MK300 booster fuze	1
Catapult motor	1
Illumination candle	1
Total	**2,107**

Figures

R:\USNAVFACENGCOM405450\VIEQUES\MAPFILES\UXO_16_ESI_QAPP\FIGURE 1 - REGIONAL LOCATION MAP.MXD JCROCKETT 11/21/2013 2:46:23 PM

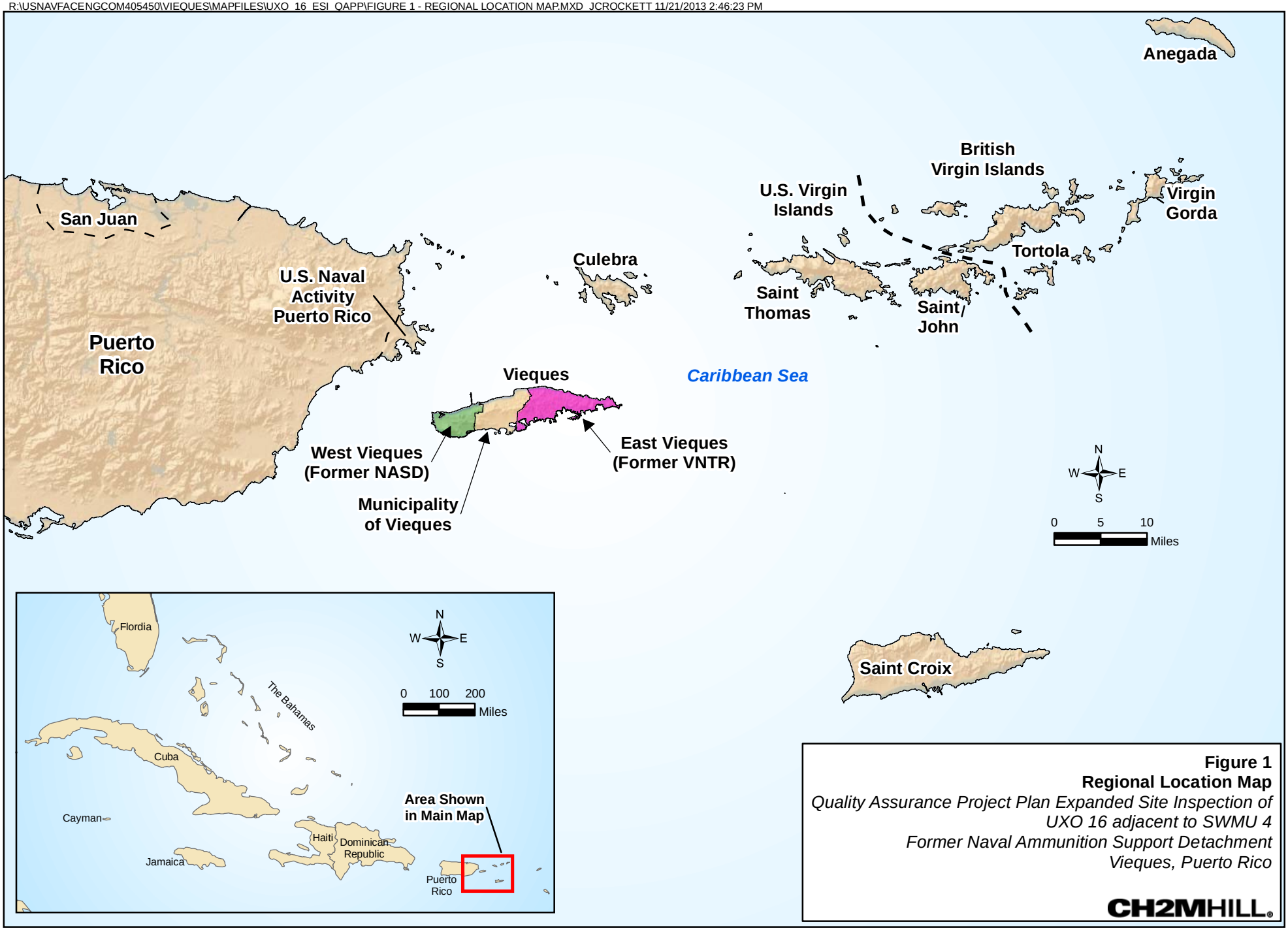

Figure 1
Regional Location Map
Quality Assurance Project Plan Expanded Site Inspection of UXO 16 adjacent to SWMU 4
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

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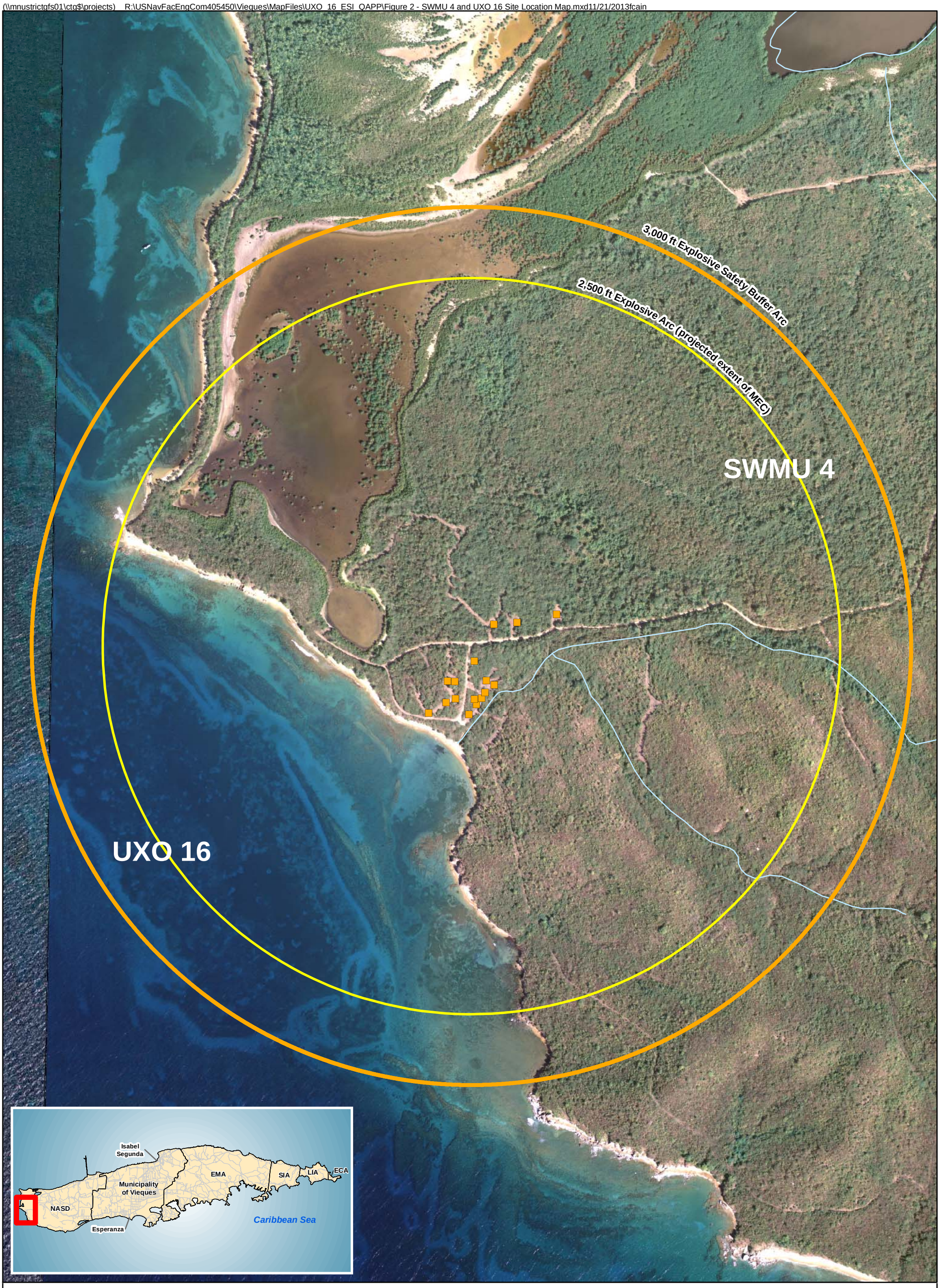
(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\UXO_16_ESI_QAPP\Figure 2 - SWMU 4 and UXO 16 Site Location Map.mxd11/21/2013fcain



Legend

- OB/OD Pits
- Ephemeral Stream

N
W E
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0 500 1,000
Feet

Figure 2
SWMU 4 and UXO 16 Site Location Map
Quality Assurance Project Plan Expanded Site Inspection of UXO 16 adjacent to SWMU 4
Former Naval Ammunition Support Detachment Vieques, Puerto Rico

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(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\UXO_16_ESI_QAPP\Figure 3 - UXO 16 Area Adjacent to SWMU 4 Transect Density Results.mxd11/21/2013fcain

SWMU 4

UXO 16

Expended/Inert Base Section
M123 Series Photoflash Cartridge

20mm Projectile
(Type, Fuzing, Condition- Unknown)

Base section of a 40mm
Grenade Star Cluster Flare.
Expended. Found By CH2MHill Biologist

2,500 ft Explosive Arc (projected extent of MEC)

3,000 ft Explosive Safety Buffer Arc

Legend

- Interval Point (200ft Intervals)
- MPPEH Location
- OB/OD Pits
- Underwater Transects from July, 2012 Site Inspection
- Ephemeral Stream
- Delta from Ephemeral Stream

N
W E
S

0 250 500
Feet

Note:
- Spacing for Transects is Approximately 50 ft.
- All anomaly counts are for subsurface anomalies found between interval points

Figure 3
UXO 16 Area Adjacent to SWMU 4 Initial SI Results
Quality Assurance Project Plan Expanded Site Inspection of UXO 16 adjacent to SWMU 4
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

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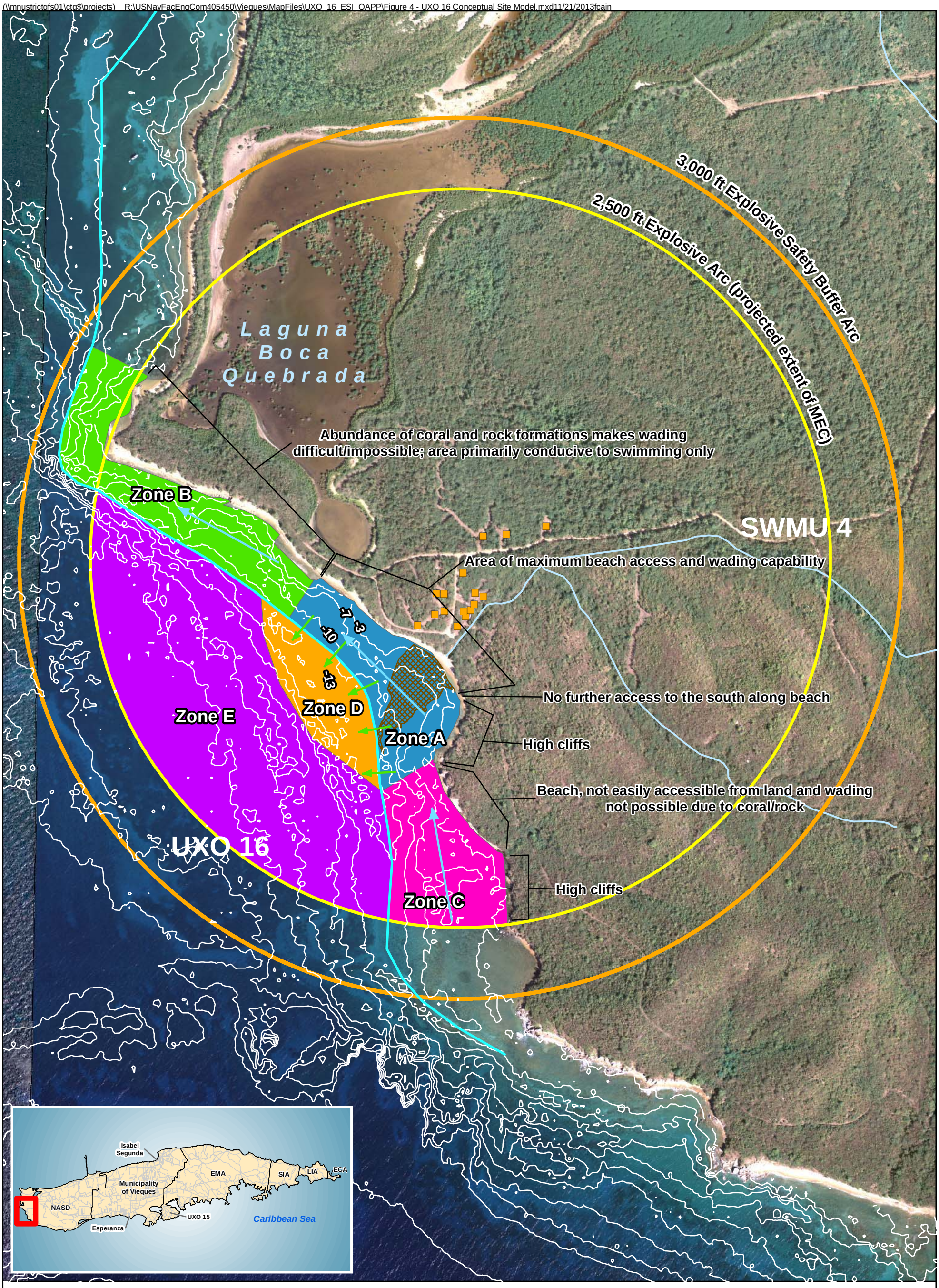
(\\mnustrictqfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\UXO_16_ESI_QAPP\Figure 4 - UXO 16 Conceptual Site Model.mxd11/21/2013fcain



Legend

- OB/OD Pits
- Ephemeral Stream
- Bathymetry Contour (feet)
- Depth of Closure
- Direction of Sediment Transport
- Cross-Shore Sediment Transport During Extreme Conditions
- Delta from Ephemeral Stream

N
W E
S

0 500 1,000
Feet

Figure 4
UXO 16 Conceptual Site Model
Quality Assurance Project Plan Expanded Site Inspection of UXO 16 adjacent to SWMU 4
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

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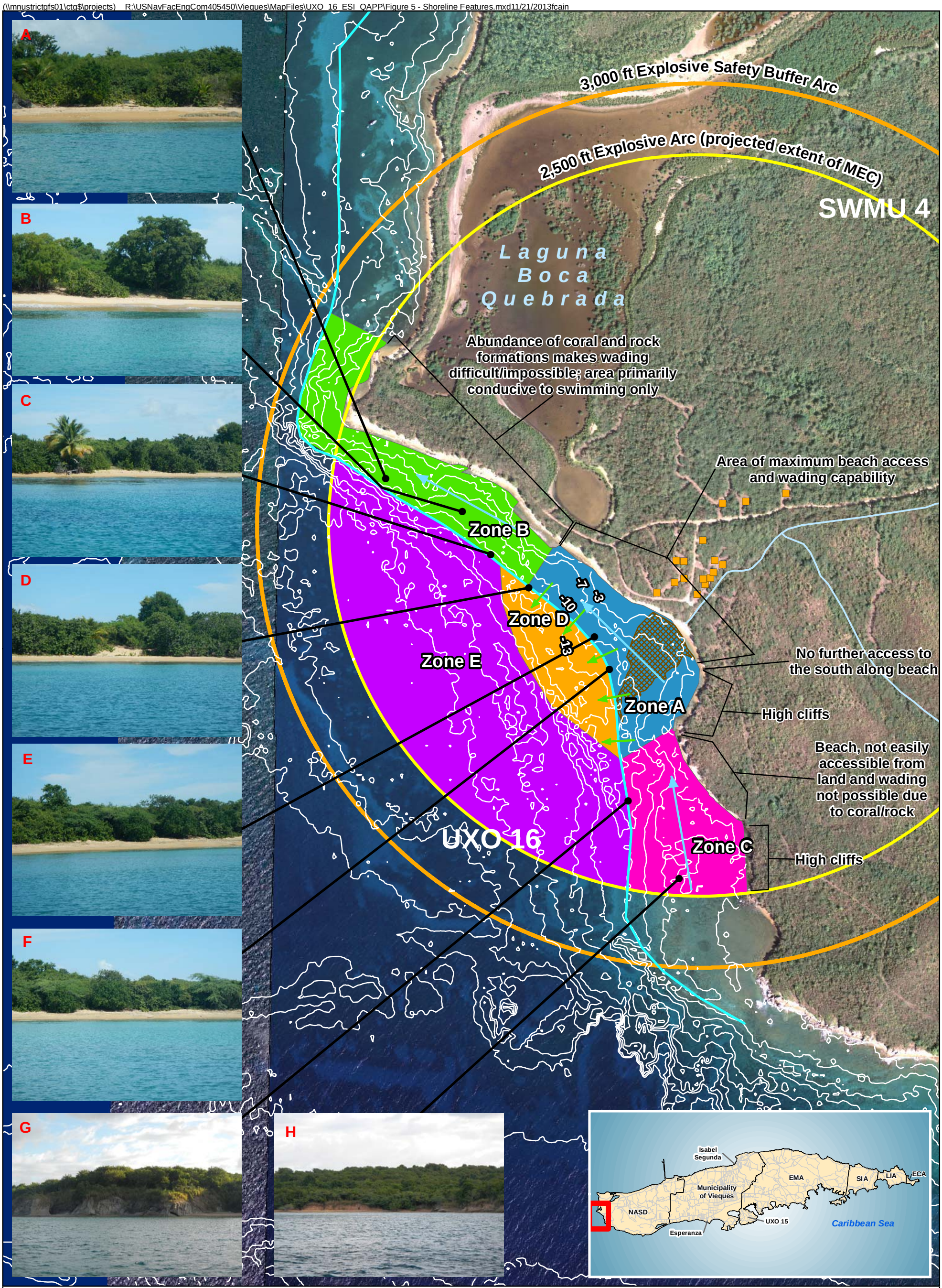
(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\UXO_16_ESI_QAPP\Figure 5 - Shoreline Features.mxd11/21/2013fcain



Legend

- OB/OD Pits
- Ephemeral Stream
- Bathymetry Contour (feet)
- Depth of Closure
- Direction of Sediment Transport
- Cross-Shore Sediment Transport During Extreme Conditions
- Delta from Ephemeral Stream

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W E
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0 500 1,000 Feet

Figure 5
UXO 16/SWMU 4 Shoreline Features
Quality Assurance Project Plan Expanded Site Inspection of UXO 16 adjacent to SWMU 4
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

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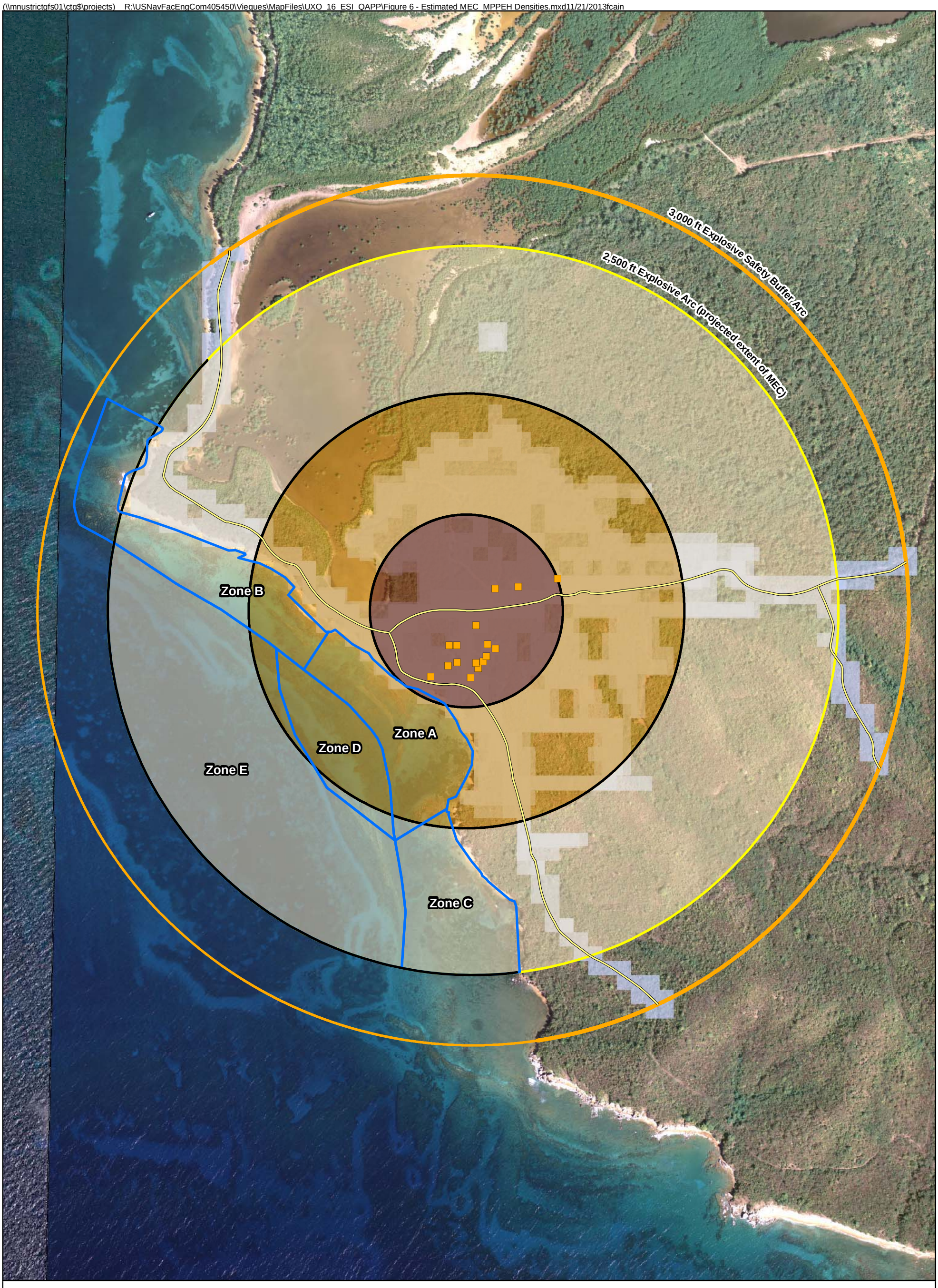
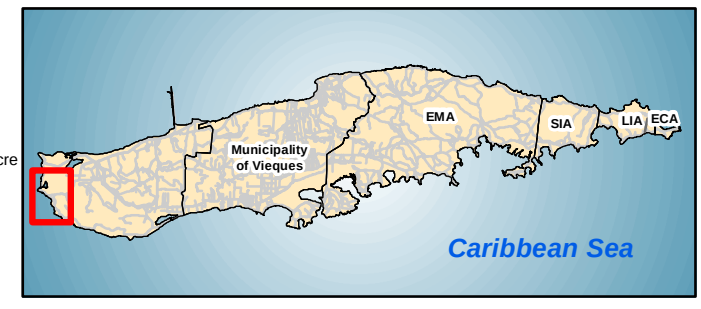
(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\UXO_16_ESI_QAPP\Figure 6 - Estimated MEC_MPPEH Densities.mxd11/21/2013fcain



Legend

- OB/OD Pits
- Road
- MEC/MPPEH Density less than 5 per acre
- MEC/MPPEH Density less than 15 per acre
- MEC/MPPEH Density greater than 15 per acre
- Area of Past Munitions Clearance Activities



2007 Aerial Imagery

Figure 6
Estimated MEC/MPPEH Densities
Quality Assurance Project Plan Expanded Site Inspection of UXO 16 adjacent to SWMU 4
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

N
W E
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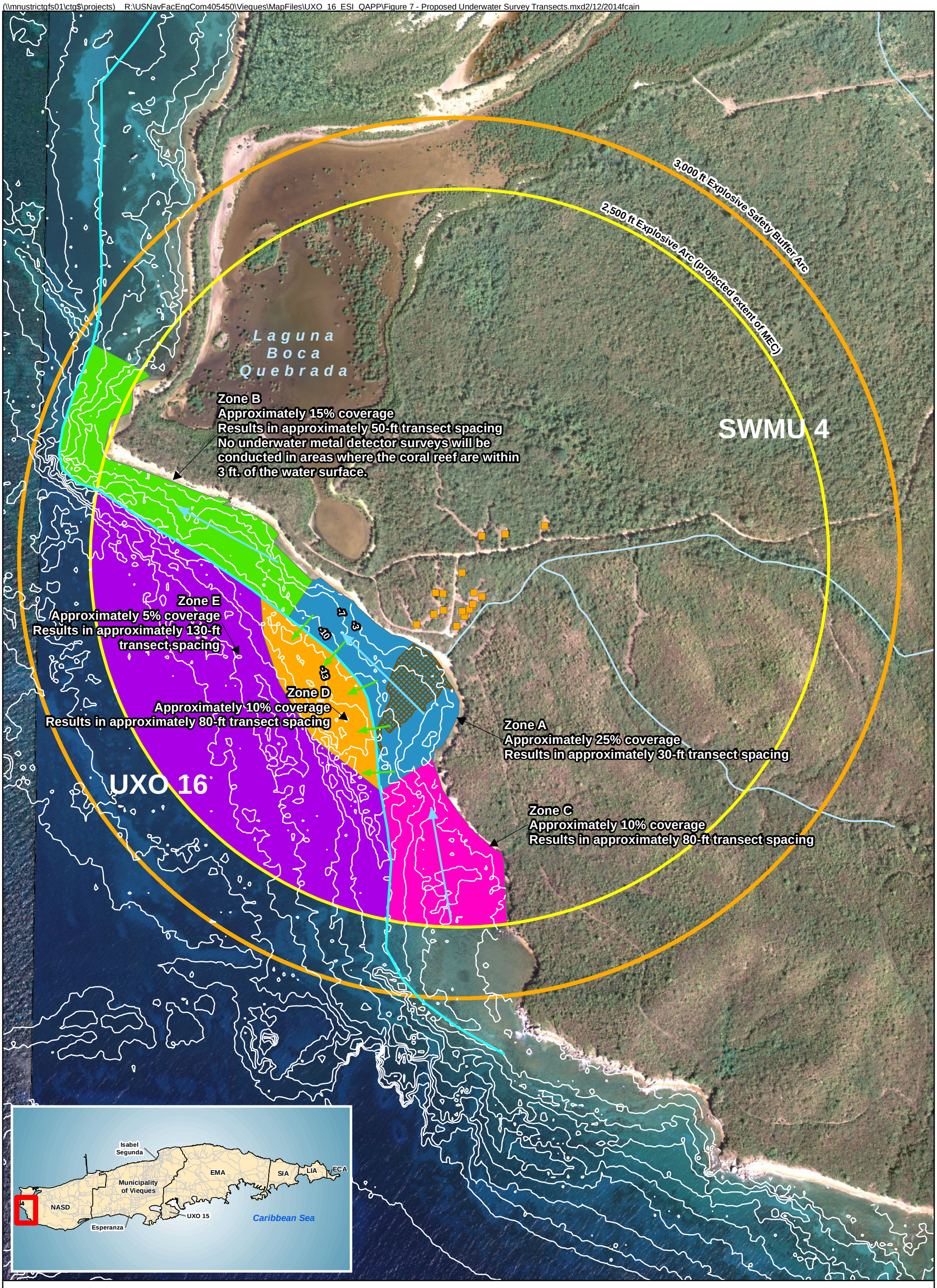
0 300 600
Feet

CH2MHILL

(\\mnustrictgfs01\ctg$\projects) R:\USNavFacEngCom405450\Vieques\MapFiles\UXO_16_ESI_QAPP\Figure 7 - Proposed Underwater Survey Transects.mxd2/12/2014fcain



Legend

- OB/OD Pits
- Ephemeral Stream
- Bathymetry Contour (feet)
- Depth of Closure
- Direction of Sediment Transport
- Cross-Shore Sediment Transport During Extreme Conditions
- Delta from Ephemeral Stream

N
W E
S

0 500 1,000
Feet

Figure 7
Underwater Survey Coverage
Quality Assurance Project Plan Expanded Site Inspection of UXO 16 adjacent to SWMU 4
Former Vieques Naval Ammunition Support Detachment
Vieques, Puerto Rico

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Attachment A
Standard Operating Procedures

STANDARD OPERATING PROCEDURE-01

Standard Operating Procedure: Underwater Data Collection in UXO 16 Adjacent to SWMU 4

1.1 Purpose

This standard operating procedure (SOP) provides general guidelines for the collection of munitions-related data from the underwater area (UXO 16) adjacent to Solid Waste Management Unit (SWMU) 4 during the Expanded Site Inspection (ESI).

1.2 Scope

ESI data will be collected while diving or snorkeling using manual writing media, digital camera, Global Positioning System (GPS), and an all-metals detector.

1.3 Equipment and Materials

- Grease pen and board, writing slate and pencil, magnetic writing board, or other writing media capable of use underwater
- Underwater digital camera
- GPS point collection equipment
- Whites Dual Pro PI underwater all-metals detectors (or comparable)
- Log book
- Indelible pen

1.4 Procedures and Guidelines

1.4.1 Underwater Data Collection

A. Procedures for Collecting Underwater Data

1. Data collected may be used to assist future investigations and help make removal/remedial action determinations; therefore, the data will be collected in the manner described below. Any of the following positioning equipment can be utilized as long as it is designed to provide sub-meter accuracy.

    - A GPS with a surface-tethered antennae such as *The Sound Ocean Systems, Inc. Sea Guide*
    - A buoy floated from the seabed to the surface with the location marked at the surface using GPS
    - The position on a search line between two known points.

    NOTE: systems utilizing a surface tether to either a buoy or an antenna will need to be sub-meter accurate at the seabed location not at the surface location.

2. A CH2M HILL biologist will conduct a visual inspection of all areas to identify where the coral reef and sea grass habitats are located prior to any intrusive activities.

3. Whites Dual Pro PI underwater all-metals detectors [or comparable] will be used to support the visual survey and to identify sub-seabed anomalies where rock or coral is not present at the seabed surface. The metal detector will be tested at least once daily to ensure that it is functional. The functionality test will follow the procedures defined by the manufacturer. Since metal detectors vary from manufacturer to manufacturer, the owner's manual specific to the make and model used will serve as the functionality test SOP.

4. Data will be collected along the approximate transects specified in the QAPP as follows:

- Waypoints will be collected along each transect to map the final transect position. This will include start point and end point (coordinates) of each transect, which will be done using any of the systems described above for position collection. To generally maintain the target spacing between transects prepositioning markers may be included as guides depending on the type of positioning system used.

5. For anomalies or items visually observed, observations relevant to the ESI objectives will be noted, including, but not limited to:

   - GPS coordinate of the observed MEC/MPPEH items
   - Locations of anomalies that are detected with the metal detector
   - If an anomaly cannot be investigated due to the presence of coral, sea grass, or other obstructions, the reason for not investigating the anomaly will also be recorded.
   - Photograph of the observed/excavated item
   - Written description of the observed/excavated item (specifics described below). The description will be written using a grease pen and board, writing slate and pencil, magnetic writing board, or other writing media capable of use underwater and photographed next to the item. If practical, the description of the item will be provided to the dive supervisor for inclusion in the field logbook.
   - Whether the item is confirmed or suspected to be MEC/MPPEH. All documentation/classifications of MEC/MPPEH will be done by UXO-qualified personnel.
   - Underwater obstructions or obstacles that could impede or impact the current or future investigation/removal actions.

6. MEC/MPPEH located during this investigation will be removed from the site, if practicable, in accordance with the ESS and the following procedures:

   - Only items that can be safely moved as determined by the SUXOS and UXOSO will be moved in accordance with the ESS.
   - The immediate area of an item deemed safe to move will be inspected by a CH2M HILL biologist prior to its removal to ensure no adverse ecological impact to the area will result from the removal. The biologist will be escorted by a UXO qualified escort and under no circumstances will the biologist touch or move the MEC/MPPEH item.
     - No MEC/MPPEH items will be removed if doing so negatively impacts the local environment, coral, sea grass, etc., unless mitigation measures approved by National Marine Fisheries Service (NMFS) and the Department of Natural and Environmental Resources (DNER) can be accomplished immediately (e.g., replanting sea grass).
   - No underwater demolition will be permitted; all safe-to-move items requiring explosive treatment will be moved to a designated area within SWMU 4 for treatment.
   - If an MEC/MPPEH item found is deemed unsafe to move, and presents an imminent explosive hazard to persons in the area or potential trespassers, the Navy Project Manager will be immediately notified and the site will be secured until a final disposition of the item can be made.

B. Information to be Included in MEC/MPPEH Item Descriptions and included in the Vieques MR database (if those determinations can be made)

1. Unique, Sequential Identification Number
2. Item Group
3. Item Class
4. Item Category
5. Type/Filler

6. Description/Fuzing
7. Quantity
8. Depth of water
9. Depth of Item in Sediment (approximate)
10. Weight (estimate)
11. Frag
12. Demo Required
13. General Comment for Condition of Item (biological growth on item, etc.)
14. General Location (i.e., SWMU 4, Anchor Point, VNTR, etc.)
15. Date Found
16. Action Taken
17. Item Moved To (as applicable)
18. X Geographic Coordinate
19. Y Geographic Coordinate
20. Photograph will include accompanied white board

1.4.2 Data Collection

The basic requirements for field log book entries are detailed below.

A. Information to be Included in Field Log Books

1. Entries into the log book will be as detailed and descriptive as possible so that a particular situation can be recalled without reliance on the collector's memory.
2. General project information will be recorded at the beginning of each field project. This will include the project title, the project number, and project staff.
3. Scope: Describe the general scope of work to be performed each day.
4. Weather: Record the weather conditions and any significant changes in the weather during the day.
5. Tail Gate Safety Meetings: Record time and location of meeting, who was present, topics discussed, issues/problems/concerns identified, and corrective actions or adjustments made to address concerns/ problems, and other pertinent information.
6. Standard Health and Safety Procedures: Record level of personal protection being used (e.g., level D PPE) and personnel monitoring information. Also record other required health and safety procedures as specified in the project specific health and safety plan.
7. Instrument Calibration: As applicable, record calibration/functionality information for each piece of health and safety and field equipment.
8. Personnel: Record names of all personnel present during field activities and list their roles and their affiliation. Record when personnel and visitors enter and leave a project site and their level of personal protection.
9. Communications: Record communications with project manager, subcontractors, regulators, facility personnel, and others that impact performance of the project.
10. Time: Keep a running time log explaining field activities as they occur chronologically throughout the day.
11. Deviations from the Work Plan: Record any deviations from the work plan and document why these were required and any communications authorizing these deviations.
12. Health and Safety Incidents: Record any health and safety incidents and immediately report any incidents to the Project Manager.
13. Subcontractor Information: Record name of company, record names and roles of subcontractor personnel, list type of equipment being used and general scope of work. List times of starting and stopping work and quantities of consumable equipment used if it is to be billed to the project.

14. Problems and Corrective Actions: Clearly describe any problems encountered during the field work and the corrective actions taken to address these problems.
15. Technical and Project Information: Describe work being performed each day.
16. Any conditions that might adversely affect the work or any data obtained (e.g., water visibility).
17. Areas of hard bottom (rock or coral)

1.4.3 Data Review

All data entered into the Vieques MR database will be reviewed to ensure that:

- All relevant information about the item has been recorded (as applicable and available) and accurate (based on the field notes, pictures, and discussions with the data collection team)
- There is appropriate agreement between the various elements of the item description
- The descriptions of the action taken for the item are accurate

Field log books will allow the reviewer to verify:

- Equipment functional tests are conducted in accordance with manufacturer's recommendations
- The rationale for adjusting/terminating transects is recorded
- Pictures are being taken and logged
- Relevant details pertaining to the investigation have been/are being recorded

TABLE 1
QAPP Expanded SI of UXO 16 Adjacent to SWMU 4
Definable Features of Work
Atlantic Fleet Weapons Training Area – Vieques
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

Activity	DFOW with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Planning	Document management and control (Pre-Mobilization Activities)	Verify appropriate measures are in place to manage and control project documents	PP	Once	Appropriate measures are in place to manage and control project documents	Do not proceed with field activities until criterion is passed
Planning	Data Management (Pre-Mobilization Activities)	Verify appropriate measures are in place to manage and control project data	PP	Once	Appropriate measures are in place to manage and control project data	Do not proceed with field activities until criterion is passed
Planning	Pre-Mobilization Activities	Verify MR contractor qualifications, training, licenses	PP/IP	Once	Contractors' qualifications, training, and licenses are up to date and acceptable	Do not proceed with work until the qualifications, training, and licenses are provided
Field Operations	Site preparation	Verify all project SOPs are approved	PP/IP	Once	All SOPs are approved by the Navy and the regulatory agencies	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation	Verify regulatory agencies are notified of field schedule	PP/IP	Once	Regulatory agencies are notified	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation	Verify GPS and hand held geophysical equipment are procured	PP/IP	Once	Equipment is procured	Proceed only with activities for which equipment has been procured
Field Operations	Site preparation	Verify MR data management systems and other logistical support are coordinated	PP/IP	Once	Data management system and other logistical support are coordinated	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation	Verify Emergency Services are coordinated	PP/IP	Once	Emergency Services are coordinated	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation	Verify operating schedules are finalized	PP/IP	Once	Operating schedules are finalized	Proceed only with those operations with finalized operating schedules

TABLE 1
QAPP Expanded SI of UXO 16 Adjacent to SWMU 4
Definable Features of Work
Atlantic Fleet Weapons Training Area – Vieques
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

Activity	DFOW with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Field Operations	Site preparation	Verify site-specific training is performed and acknowledged, including the training of divers to be familiar with the identification and mitigation measures for federally listed coral reefs and sea turtles that may be on site	PP/IP	Once	Site-specific training is performed and acknowledged as per SOP#-002	Do not proceed with field activities until criterion is passed
Field Operations	Site preparation	Verify project plans are reviewed and acknowledged by field staff	PP/IP	Once	Project plans are reviewed and acknowledged	Do not proceed with field activities until criterion is passed
Field Operations	Site layout	Verify site boundaries have been established	PP/IP	Once	Site boundaries have been established	Do not proceed with dependent field activities until criterion is passed
Field Operations	Detector Aided Underwater Visual Survey	Verify testing of All Metals hand held equipment can detect a 20mm projectile to a depth of 9 inches	IP/FP	Daily	Equipment passes daily function test in equipment check area	Repair or replace instrument
Field Operations	Detector Aided Underwater Visual Survey	Verify underwater visibility is at least 50 feet	IP/FP	Periodically	Visibility at least 50 feet throughout the day	Do not survey when visibility < 50 ft
Field Operations	Detector Aided Underwater Visual Survey	Verify area/boundary	PP/IP	Once	Area/boundary is correct	Stop activities until area/boundary can be verified
Field Operations	Detector Aided Underwater Visual Survey	Verify work methods	IP/FP	Daily	Work methods are being performed IAW the Work Plan and SOP-001 and SOP-002	Stop activities until Work Plan and SOPs are being followed and any activities not performed within compliance are re-evaluated and re-performed if necessary

TABLE 1
QAPP Expanded SI of UXO 16 Adjacent to SWMU 4
Definable Features of Work
Atlantic Fleet Weapons Training Area – Vieques
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Vieques, Puerto Rico

Activity	DFOW with Auditable Function	Audit Procedure	QC Phase	Frequency of Audit	Pass/Fail Criteria	Action if Failure Occurs
Field Operations	Demobilization	Verify that all equipment is inspected, packaged, and shipped to appropriate location.	FP	Once	All equipment is inspected, packaged, and shipped to appropriate location.	Ensure equipment is inspected, packaged, and shipped to appropriate location
Final Project Reports and Close-out	SI/ESI Report preparation and approval	Verify tabulation of all MEC, MD, and other acres cleared during the removal actions are accurate and complete	IP	Once	Tabulation of all MEC, MD, and acres cleared during the removal actions are accurate and complete	Ensure tabulation of all MEC, MD, and other material recovered during the removal actions are accurate and complete
Final Project Reports and Close-out	SI/ESI Report preparation and approval	Verify reviews performed by project, senior technical and program teams	FP	Once	Reviews performed by project, senior technical and program teams	Ensure reviews performed by project, senior technical and program teams
Final Project Reports and Close-out	Project Closeout	Verify task orders have been closed out	IP	Once	Task orders have been closed out	Ensure task orders are closed out
Final Project Reports and Close-out	Project Closeout	Verify invoices completed and approved	IP	Once	Invoices completed and approved	Ensure invoices are completed and approved

STANDARD OPERATING PROCEDURE-02

Standard Operating Procedure: Protection of Federally Listed Species and Sensitive Habitat

1.1 Vessel Operations

- All project related watercrafts should travel at no wake speed within shallow waters (10 feet or less) and/or when 150 feet from the coastline.
- All vessels will preferentially follow deep water routes whenever possible.
- Vessel operators will review nautical charts and use onboard depth sounders to prevent vessel contact with the seafloor and coral colonies that extend toward the sea surface.
- Vessels will be anchored preferentially on sandy bottom whenever possible. If anchoring on sandy bottom is not possible, vessels may be anchored on vegetated bottom that consists of seagrass and/or algae (seaweed). Vessels will not be anchored on hardbottom that contains hard and/or soft coral, regardless of the percentage of coral cover present. The type of bottom present will be confirmed by divers, onboard using a glass-bottom bucket, or by other appropriate means, prior to anchoring.
- If the vessel is anchored on vegetated bottom (seagrass/algae), the anchor will be removed from the seafloor in a manner that minimizes disturbance to the vegetation as follows:
  - by attaching a secondary anchor line to the rear of any plow-type anchor (danforth, union, bruce) and pulling the anchor free from the seafloor before lifting to the surface, or
  - by having a diver remove the anchor from the seafloor manually underwater

1.2 Protection of Sea Turtles and Marine Mammals

- All work personnel will be familiar with the identification of federally listed sea turtle and marine mammal species that have the potential to occur in the work areas; ESA policy and associated civil/criminal penalties for violations; and the procedures to be followed to prevent impacts to sea turtles and marine mammals during work activities.
- Contractor personnel shall coordinate with Refuge staff and DNER one week prior to any beach operations to ensure that active sea turtle nests are not affected. The Puerto Rico DNER and National Marine Fisheries Service (NMFS) has jurisdiction on the rest of the marine mammals, sea turtles in the water and corals. Any impacts to these resources should be coordinated with DNER and NMFS.
- The following federally listed sea turtle species have the potential to occur in the work areas:
  - Loggerhead sea turtle (*Caretta caretta*)
  - Green sea turtle (*Chelonia mydas*)
  - Leatherback sea turtle (*Dermochelys coriacea*)
  - Hawksbill sea turtle (*Eretmochelys imbricata*)
- The following federally listed marine mammal species have the potential to occur in the work areas:
  - West Indian manatee (Trichechus manatus)
  - Humpback whale (Megaptera novaeangliae)
  - Sperm whale (Physeter macrocephalus)
  - Sei whale (Balaenoptera borealis)
  - Blue whale (Balaenoptera musculus)

  - Finback whale (Balaenoptera physalus)

- All sightings of the above federally listed sea turtle and marine mammal species will be documented in a log to be provided to the Navy, DNER and the Fish and Wildlife Service at the end of the project. The following information shall be collected and recorded in the log for all listed species sightings:
  - Sighted species
  - Date and time of sighting
  - GPS coordinates of sighting location
  - One or more photographs if possible
  - Any action taken to minimize potential impacts to species (see below)
- All personnel onboard work vessels are responsible for observing for the presence of sea turtles and marine mammals. The work areas will be routinely monitored for the presence of sea turtles and marine mammals both underwater and above water.
- If a whale is sighted, maintain a distance of 100 yards or greater between the whale and the vessel whenever possible.
- If a sea turtle or manatee is sighted, maintain a distance of 50 yards or greater between the animal and the vessel whenever possible.
- If a whale is sighted while a vessel is underway (e.g., bow-riding), attempt to remain parallel to the animal's course. Avoid excessive speed or abrupt changes in direction until the whale has left the area.
- Reduce vessel speed to 10 knots or less when mother/calf pairs, groups, or large assemblages of whales are sighted near an underway vessel, when safety permits. A single whale at the surface may indicate the presence of submerged animals in the vicinity. The vessel should attempt to route around the animals, maintaining a minimum distance of 100 yards whenever possible.
- Sea turtles and marine mammals may surface in unpredictable locations or approach slowly moving vessels. When an animal is sighted in the vessel's path or in close proximity to a moving vessel, reduce speed and shift the engine to neutral. Do not engage the engines until the animal is clear of the area. If manatees are observed prior to or during the proposed activities, the contractor shall implement all the necessary precautions to avoid/minimize effects on the species. If manatees are seen within the project area, manatees shall not be herded or chased outside of the projects boundary.
- Any collision with and/or injury to a sea turtle or marine mammal will be reported immediately to DNER and NMFS. Work personnel should report sightings of any injured or dead sea turtle or marine mammal immediately to NMFS, regardless of whether the injury/death is caused by the work personnel.
- Report sea turtles to the NMFS Southeast Regional Office: (727) 824-5312 and to the DNER Ranger Corps 787-724-5700 or 787-771-1124.
- Report marine mammals to the Southeast U.S. Stranding Hotline: (877) 433-8299 and the DNER Marine Mammal Rescue Program (787) 645-5593 or (787) 538-4684. Any incidents involving manatees must be reported immediately to the DNER Manatee Stranding Coordinator at 787 645-5593, the USFWS Caribbean Field Office at 787 851-7297 ext. 220, and to the Vieques National Wildlife Refuge at (787) 741-2138.
- If the injury or death of a sea turtle or marine mammal is caused by a vessel collision or other work activity, the responsible parties will remain available to assist the respective response personnel as needed.

1.3 Diving and Anomaly Removal Operations

- All work personnel will be familiar with the identification of federally listed coral species, hardbottom habitat, and vegetated bottom habitat that have the potential to occur in the work areas; ESA policy and associated civil/criminal penalties for violations; and the procedures to be followed to prevent impacts to listed (and proposed for listing) coral species, hardbottom habitat, and vegetated bottom habitat during work activities.
- The following general "best diving practices" will be followed:
  - The dive team lead will make sure that underwater conditions (e.g., visibility, current speeds) and weather are suitable for diving to ensure safety of divers and for ability to avoid damaging sensitive underwater habitats.
  - The point of entry and exit will be carefully selected to avoid damaging coral or underwater sensitive areas.
  - Divers will make sure that all equipment is well secured before entering in the water.
  - Divers will make sure that they are neutrally buoyant at all times.
  - Contact with coral species described in this SOP shall be avoided.
  - Good finning practice and body control will be followed to avoid accidental contact with coral or stirring up the sediment.
  - Divers will not stand or rest on corals or other sessile benthic invertebrates.
- All equipment will be used in a manner to avoid physical contact or harassment of any protected species. Hand-held equipment that would be carried by divers should not be allowed to contact corals or disturb the hardbottom or seagrasses in the area.
- The following federally listed coral species have the potential to occur in the work areas:
  - Staghorn coral (Acropora cervicornis)
  - Elkhorn coral (*Acropora palmata*)
- In addition to staghorn and elkhorn coral, there are seven coral species proposed for federal listing that have the potential to occur in the work areas. These are pillar coral (Dendrogyra cylindrus), boulder star coral (Montastraea annularis), mountainous star coral (Montastraea faveolata), star coral (Montastraea franksi), cactus coral (Mycetophyllia ferox), Lamarck's sheet coral (Agaricia lamarcki), and elliptical star coral (Dichocoenia stokesii). As standard practice, impacts to any hard or soft coral species should be avoided.
- Divers will limit physical contact with the benthic environment to the minimum extent needed to effectively conduct the work identified in the Quality Assurance Project Plan. This will include not working in areas where the two ESA-listed or seven proposed for listing coral species (see above) occur either in waters shallower than 3 feet or where the tops of the coral are within a few feet of the water surface. There will be little possibility of impacts to these corals from equipment, dive gear, fins, etc. if these areas are avoided. Where areas must be avoided due to the presence of these species, transects will be rerouted in adjacent areas to ensure the target percent coverage is attained.
- Underwater metal detector surveys may be conducted over any type of bottom, except where ESA-listed or proposed corals occur either in waters shallower than 3 feet or where the tops of the coral are within a few feet of the water surface. Surface anomalies may be removed from any type of bottom; however, surface anomalies on hardbottom (hard/soft coral) may be removed only if they are loose (not attached to the substrate in any way) and have not been colonized by coral species.

- Excavation/removal of subsurface anomalies will occur only on sandy bottom or vegetated bottom (seagrass/algae), not on hardbottom (hard/soft coral).
- Turbidity (sediment suspension) will be minimized to the extent possible during all underwater work activities. Although excessive turbidity is not expected to be generated by the underwater work activities, turbidity will be visually monitored and prudent measures will be taken to minimize turbidity generation.
- Anomalies determined safe to remove will be removed manually by hand and/or using hand-held tools. No underwater detonations will be conducted.
- All removed anomalies will be transported to agency-approved terrestrial detonation/disposal areas.
- Excavations to inspect/remove subsurface anomalies will be limited to a depth of 1 foot below the seafloor.
- The disturbance footprint of the seafloor during subsurface anomaly excavations will be limited to approximately 2 square feet whenever possible.
- All excavations of the seafloor will be backfilled to match the pre-excavation grade to the extent possible.
- Any seagrass that is removed during anomaly excavations will be immediately replanted by hand in the same area. When excavating in seagrass areas, divers will attempt to maintain the integrity of the root/rhizome structure of any seagrass that is removed and replanted. The void created during excavation will be backfilled with removed sediment so the grade of the excavation area is flush with the surrounding grade.
- The methods used to handle/replant seagrass will be specific to the seagrass species involved. As appropriate, the method used to handle/replant turtle grass (Thalassia testudinum) may involve cutting the rhizomes/roots in a manner that allows the turtle grass to be flipped over more or less in situ away from the excavation area (with some roots/rhizomes still attached), and then flipped back into the excavation area after the excavation activity is completed. Use of biodegradable stakes to secure the replanted turtle grass will be evaluated in the field with respect to its suitability based on field conditions. The methods used for other seagrass species that have shallower root systems than turtle grass, such as shoal grass (Halodule wrightii), manatee grass (Syringodium filiforme), and paddle grass (Halophila decipiens), may involve, as appropriate, removal of individual plugs (with root system intact) and replanting of the plugs back into the excavation area after the excavation activity is completed.
- If an underwater item that may have historic or archaeological value is encountered, the item will not be disturbed in any way. The item will be photographed, GPS coordinates of the location will be collected, and the Navy will be notified. The Navy will coordinate the collected information with the Puerto Rico State Historic Preservation Office in compliance with the National Historic Preservation Act.

Attachment B
Final Responses to Agency Comments

Final
Responses to Agency Comments
on Red-line Version of UXO 16 ESI QAPP
Atlantic Weapons Training Area – Vieques
Former Naval Ammunition Support Detachment
Vieques, Puerto Rico

PREQB

1. Page 25, Worksheet #10, Bullet 5: Although the predominant winds are from south to north, wind direction may change due to storm events. Therefore, please revise the first sentence of this bullet to indicate the predominant wind direction is from south to north, and also indicate how storm events and the results of the beach dynamics study will be considered in assessing MEC/MPPEH movement.

   ***Navy Response**:*

   The first sentence has been revised to read: "In the nearshore, munitions-related items may move due to the effects of waves (which predominantly move south to north adjacent to SWMU 4) and the dynamic nature of the sediment (including the beach)."

   With respect to the second part of the comment, the ESI is not intended to study the movement of MEC/MPPEH; it is intended to study the presence of MEC/MPPEH. Further, the ESI will be completed before the beach dynamics investigation will be completed, which includes evaluation of the effects of storm events on sand (and therefore MEC/MPPEH) movement. This information will be included in future studies of the area, as warranted.

2. Page 39, Worksheet #17, Bullet 1, Item 2. The revised text indicates that the detector is capable of detecting 20-mm projectiles to a depth of 9 inches; however, under the second bullet, Excavation, 1 foot is listed as the practical limit and depth to which anomalies will be investigated. Please clarify the second bullet in light of the new text indicating that 9 inches is the depth to which the detector can detect anomalies.

   Navy Response:

   The second bullet has been revised to read: "Although the all-metals detector technological limit for a 20-mm projectile is approximately 9 inches, anomaly excavations will be performed up to 1 foot below the seafloor, which is the practical limit of excavation with no/minimal unintentional contact with any MEC/MPPEH present."

DNER

1. QAPP Worksheet #3:

   a. Change the e-mail for Craig Lilyestrom to: craig.lilyestrom@drna.gobierno.pr

   Navy Response:

   Revision made as requested.

2. QAPP Worksheet 11:

   a. Change the following text under "Who will use the data?"

   CURRENT TEXT: The Navy, USEPA, EQB, and USFWS, NOAA, and NMFS will use the data collected to answer the questions above.

CHANGE TEXT TO: The Navy, USEPA, EQB, DNER, USFWS, NOAA, and NMFS will use the data collected to answer the questions above.

b. Change the following text under "Who will collect and generate the data? How will the data be reported?

CURRENT TEXT: (Under Second Bullet, second sentence of that bullet): In addition, data collection activities will be coordinated with NMFS to ensure potential impacts to threatened and endangered species are avoided.

CHANGE TEXT TO: In addition, data collection activities will be coordinated with NMFS and DNER to ensure potential impacts to threatened and endangered species are avoided.

Navy Response:

Revisions made as requested.

3. QAPP Worksheet 14:

a. Change the following text the Second Bullet, first sub bullet:

CURRENT TEXT: Prior to mobilization, the protocol mitigation measures for protection of threatened and endangered species during the SI/ESI, as described in SOP-2, will be discussed and concurred upon with FWS and NMFS.

CHANGE TEXT TO: Prior to mobilization, the protocol mitigation measures for protection of threatened and endangered species during the SI/ESI, as described in SOP-2, will be discussed and concurred upon with FWS, DNER and NMFS

Navy Response:

Revision made as requested.

4. SOP-2:

a. Change the following text under Section 1.2 (Protection of Sea Turtles and Marine Mammals), 11th bullet:

CURRENT TEXT: Any collision with and/or injury to a sea turtle or marine mammal will be reported immediately to NMFS. Work personnel should report sightings of any injured or dead sea turtle or marine mammal immediately to NMFS, regardless of whether the injury/death is caused by the work personnel.

CHANGE TEXT TO: Any collision with and/or injury to a sea turtle or marine mammal will be reported immediately to DNER and NMFS. Work personnel should report sightings of any injured or dead sea turtle or marine mammal immediately to NMFS, regardless of whether the injury/death is caused by the work personnel.

CURRENT TEXT (3rd from last bullet): Report sea turtles to the NMFS Southeast Regional Office: (727) 824-5312.

CHANGE TEXT TO: Report sea turtles to the NMFS Southeast Regional Office: (727) 824-5312 and to the DNER Ranger Corps 787-724-5700 or 787-771-1124.

CURRENT TEXT (next to last bullet): Report marine mammals to the Southeast U.S. Stranding Hotline: (877) 433-8299.

CHANGE TEXT TO: Report marine mammals to the Southeast U.S. Stranding Hotline: (877) 433-8299 and the DNER Marine Mammal Rescue Program (787) 645-5593 or (787) 538-4684.

Navy Response:

Revisions made as requested.

USFWS

1. We concur with the changes to the document, with the exception of SOP 002. The SOP should incorporate information on the manatee which we have provided below.

   The entire coastline of Vieques is within the range of endangered Antillean manatee (*Trichechus manatus manatus*), a species which falls under the jurisdiction of the Fish and Wildlife Service. Manatees seem to be more common west of Mosquito pier all the way towards Punta Arenas. In the revised document the Navy has included SOP 002 for marine mammals, sea turtles in the water and listed corals. In addition to the measures already included in the SOP, the following manatee measures should be incorporated into the SOP 002.

   1. All project related watercrafts should travel at no wake speed within shallow waters (10 feet or less) and/or when 150 feet from the coastline.
   2. If manatees are observed prior to or during the proposed activities, the contractor shall implement all the necessary precautions to avoid/minimize effects on the species. If manatees are seen within the project area, manatees shall not be herded or chased outside of the projects boundary.
   3. Any incidents involving manatees must be reported immediately to the DNER Manatee Stranding Coordinator at 787 645-5593, the USFWS Caribbean Field Office at 787 851-7297 ext. 220, and to the Vieques National Wildlife Refuge at 787 741-2138.
   4. Copies of all manatee sighting logs will be submitted to the Service at the completion of the project.

   It should also be noted in the SOP, in the event that shoreline operations take place at SWMU-4, that this beach supports sea turtle nesting activities and is monitored by USFWS Refuge staff or volunteers. Contractor personnel shall coordinate with Refuge staff one week prior to any beach operations to ensure that active sea turtle nests are not affected. The National Marine Fisheries Service (NMFS) has jurisdiction on the rest of the marine mammals, sea turtles in the water and corals. Any impacts to these resources should be coordinated with NMFS.

   Navy Response:

   SOP 002 has been revised to incorporate information provided above.