DRAFT FINAL

Site Inspection Report for Montauk Naval Sub Base

DERP FUDS Project No. **C02NY076602**

Prepared Under: **Contract No. W912DY-04-D-0017**
Task Order # 00170001

Prepared for:
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April 2009

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April 2009

CONTRACTOR STATEMENT OF AUTHORSHIP AND INDEPENDENT TECHNICAL REVIEW

Alion Science and Technology Corporation has prepared this Site Inspection Report for Montauk Naval Sub Base, Formerly Used Defense Site (FUDS), Project No. C02NY076602. An independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project, as defined in the Programmatic Work Plan. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions; methods, procedures, and material used in analyses; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with existing Corps policy. In accordance with Corps requirements, significant authors to this report are presented below.

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Significant concerns and explanation of the resolutions are documented within the project file.

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LIST OF ACRONYMS AND ABBREVIATIONS

Alion	Alion Science and Technology Corporation
ASR	Archive Search Report
bgs	Below ground surface
BHG-1	Borehole Gradiometer (1)
CAS	Chemical Abstracts Service
CDQAR	Chemical Data Quality Assessment Report
CENAB	Corps of Engineers North Atlantic Baltimore
CENAN	Corps of Engineers North Atlantic New York
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	Chemicals of Potential Concern
COPEC	Chemicals of Potential Ecological Concern
CSM	Conceptual Site Model
CTT	Closed Transferring and Transferred
CWM	Chemical Warfare Materiel
CX	Center of Expertise
DC	Design Center
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DNT	Dinitrotoluene
DoA	Department of the Army
DoD	Department of Defense
DoI	Department of Interior
DQI	Data Quality Indicator
DQO	Data Quality Objective
Eco-SSL	Ecological Soil Screening Level
EDMS	Environmental Document Management Systems
EDS	Environmental Data Services, Inc.
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
EP	Engineering Pamphlet
EPA	U.S. Environmental Protection Agency
˚F	Degree (s) Fahrenheit
ft	Foot or Feet
FDE	Findings and Determination of Eligibility
FUDS	Formerly Used Defense Site(s)
FUDSMIS	FUDS Management Information System

LIST OF ACRONYMS AND ABBREVIATIONS

GIS	Geographic Information Systems
GPL	GPL Laboratories, LLLP
GSA	General Services Administration
HHE	Health Hazard Evaluation
HHRA	Human Health Risk Assessment
HRS	Hazard Ranking System
HTRW	Hazardous Toxic and Radiological Waste
HQ	Hazard Quotient
In.	Inch (es)
INPR	Inventory Project Report
LIRR	Long Island Railroad
Ma	Million years ago
MC	Munitions Constituents
MCL	Maximum Contaminant Level
MD	Munitions Debris
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
mg/kg	Milligram per kilogram
Mi	Mile(s)
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	Mean Sea Level
NAD	North American Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDAI	No Department of Defense Action Indicated
NG	Nitroglycerin
NOAA	National Oceanographic and Atmospheric Administration
NTCRA	Non-Time Critical Removal Action
NYSDEC	New York State Department of Environmental Conservation
NYSOP	New York State Office of Parks
OEW	Ordnance and Explosive Waste
PAOI	Potential Area of Interest
PGM	Program Manager
PM	Project Manager

LIST OF ACRONYMS AND ABBREVIATIONS

PMMQL	Preferred Maximum Method Quantitation Limits
PRG	Preliminary Remediation Goal
PWP	Programmatic Work Plan
PWS	Performance Work Statement
QA	Quality Assurances
QC	Quality Control
RAC	Risk Assessment Code
RCWM	Recovered Chemical Waste Materiel
RI/FS	Remedial Investigation /Feasibility Study
RL	Reporting Limit
RMIS	Restoration Management Information System
SB	Subsurface Soil
SD	Sediment
SI	Site Inspection
SL	Screening Level
SLERA	Screening Level Ecological Risk Assessment
SQG	Sediment Quality Guideline
SS	Surface Soil
SSL	Soil Screening Level
SS-WP	Final Site-Specific Work Plan Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Montauk Naval Sub Base
T&E	Threatened and Endangered
TCRA	Time Critical Removal Action
TPP	Technical Project Planning
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USDA	United States Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
WWI	World War I
WWII	World War II

GLOSSARY OF TERMS

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) – Congress enacted CERCLA, commonly known as Superfund, on 11 December 1980. This law created a tax on the chemical and petroleum industries and provided broad Federal authority to respond directly to releases or threatened releases of hazardous substances that may endanger public health or the environment (USACE 2004b).

Discarded Military Munitions (DMM) – Military munitions that were abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that were properly disposed of, consistent with applicable environmental laws and regulations. (10 USC 2710(e)(2)) (Department of the Army [DoA] 2005).

Explosive Ordnance Disposal (EOD) – The detection, identification, on-site evaluation, rendering safe, recovery, and final disposal of unexploded explosive ordnance and of other munitions that have become an imposing danger, for example, by damage or deterioration (DoA 2005).

Explosives Safety – A condition where operational capability and readiness, people, property, and the environment are protected from the unacceptable effects or risks of potential mishaps involving military munitions (DoA 2005).

Formerly Used Defense Site (FUDS) – A FUDS is defined as a facility or site (property) that was under the jurisdiction of the Secretary of Defense and owned by, leased to, or otherwise possessed by the United States at the time of actions leading to contamination by hazardous substances. By the Department of Defense Environmental Restoration Program (DERP) policy, the FUDS program is limited to those real properties that were transferred from DoD control prior to 17 October 1986. FUDS properties can be located within the 50 States, District of Columbia, Territories, Commonwealths, and possessions of the United States. ER 200-3-1 (May 10, 2004) (USACE 2004b).

Material Potentially Presenting an Explosive Hazard (MPPEH) – Material potentially containing explosives or munitions (e.g., munitions containers and packaging material; munitions debris remaining after munitions use, demilitarization, or disposal; and range-related debris); or material potentially containing a high enough concentration of explosives such that the material presents an explosive hazard (e.g., equipment, drainage systems, holding tanks, piping, or ventilation ducts that were associated with munitions production, demilitarization or disposal operations). Excluded from MPPEH are munitions within DoD's established munitions management system and other hazardous items that may present explosion hazards (e.g., gasoline cans, compressed gas cylinders) that are not munitions and are not intended for use as munitions (DoA 2005).

GLOSSARY OF TERMS

Military Munitions – All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the DoD, the Coast Guard, the Department of Energy, and the National Guard. The term includes confined gaseous, liquid, and solid propellants; explosives, pyrotechnics, chemical and riot control agents, smokes, and incendiaries, including bulk explosives, and chemical warfare agents; chemical munitions, rockets, guided and ballistic missiles, bombs, warheads, mortar rounds, artillery ammunition, small arms ammunition, grenades, mines, torpedoes, depth charges, cluster munitions and dispensers, demolition charges; and devices and components thereof. The term does not include wholly inert items; improvised explosive devices; and nuclear weapons, nuclear devices, and nuclear components, other then nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the Department of Energy after all required sanitization operations under the Atomic Energy Act of 1954 (42 USC 2011 et seq.) were completed. (10 USC 101(e)(4)(A) through (C)) (DoA 2005).

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) Unexploded ordnance (UXO), as defined in 10 USC 101(e)(5); (B) DMM, as defined in 10 USC 2710(e)(2); or (C) Munitions constituents (e.g., trinitrotoluene, hexahydro-1,3,5-trinitro-1,3,5-triazine), as defined in 10 USC 2710(e)(3), present in high enough concentrations to pose an explosive hazard (DoA 2005).

Munitions Constituents (MC) – Any materials originating from UXO, DMM, or other military munitions, including explosive and non-explosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions. (10 USC 2710(e)(3)) (DoA 2005).

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal (DoA 2005).

Munitions Response Area – Any area on a defense site that is known or suspected to contain UXO, DMM, or MC. Examples include former ranges and munitions burial areas. A munitions response area is comprised of one or more munitions response sites (32 Code of Federal Regulations [CFR] 179.3).

Munitions Response Site (MRS) – A discrete location within a Munitions Response Area that is known to require a munitions response (32 CFR 179.3).

GLOSSARY OF TERMS

Munitions Response Site Prioritization Protocol (MRSPP) – The MRSPP was published as a rule on 5 October 2005. This rule implements the requirement established in Section 311(b) of the National Defense Authorization Act for Fiscal Year 2002 for the DoD to assign a relative priority for munitions responses to each location in the DoD's inventory of defense sites known or suspected of containing UXO, DMM, or MC. The DoD adopted the MRSPP under the authority of 10 USC 2710(b). Provisions of 10 USC 2710(b) require that the DoD assign to each defense site in the inventory a relative priority for response activities based on the overall conditions at each location and taking into consideration various factors related to safety and environmental hazards.

Non-Time Critical Removal Action (NTCRA) – Actions initiated in response to a release or threat of a release that poses a risk to human health or the environment where more than six months planning time is available (USACE 2007b).

Range – A designated land or water area that is set aside, managed, and used for range activities of the DoD. The term includes firing lines and positions, maneuver areas, firing lanes, test pads, detonation pads, impact areas, electronic scoring sites, buffer zones with restricted access and exclusionary areas. The term also includes airspace areas designated for military use in accordance with regulations and procedures prescribed by the Administrator of the Federal Aviation Administration. (10 USC 101(e)(1)(A) and (B)) (DoA 2005).

Range Activities – Research, development, testing, and evaluation of military munitions, other ordnance, and weapons systems; and the training of members of the armed forces in the use and handling of military munitions, other ordnance, and weapons systems. (10 USC 101(e)(2)(A) and (B)) (DoA 2005).

Range Related Debris – Debris, other than munitions debris, collected from operational ranges or from former ranges (e.g. target debris, military munitions packaging, and crating material).

Risk Assessment Code (RAC) – An expression of the risk associated with a hazard. The RAC combines the hazard severity and accident probability into a single Arabic number on a scale from 1 to 5, with 1 being the greatest risk and 5 the lowest risk. The RAC is used to prioritize response actions (USACE 2004b).

Time Critical Removal Action (TCRA) – Removal actions conducted to respond to an imminent danger posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within 6 months to reduce risk to public health or the environment (USACE 2007b).

Unexploded Ordnance (UXO) – Military munitions that (A) were primed, fuzed, armed, or otherwise prepared for action; (B) were fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (C) remain unexploded whether by malfunction, design, or any other cause (10 USC 101(e)(5)(A) through (C)) (DoA 2005).

EXECUTIVE SUMMARY

ES.1 Under contract with the United States Army Corps of Engineers (USACE), Alion Science and Technology Corporation (Alion) prepared this Site Inspection (SI) Report to document SI activities and findings for the Montauk Naval Sub Base Formerly Used Defense Site (FUDS), Property No. C02NY0766, located in Montauk, Suffolk County, New York. The Department of Defense (DoD) established the Military Munitions Response Program (MMRP) under the Defense Environmental Restoration Program (DERP) to address potential munitions and explosives of concern (MEC) and munitions constituents (MC) remaining at FUDS. This SI is completed under MMRP Project No. C02NY076602 and addresses potential MMRP hazards remaining at the Montauk Naval Sub Base FUDS.

ES.2 **Site Inspection Objectives and Scope**. The primary objective of the MMRP SI is to determine whether or not the FUDS project warrants further response action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The SI collects the minimum amount of information necessary to make this determination. The SI also (i) determines the potential need for a Time Critical Removal Action (TCRA); (ii) collects or develops additional data, as appropriate, for potential Hazard Ranking System (HRS) scoring by the United States Environmental Protection Agency (EPA); and (iii) collects data, as appropriate, to characterize the hazardous substance release for effective and rapid initiation of the remedial investigation/feasibility study (RI/FS). An additional objective of the SI is to collect the additional data necessary to evaluate munitions response sites (MRSs) using the Munitions Response Site Prioritization Protocol (MRSPP).

ES.3 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of the FUDS prior to property transfer. Potential releases of hazardous, toxic, or radioactive waste (HTRW) are not within the SI scope.

ES.4 **Montauk Naval Sub Base**. The Montauk Naval Sub Base FUDS was comprised of approximately 45 acres located in Montauk, Suffolk County, New York. The military utilized the FUDS as a torpedo manufacturing facility and torpedo engine testing range from approximately 1943 to 1946. Numerous structures were constructed at the former Montauk Naval Sub Base in support of the military operations such as a submarine port, piers, torpedo manufacturing facilities, and torpedo testing barges, as well as general facilities for military and non-military staff. The Navy used the base as a submarine port, maintenance facility, and seaplane landing area. In 1946, Montauk Naval Sub Base was declared excess and was transferred to the War Assets Administration. The Montauk Naval Sub Base was then disposed of and ownership of a

small portion of the property was transferred to the Globe Aircraft Specialties Corporation on 1949. Between 1950 and 1958 the General Services Administration (GSA) conveyed the remaining portions of the former Montauk Naval Sub Base to the Long Island Railroad (LIRR) and real estate developers. Currently, the area within and surrounding the former Montauk Naval Sub Base is used for recreation (beaches) and residences (seasonal housing), and industrial uses (railroad station).

ES.5 **Technical Project Planning.** The SI approach was developed in concert with stakeholders through USACE's technical project planning (TPP) framework, which was applied at the initial TPP meeting on 12 February 2008. Stakeholders agreed to the SI approach, as presented and modified during the TPP meeting and finalized in the Site-Specific Work Plan (SS-WP). In summary, these agreements were to inspect the FUDS and complete multimedia sampling in accordance with the Data Quality Objectives (DQOs) and Final SS-WP.

ES.6 USACE programmatic range documents identified two MRSs areas at the Montauk Naval Sub Base FUDS: MRS 1, Fort Pond Bay and Beach (Restoration Management Information System [RMIS] Range ID No. C02NY076602M01) and MRS 2, Torpedo Test Range (RMIS Range ID No. C02NY076602R01). No potential areas of interest (PAOIs) were identified at Montauk Naval Sub Base during the TPP meeting by stakeholders. MRS 2 (Torpedo Test Range) is located entirely within water (Block Island Sound and the Atlantic Ocean) and was not evaluated during this SI per USACE guidance (ER200 3-1). Stakeholders concurred with this SI strategy at the TPP meeting, and this decision was documented in the Final TPP Memorandum and Site-Specific Work Plan (SS-WP).

ES.7 **Qualitative Site Reconnaissance and Munitions and Explosives of Concern Assessment**. SI field activities were performed on 30 September 2008. A qualitative site reconnaissance, including analog geophysics and visual observations, of the FUDS was performed over approximately 2.23 acres of land and 0.72 acres of water within MRS 1. The field sampling approach included magnetometer-assisted reconnaissance following a meandering path in and around sampling locations and suspected locations of historical munitions finds to identify the presence/absence of MEC/munitions debris (MD) or other areas of interest (i.e. areas containing indications of munitions use) at the FUDS. Additionally, waterway reconnaissance was performed within Fort Pond Bay. During the reconnaissance and sampling activities, no MEC, MD, or additional areas of interest were identified. One subsurface anomaly was recorded on the land portion of MRS 1 and five anomalies were recorded within the water portion of MRS 1 (Fort Pond Bay). Intrusive investigations are not within the scope of the SI, therefore, the

anomalies could not be investigated or identified as MEC/MD, range related debris, or cultural debris. As stated previously MRS 2 was not investigated during this SI.

ES.8 A qualitative MEC screening level risk assessment was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the Inventory Project Report (INPR), Archives Search Report (ASR), and the ASR Supplement. Since military use ended in 1946, local residents have reported finding suspected .50 caliber whole small arms rounds washed on the shore of Fort Pond Bay as well as reports of local divers observing .30 and/or .45 caliber small arms near the "L-shaped" pier within Fort Pond Bay in the mid 1980's to early 1990's. No MEC/MD was found during the USACE 1995 site visit or the Alion 2008 SI. The potential risk posed by MEC, assessed through three risk factors (i.e., presence of MEC source, accessibility or pathway presence, and potential receptor contact), is low for MRS 1 due to the nature of the munitions used and found at the site (small arms) and the location and limited accessibility to the small arms (under water).

ES.9 **Munitions Constituents Sampling and Risk Screening**. A total of four surface soil samples, one subsurface soil sample and six sediment samples were collected. One duplicate sediment sample and one duplicate surface soil sample was also collected during the field event at the former Montauk Naval Sub Base. There were no detections of munitions-related explosives at MRS 1. Metals were detected in all surface soil samples, sediment samples and subsurface soil sample within MRS 1 and in background samples. Metals concentrations in the sediment and soils at MRS 1 were equivalent or below background concentrations.

ES.10 A list of MC potentially associated with munitions used at the FUDS was developed and used to support analysis of results and the risk screening. The list of site-specific MC for MRS 1 includes nitroglycerine (NG), dinitrotoluene (DNT) and DNT breakdown products (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene, 4- nitrotoluene) and metal MCs associated with small arms that include antimony, copper, lead, iron and nickel (Table ES-1). Human Health Risk Assessment (HHRA) and Screening Level Ecological Risk Assessment (SLERA) analyses were performed on MC possibly present as a result of complete rounds being disposed of at the MRS. Complete small arms rounds were identified at MRS 1 by local residents and recreational divers. Therefore, the MC sampling/analysis focused on constituents present in propellants, primers and bullets of small arms potentially present at MRS 1.

Analytical results indicate no detections of explosives related MC in any of the soil samples or sediment samples collected at Montauk Naval Sub Base. The laboratory detection limit for DNT

and DNT breakdown products is less than the human health and ecological screening levels; therefore, the results of the HHRA and SLERA indicate that these MC can be eliminated as chemicals of potential concern (COPC) or chemicals of potential ecological concern (COPEC). NG was not detected in any of the soil samples or sediment samples at the FUDS, however, the laboratory reporting limit of NG is higher than the human health screening level. As discussed in Sections 5.1.4.2 and 5.1.4.4, the reporting limit for NG was determined to be adequate for use in the HHRA. No ecological screening level exists for NG; therefore, no conclusion was made on the adequacy of the NG laboratory reporting limit.

In surface soil, iron exceeded the human health criterion used for visitors/trespassers and residents and was identified as a COPC. However, the site mean and maximum concentrations were below the respective background concentrations. Therefore, no added risk to humans from exposure to iron in surface soil was identified based on the use of the site. Similarly, the maximum concentration of lead in soil exceeded the ecological screening criterion, but as below background values. Lead was identified as a COPEC, however, no additional risk to ecological receptors from exposures to lead from past military use was identified. No MCs were detected in subsurface soils at concentrations that exceeded criteria selected to screen risks to human receptors; and therefore no COPCs were identified within MRS 1 for subsurface soil. Antimony concentrations in sediment exceeded site specific background concentrations, but were below the ecological screening criterion for antimony. Consequently, no COPCs or COPECs were identified in sediment at MRS 1.

ES.11 **Recommendations.** MRS 1 (Fort Pond Bay and Beach) was assessed during the SI of the Montauk Naval Sub Base FUDS. Historically, there were several reports of complete small arms being found on the shoreline of Fort Pond Bay (.50 caliber rounds) and within Fort Pond Bay (suspected .30 or .45 caliber rounds) by local residents and local divers. The potential for an explosive safety risk is based on the evaluation of the potential presence of three elements: a source (presence of MEC/MD), a receptor (person), and interaction (e.g., touching or picking up an item). The explosive safety or MEC risk posed by small arms, is low at Montauk Naval Sub Base because small arms 1) do not contain sensitive fuzes, 2) contained only small amounts of explosives (propellant) and 3) are not likely to be in a working order due to the age and physical setting of the munitions (under water or in saturated sands). Lead in surface soil was identified as a COPEC at MRS 1, but was below site specific background concentrations and not attributable to past military use. Iron exceeded the human health screening and was identified as a COPC; however, iron was not detected above soil background concentrations. Based on the findings and conclusions of the SI report, a RI/FS is recommended at MRS 1 for MEC only. A TCRA or a non-TCRA is not recommended (Table ES-1).

Based on USACE guidance for water ranges, MRS 2 (Torpedo Test Range) was not evaluated in this SI, and the recommendation is noted as being evaluation pending. This MRS will be addressed at some undetermined point in the future. An MRSPP evaluation for MRS 2 was prepared to support this recommendation and any future investigations (Table ES-1).

Table ES-1 Summary of Site Recommendations for Montauk Naval Sub Base (FUDS Project No. C02NY076602)

MRS	Recommendation	Basis for Recommendation	
		MEC	**MC**
MRS 1 Fort Pond Bay and Beach	RI/FS Additional studies should focus on MEC (small arms) TCRA/NTCRA not recommended	MEC Assessment: Low risk Historically: .30, .45 and .50 Caliber. Small Arms (CTT01), Small Arms – Complete Rounds (CTT02) Historically .50 caliber whole small arms rounds on have been found at MRS 1 as well as local divers observing .30 and/or .45 caliber small arms within Fort Pond Bay in the mid 1980's to early 1990's. No MEC/MD observed during USACE site visit in 1995 or during the 2008 SI field work.	*Risk Screening Assessment:* No unacceptable risks to humans and ecological receptors identified. *Surface Soil:* Iron exceeded the human health screening criterion (COPC) and lead exceeded ecological screening criterion, (COPEC) but not their respective background levels. However no additional risks to either human or ecological receptors attributable to military presence were identified. *Subsurface Soil:* No MCs were detected in subsurface soils at concentrations that exceeded human receptor screening criteria (i.e, no COPCs identified). *Sediment:* Antimony levels exceeded background concentrations. However, antimony levels did not exceed screening criteria selected for the human or ecological receptors; therefore, no COPCs or COPECs were identified.

Table ES-1 Summary of Site Recommendations for Montauk Naval Sub Base (FUDS Project No. C02NY076602)

MRS	Recommendation	Basis for Recommendation	
		MEC	MC
MRS 2 Torpedo Test Range	To be addressed at an undetermined point in the future.	MEC Assessment: Not Evaluated No site reconnaissance was conducted in the water portion of MRS 2 in accordance with the Final SS-WP.	No sampling was conducted at MRS 2 in accordance with the Final SS-WP. The MRS is located within Block Island Sound and the Atlantic Ocean.

COPC – Chemical of Potential Concern	MRS – Munitions Response Site
COPEC – Chemical of Ecological Potential Concern	NDAI – No DoD Action Indicated
CTT – Closed Transferring and Transferred	NTCRA – Non-Time Critical Removal Action
FUDS – Formerly Used Defense Site	RI/FS – Remedial Investigation/Feasibility Study
MC – Munitions Constituents	SI – Site Investigation
MD – Munitions Debris	SS-WP – Site Specific Work Plan
MEC – Munitions and Explosives of Concern	TCRA – Time Critical Removal Action
	USACE – United States Army Corp of Engineers

1. INTRODUCTION

1.0.1 This report documents the findings of the Military Munitions Response Program (MMRP) Site Inspection (SI) performed at the Montauk Naval Sub Base Formerly Used Defense Site (FUDS) located in Montauk, Suffolk County, New York with the MMRP Project No. C02NY0766. Alion Science and Technology Corporation (Alion), along with its subcontractors (Environmental Data Services, Inc. [EDS]; Integral Consulting Inc.; and GPL Laboratories, LLLP [GPL]); prepared this report under contract to the United States Army Engineering and Support Center, Huntsville (USAESCH). The SI is performed in accordance with Contract No. W912DY-04-D-0017, Task Order 00170001 for FUDS in the Northeast Region of the Continental United States. USAESCH transferred management of the contract to the Corps of Engineers North Atlantic Baltimore (CENAB). CENAB is working with the Corps of Engineers North Atlantic New York (CENAN) and its contractor, Alion, on the completion of this project in accordance with the SI Performance Work Statement (Appendix A).

1.0.2 The technical approach of this SI is based on the *Programmatic Work Plan for Formerly Used Defense Sites Military Munitions Response Program Site Inspections at Multiple Sites in the Northeast Region* (Alion 2005) and the *Final Site-Specific Work Plan* (SS-WP) *Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Montauk Naval Sub Base* (Alion 2008b).

1.1 Project Authorization

1.1.1 The Department of Defense (DoD) established the MMRP to address DoD sites suspected of containing munitions and explosives of concern (MEC) or munitions constituents (MC). Under the MMRP, the U.S. Army Corps of Engineers (USACE) is conducting environmental response activities at FUDS for the Army as DoD's Executive Agent for the FUDS program.

1.1.2 Pursuant to USACE's Engineer Regulation 200-3-1 (USACE 2004b) and the *Management Guidance for the Defense Environmental Response Program (DERP)* (Office of the Deputy Under Secretary of Defense [Installations and Environment], September 2001), USACE is conducting FUDS response activities in accordance with the DERP statute (10 USC 2701 et seq.), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC Section 9620), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations Part 300). As such, USACE is conducting SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

1.1.3 While not all MEC/MC constitute CERCLA hazardous substances, pollutants, or contaminants, the DERP statute provides DoD the authority to respond to releases of MEC/MC, and DoD policy states that such responses shall be conducted in accordance with CERCLA and the NCP.

1.2 Project Scope and Objectives

1.2.1 The primary objective of the MMRP SI is to determine whether or not the FUDS project warrants further response action under CERCLA. The SI collects the minimum amount of information necessary to make this determination. The SI also (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for potential Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (EPA); and (iii) collects data, as appropriate, to characterize the hazardous substance release for effective and rapid initiation of the remedial investigation/feasibility study (RI/FS). An additional objective of the MMRP SI is to collect additional data necessary to evaluate munitions response sites (MRSs) using the Munitions Response Site Prioritization Protocol (MRSPP).

1.2.2 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of this FUDS prior to property transfer. The evaluation is performed through records review, qualitative site reconnaissance to assess MEC presence/absence, and sampling where MC might be expected based on the conceptual site model (CSM). Evaluation of potential releases of hazardous, toxic, and radioactive waste (HTRW) is not within the scope of this SI.

1.3 Project Location

1.3.1 Montauk Naval Sub Base is located on the southern shore of Fort Pond Bay in Montauk, Suffolk County, New York. The North American Datum (NAD) 1983 Universal Transverse Mercator (UTM), UTM zone 19N, easting (X) and northing (Y) coordinates for the central part of the property are 250545 meters (m) and 4548509 m, respectively (USACE 2004a). This FUDS falls under the geographical jurisdiction of CENAN. This SI is being completed under DERP-FUDS Project No. C02NY076602 (FFID NY29799F127000) to address potential MMRP hazards remaining at the FUDS (USACE 2004a).

1.4 Munitions Response Site Prioritization Protocol

1.4.1 This SI Report includes a draft MRSPP ranking for MRS 1 (Fort Pond Bay and Beach) and MRS 2 (Torpedo Test Range) [Appendix K]. The MRSPP scoring will be updated on an annual basis, or when necessary, to incorporate new information, as appropriate.

2. SITE DESCRIPTION

2.1 Site Description and History

2.1.1 Former Montauk Naval Sub Base FUDS property was approximately 45 acres in area (Figures 2-1 to 2-3). A small portion of the FUDS property lies within the Fort Pond Bay and is under water. The vast majority of the former Montauk Naval Sub Base FUDS is situated on land and is bordered by Fort Pond Bay to the west and Fort Pond to the east. Prior to the construction of the torpedo testing range and facility, the majority of the property was the location of the Montauk fishing village. The War Department/Navy acquired the property to build the torpedo testing range (Montauk Naval Sub Base) in December 1942. Construction of the Montauk Naval Sub Base was completed in March 1943 (USACE 1995). Numerous structures were constructed at the former Montauk Naval Sub Base in support of the military operations such as a submarine port, piers, torpedo manufacturing facilities, torpedo testing barges as well as general facilities for military and nonmilitary staff.

2.1.2. Montauk was utilized to support the expanded need for the testing and delivery of commercially manufactured torpedoes during World War II. During the operation, two main types of torpedoes were tested, the air launched Mark (MK) 13 and surface or barged launched MK 14 steam operated torpedoes, which were fitted with inert warheads. These inert torpedoes were tested within Fort Pond Bay as well as areas within Block Island Sound. The base was also utilized by the Navy as a submarine port, maintenance facility, and seaplane landing area (USACE 1995).

2.1.3 Months before the end of World War II, the Navy issued a notice that the testing range would be disestablished in March 1945. However, the Navy then determined that the buildings and infrastructure associated with the Montauk Naval Sub Base would be of interest to the Navy for use as a storage area for inert ordnance material (USACE 1995).

2.1.4 The Montauk Naval Sub Base property was included on the surplus property list on April 17, 1946, but the Navy had to withdraw the property on August 7, 1947 due to legal disagreements associated with the validity of the Navy's title on the land. Through various amended declaration of surpluses, the Navy acquired title in April 1949 by Declaration of Taking. The Montauk Naval Sub Base was then disposed of and ownership of a small portion of the property was transferred to the Globe Aircraft Specialties Corporation on November 15, 1949 (USACE 1995). Between 1950 and 1958, the General Services Administration (GSA) conveyed

the remaining portions of the former Montauk Naval Sub Base to the Long Island Railroad (LIRR) and real estate developers (USACE 1993).

2.2 Munitions Response Site Identification and Munitions Information

2.2.1 The ASR Supplement (originally titled Inventory Project Report [INPR] Supplement) defines the range/sub-ranges associated with the FUDS property and assigns a Risk Assessment Code (RAC) score to each area where historic munitions-related activities occurred (USACE 2004). Two areas of interest, designated as MRSs in this SI, were identified at the former Montauk Naval Sub Base: Fort Pond Bay and Beach (MRS 1) and Torpedo Test Range [MRS 2] (Table 2-1). Munitions associated with the MRSs were derived from the ASR, ASR Supplement, and other USACE munitions data sources and are summarized in Table 2-2. MRS 2 (Torpedo Test Range) is completely within the open waters of Block Island Sound. In accordance with USACE guidance (Regulation ER200 3-1) water ranges are not assessed under the current MMRP SIs, therefore, MRS 2 was not evaluated during this SI. Stakeholders and regulators understood this constraint and agreed to the SI approach (i.e., to address MRS 1 only) SI (Alion 2008a and 2008b).

2.2.2 According to the ASR Supplement (USACE 2004a), MRS 1 totaled approximately 155 acres of land and 1,073 acres of tidal water within Fort Pond Bay. The total FUDS property boundary is 45 acres of land. Figure 2-2 identifies the FUDS boundary as well as MRS 1. The SI addressed the on-land and water (Fort Pond Bay) portions of MRS 1 only. As stated above, the USACE may conduct a separate study to address the water area associated with MRS 2 in the future.

2.3 Physical Setting

2.3.0.1 The following sections provide a physical description of the FUDS property with respect to relief, vegetation, and climate as well as the local demographic and land uses.

2.3.1 Topography and Vegetation

2.3.1.1 The former Montauk Naval Sub Base FUDS has elevations that range from sea level along the shoreline of Fort Pond Bay to approximately 50 feet above mean sea level (msl) in the northeastern and southwestern portions of the FUDS. The surface topography is generally flat or gently sloping within the middle portion of the FUDS (USACE 1995). Figure 2-3 shows the topographic relief of the FUDS and surrounding water.

2.3.1.2 Most of he former Montauk Naval Sub Base land is developed and used for residential purposes. Isolated areas in the north and east of the FUDS are moderately vegetated. Plant, shrub, and tree species known to be within the FUDS include bushy pockrose, globe breakrush, salt-marsh spikerush, sandplain gerardia, spikegrass, crabgrass and southern yellow flax (USACE 1995).

2.3.2 Climate

2.3.2.1 The climate at the Montauk Naval Sub Base FUDS is highly influenced by the surrounding ocean. Cool sea breezes keep summer temperatures lower than the surrounding mainland with summertime high temperatures of approximately 70°F. Winter is mild with average temperatures in the low to mid-30's. Precipitation is well-distributed throughout the year with the city of Montauk receiving approximately 3 inches per month. Snowfall is moderate with a seasonal snowfall average of 29 inches. Typically, the ground is bare of snow for extended periods of time during the winter. Episodes of heavy rain and snow and high winds are possible during either tropical storms or coastal low pressure systems. The wind direction is typically from the west-northwest at 8-11 miles per hour as recorded in Islip, NY approximately 60 miles to the west (USACE 1995).

2.3.3 Local Demographics

2.3.3.1 A large portion of the FUDS property is now owned by the Rough Riders Resort Corporation and is the location of the Rough Riders Condominiums. The Long Island Railroad (LIRR) also owns and maintains a railroad station located in the southern portion of the former Montauk Naval Sub Base property. The remaining property is comprised of seasonal vacation homes owned by private landowners (USACE 1995 and Alion 2008a).

2.3.3.2 Montauk Naval Sub Base is located in the hamlet of Montauk, Suffolk County, New York. Montauk is located in the far eastern portion of Long Island (Figure 2-3). The population density of Suffolk County is 1,593 people per square mile (mi^2). The 2007 Census population estimate for Suffolk County is 1,469,715 people. The 2006 estimate of the number of housing units in Suffolk County is 542,956 housing units. The population density of the hamlet of Montauk in 2000 was 220 people per mi^2. The 2000 Census indicates that there were 3,851 people and 1,593 households in the town of Westerly (U.S. Census Bureau 2008).

2.3.4 Current and Future Land Use

2.3.4.1 The Montauk Naval Sub Base was made surplus to the DoD in June 1946 and the property was transferred from the DoD in 1949. Since 1949, the former FUDS property was acquired by

numerous private individuals and corporations. A large portion of the property is now owned by the Rough Riders Resort Corporation and is the location of the Rough Riders Condominiums. The LIRR also owns and maintains a railroad station located in the southern portion of the former Montauk Naval Sub Base property. The remaining property is comprised of seasonal vacation homes owned by private landowners. Currently, the area within and surrounding the former Montauk Naval Sub Base is used recreational (beaches), industrial (railroad station) and seasonal and permanent housing. Future land use is expected to be similar.

2.3.5 Geologic Setting

2.3.5.1 Long Island is the terminal moraine marking the southernmost advance of the ice sheet along the Atlantic Coast during the last ice age. The soils present at the former Montauk Naval Sub Base FUDS are typically well-drained and associated with Wisconsin stage moraine deposits. The surface soil layer can range from a silty loam or fine sandy loam to clean medium grained sands along the shoreline of Fort Bay Pond. A fragipan or compact layer of altered subsurface soil that restricts water flow is often present at depths of 20 to 30 inches. Poorly sorted or crudely stratified deposits of sand and gravel are under the fragipan. Surface soil layers are typically underlain by sand, silt or glacial till and are encountered between 16 and 32 inches below ground surface (USACE 1995).

2.3.5.2 The FUDS is located within the Embayed section of the Coastal Plain physiographic province of Long Island Sound. The bedrock of Suffolk County is not exposed at the surface, but includes Cretaceous (66 – 144 million years ago (Ma)) sedimentary rocks of the Monmouth-Magothy and Raritan sand and mud units underlain by sedimentary and igneous rocks of Jurassic (144 – 208 Ma) and Triassic (208 – 245 Ma) age including the Passaic Formation, Palisades diabase, and Ladontown basalt (Rickard et al. 1970). Overlying the Monmouth-Magothy Formation, sediments currently exposed at the surface include glacial and proglacial till, gravel, sand, and mud of Pleistocene and younger age. Glacial deposits are the result of the Pleistocene age Wisconsin stage of glaciation, which produced Long Island Sound and most of the topographic features in Suffolk County (USACE 1995).

2.3.6 Hydrogeologic Setting

2.3.6.1 Situated in the far eastern portion of Long Island, the former Montauk Naval Sub Base is located on a peninsula and is surrounded by the Atlantic Ocean. There are several bodies of surface water partially within and adjacent to the FUDS property including Fort Pond, Tuthill Pond and Lake Montauk (USACE 1995).

2.3.6.2 Upper Pleistocene sediments and the Magothy and Lloyd Sand members of the Raritan Formation serve as the three main aquifers for Suffolk County. The aquifers are predominantly very permeable sands and gravels with minor silt and clay. Due to the narrow land area where the FUDS property is located, groundwater does not rise far above sea level; therefore, contamination of freshwater by salt water is possible if excessive pumping takes place (USACE 1995).

2.3.7 Area Water Supply/Groundwater Use

2.3.7.1 The majority of potable, municipal groundwater wells within the eastern portion of Long Island extract water from the Amagansett and Wainscott aquifers located approximately 11 miles west of Montauk. The Magothy aquifer, which underlies much of Long Island, is entirely saltwater from Montauk to the eastern tip of the island; therefore, this aquifer is not used as a potable water supply (USGS 1982).

2.3.8 Sensitive Environments

2.3.8.0.1 The following subsections discuss the sensitive environments associated with the FUDS and the process used to determine the necessity for completing an ecological risk assessment at the FUDS.

2.3.8.1 Army Checklist for Important Ecological Places

2.3.8.1.1 In accordance with USACE Hazardous, Toxic, and Radioactive Waste Center of Expertise guidance, the Army Checklist for Important Ecological Places (USACE 2006 and 2007) is completed (Table 2-3) to determine if a FUDS requires a screening-level ecological risk assessment. In the case of the former Montauk Naval Sub Base New York State and Federally listed rare, threatened, or endangered species were identified at or in the vicinity of the former Montauk Naval Sub Base, including Regal Fritillary, Nantucket Juneberry, and Bushy Rockrose. Transient populations of the Roseate and Common tern may nest and rear their young in the vicinity of the FUDS. Additionally, Kemp's Ridley Sea Turtles may occasionally use the beach area in and around Fort Pond Bay as a nesting site (New York State Department of Environmental Conservation (NYSDEC) 2008 and U.S. Fish and Wildlife Service (USFWS) 2008). In close proximity to the FUDS are the East Hampton Wildlife Management Area and the New York Hither Woods State Park which are state listed as sensitive environments (NYSDEC 2008). Threatened and endangered species consultation responses from NYSDEC are included in Appendix L.

2.3.8.2 Wetlands

2.3.8.2.1 Wetlands are known to be present at the Montauk Naval Sub Base FUDS including estuarine and marine wetlands, freshwater forested/shrub wetlands and freshwater emergent wetlands (DOI 1998). No wetlands were encountered during the field sampling activities conducted at the Montauk Naval Sub Base FUDS.

2.3.8.3 Coastal Zones

2.3.8.3.1 The former Montauk Naval Sub Base is situated within the New York Coastal Zone (New York State GIS Clearinghouse 2008). This area is managed under the New York Coastal Management Program, which is administered by the Department of State through the Division of Coastal Resources. The SI activities included collection of surface and subsurface soil and sediment samples. Sampling activities did not disturb the coastal areas and were in accordance with New York State coastal regulations.

2.4 Previous Investigations for Munitions Constituents and Munitions and Explosives of Concern

2.4.0.1 A summary of previous historical investigations and related discoveries of MC and MEC is provided in the following subsections. Chemical Warfare Materiel (CWM) was not used or stored at the former Montauk Naval Sub Base.

2.4.1 Inventory Project Report

2.4.1.1 USACE issued the Inventory Project Report (INPR) for the Montauk Naval Sub Base FUDS in December 1993. The USACE (1993) INPR was based on a September 1992 preliminary visit and determined that the present condition of the project site was the result of prior DoD ownership, utilization, or activity. During the site visit, the USACE team encountered no hazardous/toxic waste (e.g., underground storage tanks (USTs), oil dumps, landfills or munitions storage areas). No visual evidence of any hazardous toxic waste or unsafe debris was discovered on the site. However, USACE indicated that MEC contamination could be present in the vicinity of the loading docks, pier and beach areas and proposed further studies. The INPR determined that an environmental restoration project was an appropriate undertaking within the purview of the DERP for FUDS. A site survey and a Findings and Determination of Eligibility (FDE) were issued in 1992 and included in the INPR (USACE 1995).

2.4.2 Archives Search Report

2.4.2.1 The USACE St. Louis District prepared the Archives Search Report (ASR) Findings for Montauk Naval Sub Base in September 1995. The ASR Findings document previous investigations at the FUDS, property description, physical characteristics of the FUDS, the historical property ownership summary, site eligibility as a FUDS, a visual site inspection, MEC/Recovered Chemical Warfare Materiel (RCWM) technical data, an ordnance evaluation, and recommendations. The ASR also includes ordnance technical data sheets, physical and chemical characteristics data sheets, maps, interviews, visual inspection property report and photographs, and a preliminary assessment form. CWM was not used, stored, or disposed of at Montauk Naval Sub Base.

2.4.2.2 While conducting research and interviews for the ASR the USACE team uncovered numerous incidences where MEC or MD were reported in the eastern portion of Long Island. The USACE states in the ASR that at various times since the closure of the Montauk Naval Sub Base citizens in Long Island have reported finding various munitions items including 3-inch British artillery shells, grenade simulators, illumination rounds, booby trap simulators and munitions magazines and practice bombs. These munitions items were found on land to the northeast and west of the former Montauk Naval Sub Base not within the FUDS property. The ASR concluded that these munitions finds were not related to historical activities conducted at the former Montauk Naval Sub Base. Numerous other military installations and facilities were historically present in the eastern portion of Long Island such as Camp Wikoff (used by the Rough Riders during Spanish American War), Naval Air Station Montauk and the U.S. Naval Magazine. These military installations and facilities were located within approximately 20 miles of the former Montauk Naval Sub Base. The ASR also concluded that the only MEC/MD finds attributable to activities at the former Montauk Naval Sub Base are the various reports of fishermen “netting” practice torpedoes within Block Island Sound (MRS 2) and the small arms small arms reportedly found within Fort Pond Bay and the adjacent shoreline (MRS 1). The ASR recommended that the Montauk Naval Sub Base FUDS be carried forward to the SI stage (USACE 1995).

2.4.3 2004 Archive Search Report Supplement

2.4.3.1 The ASR Supplement was prepared for the FUDS in 2004 (USACE 2004a). The ASR Supplement assigned a Risk Assessment Code (RAC) score of 4 to the FUDS as a whole. RAC score indicates the level of MEC risk associated with the area. RAC scores range from 1, being the highest category of risk, to 5, being the lowest. The ASR Supplement stated that local

residents have reported finding unfired .50 caliber ammunition washed ashore on the beach after storms within MRS 1. Additionally, local divers have reported that the bottom of Fort Pond Bay near and around the "L-shaped" pier is littered with possible .30 and/or .45 caliber small arms ammunition. Based on interviews conducted during the ASR the small arms finds within Fort Pond Bay occurred in the mid 1980's to early 1990's. These munitions items (small arms) were all observed within MRS 1. The origin of the ammunition is unknown, but it is assumed that the small arms rounds were associated with the former Montauk Naval Sub Base (USACE 2004a).

2.4.3.2 The information provided in the ASR Supplement was combined with the information regarding specific munitions presented in the ASR and used to generate Table 2-2, which lists the military munitions type and composition for the FUDS. USACE technical documents, technical manuals, and other technical resources, were used to identify the list of MC associated with each munitions type. As previously stated in this SI, the Navy tested torpedoes (MK 13 and MK 14) within MRS 2 (Torpedo Test Range). MRS 2 was not evaluated during this SI and munitions types, acreage and RAC scores for this MRS are not included in Table 2-1. In accordance with USACE guidance (Regulation ER200 3-1) MRS 2 is considered a water range and may be assessed in the future. The list of associated MC from complete small arms rounds includes nitroglycerine (NG), dinitrotoluene (DNT) and DNT breakdown products (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene, 4- Nitrotoluene) and metal MCs associated with small arms that include antimony, copper, lead, iron and nickel. Complete small arms rounds have been identified at MRS 1. Therefore, the MC sampling/analysis focused on constituents present in propellants, primers and bullets of small arms potentially present at MRS 1. A copy of the 2004 ASR Supplement is provided in Appendix L.

2.5 Citizen Reports of Munitions and Explosives of Concern

2.5.1 Since military use of the FUDS ceased in 1946, there have been reports of complete small arms rounds, purportedly .50 caliber being found along the beach around Fort Pond Bay. No specific time frame for these munitions observations was given. Additionally, according to the ASR and discussions during the 2008 TPP meeting, local divers stated they have observed complete small arms rounds (possibly .30 and/or .45 caliber) in the vicinity of the pier within Fort Pond Bay (USACE 1995 and Alion 2008a).

2.6 Non-Department of Defense Contamination/Regulatory Status

2.6.1 There is no evidence, based on historical review and stakeholder comments, that activities occurring prior to or after DoD use of the area contributed to potential MEC, MD, or MC findings.

Table 2-1. Range Inventory (USACE 2004a)

Site Name	Range Name	Sub-range Name	RMIS Range Number	RAC Score	Acreage (land/water)
Montauk Naval Sub Base	MRS 1 – Fort Pond Bay and Beach	N/A	C02NY076602-M01	4	155 / 1,073

MRS – Munitions Response Site
RAC – Risk Assessment Code Score. The RAC allows a score of 1 (highest risk) to 5 (lowest risk).
RMIS – Restoration Management Information System

Table 2-2. Military Munitions Type and Composition (USACE 2004a and other sources)

Range ID (MRS)	Munitions ID	Munitions Type	Composition (explosives and metallic components)	Associated MC Analysis
MRS 1 – Fort Pond Bay and Beach	Small Arms (CTT01), Small Arms – Complete Rounds (CTT02)	Small Arms General (.30, .45 Caliber), .50 Caliber Machine Gun	*Projectile (.30, .45, .50 caliber):* Lead, antimony, cupro-nickel, and soft steel. *Propellant*: Single or double base powders (nitrocellulose[b] nitroglycerine (NG), dinitrotoluene (DNT), potassium sulfate, graphite *Primer:* Lead thiocyanate, antimony sulfide, potassium chlorate, gum solution	*Because complete rounds were historically found at the MRS all samples were analyzed for MC associated with a complete small arms round.* *Explosives:* - NG - DNT [a] *Metals:* - Antimony - Copper - Iron - Lead - Nickel

CTT – Closed, Transferring and Transferred
DNT – Dinitrotoluene
FUDS – Formerly Used Defense Site
ID – Identification
M – Model
MC – Munitions Constituents
MRS – Munitions Response Site
NG – Nitroglycerine
PWP – Programmatic Work Plan

[a] DNT and break down products currently on the approved PWP explosives analysis using method 8330A list (2,4-Dinitrotoluene; 2,6-Dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2-Nitrotoluene; 3-Nitrotoluene; 4-Amino-2,6-dinitrotoluene, 4- Nitrotoluene) will be analyzed.

[b] Simple single-based nitrocellulose readily breaks down in the environment and is not expected to persist while more complex nitrocellulose may persist longer in the environment (Duran et al. 1994). Nitrocellulose is not toxic, and consequently no risk-based screening values have been developed for the compound. Furthermore, there are no chemical analysis techniques that quantify nitrocellulose separately from the natural common essential nutrient nitrate. Based on this rationale, no sampling for nitrocellulose is proposed.

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
1.	Locally important ecological place identified by the Integrated Natural Resource Management Plan, Base Realignment and Closure Act Cleanup Plan or Redevelopment Plan, or other official land management plans.		No	
2.	Critical habitat for Federally designated endangered or threatened species. See No. 12 below.	Yes		There is evidence of Federally endangered and/or threatened species (Roseate and Common Tern) within the FUDS though it is unclear if the area within the FUDS is a critical habitat (Appendix L, T&E response letters).
3.	Marine Sanctuary		No	
4.	National Park		No	
5.	Designated Federal Wilderness Area		No	
6.	Areas identified under the Coastal Zone Management Act	Yes		The coastline near and within Fort Pond Bay was identified by the New York Department of State as a Significant Coastal Fish and Wildlife Area (New York State GIS Clearinghouse 2008).
7.	Sensitive Areas identified under the National Estuary Program or Near Coastal Waters Program		No	
8.	Critical areas identified under the Clean Lakes Program		No	
9.	National Monument		No	
10.	National Seashore Recreational Area		No	
11.	National Lakeshore Recreational Area		No	
12.	Habitat known to be used by Federally designated or proposed endangered or threatened species	Yes		There is evidence of Federally endangered and/or threatened species (Roseate and Common Tern nesting, Kemp's Ridley Sea Turtle) occasionally

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
				are present within the FUDS (Appendix L, T&E response letters).
13.	National preserve		No	
14.	National or State Wildlife Refuge		No	
15.	Unit of Coastal Barrier Resources System		No	
16.	Coastal Barrier (undeveloped)		No	
17.	Federal land designated for protection of natural ecosystems		No	
18.	Administratively Proposed Federal Wilderness Area		No	
19.	Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters		No	
20.	Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time		No	
21.	Terrestrial areas utilized for breeding by large or dense aggregations of animals		No	
22.	National river reach designated as Recreational		No	
23.	Habitat known to be used by state designated endangered or threatened species	Yes		There is evidence of State listed endangered and/or threatened species (Regal Fritillary, Nantucket Juneberry, Bushy Rockrose etc.) are present within the FUDS (Appendix L, T&E response letters).
24.	Habitat known to be used by species under review as to its Federal endangered or threatened status		No	
25.	Coastal Barrier (partially developed)		No	
26.	Federally designated Scenic or Wild River		No	
27.	State land designated for wildlife or game management		No	
28.	State-designated Scenic or Wild River		No	

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
29.	State-designated Natural Areas	Yes		The FUDS boundary is adjacent to the East Hampton Wildlife Management Area and the New York Hither Woods State Park (Appendix L, T&E response letters).
30.	Particular areas, relatively small in size, important to maintenance of unique biotic communities		No	
31.	State-designated areas for protection or maintenance of aquatic life		No	
32.	Wetlands		No	
33.	Fragile landscapes, land sensitive to degradation if vegetative habitat or cover diminishes		No	

Montauk Naval Sub Base

Montauk, New York
Suffolk County

Legend

FUDS Boundary

Imagery Source: New York Geographic Information Systems Clearinghouse (2005)

N
W E
S

Feet
0 300 600 1,200

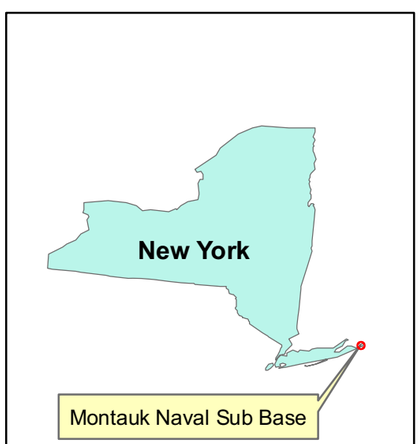


Figure 2-1. Historic Site Layout

Figure 2-2. Munitions Response Site Boundary and Impact Areas

Montauk Naval Sub Base

Montauk, New York
Suffolk County

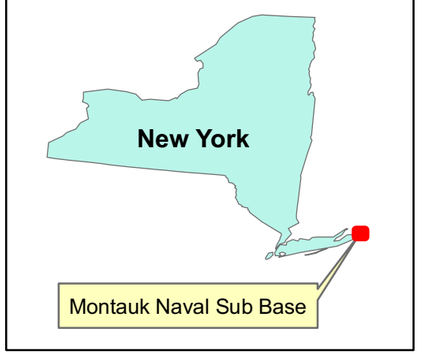
Legend

- MRS 1 - Fort Pond Bay and Beach
- FUDS Boundary

Imagery Source: New York Geographic Information Systems Clearinghouse (2005)

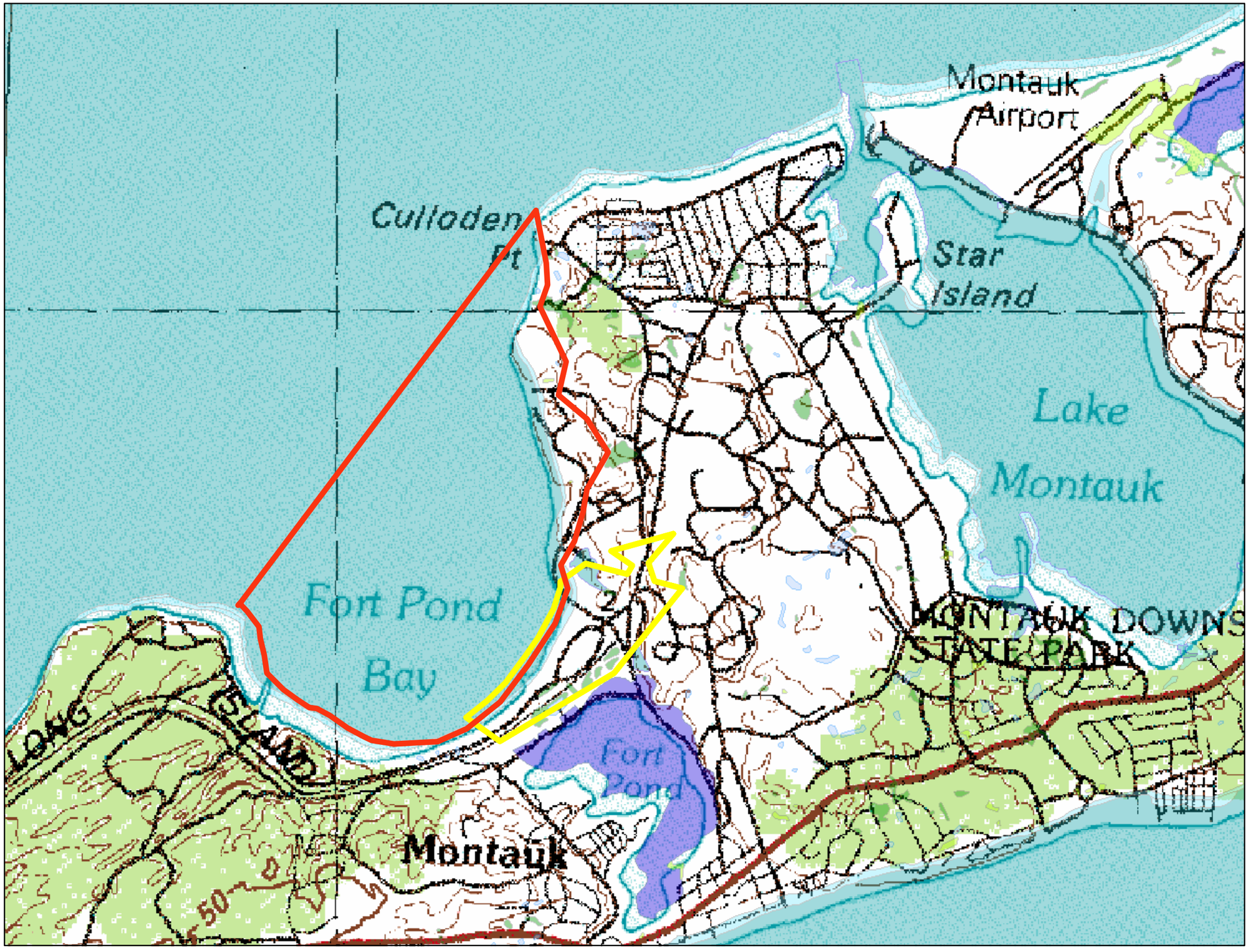
N
W E
S

0 3,000 6,000 12,000 Feet



Eastern Plain Pt
BLOCK
Shagwong Pt
Montauk Airport
False Pt
Colloden
Star Island
Big Reed Pond
Oyster Pond
MONTAUK POINT STATE PARK
Lake Montauk
MONTAUK AIR FORCE STATION
Fort Pond Bay
MONTAUK DOWNS STATE PARK
Fort Pond
LONG ISLAND
Montauk
Napeague Bay
Goff Pt
Napeague
Napeague Harbor
Fresh Pond
HITHER HILLS STATE PARK
Napeague Beach
LONG ISLAND

Figure 2-3. General Site Location and Impact Area



Montauk Naval Sub Base

Montauk, New York
Suffolk County

Legend

- MRS 1 - Fort Pond Bay and Beach
- FUDS Boundary
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- Lake
- Riverine
- Other

Imagery Source: New York Geographic Information Systems Clearinghouse (2005)

N
W E
S

0 1,250 2,500 5,000 Feet

Figure 2-4. Site Location, Topography and Wetlands.

3. SITE INSPECTION ACTIVITIES

3.1 Technical Project Planning

3.1.1 The first TPP Meeting for Montauk Naval Sub Base was conducted on 12 February 2008 at the Montauk Fire Station, Montauk, New York. The Final TPP Memorandum documenting the meeting was issued in April 2008 (Alion 2008a). The meeting participants included representatives from EPA, NYSDEC, USACE Baltimore District, USACE New York District, a representative of the Rough Riders Condominium Association (property owner) and Alion Science and Technology. The participants in the TPP meeting discussed the results of previous investigations, historical aerial photographs, the CSM, and Data Quality Objectives (DQOs).

3.1.2 **DQO 1 – Determine if the site requires additional investigation through an RI/FS or if the site may be recommended for No DoD Action Indicated (NDAI) designation based on the presence or absence of MEC and MC.** The basis of an RI/FS recommendation related to the presence/absence of MEC is specified below:

- Historic data that indicate the presence of MEC or MD.
- Visual evidence or anomalies classified as MEC, MD, or material potentially presenting and explosive hazard (MPPEH).
- One or more anomalies in a target area near historic or current MEC/MD finds or within an impact crater.
- Physical evidence indicating the presence of MEC (e.g., distressed vegetation, stained soil, ground scarring, bomb craters, burial pits).

3.1.2.1 The basis for an RI/FS recommendation related to the presence/absence of MC includes:

- Maximum concentrations at the FUDS exceed EPA regional values screening values based on current and future land use.
- Maximum concentrations at the FUDS exceed EPA interim ecological risk screening values.
- Maximum concentrations at the FUDS exceed site-specific background levels.

- Data indicating the presence or absence (less than Method Detection Limits [MDL] for metals and less than the Reporting Limit [RL] for explosives) of analytes for which no screening criteria are available are to be used to support the weight-of-evidence evaluation of MC at the FUDS.

3.1.2.2 In each of these instances, all lines of evidence (e.g., historic data, field data) are to be used to make a final recommendation for a NDAI designation or RI/FS recommendation. If none of the above scenarios occur, then the recommendation for a NDAI designation for MEC/MC is a possible option.

3.1.3 **DQO 2 – Determine the potential need for a Time Critical Removal Action (TCRA) for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.** The basis for recommendations is specified below:

- A TCRA **–** If there is a complete pathway between source and receptor and the MEC/MC and the situation are viewed as an imminent danger posed by the release or threat of a release. Cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment.

- A non-TCRA (NTCRA) – If a release or threat of release that poses a risk where more than six months planning time is available.

3.1.3.1 In each of these instances, all lines of evidence (e.g., historic data, field data) are to be used to make a final recommendation for a TCRA or NTCRA.

3.1.4 **DQO 3 – Collect or develop additional data, as appropriate, to support potential Hazard Ranking System scoring by EPA.**

- Verification that data were collected in accordance with the Final SS-WP in the SI Report.

3.1.5 **DQO 4 – Collect the additional data necessary to complete the MRSPP.**

- Completion of the MRSPP for the MRS with all available data and documentation of any data gaps for future annual MRSPP updates.

3.1.6 The TPP meeting participants concurred with the DQOs and the general technical approach for the planned SI activities discussed during the TPP and as revised and subsequently documented in the Final SS-WP (Alion 2008b). In summary, these agreements were to inspect the cited areas of concern and conduct sampling in accordance with the Final SS-WP and complete the assessment in accordance with the DQOs (Appendix B). As part of this SI Report, Alion evaluated the DQOs presented in the SS-WP (Alion 2008b) and completed a DQO attainment verification worksheet to document completion of the DQOs (Appendix B).

3.2 Supplemental Records Review

3.2.0.1 State agencies were contacted regarding threatened and endangered species and cultural and ecological resources at the FUDS property.

3.2.1 Threatened and Endangered Species

3.2.1.1 Threatened or endangered (T&E) species were documented at Montauk Naval Sub Base (USACE 1995 and Appendix L consultation response letters). The New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resources and the U.S. Department of Interior Fish and Wildlife Service were contacted and identified the Roseate and Common Terns, Kemp's Ridley Sea Turtle, Regal Fritillary and several plant and tree species as T&E species that may be present at the FUDS (NYSDEC 2008; USFWS 2008). The complete list of species is provided in Appendix L of this SI Report. Field activities were conducted in a manner and during a time period in which any adverse impacts to these T&E species and their habitat would be avoided (Appendix L).

3.2.2 Cultural and Archaeological Resources

3.2.2.1 There is little information in the ASR Findings regarding cultural or archaeological resources for the former Montauk Naval Sub Base property (USACE 1997). USACE/Alion consulted with the New York State Office of Parks, Recreation, and Historic Preservation and New York Landmarks Commission to ensure cultural, archaeological and water resources were not present at Montauk Naval Sub Base and/or would not be disturbed during field activities. The New York Natural Heritage Program identified the East Hampton Wildlife Management Area and the New York Hither Woods State Park as being located adjacent to the FUDS property. No adjustments were required to the sampling design to avoid impacts with cultural resources (Appendix L, Section 106 Consultation Letters).

3.3 Site Inspection Fieldwork

3.3.1 On 30 September 2008, the Alion field team visited the former Montauk Naval Sub Base to conduct SI field activities in accordance with the Programmatic Work Plan and the Final SS-WP (Alion 2005, 2008b). A qualitative magnetometer-assisted site reconnaissance for MEC and sample collection and analysis for possible MC contamination was completed (see Fig. 3-1 and 3-2 for Geophysical Reconnaissance Route). The Alion field team conducted qualitative reconnaissance on land totaling 101,466 square feet (2.23 acres) within MRS-1. Additionally, the Alion field team conducted waterway Qualitative Reconnaissance (QR) on approximately 31,452 square feet (0.72 acres) within Fort Pond Bay (MRS-1). A total of four surface soil samples, one subsurface soil sample and six sediment samples were collected. One duplicate sediment sample and one duplicate surface soil sample was also collected during the field event.

3.3.2 MEC reconnaissance findings and MC sample results are discussed in Sections 4 and 5, respectively. As-collected sample locations, sample designations, sampling rationale, and field observations are summarized in Table 3-1. Sampling locations are depicted on Figure 3-1. Additional information pertaining to the field activities, including field notes, forms, and chain of custodies, are provided in Appendix D. A photo documentation log from the SI is included in Appendix E.

3.4 Work Plan Deviations and Field Determinations

3.4.1 Deviations from the Final SS-WP (Alion 2008b) included slight changes to sample locations. Surface soil, subsurface soil and sediment samples were collected as near to the proposed locations as possible, however, these locations were modified slightly due to site conditions (e.g., change in site conditions, topography, inaccessibility) and to areas where sampling media were present in adequate quantities for sampling. These deviations were minor in nature and did not affect the quality of data collected. Refer to the DQO Verification Worksheet included in Appendix B.

3.5 Site Inspection Laboratory Data Quality Indicators

3.5.1 This section summarizes the data quality assessment for the former Montauk Naval Sub Base SI analytical data. Data were generated by GPL under the 2006 DoD Quality Systems Manual Version III (DoD 2006) and validated by a third-party (EDS) using EPA Region II Functional Guidelines. The detailed GPL and EDS reports are contained in Appendices F and G, respectively. The data were also analyzed using the Automated Data Review Version 8.1 based on the DoD Quality Systems Manual Version III guidelines, and these results are included in the environmental document management systems (EDMS) database. Data Quality Indicators

(DQIs) include precision, accuracy, representativeness, completeness, and comparability as well as sensitivity. At Montauk Naval Sub Base, no quality assurance split samples were collected in accordance with USACE direction. Therefore, the USACE Memorandum for Record-CQAR of Quality Assurance Split Samples is not applicable to this Draft SI Report. However, CENAB will provide a Chemical Data Quality Assessment Report (CDQAR) for inclusion in the Final SI Appendix G.

3.5.2 Precision is a measure of the reproducibility of repetitive measurements of the same process under similar conditions. Precision is determined by measuring the agreement among individual measurements of the same property, under similar conditions, and is calculated as an absolute value. The degree of agreement was expressed as the relative percent difference between the separate measurements (usually matrix spike/matrix spike duplicate [MS/MSD] pairs) and the observed relative percent difference compared to acceptable values. Any differences between MS/MSD pairs for the former Montauk Naval Sub Base data were examined and any affected sample results qualified as discussed in the Region II Functional Guidelines. The MS/MSD samples achieved acceptable values, and these samples were qualified appropriately (Appendix G). Field precision is measured by the comparison of field duplicate samples, which is also discussed as appropriate in Appendix G.

3.5.3 Accuracy is the degree of agreement of a measurement with an accepted reference or true value. Accuracy measures the bias or systematic error of the entire data collection process. To determine accuracy, a sample that was spiked with a known concentration is analyzed by the laboratory as the MS, MSD, surrogate and blank spikes, or Laboratory Control Spike. EDS assessed accuracy according to Region II Functional Guidelines and assigned qualifiers as appropriate (Appendix G).

3.5.4 Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is achieved through proper development of the field sampling program during the TPP and work plan development. Deviations from the Final SS-WP were minor: sample locations were moved slightly due to site-specific conditions therefore the representative DQI was achieved for the former Montauk Naval Sub Base.

3.5.5 Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Data are complete and valid if the data achieve all acceptance criteria including accuracy, precision, and any other criteria specified by the particular analytical method being used. None of the 169

total analyte results associated with this sample effort was rejected; therefore, the completeness indicator is 100 percent. The former Montauk Naval Sub Base data meet the completeness data quality indicator.

3.5.6 Comparability expresses the confidence with which one data set can be compared to another. There are no previous analyses of MC at Montauk Naval Sub Base for comparison of reported concentrations from this project. Standard methods for sampling and analyses were followed as documented in the SS-WP; therefore, the comparability DQI was achieved.

3.5.7 Sensitivity is a measure of the screening criteria as they compare to detection limits. If screening criteria exceed detection limits, the certainty of "non-detected" data is called into question. The laboratory reported to the RL for explosives, which represents the lowest concentration at which calibration standards were assessed. Consequently, if sensitivity DQIs were satisfied for explosives, there are no issues. Calibration standards are not analyzed between the Method Detection Limit and the Reporting Limit. The issues with Reporting Limits and/or Method Detection Limits are discussed in Section 5.1.4, however the sensitivity DQI was achieved for all analyte/receptor/matrix combinations. The reporting limit for NG is higher than the human health screening level, and NG has no ecological screening value. Uncertainties associated with the absence of screening values for these MC are discussed within the context of analytical sample results in Section 5. This uncertainty discussion indicates that for this particular FUDS, the absence of screening values does not undermine the certainty with which the determinations of risk for human and ecological receptors can be made.

Table 3-1. Montauk Naval Sub Base Sample Location Descriptions				
Location	**Sampling ID**	**Coordinate System: UTM Zone: 19N Datum: NAD 1983**		**Area of Interest / Rationale of Sampling Locations**
		Easting(m)	**Northing(m)**	
Fort Pond Bay and Beach (MRS 1)	MNSB-FPB-SS-01-01	755696.683	4548399.152	To the east of pier on the beach of MRS 1
	MNSB-FPB-SS-01-02	755657.786	4548464.386	To the east of pier on the beach of MRS 1
	MNSB-FPB-SB-02-01	755616.791	4548368.783	To the east of pier on the beach of MRS 1
	MNSB-FPB-SD-01-01	755565.765	4548346.965	To the southwest of pier in MRS 1
	MNSB-FPB-SD-01-02	755594.315	4548431.832	Within the "L-shaped" pier at MRS 1
	MNSB-FPB-SD-01-03	755637.063	4548476.426	Within the "L-shaped" pier at MRS 1
Background Samples	MNSB-BG-SS-01-01	756133.307	4548997.903	In the northeast portion of the FUDS
	MNSB-BG-SS-01-02	756312.888	4548766.394	In the northeast portion of the FUDS
	MNSB-BG-SD-01-01	754619.118	4547700.747	Outside and to the south of MRS 1
	MNSB-BG-SD-01-02	754704.265	4547693.622	Outside and to the south of MRS 1
	MNSB-BG-SD-01-03	754733.552	4547703.477	Outside and to the south of MRS 1

BG = Background
ID = Identification
MNSB = Montauk Naval Sub Base
MRS = Munitions Response Site
FPB = Fort Pond Bay
NAD = North American Datum
SS = Surface Soil Sample
SB = Subsurface Soil Sample
SD = Sediment Sample
UTM = Universal Transverse Mercator

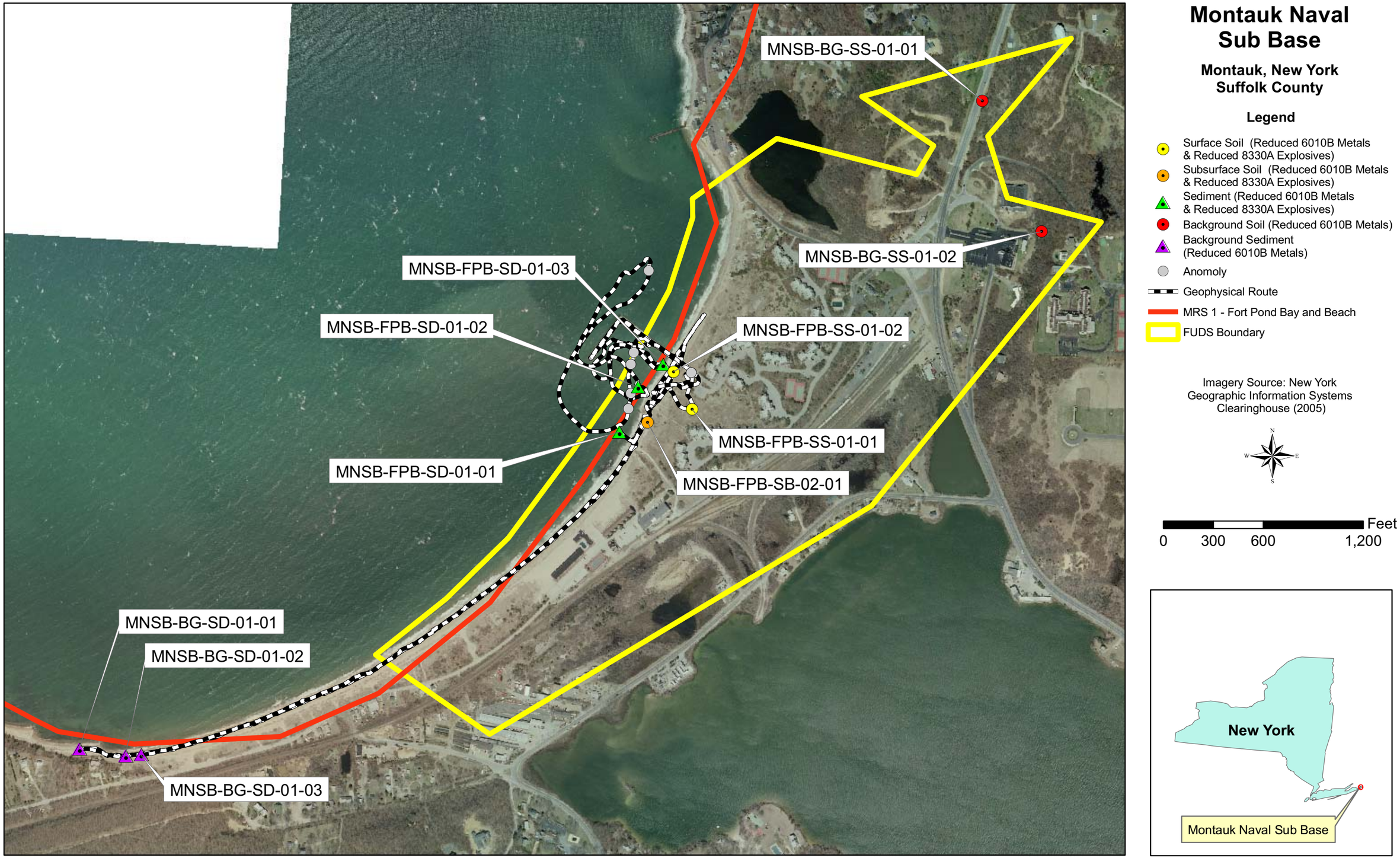


Figure 3-1. Sample Locations and Geophysical Reconnaissance Findings.

Montauk Naval Sub Base

Montauk, New York
Suffolk County

Legend

- Photos Locations
- MRS 1 - Fort Pond Bay and Beach
- FUDS Boundary

Imagery Source: New York Geographic Information Systems Clearinghouse (2005)

N
W E
S

0 300 600 1,200 Feet

Figure 3-2. Site Inspection Photograph Locations

4. MUNITIONS AND EXPLOSIVES OF CONCERN SCREENING LEVEL RISK ASSESSMENT

4.1 Operational History

4.1.1 The former Montauk Naval Sub Base was established in 1943 and utilized to increase the testing and delivery of commercially manufactured torpedoes for the war effort (WWII). During operations, the two main types of torpedoes tested were the air launched MK 13 and surface or barged launched MK 14 steam operated torpedoes (with inert warheads). These inert torpedoes were tested within Fort Pond Bay and areas within Block Island Sound (USACE 1995). The base was also utilized by the Navy as a submarine port, maintenance facility, and seaplane landing area. The Montauk Naval Sub Base was disposed of by the War Department/Navy and ownership of a small portion of the property was transferred to the Globe Aircraft Specialties Corporation on November 1949. Between 1950 and 1958, the General Services Administration (GSA) conveyed the remaining portions of the former Montauk Naval Sub Base to the LIRR and real estate developers (USACE 1995).

4.1.2 Although two MRSs were identified at the former Montauk Naval Sub Base by the ASR and ASR Supplemental only MRS 1 (Fort Pond Bay and Beach) was investigated as part of this SI. MRS 2 (Torpedo Test Range) is a water range, and in compliance with USACE guidance (USACE 2004b), was not investigated during this SI (Alion 2008b).

4.1.3 Historical document reviews and interviews performed as part of the SI indicated that the former Montauk Naval Sub Base was used as a torpedo construction, testing area and naval support facility. Historically, local residents have reported finding suspected .50 caliber whole small arms rounds washed on the shore of Fort Pond Bay. A specific time frame was not given for this munitions find. Additionally, local divers reported observing .30 and/or .45 caliber small arms near the “L-shaped” pier within Fort Pond Bay. Based on interviews conducted during the ASR the small arms finds within Fort Pond Bay occurred in the mid 1980’s to early 1990’s. All the above mentioned munitions discoveries were within the MRS 1 boundary. No MEC or MD was found at the former Montauk Naval Sub Base during the 1995 USACE ASR site investigation or the 2008 Alion SI (USACE 1995).

4.2 Site Inspection Munitions and Explosives of Concern Field Observations

4.2.0.1 A qualitative reconnaissance based on both visual observations and analog geophysics was completed. A visual reconnaissance of the site surface was completed to identify MPPEH/MD/MEC and suspect areas and visual metallic debris associated with munitions.

Analog geophysics was used primarily to support anomaly avoidance activities for the field crew. Additionally, waterway reconnaissance using a boat was performed with the aid of a Borehole Gradiometer (BHG)-1 in and around the pier located within Fort Pond Bay. Efforts were made during the waterway reconnaissance to keep the BHG-1 approximately 1-2 ft off the bottom of Fort Pond Bay. Underwater and land anomalies were noted during reconnaissance activities. Identification of these anomalies was not possible due to the lack of visual observations (beneath land surface or underwater).

4.2.0.2 The SI findings are presented below. The total estimated acreage subject to the qualitative reconnaissance is approximately 2.23 acres of land and 0.72 acres of water within Fort Pond Bay[1].

4.2.1 Fort Pond Bay and Beach (MRS 1)

4.2.1.1 Fort Pond Bay and Beach (MRS 1) encompasses approximately 1,228 acres (155 acres of land and 1,073 acres of tidal water). Alion completed land reconnaissance of MRS 1 using a ferrous metal geophysics detector (Schonstedt) following a meandering path. Waterway reconnaissance was conducted using a BHG-1 all-metal detector suspended off the side of the boat. Site reconnaissance findings are shown on Figure 3-1. A photograph log is included in Appendix E and the photograph locations are shown on Figure 3-2. Area observations are presented below.

- The land portions of the former Montauk Naval Sub Base are easily accessible and are comprised predominantly of sandy beach. Portions of MRS 1 are located in Fort Pond Bay and are accessible only by boat. A boat supplied by the Rough Riders Resort Corporation was used to conduct the waterway reconnaissance.
- Land qualitative reconnaissance was performed along the shoreline of Fort Pond Bay and at each soil sample location. Waterway QR was focused in and around the vicinity of the "L-shaped" pier where previous reports from divers indicated MEC or MD may be present as well as around sediment sample locations.
- One subsurface anomaly was detected on land approximately 100 ft east of the pier. Five underwater anomalies were detected using the BHG-1 at depths ranging from 15 to 25 ft below the water surface. Intrusive investigations are not within the scope of the SI, therefore, the the anomalies could not be investigated or identified as MEC/MD, range related debris, or cultural debris.

[1] Extent of reconnaissance estimated from global positioning system tracks and includes a 25-ft diameter around each sample location and observations along the global positioning system tracks covering a 6-ft swath.

- No MEC/MD were observed in the MRS.
- A total of four surface soil samples, one subsurface soil sample and six sediment samples were collected. One duplicate sediment sample and one duplicate surface soil sample was also collected during the field event.

4.2.2 Background Samples

4.2.4.1 Three sediment background samples and two soil background samples were collected within or in close proximity of the FUDS boundary, but outside the MRS 1 footprint. All background samples were analyzed for select metals only.

4.3 Munitions and Explosives of Concern Risk Assessment

4.3.0.1 A qualitative MEC screening level risk assessment was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the INPR, ASR, and ASR Supplement (USACE 1995 and 2004a). An explosive safety risk is the probability of the detonation of an MEC item which could potentially cause harm as a result of human activities. An explosive safety risk exists if a person is in proximity or in contact with MEC and causes a detonation. The potential for an explosive safety risk depends on the presence of three elements: a source (presence of MEC), a receptor (person), and interaction (e.g., touching or picking up an item). The CSM for MRS 1 reflects this MEC assessment strategy (Appendix J).

4.3.0.2 The exposure route for an MEC receptor typically is through direct contact with an MEC item on the surface or through subsurface activities (e.g., digging during construction). A MEC item tends to remain in place unless disturbed through human or natural forces (e.g., frost heaving and erosion). If MEC movement occurs, the probability of direct human contact may increase, but not necessarily result in direct contact or exposure.

4.3.0.3 Each of these primary risk factors was used to evaluate the field and historic data to generate an overall hazard assessment rating of either low, moderate, or high. The MEC source is based on the MEC type, sensitivity, density and depth distribution. The likelihood of exposure and thereby injury, may be severe (lethal if detonation occurs), moderate (minor or major injury if detonation occurs) or low (no detonation and no injury occurs). MEC sensitivity, the likelihood of detonation and severity of exposure (fuzing and weathering, for instance), may be very sensitive (e.g., electronic fuzing, land mines, booby traps), less sensitive (standard fuzing), and insensitive/inert (residual risk or no injury). MEC density and depth are generally unknown and evaluated during follow on studies (RI/FS).

4.3.0.4 Site characteristics are based on site accessibility (no restrictions, limited restrictions, and complete restrictions to access) and site stability (stable, moderately stable, and unstable). Finally, human interaction includes the type of human contact (low, moderate, and significant), population number and frequency of access (low, moderate, high).

Based on these criteria, low, moderate, and high MEC risks are defined as follows in Table 4-1.

Table 4-1. Low, Moderate, High MEC Risk Assessment Categories

MEC Factor	Low MEC Risk	Moderate MEC Risk	High MEC Risk
MEC Source	Low MEC Type (no detonation and no injury) Insensitive/Inert MEC	Moderate MEC Type (minor/major injury) Moderate Sensitive MEC	Severe MEC Type (lethal) Very Sensitive MEC
Site Characteristics	Complete restrictions to access Stable (no MEC exposure by natural events	Limited restrictions to access Moderately stable (MEC may be exposed by natural events)	No restrictions to access Unstable (MEC exposure most likely by natural events)
Human Interactions	Low potential for and frequency of contact (e.g., no general public access, infrequent site access primarily by site personnel, no subsurface activity)	Moderate potential for and frequency of contact (e.g., a limited number of the general public has open and somewhat frequent access, few site uses, surface/subsurface intrusive activity possible)	High potential for and frequency of contact (e.g., general public has open and frequent access, high potential for surface/subsurface intrusive activity)

4.3.1 Fort Pond Bay and Beach (MRS 1)

4.3.1.1 As discussed in Section 4.1.2, No munitions were observed by USACE personnel during the 1995 site visit. No MEC/MD was observed during the 2008 SI reconnaissance.

4.3.1.2 No documented injuries have occurred at the FUDS property. Access to MRS 1 is open to residents of the Rough Riders Condominiums. Trespassers/visitors are also likely human receptors within the beach areas of MRS 1. The waters of Fort Pond Bay are used for recreational swimming and diving. The area is heavily occupied during the summer months for recreational purposes and minimally occupied during the winter. MRS 1 has potential for MEC presence due to the historic MD finds (.30 and/or .45 caliber and .50 caliber complete rounds). Small arms do not contain sensitive fuzes or primers and have a relatively small quantity of explosive material (propellant). None of the small arms rounds (.30, .45 or .50 caliber) contain an

explosive filler. Additionally, based on the suspected location of these small arms (in or around water) the explosive hazard presented by these small arms is mitigated. Although there are numerous receptors during the summer months the overall MEC risk is low based on the discovery of small arms, site characteristics (within or near water) and the minimal explosive content of small arms. This exposure scenario is reflected as such in the CSM (Appendix J).

5. MUNITIONS CONSTITUENTS SAMPLING AND ANALYSIS

5.0.1 A screening level human health risk assessment (HHRA) and screening level ecological risk assessment (SLERA) were conducted to determine whether MC in environmental media at Montauk Naval Sub Base may warrant a more detailed assessment of potential risk to current or future human and ecological receptors. The screening methodology, CSM, analytical results for the MC sampling, and results of the screening assessment are presented below.

5.1 Data Evaluation Methodology

5.1.0.1 The following sections present the process used to evaluate the MC data collected for the Montauk Naval Sub Base FUDS. The methodology is designed to evaluate data for relevant MCs in the HHRA and SLERA using the appropriate screening criteria. The methodology also provides a means to evaluate uncertainty in the screening HHRA and SLERA process and provide context for the risk conclusions. This process is consistent with the decision rules outlined in Section 3.1 (TPP) of this report, and is described in more detail in the following sections.

5.1.1 Refinement of Munitions Constituents

5.1.1.1 During the SI process, Alion evaluated MCs potentially associated with Montauk Naval Sub Base. MCs were identified based on knowledge of munitions historically used at the FUDS. Information on historic use was obtained from munitions data sheets, historical documents, and other munitions reference documents.

5.1.1.2 The list of MCs for evaluation for MRS 1 identified at Montauk Naval Sub Base is provided below and presented in further detail in Table 2-2. MCs potentially associated with MRS 2 (Torpedo Test Range) were not identified or evaluated as part of this SI.

Fort Pond Bay and Beach (MRS 1)

- Explosives (DNT and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, NG)
- Metals (antimony, copper, iron, lead, nickel)

Torpedo Test Range (MRS 2)

- N/A[2]

5.1.2 Data Quality

5.1.2.1 Only validated data were used in the screening process. The validated data were composed of the following samples:

1. Two surface soil samples (collected 0-6 inches bgs)
2. One duplicate[3] surface soil sample
3. Two background surface soil samples
4. One subsurface soil sample (collected 12-18 inches bgs)
5. Three sediment samples (collected 0-6 inches bgs)
6. One duplicate sediment sample
7. Three background sediment samples

5.1.2.2 The first step in the screening risk assessments was the evaluation of the analytical data. Inclusion or exclusion of data on the basis of analytical qualifiers was performed in accordance with U.S. EPA guidance (EPA 1989a and 1989b). The following provides a listing of the qualifiers in the validated analytical data and their treatment in the risk assessments:

- Analytical results bearing the U or UJ qualifiers (indicating that the analyte was not detected at the given detection limit) were retained in the data set. One of two detection limit types was used for this purpose, depending on the chemical class. For inorganics, the method detection limit was used for non-detected samples. For organics, the reporting limit was used for non-detected samples.

- Analytical results bearing the J qualifier (indicating that the reported value was estimated) were retained. The estimated concentration provided by the laboratory was used in the risk screening.

[2] MRS 2 was not evaluated as part of this SI. MRS 2 is a water range and was not investigated during this SI consistent with USACE guidance.

[3] Duplicate samples were treated as discrete samples; duplicates were not averaged for the purpose of this risk screening.

5.1.3 Screening Values

5.1.3.1 Screening concentrations were used in the HHRA and SLERA to support risk-based conclusions and recommendations regarding the FUDS property. Maximum property concentrations for relevant MCs were compared to the risk-based concentrations as part of the selection process for chemicals of potential concern (COPCs) and chemicals of potential environmental concern (COPECs).

5.1.3.2 For the HHRA, EPA regional screening levels (SLs) for residential soil and industrial soil (outdoor worker) were selected as the screening criteria to select COPCs in soil. The SLs, referred to in this section as "regional SLs" are maintained for the EPA by the Oak Ridge National Laboratory (ORNL) (ORNL 2008). SLs are developed from toxicity values and standard exposure factors to estimate contaminant concentrations that are protective of humans, including sensitive subgroups, over a lifetime. The regional SLs for residential and industrial soils consider exposures through direct contact (e.g., incidental ingestion, dermal contact, inhalation of particulates and vapors) and reflect exposure pathways identified for MCs in the SS-WP Addendum (Alion 2008b) that could occur at the FUDS (i.e., potentially completed pathways). For sediment, potentially complete pathways identified in the SS-WP Addendum for human receptors included the incidental ingestion of, and dermal contact with, MCs in sediment. Regional SLs or similar values are not available for screening risks from human exposure to sediments, and soil SLs are not directly applicable for screening sediment for human receptors given the likelihood of reduced exposure to sediment relative to soil. Therefore, for use in screening sediment in the HHRA, soil SLs were adjusted to account for the relatively lower exposure levels for human receptors to sediment. The adjustment is described in Section 5.1.3.5.

5.1.3.3 In some cases, SLs are based on the toxicity, or relative toxicity of related compounds. The regional SLs for 2-amino-4,6-DNT and 4-amino-2,6-DNT are based on toxicity information for 2,4-DNT. Because the amino-DNT isomers may behave differently from 2,4-DNT, the use of the regional SLs for these MCs may result in some uncertainty in the risk assessment.

5.1.3.4 The regional SLs for direct contact with soil correspond to typical risk thresholds of a one-in-one million (1×10^{6}) cancer risk or a non-carcinogenic hazard quotient (HQ) of 1.0. The HHRA screening levels for 2-nitrotoluene and 4-nitrotoluene are based on carcinogenic endpoints. The HHRA screening levels for explosives, 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 3-nitrotoluene, 4-amino-2,6-DNT, and NG; and metals, antimony, copper, iron, lead, and nickel are based on non-carcinogenic endpoints.

5.1.3.5 As discussed in the SS-WP Addendum (Alion 2008b) the screening levels derived from non-carcinogenic endpoints were divided by ten to provide a means to account for potential occurrence of adverse non-carcinogenic health effects due to exposure to multiple non-carcinogens. The soil screening values used for the HHRA were increased by a factor of ten for application as sediment screening values to account for lower incidence of exposure to sediments relative to soils. The exception to the adjustments described is for lead. In the case of lead, regional SLs for soil are based on a blood lead level rather than a chronic daily intake as used for the other non-carcinogens; therefore, no adjustments were made to the lead SLs for use in evaluating soils or sediments. Adjustments of the soil screening values for use in the sediment screening are consistent with previous HHRAs under this program. The application of HHRA screening values is described in Sections 5.1.3.11 and 5.1.3.12. Results of the HHRA are discussed in Section 5.4 and presented in Table 5-1 and 5-2.

5.1.3.6 Screening for ecological-based COPECs was conducted by calculating an HQ, which represents the ratio of the maximum detected chemical concentration in environmental media to a medium specific ecological screening level. Screening levels derived from studies in specific medium and environmentally similar conditions to those at the FUDS are the most relevant and appropriate for screening. In cases where screening values derived from environmentally specific testing environments are not available, alternative screening values may offer a sufficient screening tool.

5.1.3.7 Ecological soil screening levels (eco-SSLs) were used to screen for COPECs in soil. Eco-SSLs are screening level benchmark concentrations for contaminants in soil that have been determined to be protective of terrestrial-based ecological receptors that commonly come into contact with soil or ingest biota that live in or on the soil. These benchmark concentrations generally are used for screening-level purposes to identify COPECs in upland soils that may require further evaluation. Eco-SSLs are derived using information on toxicity and estimated ingestion exposure doses for terrestrial ecological receptors. As described in the SS-WP Addendum CSM diagram for the former Montauk Naval Sub Base, potentially completed transfer pathways for surface soils to ecological receptors at the FUDS are ingestion, dermal contact, and inhalation. EPA guidance (2005) states that because dermal and inhalation pathways are generally less significant compared to ingestion, they do not warrant inclusion in the derivation of eco-SSLs. Therefore, the eco-SSLs derived using exposure assumptions for ingestion only, are determined to be adequate for the purposes of the SLERA.

5.1.3.8 Where available, sediment screening levels were used to screen for COPECs in sediment. A full set of sediment screening values are not derived by EPA. For the SLERA, EPA derived

sediment screening values were adopted where available; where no EPA value was available, peer-reviewed literature and other regulatory and advisory programs were reviewed for appropriate screening values. The former Montauk Naval Sub Base is characterized as a marine environment; therefore, where available marine specific sediment screening values were adopted. If no marine value was available, sediment screening values derived in freshwater environments were adopted for use in the SLERA. In the instance where no sediment screening values were available, eco-SSLs were used to screen for COPECs in sediment. According to EPA, eco-SSLs may provide some utility for screening wetland soils like those found in MRS 1 (EPA 2005). The appropriateness of their use generally is determined by comparing the soil properties evaluated to the sediment properties in the site of interest and the degree of flooding estimated to occur at the marsh. In general, EPA considers the eco-SSLs to be conservative with respect to their use for wetlands, given that wetlands sediments generally have conditions which limit bioavailability relative to upland soils (e.g., relatively higher total organic carbon present in sediments). Potentially complete pathways for ecological receptors to sediment at Montauk Naval Sub Base include incidental ingestion of, ingestion of benthos exposed to, and dermal contact with MC in sediment. The sediment screening values and eco-SSLs described above were derived using assumptions of exposure via ingestion pathways. As described in Section 5.1.3.7, exposures via dermal and inhalation pathways are generally less significant when compared to the ingestion pathway. Therefore, the sediment screening values and eco-SSLs derived using exposure assumptions for ingestion only are determined to be adequate for the purposes of sediment screening in the SLERA.

5.1.3.9 For the soil screening, eco-SSLs developed by EPA were used for screening metals. No eco-SSLs were available from EPA for iron or for any of the explosives evaluated at the FUDS. Consistent with previous SLERAs under this program, screening values were obtained from Talmage et al. (1999) for these MCs. The eco-SSLs of 30 mg/kg for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on toxicity data for 2,4,6-Trinitrotoluene (2,4,6- TNT). 2,4,6-TNT can be reduced by several pathways. Although there is not conclusive evidence on the dominant process by which 2,4,6-TNT is reduced in soil several studies show bacterial degradation of 2,4,6-TNT to 2- and 4- amino-DNT under aerobic and anaerobic conditions (Vorbeck et al. 1998). An *in vitro* study completed in a *Psuedomonas bacterium* species suggests that 2,4,6-TNT breaks down to 2,4-DNT (Haidour and Ramos 1996). Laboratory studies support the observations of Haidour and Ramos (1996) that bacteria strains can generate 2, 4- DNT from TNT (Martin et al. 1997). These findings provide some support for the use of TNT as a surrogate for DNT and DNT breakdown products. However, because there is not definitive knowledge regarding the reductive processes that dominate TNT breakdown (Vorbeck et al. 1998), there is some uncertainty associated with adopting a surrogate screening

value from 2,4,6-TNT. A limited amount of data were available for the derivation of eco-SSLs for 2-amino-4,6-DNT, and 4-amino-2,6-DNT. These eco-SSLs were derived using data from a single study in plants. No eco-SSLs, or appropriate surrogates, were available for iron and NG.

5.1.3.10 For the sediment screening, sediment specific screening values derived for marine organisms were available for antimony, copper, and nickel. No value derived for marine organisms was available for iron or lead; however, sediment screening values for freshwater organisms were available for these metals, and were adopted for the SLERA. No sediment screening values were available for DNT and DNT breakdown products, and NG. In the absence of sediment specific values interim eco-SSLs derived by Talmage et al. (1999) were applied for screening these analytes in sediment. Although the use of eco-SSLs for screening sediments introduces some uncertainty into the SLERA results, as discussed in Section 5.1.3.8, the use of soil screening values for wetland soils is likely to result in a conservative evaluation; therefore, this is determined to be an adequate screening tool for the SLERA. No screening value, or appropriate surrogate, was available for NG. The application of the ecological screening values is described in Sections 5.1.3.11 and 5.1.3.13. Results of the SLERA are discussed in Section 5.4 and presented in Tables 5-1 and 5-2.

5.1.3.11 In accordance with EPA Guidance, the following screening process is utilized.

1. The maximum concentration of each chemical detected in each medium is identified.

2. If a chemical was detected in at least one sample in a specific medium, it is retained for consideration in the screening of COPCs/COPECs.

3. If the concentration of a specific chemical exceeds its screening value and is above the maximum background concentration, the chemical is retained as a COPC/COPEC.

4. If a screening concentration is not available for a specific chemical in a particular medium, the screening concentration for a structurally similar compound is used, if warranted. The screening tables list any surrogates that are used.

An analyte is eliminated from the list of COPCs/COPECs if it is an essential nutrient of low toxicity, and its reported maximum concentration is unlikely to be associated with adverse health impacts.

5.1.3.12 For the HHRA, the maximum detected concentration of all detected MCs was compared to the screening criteria determined for use in the HHRA. If the maximum concentration was less than the screening value, the target analyte was eliminated from consideration. If the maximum concentration exceeded the screening value, the analyte was retained as a COPC.

5.1.3.13 Under the SLERA, an HQ analysis was completed for each detected analyte. A HQ is defined as the measured concentration divided by the screening criteria. If the maximum concentration was less than the screening value (HQ < 1.0), the analyte was eliminated from consideration as a COPEC. If the maximum concentration exceeded the screening value (HQ > 1.0), the analyte was retained as a COPEC.

5.1.3.14 For both the HHRA and SLERA, in cases in which no screening criteria are available, any available information regarding the potential for the MC to present a risk to receptors is presented.

5.1.4 Comparison of Screening Levels with Reporting Limits for Never-Detected Analytes

5.1.4.1 The usability of the analytical data for making conclusions regarding risk was evaluated by comparing the reporting limits or detection limits (reporting limits for organics; method detection limits for inorganics) for never-detected chemicals to their respective screening values used for human health (Table 5-3) and ecological (Table 5-4) risk screening . If a chemical was never detected, but the reporting/detection limit was higher than the screening value, then eliminating the chemical as a COPC or COPEC for the FUDS would introduce uncertainty into the risk assessment. Where no screening values are available, no conclusions can be drawn regarding the adequacy of the reporting limits for screening risk, and as a result, uncertainty is introduced into the risk assessment.

5.1.4.2 Table 5-3 shows a comparison of the reporting/detection limits and human health screening values for all analytes never detected in soil and sediment by media. In soil, all of the explosives analyzed and antimony were never detected above their respective reporting/detection limits in soil. For all never-detected MC with the exception of NG the analytes' detection limits were lower than the respective screening criteria for soil adopted for the HHRA. When the residential soil SL of 6.1 mg/kg for NG is divided by ten to account for the potential exposure to multiple non-carcinogens (as described in Section 5.1.3.5), the resulting screening soil concentration of 0.61 mg/kg is lower than the reporting limit of 4 mg/kg for NG in soil. However, under the methodology employed in the HHRA for cumulative non-carcinogenic risk, ten chemicals are assumed to elicit toxic effects on the same target organ. At MRS 1 thirteen MCs were identified. Each of these MCs is not anticipated to act by the same non-carcinogenic

mode of action or at the same target organ. Considering these factors the reporting limit for NG is determined to be adequate for the HHRA screening at this FUDS. As described in Section 5.1.3.4, the regional SLs for 2,-amino-4,6-DNT and 4-amino-2,6-DNT are based on toxicity information for 2,4-DNT. The reporting limits of 0.04 mg/kg in soil for the amino-DNT isomers are below screening criteria developed from regional SLs for use in the HHRA (15 and 200 mg/kg, 2-amino-4,6-DNT; 15 and 190 mg/kg, 4-amino-2,6-DNT). Any uncertainties in the application of these screening levels to the risk assessment are, therefore, determined not to be significant for the HHRA.

5.1.4.3 In sediment all eight of the explosives analyzed were never detected above their respective reporting limits. The reporting limits for all never detected MC were lower than their respective screening criteria adopted for sediment for the HHRA.

5.1.4.4 Table 5-4 shows a comparison of the reporting/detection limits and ecological screening values for analytes never detected in soil and sediment, by media. In soil, all eight of the explosives analyzed and antimony were never detected above their respective detection limits (reporting limits for organics; method detection limits for inorganics). The reporting/detection limits for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, 4-nitrotoluene, and antimony were below their respective ecological screening values used in the SLERA. The eco-SSL for 2,4,6-TNT was adopted for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene. As described in Section 5.1.3.9 the use of the 2,4,6-TNT screening value for these MCs introduces some uncertainty into the risk screening. The reporting limits of 0.04 mg/kg for 2,4-DNT and 2,6-DNT and 0.08 mg/kg for 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are well below the soil screening value of 30 mg/kg adopted for these MC in the SLERA. Therefore, any uncertainties associated with the use of 2,4,6-TNT as a surrogate for these five MCs are determined not to be significant for the SLERA. Since there was no screening level available for NG, no conclusion regarding the adequacy of the reporting limit obtained for this MC can be made.

5.1.4.5 In sediment all eight of the explosives analyzed were never detected above their respective reporting limits. The reporting limits for all of these explosives were below the screening values adopted for these MCs in sediment for the SLERA. As described in 5.1.3.10 the adoption of eco-SSLs for sediment screening values for these MCs introduces some uncertainty into the SLERA. Given that the reporting limits of 0.04 mg/kg and 0.08 mg/kg in sediment are significantly below the adopted screening values of 30 mg/kg (2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene) and 80 mg/kg (2-amino-4,6-DNT, 4-amino-2,6-DNT), any uncertainties associated with the use of these eco-SSLs for screening the MC in

sediment are determined not to be significant for the SLERA. No screening level was available for NG, and therefore no conclusion regarding the adequacy of the reporting limit obtained in sediment for this MC can be made.

5.2 Conceptual Site Model

5.2.0.1 The CSM diagram for MRS 1 at Montauk Naval Sub Base is provided in Appendix J. The CSM for MRS 2 is included in Appendix J, but a specific evaluation of the CSM for MRS 2 is not discussed in this SI because this MRS was not investigated. The CSM defines the source(s) (e.g., the secondary source/media), interaction (e.g., secondary release mechanism, tertiary source, exposure route), and receptors at the FUDS and provides an overview of completed and potentially completed pathways. The CSM is limited to those areas potentially impacted by MEC and/or MCs based on the site use and history. These areas are shown in Figure 2-2. In this SI Report, the CSM has been revised from the version presented in the SS-WP to reflect the results of the human and ecological risk screening.

5.2.0.2 Current and future potential human receptors for the FUDS are expected to be visitors/trespassers, construction workers, residents, and employees. In the HHRA the soil and sediment screening values for the trespassers/visitors and residents were based on regional SLs for direct contact with residential soil. The screening values used for construction workers and employees were based on the regional SLs for direct contact with industrial soils. The ecological receptors of concern for the FUDS are plants, benthic invertebrates, terrestrial-feeding mammals, and terrestrial-feeding birds. Media specific screening values selected for the SLERA were applied uniformly to all ecological receptors. As described in the SS-WP Addendum for Montauk Naval Sub Base there are no permanent freshwater surface water bodies within MRS 1, only ocean water. Due to saltwater intrusion near the coast line potable drinking water wells do not exist in the shallow aquifer vicinity of MRS 1. Therefore surface water and groundwater were determined not to be media of concern (Alion 2008b).

5.2.0.3 Potentially complete pathways for human and ecological receptors are based on the presence of MEC/MC and interactions including transport and release mechanisms and receptor use patterns.

5.2.0.4 A pathway is complete if all of the following conditions are present:

1. Source and mechanism of chemical release (e.g. a munitions-related organic chemical is detected or a munitions related inorganic chemical is detected at levels exceeding background concentrations).

2. Transfer mechanisms (e.g. overland flow of contaminants into an adjacent stream, advection of contaminants with groundwater flow).

3. Point of contact (exposure point, e.g., drinking water, soil).

4. Exposure route to receptor (e.g., ingestion, inhalation, etc.).

5.2.0.5 Once it has been determined that complete pathways exist between media and receptors comparisons of maximum detected site concentrations to risk-based screening values are used to determine if the MC is a COPC or COPEC, depending on the risk screening being conducted (human health and ecological respectively). Using a weight of evidence approach, a RI/FS may be recommended for MC where COPC and/or COPEC are identified. An NDAI designation may be recommended for MC if no COPCs or COPECs are identified through the risk screening process or if the weight of evidence evaluation indicates that COPCs/COPECs do not pose an unacceptable risk to the exposed receptor.

5.2.0.6 In conclusion, pathway completeness will result in an RI/FS recommendation for MC only in the instance where risk screening criteria exceedances occur. A pathway can be complete but an RI/FS is not recommended if there are no exceedances of risk screening criteria or if identified risks are determined to be at acceptable risk levels. When a pathway is incomplete, an RI/FS recommendation is not made.

5.3 Background Data Evaluation

5.3.0.1 During the SI field activities, two background surface soil samples and three background sediment samples were obtained from areas adjacent to the boundary of MRS 1. Comparisons of concentrations of metals in background soil and sediment samples to on-site surface soil and sediment samples are shown in Tables 5-5 and 5-6, respectively. No subsurface soil background samples were obtained.

5.3.0.2 In surface soil, all metals had site mean and maximum concentrations that were lower than their respective mean and maximum concentrations in background samples. In sediment, site antimony had greater mean and maximum concentrations compared to background. All other

inorganic compounds in sediment were measured at concentrations lower than their respective concentrations in background.

5.3.0.3 In cases involving exceedance of screening criteria but not background, the analyte (s) is identified as a COPC/COPEC, however no added risks to receptors from exposure to the analyte is identified based on the use of the site.

5.4 Fort Pond Bay and Beach (MRS 1)

5.4.0.1 As presented in Section 5.1.1, DNT and its breakdown products, NG, antimony, copper, iron, lead, and nickel were identified as MCs at MRS 1. Surface soil, subsurface soil, and sediment were identified as media of concern for this area. Table 5-1 and 5-2 present results of the screening level analysis in these media.

5.4.1 Soil Pathway and Screening Results

5.3.1.1 Potentially complete exposure pathways in surface soils were initially identified for human and ecological receptors. A total of four soil samples were collected in MRS 1: two surface samples, one duplicate surface sample, and one subsurface sample. All four samples were analyzed for DNT and its breakdown products, NG, antimony, copper, iron, lead, and nickel. Table 5-1 presents the analytical results for surface and subsurface soils along with the human health and ecological screening values described previously in Section 5.1.3.

5.3.1.2 As described in the SS-WP Addendum for the former Montauk Naval Sub Base the ingestion of, dermal contact with, and inhalation of MC from surface soil were identified as potentially completed pathways for visitors/trespassers, construction workers, employees, and biota. Two surface samples and one duplicate surface sample were collected at MRS 1 from areas where historical accounts indicate that MEC or MC may be present.

5.3.1.3 No explosives were detected at concentrations above their respective reporting limits in surface soil samples collected at MRS 1. The reporting limits for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for risks to human receptors. As described in Section 5.1.4.2, the reporting limit for NG was also deemed adequate to support the HHRA.

5.4.1.4 The inorganics copper, iron, lead, and nickel were detected in surface soils at MRS 1. The maximum iron concentration was greater than the residential screening level, and therefore

iron is designated as a COPC for surface soil at MRS 1. For iron, the risk-based residential screening level (SL) of 55,000 mg/kg derived by EPA was divided by ten to account for potential exposure to multiple non-carcinogens and results in the SL of 5,500 mg/kg used in the HHRA. The value of 55,000 mg/kg for iron is health protective if an individual is exposed to this non-carcinogenic chemical alone. It is standard practice in risk assessment that when a modified non-carcinogenic SL is exceeded, the assumptions used in the derivation are examined with respect to actual site conditions to determine if this result is truly risk significant. At Montauk Naval Sub Base only four non-carcinogenic MCs were identified (excluding lead) therefore making the screening value of 5,500 mg/kg highly conservative. Each of these MCs is not anticipated to act by the same non-carcinogenic mode of action, or at the same target organ. Additionally, mean and maximum concentrations of iron were below their respective concentrations in background. Therefore no added risk to humans from exposure to iron in surface soil was identified based on the use of the site.

5.4.1.5 As described above, no explosive MCs were detected in the surface soil samples for MRS 1. The reporting limits for 2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene were below the ecological screening criteria selected for the SLERA. This confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for risks to ecological receptors.

5.4.1.6 No eco-SSL was available for NG, and therefore it is not possible to make a similar comparison for this MC. NG is readily biodegradable and is not expected to bioconcentrate or biomagnify, which makes food chain exposures unlikely (USACHPPM 2007). Based on the fact that NG was not detected above the analytical reporting limit, and its fate and transport characteristics, NG was not identified as a COPEC in MRS 1 and is not expected to introduce an unacceptable level of uncertainty into the SLERA.

5.4.1.7 As described in Section 5.4.1.4 of the inorganic MCs evaluated copper, iron, lead, and nickel were detected in surface soil at MRS 1. Lead was detected in one of three surface soil samples at concentrations exceeding the eco-SSL of 11 mg/kg (HQ =1.5). Lead is identified as a COPEC in surface soil. However, the maximum and mean concentrations of lead at MRS 1 were below their respective background concentrations. Therefore no additional risk to ecological receptors from exposure to lead was identified based on site use.

5.4.1.8 As described in the SS-WP Addendum for the former Montauk Naval Sub Base, the incidental ingestion of and dermal contact with MC in subsurface soil were identified as potentially complete pathways for visitors/trespassers, construction workers, and residents at

MRS 1. No potentially completed exposure pathways were identified for MC in surface soils for employees or ecological receptors.

5.4.1.9 One subsurface soil sample was collected in an area where historical accounts indicate that MEC or MC may be present or deposited at MRS 1. No explosives were detected in concentrations above their respective reporting limits in subsurface soil samples. As discussed in Section 5.1.4.2, the reporting limits for all MCs at this MRS were sufficient to screen for risks to human receptors.

5.4.1.10 Of the inorganics analyzed, copper, iron, and lead were detected in subsurface soils in MRS 1. No background samples were obtained for subsurface soils, and therefore the detection of these MCs determines the subsurface soil pathway at MRS 1 to be complete for human receptors. The detected concentrations for these MCs did not did not exceed the respective screening criteria selected for the HHRA; therefore no COPC were designated in subsurface soil at MRS 1.

5.4.2 Sediment Pathway and Screening Results

5.4.2.1 Sediment was identified as a medium with a potentially complete pathway for human receptors including visitors/trespassers and residents, as well as ecological receptors at MRS 1. As described in the SS-WP Addendum (Alion 2008b), ingestion of and dermal contact with MCs in sediment were identified as potentially completed pathways for human and ecological receptors. Three sediment samples and one duplicate sediment sample were collected in and around the pier located within Fort Pond Bay. Samples were analyzed for DNT and its breakdown products, NG, antimony, copper, iron, lead, and nickel. Table 5-2 presents the analytical results for sediment, along with the human health and ecological screening values described previously in Section 5.1.3.

5.4.2.2 No explosives were detected at concentrations above their respective reporting limits in sediment samples collected at MRS 1. As described in Section 5.1.4.3, the reporting limits for all 8 explosives analyzed were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for risks to human receptors exposed to sediment.

5.4.2.3 As described in Section 5.3.0.2 in sediment, antimony was present within the MRS at concentrations exceeding background. The exposure pathway for visitors/trespassers and residents to sediment, therefore, is complete. All five of the inorganic MCs evaluated were

detected in sediment at MRS 1 however the maximum detected concentration of each inorganic MC was below the respective screening criteria applied in the HHRA. No COPC were identified in sediment.

5.4.2.4 As presented above in Section 5.4.2.2, no organic MCs were detected at concentrations above their respective reporting limits in at MRS 1. As discussed in Section 5.1.4.5 the analytical techniques were determined to be adequate to detect and screen for risks to ecological receptors from exposures to sediment.

5.4.2.5 No ecological screening criterion was available for NG in sediment; therefore, it is not possible to make a similar comparison for this MC. Given the fact that NG was not detected above the analytical reporting limit in any sediment sample, and its fate and transport characteristics discussed previously in Section 5.4.1.6, NG was not identified as a COPEC in MRS 1 sediment. The absence of a screening criterion for NG is not expected to introduce an unacceptable level of uncertainty into the SLERA.

5.4.2.6 As described in Section 5.3.0.2 site antimony in sediment was detected at concentrations that exceeded background. Therefore the sediment pathway is complete for ecological receptors at MRS 1. All five inorganics evaluated were detected in sediment, however, the maximum detected value of each was below the respective screening criteria applied in the SLERA. No COPECs were identified in sediment.

Table 5-1 Summary of Soil Analytical Results

			Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco-SSLs						
Sample Name:						**MNSB-FPB-SS-01-01**	**MNSB-FPB-SS-01-02**	**FD #01**	**MNSB-FPB-SB-02-01**	**MNSB-BG-SS-01-01**	**MNSB-BG-SS-01-02**
Sample Date:						**9/30/2008**	**9/30/2008**	**9/30/2008**	**9/30/2008**	**9/30/2008**	**9/30/2008**
Parent Name:								**MNSB-FPB-SS-01-02**			
MRS:						MRS 1	MRS 1	MRS 1	MRS 1		
Analyte	**CAS**	**Unit**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**						
Explosives											
2,4-DINITROTOLUENE	121-14-2	mg/kg	12	120	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-	-
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-	-
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15 [c]	200 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-	-
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	-	-
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	-	-
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-	-
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	-	-
NITROGLYCERIN	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	-	-
Metals											
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [e]	0.20 U	0.17 U	0.18 U	0.22 U	*0.53 J*	0.21
COPPER	7440-50-8	mg/kg	310	4,100	28 [f]	7.70	4.70 J	1.60 J	0.86	8.70	7.20
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	**7,850 J**	2,040 J	2,190 J	1,810 J	**11,000 J**	**10,400**
LEAD	7439-92-1	mg/kg	400	800	11 [g]	*17.1*	3.5 J	0.93 J	0.91	*39.7*	6.10
NICKEL	7440-02-0	mg/kg	160	2,000	38 [h]	4.10	3.20	0.74 U	0.81 U	6.50	5.70

[a] Screening levels for residential and industrial soils are derived from ORNL 2008. ORNL. 2008. Screening levels for chemical contaminants.
Available at: http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.html. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.

[b] For non-carcinogens, with the exception of lead, the soil residential and industrial soil screening levels were divided by 10. No adjustments were made for carcinogens or lead.

[c] The ORNL screening level for 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene is based on toxicity information for 2,4-dinitrotoluene (from EPA's IRIS).

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156.
Values based on 2,4,6-TNT with the except ion of 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene.

[e] EPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 20 November 2008.

[f] EPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 20 November 2008.

[g] EPA. 2005b. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 20 November 2008.

[h] EPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 20 November 2008.

CAS = Chemical Abstract Service
eco-SSL = Ecological soil screening level
EPA = United States Environmental Protection Agency
IRIS = EPA's Integrated Risk Information System
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram
MRS = Munitions Response Site
NSL = No screening level
ORNL = Oak Ridge National Laboratory
RfD = Reference dose
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs)
- = Not analyzed

Shaded and bolded values represent exceedance of human health screening criteria.
Shaded and italicized values represent exceedance of ecological screening criteria.

Table 5-2 Summary of Sediment Analytical Results

			Screening Levels Residential Soil- Direct [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco Screening Levels					
Sample Name:						MNSB-FPB-SD-01-01	MNSB-FPB-SD-01-02	FD #01	MNSB-FPB-SD-01-03	MNSB-BG-SD-01-(
Sample Date:						9/30/2008	9/30/2008	9/30/2008	9/30/2008	9/30/2008
Parent Name:								MNSB-FPB-SD-01-02		
MRS:						MRS 1	MRS 1	MRS 1	MRS 1	
Analyte	**CAS**	**Unit**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**					
Explosives										
2,4-DINITROTOLUENE	121-14-2	mg/kg	120	1,200	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-
2,6-DINITROTOLUENE	606-20-2	mg/kg	61	620	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	150 [c]	2,000 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-
2-NITROTOLUENE	88-72-2	mg/kg	29	130	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	-
3-NITROTOLUENE	99-08-1	mg/kg	1,200	12,000	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	-
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	150 [c]	1,900 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	-
4-NITROTOLUENE	99-99-0	mg/kg	300	1,100	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	-
NITROGLYCERIN	55-63-0	mg/kg	6.1	62	NSL	4.00 U	4.00 U	4.00 U	4.00 U	-
Metals										
ANTIMONY	7440-36-0	mg/kg	31	420	2.0 [e]	0.20 U	0.27 J	0.20 U	0.21 J	0.18
COPPER	7440-50-8	mg/kg	3,100	41,000	34 [f]	0.41 J	0.33 J	0.78 J	0.76 J	4.60
IRON	7439-89-6	mg/kg	55,000	720,000	20,000 [g]	627 J	830 J	915 J	1,930 J	*26,500*
LEAD	7439-92-1	mg/kg	400	800	35.8 [h]	0.34 J	0.25 J	0.45 J	0.67 J	5.30
NICKEL	7440-02-0	mg/kg	1,600	20,000	20.9 [f]	0.83 U	0.90 U	0.81 U	0.89	4.80

[a] Residential and industrial screening levels for sediment are derived from ORNL 2008 residential and industrial soil SLs.
ORNL. 2008. Screening levels for chemical contaminants. Available at:http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.html. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.

[b] With the exception of lead the residential and industrial soil screening levels for non-carciongens were divided by 10; no preliminary adjustments were made for carcinogens
Resulting screening levels were multiplied by 10 to account for reduced exposures to sediment compared to soil. No adjustments were made to lead screening levels.

[c] The ORNL screening level for 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene is based on toxicity information for 2,4-dinitrotoluene (from EPA's IRIS).

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156. Values were derived for soil.

[e] Long and Morgan. 1990. The potential for biological effects of sediment-sorbed contaminants tested in the national status and trends program.
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[f] Long et al. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. Environ. Manage. 19: 81-97.

[g] Persaud et al. 1993. Guidelines for the protection and management of aquatic sediment quality in Ontario. Ontario Ministry of the Environment and Energy. August.
ISBN 0-7729-9248-7.

[h] MacDonald et al. 2000. Development and evaluation of consensus-based sediment quality guidelines for freshwater ecosystems. Arch. Environ. Contam. Toxicol. 39: 20-31.

CAS = Chemical Abstract Service
EPA = United States Environmental Protection Agency
IRIS = EPA's Integrated Risk Information System
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram
MRS = Munitions Response Site
NSL = No screening level
ORNL = Oak Ridge National Laboratory
RfD = Reference dose
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs)
- = Not analyzed

Table 5-3
Non-Detection Concentrations and Screening Values for Human Receptors for Never-Detected Analytes

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Screening Value - Trespasser/Visitor [b]	Screening Value - Workers [b]
Surface and Subsurface Soil						
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	12	120
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	6.1	62
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	15	200
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	2.9	13
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	120	1,200
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	15	190
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	30	110
NITROGLYCERIN	55-63-0	mg/kg	4	4	0.61	6.2
ANTIMONY	7440-36-0	mg/kg	0.17	0.22	3.1	42
NA = Not applicable; assessment not completed.						
Sediment						
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	120	1,200
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	61	620
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	150	2,000
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	29	130
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	1,200	12,000
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	150	1,900
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	300	1,100
NITROGLYCERIN	55-63-0	mg/kg	4	4	6.1	62

[a] The Reporting Limits are reported for explosive compounds and Method Detection Limits are reported for metals.

[b] Sources and derivations of screening levels for all receptors and environmental media are detailed in Tables 5-1 through 5-2.

CAS = Chemical Abstract Service.
mg/kg = Milligram per kilogram.

Table 5-4
Non-Detection Concentrations and Screening Values for Ecological Receptors for Never-Detected Analytes

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Ecological Screening Value [b]
Surface and Subsurface Soil					
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	30
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	30
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	80
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	30
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	30
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	80
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	30
NITROGLYCERIN	55-63-0	mg/kg	4	4	NSL
ANTIMONY	7440-36-0	mg/kg	0.17	0.22	0.27
NA = Not applicable; assessment not completed.					
Sediment					
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	30
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	30
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	80
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	30
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	30
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	80
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	30
NITROGLYCERIN	55-63-0	mg/kg	4	4	NSL

[a] The Reporting Limits are reported for explosive compounds and Method Detection Limits are reported for metals.

[b] Sources and derivations of screening levels for all receptors and environmental media are detailed in Tables 5-1 through 5-2.

CAS = Chemical Abstract Service.
mg/kg = Milligram per kilogram.
NSL = No screening level.

Table 5-5
Comparison of Onsite and Background Surface Soil Concentrations for Metals at MRS 1

	Onsite: MRS 1					Background					Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]		Maximum Concentration/Qualifier (mg/kg)		Mean Concentration (mg/kg) [b]	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]		Maximum Concentration/Qualifier (mg/kg)		Mean Concentration (mg/kg) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
ANTIMONY	0/3	ND		ND		0.09	1/2	0.53	J	0.53	J	0.32	NO	NO
COPPER	3/3	1.60	J	7.70		4.67	2/2	7.20		8.70		7.95	NO	NO
IRON	3/3	2,040	J	7,850		4,027	2/2	10,400	J	11,000	J	10,700	NO	NO
LEAD	3/3	0.93	J	17.1		7.18	2/2	6.10		39.7		22.9	NO	NO
NICKEL	2/3	3.20		4.10		2.56	2/2	5.70		6.50		6.10	NO	NO

[a] Minimum concentration of analyte detected.
[b] Non detects are carried forth as one-half of the method detection limit in the calculation of the mean concentration.

NA = Not applicable; assessment not completed.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
ND = No detected results.

Table 5-6
Comparison of Onsite and Background Sediment Concentrations for Metals at MRS 1

	Onsite: MRS 1					Background					Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]		Maximum Concentration/Qualifier (mg/kg)		Mean Concentration (mg/kg) [b]	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]		Maximum Concentration/Qualifier (mg/kg)		Mean Concentration (mg/kg) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
ANTIMONY	2/4	0.21	J	0.27	J	0.17	0/3	ND		ND		0.10	YES	YES
COPPER	4/4	0.33	J	0.78	J	0.57	3/3	1.10		4.60		2.27	NO	NO
IRON	4/4	627	J	1,930	J	1,076	3/3	1,990	J	26,500	J	10,427	NO	NO
LEAD	4/4	0.25	J	0.67	J	0.43	3/3	0.59	J	5.30		2.24	NO	NO
NICKEL	1/4	0.89		0.89		0.54	3/3	0.97		4.80		2.25	NO	NO

[a] Minimum concentration of analyte detected.
[b] Non detects are carried forth as one-half of the method detection limit in the calculation of the mean concentration.

NA = Not applicable; assessment not completed.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
ND = No detected results.

6. SUMMARY AND CONCLUSIONS

6.0.1 Montauk Naval Sub Base is located on the southern shore of Fort Pond Bay in Montauk, Suffolk County, New York. The North American Datum (NAD) 1983 Universal Transverse Mercator (UTM), UTM zone 19N, easting (X) and northing (Y) coordinates for the central part of the property are 250545 meters (m) and 4548509 m, respectively. This FUDS falls under the geographical jurisdiction of USACE New York District (CENAN). This SI is being completed under DERP-FUDS Project No. C02NY076602 to address potential MMRP hazards remaining at the FUDS (USACE 2004a).

6.0.2 During the SI, two MRS were identified in the Montauk Naval Sub Base FUDS, as follows:

- MRS 1 – Fort Pond Bay and Beach
- MRS 2 – Torpedo Test Range. This MRS may be investigated by the USACE under a separate project in the future.

6.0.3 A summary of the results and conclusions is presented below, and is summarized in Table 6-1.

6.1 Fort Bay Pond and Beach (MRS 1)

6.1.0.1 Potential human receptors for MRS 1 include visitors/trespassers, construction workers, residents, and employees. Potential ecological receptors include benthic organisms, terrestrial-feeding mammals, and terrestrial-feeding birds.

6.1.0.2 Since military use of Montauk Naval Sub Base ceased in 1946, local residents have reported finding unfired .50 caliber ammunition washed ashore on the Fort Pond Bay beach after storms within MRS 1. A specific time frame for this observation was not given in historical documents. Additionally, between the mid 1980's and 90's local divers have reported that the bottom of Fort Pond Bay near and around the "L-shaped" pier is littered with possible .30 and/or .45 caliber small arms ammunition (USACE 2004a).

6.1.0.3 Surface soil, subsurface soil, and sediment were media with potentially complete exposure pathways for human and ecological receptors in MRS 1. In surface soil, iron exceeded the human health criterion used for visitors/trespassers and residents and was identified as a COPC. However, the site mean and maximum concentrations were below the respective background concentrations and therefore no added risk to humans from exposure to iron in

surface soil was identified based on the use of the site. Similarly, the maximum concentration of lead exceeded the ecological screening criterion selected for lead for the SLERA, but not concentrations of lead in background soils. Lead was identified as a COPEC, however, no additional risk to ecological receptors from exposures to lead from site use was identified. Due to the detection of metals in subsurface soil, the subsurface soil pathway was determined to be complete for human receptors. No MCs were detected in subsurface soils at concentrations that exceeded criteria selected to screen risks to human receptors; and therefore no COPCs were identified MRS 1 for subsurface soil. Due to the presence of antimony at levels exceeding background the sediment pathway was determined to be complete for human and ecological receptors at MRS 1. No MCs were detected in sediment at concentrations exceeding screening criteria selected for the HHRA or SLERA, and no COPCs or COPECs were identified.

Table 6-1 Summary of Human Health and Ecological Screening Level Risk Assessment Results

Medium of Concern	Human Health COPCs (HHRA) [a]	Ecological COPECs (SLERA)[a]
	Fort Pond Bay and Reach (MRS1)	**Fort Pond Bay and Reach (MRS1)**
Surface Soil	Iron exceeds screening criteria but not background. COPC, no additional risks from site use were identified.	Lead exceeds screening criteria but not background. COPEC, no additional risks from site use were identified
Subsurface Soil	No COPC	NA
Sediment	No COPC	No COPEC

[a] Sources and derivations of screening levels for all receptors and environmental media in the HHRA and SLERA are detailed in Tables 5-1 through 5-2.

COPC = Chemical of potential concern
COPEC = Chemical of potential environmental concern
HHRA = Human health risk assessment
MRS = Munitions Response Site
NA = Not applicable; assessment not completed.
SLERA = Screening level ecological risk assessment

7. RECOMMENDATIONS FOR FURTHER ACTION

7.0.1 Although two MRSs were identified in the ASR and ASR Supplemental only MRS 1 – Fort Pond Bay and Beach, was investigated at the Montauk Naval Sub Base FUDS. MRS 2 – Torpedo Test Range is entirely located within coastal waters (Block Island Sound and the Atlantic Ocean) and in accordance with USACE guidance (USACE 2004b), MRS 2 was not investigated during this SI. Concurrence with stakeholders on this decision was reached during the TPP meeting and documented in the Final TPP Memorandum and SS-WP (Alion 2008a and b).

7.0.2 Based on the results and conclusions of this SI, the following recommendations are provided:

MRS 1 (Fort Pond Bay and Beach) – An RI/FS is recommended at MRS 1. Additional studies should focus on MEC only. Historical documentation indicates that complete small arms rounds including suspected .30, .45 and .50 caliber small arms were observed at MRS 1 by local residents and divers. Based on these historical MD finds and the limited reconnaissance conducted in the area, there is a reasonable probability that MEC or MD may be present beneath the water and on land at MRS 1. Lead in surface soil exceeded ecological screening criteria was identified as a COPEC at MRS 1, but was below site specific background concentrations and not attributable to past military use. Iron exceeded the human health screening and was identified as a COPC however it was not detected above soil background concentrations. Based on a weight of evidence evaluation, neither iron nor lead are anticipated to pose unacceptable risks to receptors.

MRS 2 (Torpedo Test Range) – Based on USACE guidance for water ranges, MRS 2 (Torpedo Test Range) was not evaluated in this SI, and the recommendation is noted as being evaluation pending. This MRS will be addressed at some undetermined point in the future. An MRSPP evaluation for MRS 2 was prepared to support this recommendation and any future investigations

7.0.3 Neither a TCRA nor a NTCRA are recommended at MRS 1.

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APPENDIX A – SCOPE OF WORK

Located on CD.

APPENDIX B – TECHNICAL PROJECT PLANNING MEMORANDUM

- Technical Project Planning Memorandum (Located on CD)
- Data Quality Objective Verification Worksheets

Data Quality Objective Verification Worksheet			
Site: Montauk Naval Sub Base			
Project: FUDS MMRP SI Project Number C02NY076601			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine if the site requires additional investigation through a remedial investigation/feasibility study (RI/FS) or if the site may be recommended for No Department of Defense Action Indicated (NDAI) designation based on the presence or absence of munitions and explosives of concern (MEC) and munitions constituents (MC).	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC	Yes__X__ No ____	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil, and sediment	Yes__X__ No ____	
Required Sampling Locations or Areas	MEC and MC: Areas where military munition-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.	Yes__X__ No ____	
Number of Samples Required	MEC - Analog geophysical and visual reconnaissance data, rather than discrete sampling data, will be collected to accomplish this objective. These data will be collected using "meandering path" to and from the sampling points. The UXO Technician will collect data on an approximate 6-ft wide path using the geophysical equipment. The visual reach of observations is approximately 12 ft, and may be limited by the presence of vegetation. Once at the individual sampling point, the geophysical equipment will be used to assess an approximately 25 ft diameter circle for anomalies around the sampling point as site conditions permit. In some areas, there may be limitations to the ability to complete geophysical and visual observations. The total area on the paths to/from the sampling locations is approximately 101,460 ft² (2.23 acres) within MRS-1, and the area around the sampling locations is approximately 2,400 ft². Additionally, the Alion field team conducted waterway QR on approximately 31,450 ft² (0.72 acres) within Fort Pond Bay (MRS-1).Total QR (land and water) was 135,310 ft² (2.95 acres).		
	MC – The Alion field team also collected four surface soil samples (+ 1 duplicate), one subsurface soil sample and six sediment samples (+1 duplicate).	Yes__X__ No ____	

Data Quality Objective Verification Worksheet			
Site: Montauk Naval Sub Base			
Project: FUDS MMRP SI Project Number C02NY076601			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Reference Concentration of Interest or Other Performance Criteria	MEC: If historic data indicate the presence of MEC and one anomaly classified as of MPPEH, or confirmed MEC is found with the magnetometer, or if physical evidence indicating the presence of MEC is found during the visual inspection, then an RI/FS may be recommended. If no anomalies, MPPEH, or confirmed MEC are found, or if the UXO Technician indicates that there is no potential hazard from past use of munitions or MEC discoveries, then an NDAI may be recommended. In each of these instances, all lines of evidence (e.g., historic data, field data, etc.) will be used to make a final decision for an NDAI or RI/FS. In both instances (RI/FS or NDAI), all lines of evidence (e.g., historic data, field data etc. for both MEC and MC) will be used to make a final decision for an NDAI or RI/FS.	Yes__X__ No ____	
	MC: If the maximum concentrations measured at the site exceed EPA Region 9 Preliminary Remediation Goals (PRGs) based on current and future land use or EPA interim ecological risk screening values, then an RI/FS may be recommended for the site. If the maximum concentrations measured at the site do not exceed PRGs or ecological risk screening values, then an NDAI may be recommended. In summary, all lines of evidence including secondary lines of evidence, such as historic data, field data and comparison to state screening/cleanup criteria, will be used to make a final decision for an NDAI or RI/FS. Screening values selected for comparison at this site are specified in the chemical-specific measurement quality objective (MQO) tables.	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysics with a handheld analog magnetometer, which will used to collect related data, is accurate to an approximate depth of 2 ft. Global Positioning System (GPS) equipment will be used to log locations of MEC items encountered by the magnetometer. Visual observations will provide a continuous source of additional information which will be noted in the field log book with GPS coordinates. Photographs also will used as an additional documentation method. Geophysical methods/procedures will be described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC are described in detail in Section 4 of the SS WP, and Field Activities section of the PFSP.	Yes__X__ No ____	

Data Quality Objective Verification Worksheet			
Site: Montauk Naval Sub Base			
Project: FUDS MMRP SI Project Number C02NY076601			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Analytical Method	MEC: Analytical methods are not used with analog magnetometry. However, trained UXO professionals, engineers, and scientists will review all data to determine whether evidence gathered indicates the presence or absence of MEC. This analysis will be subject to an independent review within the Alion Team, by the USACE North Atlantic New York (CENAN), USACE Baltimore District Design Center (CENAB), and USACE Center of Expertise. MC: The methods that can be used for analysis include the following: Explosives Methods–8330A, 8330A (mod) for nitroglycerine; Metals Methods–6010B (reduced); Explosives Prep Methods - 8330A, 8330A (mod) for nitroglycerine; Metals Prep Method – 3050B, 3050 (mod).	Yes__X__ No ____	

Data Quality Objective Verification Worksheet			
Site: Montauk Naval Sub Base			
Project: FUDS MMRP SI Project Number C02NY076601			
DQO Statement Number: **2 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine the potential need for a Time-Critical Removal Action (TCRA) for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC	Yes__X__ No ____	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil, and sediment	Yes__X__ No ____	
Required Sampling Locations or Areas	Areas where military munitions-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.	Yes__X__ No ____	
Number of Samples Required	Refer to DQO 1 for MC/MEC sampling parameters.	Yes__X__ No _____	
Reference Concentration of Interest or Other Performance Criteria	If MC is reported in samples collected at the FUDS at concentrations exceeding screening criteria and those exceedances result in unacceptable risk and an imminent threat to receptors as identified through human health and ecological risk assessments or if one piece of confirmed MEC is found with the magnetometer or if physical evidence indicating the presence of MEC is found during the visual inspection, and if the item(s) is determined by a qualified UXO-Technician, explosive ordnance disposal (EOD) unit, and/or the USACE to be an immediate or imminent threat, then one of two actions may be initiated:	Yes__X__ No ____	
	TCRA- If there is a complete pathway between source and receptor and the MEC and the situation is viewed as an "imminent danger threat posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment", the Alion Team will immediately notify the Military Munitions Design Center Project Manager at USACE and the property owner. USACE will determine, with input from the Alion Team and stakeholders, whether or not a TCRA will be implemented.	Yes__X__ No ____	
	Non-TCRA - A non-TCRA (NTCRA) may be initiated in response to a release or threat of release that poses a risk where more than six months planning time is available.	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysical methods/procedures are described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC are described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.	Yes__X__ No ____	
Analytical Method	Refer to DQO 1 for MEC and MC analytical methods to be incorporated.	Yes__X__ No ____	

Data Quality Objective Verification Worksheet			
Site: Montauk Naval Sub Base			
Project: FUDS MMRP SI Project Number C02NY076601			
DQO Statement Number: **3 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect, or develop, additional data, as appropriate, in support of potential Hazard Ranking System (HRS) scoring by Environmental Protection Agency (EPA).	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	Data for HRS worksheet parameters will be compiled by gathering basic identifying information, general site description, site type, waste description, demographics, water use, sensitive environments, and response actions.	Yes__X__ No ____	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil, and sediment	Yes__X__ No ____	
Required Sampling Locations or Areas	Areas where MEC has been historically found, used, or disposed as documented in interviews or existing documentation.	Yes__X__ No ____	
Number of Samples Required	Refer to DQOs 1and 2.		
Reference Concentration of Interest or Other Performance Criteria	The HRS levels of contamination are Level I (concentrations that meet the criteria for actual contamination and are at or above media-specific benchmark levels), Level II (concentrations that either meet the criteria for actual contamination but are less than media-specific benchmarks, or meet the criteria for actual contamination based on direct observation), and Potential (no observed release is required but targets must be within the target distance limit). These levels are weighted for each target by EPA (Level I carries the greatest weight) and scores of 28.5 or above are then eligible for listing on the National Priorities List (NPL).	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Methods associated with historic data field reconnaissance and sampling (see DQOs 1 and 2). Refer to NPL Characteristics Data Collection Form, Version 3.0 (EPA 2001).	Yes__X__ No ____	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

Data Quality Objective Verification Worksheet			
Site: Montauk Naval Sub Base			
Project: FUDS MMRP SI Project Number C02NY076601			
DQO Statement Number: **4 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect the additional data necessary to the complete the Munitions Response Site Prioritization Protocol (MRSPP).	Yes__X__ No ____	
Data Needs Requirements:			
Data User Perspective(s)	Risk-MEC and MC, Compliance	Yes__X__ No ____	
Contaminant or Characteristic of Interest	Explosive Hazard Evaluation (EHE), Chemical Warfare Materiel Hazard Evaluation (CHE), and Health Hazard Evaluation (HHE). For the EHE and CHE modules, factors evaluated include the details of the hazard, accessibility to the Munitions Response Site (MRS), and receptor information. HHE factors include an evaluation of MC and any non-munitions-related incidental contaminants present, receptor information, and details pertaining to environmental migration pathways. Typical information compiled includes details pertaining to historical use, current/future use and ownership, cultural/ecological resources, and structures.	Yes__X__ No ____	
Media of Interest	MEC - Surface and subsurface soil MC - Surface soil, subsurface soil, and sediment	Yes__X__ No ____	
Required Sampling Locations or Areas	Areas where MEC has been identified historically and where sampling is recommended.	Yes__X__ No ____	
Number of Samples Required	Refer to DQOs 1 and 2 for related sampling required.		
Reference Concentration of Interest or Other Performance Criteria	An MRS priority is determined by USACE based on integrating the ratings from the EHE, CHE, and HHE modules. Refer to Federal Register/Vol. 70, No. 192/Wednesday, October 5, 2005/Rules and Regulations.	Yes__X__ No ____	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Data gathering prior to field activities as well as additional data gathered during field reconnaissance and sampling (DoD 2005).	Yes__X__ No ____	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

APPENDIX C – INTERVIEW DOCUMENTATION

(Not used)

APPENDIX D – FIELD NOTES AND FIELD FORMS

- Daily Quality Control Reports
- Field Forms
- Logbook
- Chain of Custody

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	09-30-08-01	Date: September 30, 2008	
Project Name:	C02NY076602	Contract Number:	W912DY-04-D-0017
Location of Work:	Montauk Nav Sub Base, Suffolk County, NY		
Description of Work: Conduct meandering path geophysics throughout the site with a focus around the former artillery batteries. Collect surface soil samples in front of selected batteries for explosives analysis.			
Weather: Cloudy	Rainfall: 0.00"	Temperature: Min. 60 f	Max. 65 f

1. Work performed today by Alion:

The Alion field team conducted qualitative reconnaissance (QR) on land totaling 101,466 square feet (2.23 acres) within MRS-1. Additionally, the Alion field team conducted waterway QR on approximately 31,452 square feet (0.72 acres) within Fort Pond Bay (MRS-1). The Alion field team also collected four surface soil samples (+ 1 duplicate), one subsurface soil sample and six sediment samples (+1 duplicate).

Samples Collected: Some sample locations may vary from SS-WP maps due to accessibility.

MNSB-FPB-SS-01-01	MNSB-BG-SS-01-02
MNSB-FPB-SS-01-02	MNSB-BG-SD-01-01
MNSB-FPB-SB-02-01	MNSB-BG-SD-01-02
MNSB-FPB-SD-01-01	MNSB-BG-SD-01-03
MNSB-FPB-SD-01-02	SOIL-DUP-01
MNSB-FPB-SD-01-03	SED-DUP-01
MNSB-BG-SS-01-01	

Reconnaissance Acreage / Discussion:

Reconnaissance was conducted in the meandering path fashion. Travel paths varied slightly from the geophysical site reconnaissance on figures in the SS-WP due to natural terrain and accessibility.

2. Work performed today by Subcontractors.

No subcontractors were needed for the Montauk Nav Sub Base SI field event.

3. Type and results of Control Phases and Inspection. (Indicate whether Preparatory – P, Initial – I, or Follow-Up – F and include satisfactory work completed or deficiencies with actions to be taken)

Preparatory phase inspections for the field were completed prior to mobilization to the Montauk Nav Sub Base in Montauk, NY. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

4. List type and location of tests performed and results of these tests.

GPS benchmark control point coordinates were collected prior to field work and then again after completion of the fieldwork (see below). Schonstedt checked ok.

Benchmark coordinates: Northing 4548214.814 meters (m), Easting 251408.597 m (UTM, Zone 19N, Conus 1983)

Initial GPS reading: Northing 4548221.23 m, Easting 251409.732 m (UTM, Zone 19N, Conus 1983)

Post event GPS reading: Northing 4548221.89 m, Easting 251409.112 m (UTM, Zone 18N, Conus 1983)

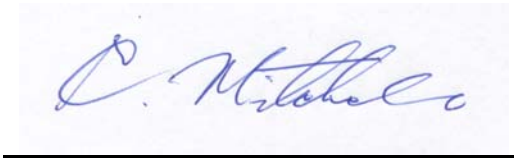
Benchmark was located at the Rough Riders Condominiums in Montauk, NY.

5. List material and equipment received.

All equipment (GPS unit, geophysical instrument) supplied by Alion.

6. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.
None
7. Off-site surveillance activities, including action taken.
None
8. Job Safety. (Report safety violations observed and actions taken)
No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.
9. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Qualitative Reconnaissance (QR) on-land was performed along the shoreline of the Rough Riders Condominiums. Waterway QR was performed within areas were historical documents indicated various debris from the former Montauk Nav Sub Base were disposed (Fort Pond Bay). A total of five underwater anomalies were detected using a BHG-1 all-metal magnetometer. None of these underwater anomalies were identified due to the depth Fort Pond Bay (20-30 ft). No subsurface anomalies were detected on land. No munitions debris (MD), munitions and explosives of concern (MEC) or munitions potentially presenting an explosive hazard (MPPEH) were identified at the MRS.

Alion Science and Technology, Inc's Verification: On behalf of Alion, I certify this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the contract plans and specifications, to the best of my knowledge, except as noted above.



Curtis W Mitchell

DAILY SITE SAFETY JOURNAL
Page 1 of 2

DATE: 30 Sep 08	PROJECT: MONTAUK
SUXOS: Mitchell	PM:
SSO: Mitchell	QCO:

AREA / ITEMS INSPECTED	SAT	UNSAT
Proper work attire (PPE)	✓	
Vehicle condition	✓	
Emergency equipment	✓	
Safe demolition procedures	N/A	
Field office, inside	N/A	
Field office grounds	N/A	
BHG-1	✓	
Schonstadt	✓	
Trimble	✓	

[ ] Last Work Days Events
[✓] Site Description
[✓] Work Area Description
[✓] Work Area Hazards
[✓] On-Site Emergency
[✓] Site Evacuation Procedures
[ ] Emergency Response Personnel
[ ] Emergency Telephone Numbers
[✓] Directions to Hospital
[✓] First Aid
[ ] Heat / Cold Stress
[ ] Asbestos Awareness & ID
[ ] Ticks
[✓] Safety Concerns
[✓] Personnel Protective Equipment
[✓] Safe Work Practices
[✓] Emergency Response Plan
[ ] Chemical Hazards
[✓] Emergency Equipment, Location
[✓] Emergency Equipment, by Type
[ ] Emergency Decontamination
[✓] Safe Work Practices - General
[✓] Site specific OE Safety Precautions
[✓] Site specific OE Identification Features
[ ] Liquid Contaminates / Landfill Material
[ ] Other _____

Comments:

SSO SIGNATURE:

DAILY SITE SAFETY JOURNAL
MEETING ATTENDEES
DATE: 30 Sept 08
Page 2 of 2

	Name	Affiliation
1	Ben Claus	Alion
2	Marcin Fonejsze-Wysocki	Alion
3	TODD GRAHAM	Alion
4		
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Montauk Naval
Sub Base

Field Book
E 64-8x4 S

SI Field Book

Sept. 2008

CURVE FORMULAS

$T = R \tan \frac{1}{2} I$

$T = \frac{50 \tan \frac{1}{2} I}{\text{Sin. } \frac{1}{2} D}$

$\text{Sin. } \frac{1}{2}D = \frac{50}{R}$

$\text{Sin. } \frac{1}{2}D = \frac{50 \tan \frac{1}{2}I}{T}$

$R = T \cot \frac{1}{2}I$

$R = \frac{50}{\text{Sin. } \frac{1}{2}D}$

$E = R \text{ ex. sec } \frac{1}{2} I$

$E = T \tan \frac{1}{4} I$

$\text{Chord def.} = \frac{\text{chord}^2}{R}$

$\text{No. chords} = \frac{I}{D}$

$\text{Tan. def.} = \frac{1}{2} \text{ chord def.}$

The square of any distance, divided by twice the radius, will equal the distance from tangent to curve, very nearly.

To find angle for a given distance and deflection.

Rule 1. Multiply the given distance by .01745 (def. for 1° for 1 ft.) and divide given deflection by the product.

Rule 2. Multiply given deflection by 57.3, and divide the product by the given distance.

To find deflection for a given angle and distance. Multiply the angle by .01745, and the product by the distance.

GENERAL DATA

RIGHT ANGLE TRIANGLES. Square the altitude, divide by twice the base. Add quotient to base for hypotenuse.

Given Base 100, Alt. $10.10^2 \div 200 = .5$. $100 + .5 = 100.5$ hyp.

Given Hyp. 100, Alt. $25.25^2 \div 200 = 3.125$. $100 - 3.125 = 96.875$ = Base.

Error in first example, .002; in last, .045.

To find Tons of Rail in one mile of track: multiply weight per yard by 11, and divide by 7.

LEVELING. The correction for curvature and refraction, in feet and decimals of feet is equal to $0.574\ d^2$, where d is the distance in miles. The correction for curvature alone is closely, $\frac{2}{3}d^2$. The combined correction is negative.

PROBABLE ERROR. If d_1, d_2, d_3, etc. are the discrepancies of various results from the mean, and if Σd^2 = the sum of the squares of these differences and n = the number of observations, then the probable error of the mean = $\pm 0.6745 \sqrt{\frac{\Sigma d^2}{n(n-1)}}$

MINUTES IN DECIMALS OF A DEGREE

1'	.0167	11'	.1833	21'	.3500	31'	.5167	41'	.6833	51'	.8500
2	.0333	12	.2000	22	.3667	32	.5333	42	.7000	52	.8667
3	.0500	13	.2167	23	.3833	33	.5500	43	.7167	53	.8833
4	.0667	14	.2333	24	.4000	34	.5667	44	.7333	54	.9000
5	.0833	15	.2500	25	.4167	35	.5833	45	.7500	55	.9167
6	.1000	16	.2667	26	.4333	36	.6000	46	.7667	56	.9333
7	.1167	17	.2833	27	.4500	37	.6167	47	.7833	57	.9500
8	.1333	18	.3000	28	.4667	38	.6333	48	.8000	58	.9667
9	.1500	19	.3167	29	.4833	39	.6500	49	.8167	59	.9833
10	.1667	20	.3333	30	.5000	40	.6667	50	.8333	60	1.0000

INCHES IN DECIMALS OF A FOOT

1/16	3/32	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	7/8
.0052	.0078	.0104	.0156	.0208	.0260	.0313	.0417	.0521	.0625	.0729

1	2	3	4	5	6	7	8	9	10	11
.0833	.1667	.2500	.3333	.4167	.5000	.5833	.6667	.7500	.8333	.9167

Elec. Publishing Co., Inc., Meredith, N.H. 03253

(1)

Field Contact List

Gatis Mastins: cell: 516-456-5844
work: 631-668-3650

Rich Gajdek Cell: 917-514-7242

NAN SV3 BASE

SAMPLE COORDINATES UTM NAD83 ZONE 19N

ID	EASTING (m)	NORTHING (m)
MNSB-FPB-SS-01-01	251411.361	4548153.953
MNSB-FPB-SS-01-02	251376.936	4548222.517
MNSB-FPB-SB-02-01	251329.605	4548130.055
MNSB-BG-SD-01-03	250401.407	4547521.841
MNSB-BG-SD-01-02	250372.788	4547519.414
MNSB-BG-01-01	250488.198	4547532.312
MNSB-FBB-SD-01-03	251356.958	4548235.915
MNSB-FPB-SD-01-02	251311.47	4548194.313
MNSB-FPB-SD-01-03	251277.07	4548111.799
MSBR-BG-SS-01-01	251943.01	4548718.018
MNSB-BG-SS-01-02	252051.553	4548478.698
ANOMALIES		
H_2O MNSB	251331.437	4548407.11
	251294.447	4548154.83
	251279	4548183.238
	251299.09	4548235.614
	251304.556	4548257.128

DG BC

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DG BC

(2)

If found, please return to:

Corinne Shia
3975 Fair Ridge Dr.
Suite 125 South
Fairfax, VA 22033

703-259-5147

Signature Page (3)

Curtis Mitchell (Rusty)
Todd Brancel
Ben Cums
Maria Borejsza Wysocka

6

9/30/08 Montauk Nav SI

0700: Leave Hotel and mob to Montauk Nav. Sub base Site.

0745: Arrive at SI site conduct equipment check.

BHG - check - O.K E = 251408.597

Schonstedt - check - O.K N = 4548214.814

GPS check.

Benchmark coords: UTM Zone 19N

N =

E =

GPS coords:

N = ~~4548465.58~~ N 4548221.23

E = ~~755690.32~~ 251409.772

8~~15~~. Rusty Mitchell conducts HES tailgate meeting to site personell.

Present:

Maria Borejszo Wysocky / Alion / Field tech

Ben Claus / Alion / PIL

Todd Belanger / Alion / Field tech

Rusty Mitchell / HFA / UXO Tech.

Topics: UXO/MEC safety. Boat safe water safety, proper hydration, Slips trips/falls.

B. Claus discusses objectives of field event.

7

9/30/08 Montauk Nav SI

cont. Field objectives.

- collect surface soil, subsurface soil, and sediment samples.
- QR using schonstedt on-land and BHG-I in water.
- GPS all sample locations, UXO/MEC, and QR paths.
- Safe work conducted as specified in final SS-WP.

0825: weather: 60-65 °F, Cloudy, 0-5 mph wind.

840: Meet with Gavin Hastings to conduct water way QR.

8:50: Sample collection

MNSB-FPB-SS-01-01

Sandy soil, gravels

9:00: Sample collection

MNSB-FPB-SS-01-02

Sand (gravely)

9:05: Sample duplicate

Soil dup #1 at MNSB-FPB-SS-01-02

9:15: Sample

MNSB-FPB-SB-02-01 Sand

MS/MSD collected

9/30/08 Montauk Nav SI Event (8)

935: Conduct QR around dock and along pathway to background Sediment Samples

10:05: Background sample
MNSB-BG-SD-01-03
clean Sand

10:15 Background sample
MNSB-BG-SD-01-02
clean Sand
Background samples analyzed for metals only

10:20 Background Sample
MNSB-BG-SD-01-01
Sand

11:25 Come back to car unload samples meet Gatis and wait for boat

11:35 Boarded the boat
water QR

11:45 Sample
MNSB-FPB-SD-01-03
Sandy Sediment material
5-10% organic material

9/30/08
Montauk Nav. SI Event (9)

11:50 Sample
MNSB-FPB-SD-01-02
Sandy Gravel

11:55 Sediment Dup #1
at MNSB-FPB-SD-01-02 location

12:00 Sub-anomaly 1
water depth between 25-30 ft

12:15 Sub-anomaly 2
water depth ~15 ft

12:16 Sub-anomaly
water depth ~15 ft

12:21 Sub-anomaly ~20 ft

12:22 Sub-anomaly
water depth ~20 ft

12:25 Got off the boat

1245 MSD
MS
MNSB-FPB-SD-01-01
sandy

13:15 Sample background
MNSB-BG-SS-01-01

13:20 Sample background
MNSB-BG-SS-01-02

9/30/08. Montauk SI Event (10)
1400: Pack-up samples and ensure all samplers collected. All samplers collected.
1420: Summary, no surface MD, MEC, MPPEH of KRD found. A total of 5 anomalies detected in H_2O QR. These are in and around the pier near condominiums.
1530: Alion field team completes all fieldwork and demobs from Montauk naval subs base sit.

End of Day.

GPL LABORATORIES, LLC

7210A Corporate Court
Frederick, MD 21703
(301) 694-5310
Fax (301) 620-0731

Contract #/Billing Reference:

Project: Montauk Naval Sub base
Client: Alion Science
Send Results To: C. Shia, B. Claus
Address: 3975 Fair Ridge Dr.
Fairfax VA 22033
Phone: 703-259-5264

Turnaround Time: Standard
# of Containers:
Container Type: 8 oz
Preservative Used: NA
Type of Analysis:

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Explosives (EPA 8330 from 1600 Dicke)	Nitroglycerine	2,4-Dinitrotoluene (DNT)	2,6-DNT	2-Amino-4,6-DNT	4-Amino-2,6-DNT	2-Nitrotoluene	3-Nitrotoluene	4-Nitrotoluene	Lab Cooler No.	CLIENT COMMENTS
MNSB-FPB-SS-01-01	10/30	0850	Soil	BC	X	X	X	X	X	X	X	X	X		
MNSB-FPB-SS-01-02	10/30	0900	Soil	BC	X	X	X	X	X	X	X	X	X		
MNSB-FPB-SB-02-01	10/30	0915	Soil	BC	X	X	X	X	X	X	X	X	X		MS/MSD
MNSB-FPB-SD-01-01	10/30	1245	Sed	BC	X	X	X	X	X	X	X	X	X		MS/MSD
MNSB-FPB-SD-01-02	10/30	1150	Sed	BC	X	X	X	X	X	X	X	X	X		
MNSB-FPB-SD-01-03	10/30	1145	Sed	BC	X	X	X	X	X	X	X	X	X		
MNSB-B6-SS-01-01	10/30	1315	Soil	BC	X										
MNSB-B6 SS-01-02	10/30	1320	Soil	BC	X										
MNSB-B6-SD-01-01	10/30	1020	Sed	BC	X										
MNSB-B6-SD-01-02	10/30	1015	Sed	BC	X										
MNSB-B6-SD-01-03	10/30	1005	Sed	BC	X										
Soil-Dup #1	10/30	0905	Soil	BC	X	X	X	X	X	X	X	X	X		

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	10/31/08 1600				

Relinquished By:	Date/Time	Received By:	Date/Time	Shipper:	Airbill No.:

Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:

G.P. W.O. _____

GPL LABORATORIES, LLC

7210A Corporate Court
Frederick, MD 21703
(301) 694-5310
Fax (301) 620-0731

Contract #/Billing Reference

2 of 2 Pgs.

Project: Montauk Nav Sub base
Client: Alion
Send Results To: B. Claus, C. Shia
Address: 3975 fair Ridge
Fairfax, VA 22033
Phone:

Turnaround Time: Standard
# of Containers: 2
Container Type: 8oz
Preservative Used: Na
Type of Analysis

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Antimony, Iron, Lead, Nickel	Nitroglycerine	2,4,6-Trinitrotoluene CONF	2,6-DNT	2-Amino-4,6-DNT	4-Amino-2,6-DNT	2-Nitrotoluene	3-Nitrotoluene	4-Nitrotoluene	Lab Cooler No.	CLIENT COMMENTS
Sed-Dup#1	10/30	1155	sed	BC	X	X	X	X	X	X	X	X	X		

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	10/31/08 1600				

Relinquished By:	Date/Time	Received By:	Date/Time	Shipper:	Airbill No.:

Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:

 G.P. W.O. _____

APPENDIX E – PHOTO DOCUMENTATION LOG

APPENDIX E – PHOTOGRAPHIC LOG

Project/Site: Montauk Naval Sub Base
Project No.: C02NY076602

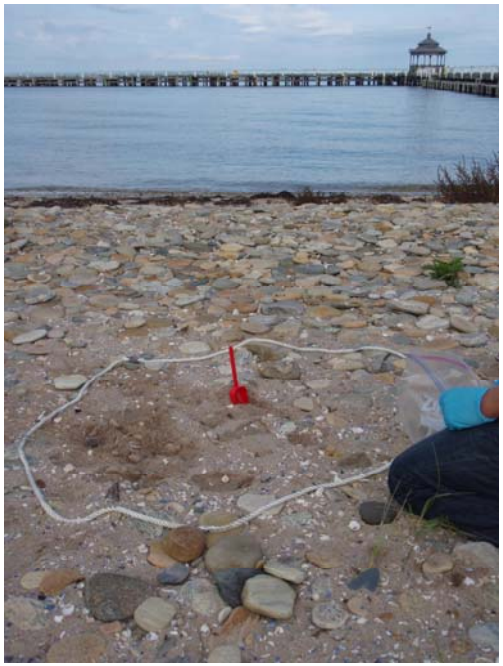
Date	Photo ID	Description
09/30/2008	E.1	Looking North along pier on Fort Pond Bay
09/30/2008	E.2	Conducting waterway geophysical reconnaissance within Fort Pond Bay
09/30/2008	E.3	Surface soil sample MNSB-FPB-SS-01-02 near the shoreline of Fort Pond Bay
09/30/2008	E.4	Photo showing the general site layout of the beach portion of MRS – 1
09/30/2008	E.5	Photo showing 7-wheel sampling technique at location MNSB-FPB-SS-01-01
09/30/2008	E.6	Subsurface soil sample location MNSB-FPB-SB-02-01

Montauk Naval Sub Base – Field Photographs

Site: Montauk Naval Sub Base
Photographer: B. Claus
Location of Photograph: MRS - 1
GPS Coordinates: N 4548224.44 E 251377.70
(UTM Zone 18N)
Direction of Photo: North
Comments: Looking North along pier on Fort Pond Bay
Photograph No.: E.1 Date: 09/30/08 Time: 8:50 AM

Site: Montauk Naval Sub Base
Photographer: B. Claus
Location of Photograph: Fort Pond Bay
GPS Coordinates: N 4548220.48 E 251178.61
(UTM Zone 16N)
Direction of Photo: South
Comments: Conducting waterway geophysical reconnaissance within Fort Pond Bay
Photograph No.: E.2 Date: 09/30/08 Time: 10:20 AM

Montauk Naval Sub Base – Field Photographs

Site: Montauk Naval Sub Base Photographer: B. Claus Location of Photograph: MNSB-FPB-SS-01-02 GPS Coordinates: N 4548209.44 E 251353.82 (UTM Zone 18N) Direction of Photo: North Comments: Surface soil sample MNSB-FPB-SS-01-02 near the shoreline of Fort Pond Bay. Photograph No.: E.3 Date: 09/30/08 Time: 9:00 AM	Site: Montauk Naval Sub Base Photographer: B. Claus Location of Photograph: MRS - 1 GPS Coordinates: N 4548191.02 E 251324.02 (UTM Zone 18N) Direction of Photo: West Comments: Photo showing the general site layout of the beach portion of MRS – 1. Photograph No.: E.4 Date: 09/30/08 Time: 10:45 AM
	

Montauk Naval Sub Base – Field Photographs

Site:	Montauk Naval Sub Base
Photographer:	M. Borejsza-Wysocka
Location of Photograph:	MNSB-FPB-SS-01-01
GPS Coordinates: (UTM Zone 18N)	N 4548161.25 E 251324.02
Direction of Photo:	East
Comments:	Photo showing 7-wheel sampling technique at location MNSB-FPB-SS-01-01.
Photograph No.:	E.5 Date: 9/30/08 Time: 8:50 AM

Site:	Montauk Naval Sub Base
Photographer:	B. Claus
Location of Photograph:	MNSB-FPB-SB-02-01
GPS Coordinates: (UTM Zone 18N)	N 4548161.33 E 251330.64
Direction of Photo:	Not Applicable
Comments:	Subsurface soil sample location MNSB-FPB-SB-02-01.
Photograph No.:	E.6 Date: 9/30/08 Time: 9:15 AM

APPENDIX F – ANALYTICAL DATA

- Automated Data Review Library
- Automated Data Review EDDs
- EDMS
- Analytical Summary Reports
- Analytical Data Reports
- SEDD Deliverable

Located on CD.

APPENDIX G – ANALYTICAL DATA QUALITY ASSURANCE/ QUALITY CONTROL REPORT

- Validated Data from EDS
- USACE Memorandum for Record-CQAR of Quality Assurance Split Samples. (Split Samples not collected in accordance to CENAB direction.)

Located on CD.

APPENDIX H – GEOGRAPHIC INFORMATION SYSTEMS DATA

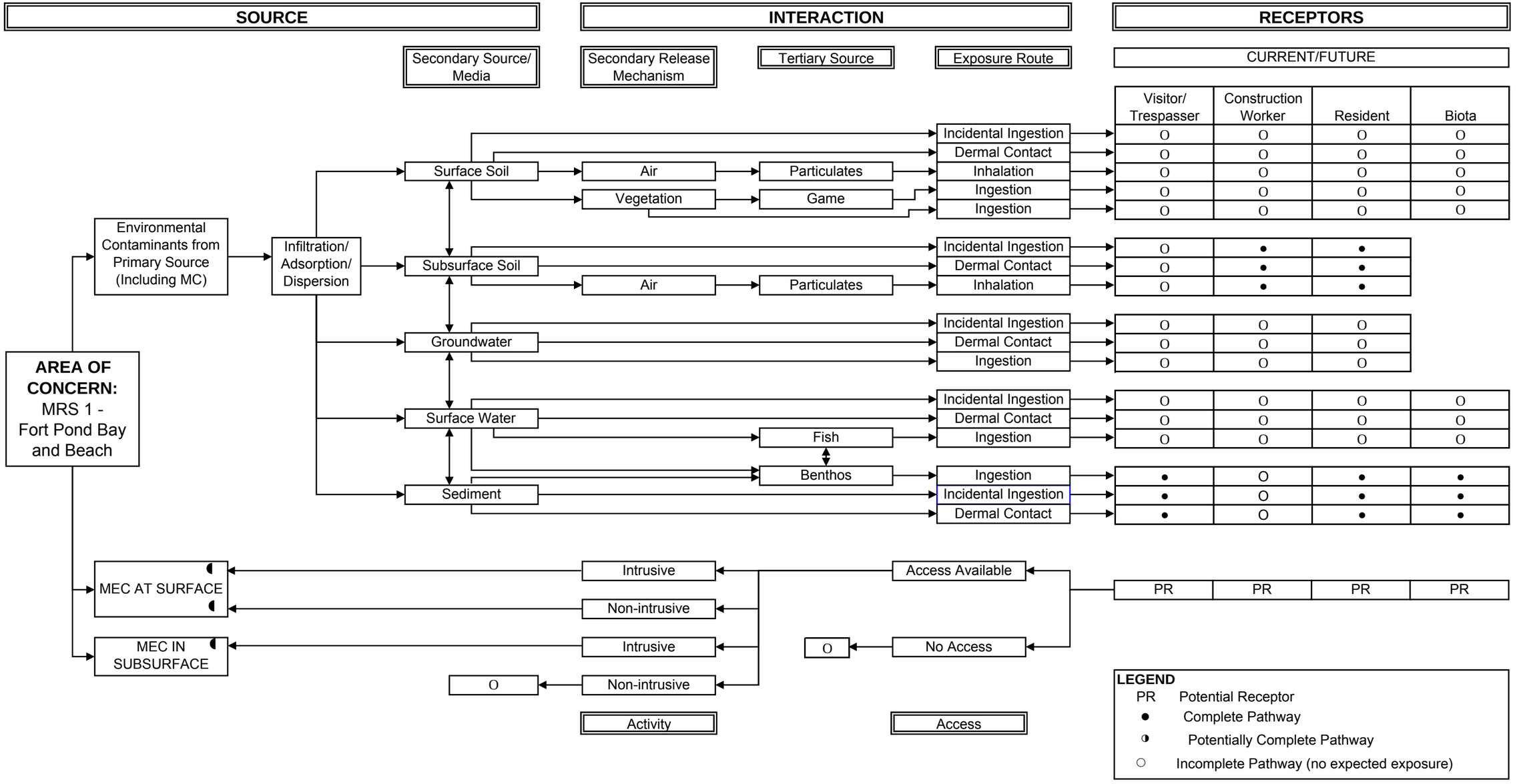
Per USACE guidance submitted during the Final SIR.

APPENDIX I – GEOPHYSICAL DATA

Appendix not used.

APPENDIX J – CONCEPTUAL SITE MODEL

- MRS 1
- MRS 2



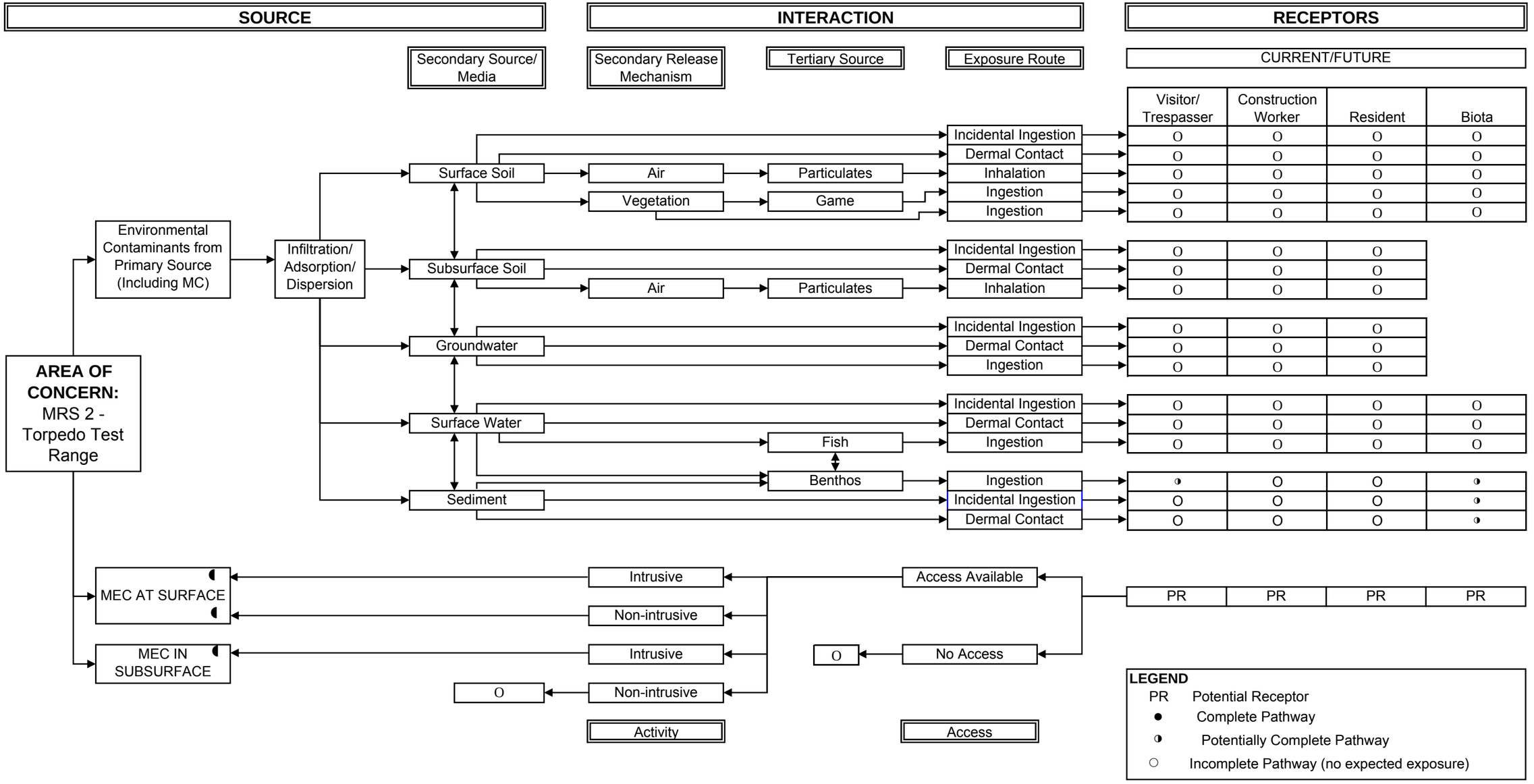
NOTES:

1. For the MMRP SI at Montauk Naval Sub Base, this CSM summarizes the potential risk exposure scenarios for MRS 1 - Fort Pond Bay and Beach. For a pathway to be complete, it must include a source, an exposure medium, an exposure route, and a receptor. A complete pathway may also include a release mechanism and a transport medium. Interaction between a potential receptor and MEC has two components: access and activity.

2. Primary sources will vary but will include the MRS 1 area where historical MEC activities occurred. MCs (metals) in sediment samples were detected in concentrations that were below background concentrations, but above screening criteria and are therefore potentially complete pathways. Site groundwater is not used as a drinking water source (incomplete pathway for ingestion) and is tidally influenced; therefore, this medium is an incomplete pathway.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL
FOR
Montauk Naval Sub Base [1. 2 and 3]
MRS 1 - Fort Pond Bay and Beach
(WORKING DRAFT)
Revised February 2009 Figure J1

Source: U.S. Army Corps of Engineers (USACE). 2003. *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Wastes (HTRW) Projects.* EM 1110-1-1200.



NOTES:

1. For the MMRP SI at Montauk Naval Sub Base, this CSM summarizes the potential risk exposure scenarios for MRS 2- Torpedo Test Range. For a pathway to be complete, it must include a source, an exposure medium, an exposure route, and a receptor. A complete pathway may also include a release mechanism and a transport medium. Interaction between a potential receptor and MEC has two components: access and activity.

2. Primary sources will vary but will include the MRS 2 area where historical MEC activities occurred. MRS 2 is located entirely within Block Island Sound and the Atlantic Ocean therefore surface soil, subsurface soil are not present at the MRS. Although surface water is present it is completely within a tidally influenced area and is unlikely to be impacted by MC. Sediment is present within the MRS (at varying depths from 30 -150 feet deep) and is potentially a complete exposire pathway for biota as well as ingestion of benthos by human receptors (shellfish). Site groundwater is not used as a drinking water source (incomplete pathway for ingestion) and is tidally influenced; therefore, this medium is an incomplete pathway.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR

Montauk Naval Sub Base [1. 2 and 3]

MRS 2 - Torpedo Test Range - Water Range

(WORKING DRAFT)

Revised February 2009 Figure J2

Source: U.S. Army Corps of Engineers (USACE). 2003. *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Wastes (HTRW) Projects.* EM 1110-1-1200.

APPENDIX K – MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL RESULTS

- MRS 1
- MRS 2

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: MRS 1 - Fort Pond Bay and Beach

Component: U.S. Navy

Installation/Property Name: Nav Sub Base (FFID: NY29799F127000)

Location (City, County, State): Montauk, Suffolk County, New York

Site Name (RMIS ID)/Project Name (Project No.): Nav Sub Base (C02NY076602)/(RMIS ID C02NY076602M01)

Date Information Entered/Updated: 1/6/2009 1:29:09 AM

Point of Contact (Name/Phone): Rick Gajdek (917-790-8234)

Project Phase (check only one):

☐ PA	■ SI	☐ RI	☐ FS	☐ RD
☐ RA-C	☐ RIP	☐ RA-O	☐ RC	☐ LTM

Media Evaluated (check all that apply):

☐ Groundwater	■ Sediment (human receptor)
■ Surface soil	☐ Surface Water (ecological receptor)
■ Sediment (ecological receptor)	☐ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

The Montauk Naval Sub Base FUDS was comprised of approximately 45 acres located in Montauk, Suffolk County, New York. The military utilized the FUDS as a torpedo manufacturing facility and torpedo engine testing range from approximately 1943 to 1946. Between 1946 and 1958 the General Services Administration (GSA) conveyed portions of the former Montauk Naval Sub Base to the Long Island Railroad (LIRR) and real estate developers (USACE 1993). Since military use ended in 1946, local residents have reported finding suspected .50 caliber whole small arms rounds washed on the shore of Fort Pond Bay as well as reports of local divers observing .30 and/or .45 caliber small arms near the "L-shaped" pier within Fort Pond Bay (USACE 1995). Two MRSs were identified in the ASR Supplemental. MRS 1 - Fort Pond Bay and Beach and MRS 2 - Torpedo Test Range. Refer to Sections 2.1 (entire), 2.4.3.1, 2.4.3.2, 2.5.1, 4.2.1.1, 4.3.1.1, and 4.3.1.2 and Table 2-2 of the SI report for more information concerning the history of the FUDS and the types of munitions used at MRS 1.

Note: MRS 2 (Torpedo Test Range) was not investigated as part of this SI. MRS 2 is located entirely within water (Block Island Sound and the Atlantic Ocean) and may be investigated under a separate project. A MRSPP is included in this SI for MRS 2.

Description of Pathways for Human and Ecological Receptors:
Based on analytical data collected during the SIR and subsequent human health and ecological risk assessments no complete pathways were identified at MRS 1.
Description of Receptors (Human and Ecological):
Construction worker, residents, trespasser/visitor, biota.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms practice munitions, small arms, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazardard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrothechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	2

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

Small arms munitions including complete .50 caliber rounds and suspected .30 and .45 caliber were found in MRS 1 along the eastern shoreline of Fort Pond Bay and within the waters of Fort Pond Bay. These munitions are classified as Discarded Military Munitions (DMM) due to the fact that they were dumped or dissposed of within the MRS. The specific location of these munitions was not determined (USACE 1995). Refer to Sections 2.4.1.1, 2.4.2.1, 2.5.1, 4.2.1.1, 4.3.1.1, 4.3.1.2 and Table 2-2 of this SI report for more information.

Table 2

EHE Module: Source of Hazard Data Element Table

DIRECTIONS: Below are 11 classifications describing sources of explosive hazards. Circle the score(s) that correspond with **all** sources of explosive hazards known or suspected to be present at the MRS.

Note: The terms former range, practice munitions, small arms, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Former range	◆ The MRS is a former military range where munitions (including practice munitions with sensitive fuzes) have been used. Such areas include: impact or target areas, associated buffer and safety zones, firing points, and live-fire maneuver areas.	10
Former munitions treatment (i.e., OB/OD) unit	◆ The MRS is a location where UXO or DMM (e.g., munitions, bulk explosives, bulk pyrotechnic, or bulk propellants) were burned or detonated for the purpose of treatment prior to disposal.	8
Former practice munitions range	◆ The MRS is a former military range on which only practice munitions without sensitive fuzes were used.	6
Former maneuver area	◆ The MRS is a former maneuver area where no munitions other than flares, simulators, smokes, and blanks were used. There must be evidence that no other munitions were used at the location to place an MRS into this category.	5
Former burial pit or other disposal area	◆ The MRS is a location where DMM were buried or disposed of (e.g., disposed of into a water body) without prior thermal treatment.	5
Former industrial operating facilities	◆ The MRS is a location that is a former munitions maintenance, manufacturing, or demilitarization facility.	4
Former firing points	◆ The MRS is a firing point, where the firing point is delineated as an MRS separate from the rest of a former military range.	4
Former missile or air defense artillery emplacements	◆ The MRS is a former missile defense or air defense artillery (ADA) emplacement not associated with a military range.	2
Former storage or transfer points	◆ The MRS is a location where munitions were stored or handled for transfer between different modes of transportation (e.g., rail to truck, truck to weapon system).	2
Former small arms range	◆ The MRS is a former military range where only small arms ammunition was used [There must be evidence that no other types of munitions (e.g., grenades) were used or are present to place an MRS into this category.].	*1*
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that no UXO or DMM are present, or there is historical evidence indicating that no UXO or DMM are present.	0
SOURCE OF HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	*1*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Source of Hazard*** classifications in the space provided.

The Fort Pond Beach area was used as a torpedo recovery and pier area. The origin and source of the small arms ammunition is unknown, but it is assumed the small arms ammunition was disposed of within the MRS (USACE 2004). Refer to Sections 2.4.1.1, 2.4.2.1, 2.5.1, 4.2.1.1, 4.3.1.1, 4.3.2.1 and Table 2-2 of this SI report for more information.

Table 3

EHE Module: Location of Munitions Data Element Table

DIRECTIONS: Below are eight classifications of munitions locations and their descriptions. Circle the score(s) that correspond with **all** locations where munitions are located or suspected of being found at the MRS.

Note: The terms surface, subsurface, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Confirmed surface	◆ Physical evidence indicates that there are UXO or DMM on the surface of the MRS ◆ Historical evidence (e.g., a confirmed incident report or accident report) indicates there are UXO or DMM on the surface of the MRS.	25
Confirmed subsurface, active	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS,and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena (e.g., drought, flooding, erosion, frost, heat heave, tidal action), or intrusive activities (e.g., plowing, construction, dredging) at the MRS are likely to expose UXO or DMM.	20
Confirmed subsurface, stable	◆ Physical evidence indicates the presence of UXO or DMM in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed. ◆ Historical evidence indicates that UXO or DMM are located in the subsurface of the MRS and the geological conditions at the MRS are not likely to cause UXO or DMM to be exposed, in the future, by naturally occurring phenomena, or intrusive activities at the MRS are not likely to cause UXO or DMM to be exposed.	15
Suspected (physical evidence)	◆ There is physical evidence (e.g., munitions debris, such fragments, penetrators, projectiles, shell casings, links, fins), other than the documented presence of UXO or DMM, indicating that UXO or DMM may be present at the MRS.	10
Suspected (historical evidence)	◆ There is historical evidence indicating that UXO or DMM may be present at the MRS.	5
Subsurface, physical constraint	◆ There is physical or historical evidence indicating that UXO or DMM may be present in the subsurface, but there is a physical constraint (e.g., pavement, water depth over 120 feet) preventing direct access to the UXO or DMM.	2
Small arms (regardless of location)	◆ The presence of small arms ammunition is confirmed or suspected, regardless of other factors such as geological stability [There must be evidence that no other types of munitions (e.g., grenades) were used or are present at the MRS to place an MRS into this category.].	*1*
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	0
LOCATION OF MUNITIONS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 25).	*1*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Location of Munitions*** classifications in the space provided.

Small arms were reported by local residents and divers both underwater near the "L-shaped" pier in Fort Pond Bay and on the beach. The small arms reportedly wash ashore during storms (USACE 1995 and 2004). Refer to Sections 2.1 (entire), 2.2 (enitre), 2.5.1, and Table 2-2 of this SI report for more information.

Table 4

EHE Module: Ease of Access Data Element Table

DIRECTIONS: Below are four classifications of barrier types that can surround an MRS and their descriptions. The barrier type is directly related to the ease of public access to any explosive materiel. Circle the score that corresponds with the ease of access to the MRS.

Note: The term barrier is defined in Appendix C of the Primer.

Classification	Description	Score
No barrier	◆ There is no barrier preventing access to any part of the MRS (i.e., all parts of the MRS are accessible).	*10*
Barrier to MRS access is incomplete	◆ There is a barrier preventing access to parts of the MRS, but not the entire MRS.	8
Barrier to MRS access is complete but not monitored	◆ There is a barrier preventing access to all parts of the MRS, but there is no surveillance (e.g., by a guard) to ensure that the barrier is effectively preventing access to all parts of the MRS.	5
Barrier to MRS access is complete and monitored	◆ There is a barrier preventing access to all parts of the MRS, and there is active, continual surveillance (e.g., by a guard, video monitoring) to ensure that the barrier is effectively preventing access to all parts of the MRS.	0
EASE OF ACCESS	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 10).	*10*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ease of Access*** classifications in the space provided.

The Fort Pond beach and pier area are used by residents and visitors. There is no fence surrounding MRS 1 (USACE 1995). Refer to Sections 1.3.1, 2.1 (entire), 2.3.1.1, 2.3.3.1, 2.3.3.2, and 2.3.4.1 of this SI report for more information.

Table 5

EHE Module: Status of Property Data Element Table

DIRECTIONS: Below are three classifications of the status of a property within the Department of Defense (DoD) and their descriptions. Circle the score that corresponds with the status of property at the MRS.

Classification	Description	Score
Non-DoD control	◆ The MRS is at a location that is no longer owned by, leased to, or otherwise possessed or used by DoD. Examples are privately owned land or water bodies; land or water bodies owned or controlled by state, tribal, or local governments; and land or water bodies managed by other federal agencies.	*5*
Scheduled for transfer from DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD, and DoD plans to transfer that land or water body to the control of another entity (e.g., a state, tribal, or local government; a private party; another federal agency) within 3 years from the date the rule is applied.	3
DoD control	◆ The MRS is on land or is a water body that is owned, leased, or otherwise possessed by DoD. With respect to property that is leased or otherwise possessed, DoD must control access to the MRS 24 hours per day, every day of the calendar year.	0
STATUS OF PROPERTY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*5*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Status of Property*** classifications in the space provided.

The Nav Sub Base property is currently owned by several private owners. Much of the beach and the dock area are owned by the Rough Riders Condominiums (USACE 1995 and 2004). Refer to Section 2.3.4.1 of the SI report for further details.

Table 6

EHE Module: Population Density Data Element Table

DIRECTIONS: Below are three classifications of population density and their descriptions. Determine the population density per square mile in the vicinity of the MRS and circle the score that corresponds with the associated population density.

Note: If an MRS is located in more than one county, use the largest population density value among the counties. If the MRS is within or borders a city or town, use the population density for the city or town, rather than that of the county.

Classification	Description	Score
> 500 persons per square mile	◆ There are more than 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	*5*
100–500 persons per square mile	◆ There are 100 to 500 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	3
< 100 persons per square mile	◆ There are fewer than 100 persons per square mile in the county in which the MRS is located, based on U.S. Census Bureau data.	1
POPULATION DENSITY	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*5*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Density*** classifications in the space provided.

The population density of Suffolk County, NY is 1,593 persons per square mile (US Census 2008). Refer to Section 2.3.3.2 of the SI report for more information.

Table 7

EHE Module: Population Near Hazard Data Element Table

DIRECTIONS: Below are six classifications describing the number of inhabited structures near the MRS. The number of inhabited buildings relates to the population near the hazard. Determine the number of inhabited structures within two miles of the MRS boundary and circle the score that corresponds with the associated population near the known or suspected hazard.

Note: The term inhabited structures is defined in Appendix C of the Primer.

Classification	Description	Score
26 or more inhabited structures	◆ There are 26 or more inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	*5*
16 to 25 inhabited structures	◆ There are 16 to 25 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	4
11 to 15 inhabited structures	◆ There are 11 to 15 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	3
6 to 10 inhabited structures	◆ There are 6 to 10 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	2
1 to 5 inhabited structures	◆ There are 1 to 5 inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	1
0 inhabited structures	◆ There are no inhabited structures located up to 2 miles from the boundary of the MRS, within the boundary of the MRS, or both.	0
POPULATION NEAR HAZARD	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*5*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Population Near Hazard*** classifications in the space provided.

From aerial photos it was determined that there are greater than 26 potentially inhabited structures within a 2-miles radius of MRS-1. Refer to Sections 2.1.4, 2.3.3.1, 2.3.3.2, and 2.3.4.1 and Figures 2-2 and 2-4 of this SI report for more information.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

DIRECTIONS: Below are five classifications of activities and/or inhabited structures near the hazard and their descriptions. Review the types of activities that occur and/or structures that are present within two miles of the MRS and circle the score(s) that correspond with **all** the activities/structures classifications at the MRS.

Note: The term inhabited structure is defined in Appendix C of the Primer.

Classification	Description	Score
Residential, educational, commercial, or subsistence	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with any of the following purposes: residential, educational, child care, critical assets (e.g., hospitals, fire and rescue, police stations, dams), hotels, commercial, shopping centers, playgrounds, community gathering areas, religious sites, or sites used for subsistence hunting, fishing, and gathering.	*5*
Parks and recreational areas	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with parks, nature preserves, or other recreational uses.	*4*
Agricultural, forestry	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with agriculture or forestry.	3
Industrial or warehousing	◆ Activities are conducted, or inhabited structures are located up to two miles from the MRS's boundary or within the MRS's boundary, that are associated with industrial activities or warehousing.	*2*
No known or recurring activities	◆ There are no known or recurring activities occurring up to two miles from the MRS's boundary or within the MRS's boundary.	1
TYPES OF ACTIVITIES/STRUCTURES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	***5***

DIRECTIONS: Document any MRS-specific data used in selecting the ***Types of Activities/Structures*** classifications in the space provided.

Adjacent to MRS 1 are numerous residential and other structures associated with the Rough Riders Condominiums and the Town of Montauk. Several parks and recreational areas are located within two miles of MRS 1. Refer to Section 2.3.4.1 of this SI report for more information.

Table 9

EHE Module: Ecological and/or Cultural Resources Data Element Table

DIRECTIONS: Below are four classifications of ecological and/or cultural resources and their descriptions. Review the types of resources present and circle the score that corresponds with the ecological and/or cultural resource classifications at the MRS.

Note: The terms ecological resources and cultural resources are defined in Appendix C of the Primer.

Classification	Description	Score
Ecological and cultural resources present	◆ There are both ecological and cultural resources present on the MRS.	5
Ecological resources present	◆ There are ecological resources present on the MRS.	*3*
Cultural resources present	◆ There are cultural resources present on the MRS.	3
No ecological or cultural resources present	◆ There are no ecological resources or cultural resources present on the MRS.	0
ECOLOGICAL AND/OR CULTURAL RESOURCES	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 5).	*3*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Ecological and/or Cultural Resources*** classifications in the space provided.

According to consultation letters received from the U.S. fish and Wildlife Service (USFWS) as well the Division of Fish and Wildlife Services of New York state there are several state and federally threatened and/or endangered species located in the vicinity of the FUDS. See sections 2.3.8.1.1, 3.2.1.1, 3.2.2.1 and Table 2-3 for more information.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	2	3
Source of Hazard	Table 2	1	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	1	16
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	18
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	3	
EHE MODULE TOTAL			*37*

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	*G*
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	*G* (circled)

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms CWM/UXO, CWM/DMM, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	*0*
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	(*0*)

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Based on the ASR and ASR Supplemental, there are no known or suspected CWM hazards used, stored, or disposed of at Nav Sub Base (USACE 1995, 2004a). Refer to Sections 2.4.0.1 and 2.4.2.1 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			*0*

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: Groundwater is not a medium of concern. The residents of Montauk receive their water supply from municipla water wells located far to the west of the FUDS. Groundwater was not sampled. Refer to Sections 2.3.6.2, 2.3.7.1 and 5.2.0.2 in the SI for further information.

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is not a medium of concern. Surface water was not sampled. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios
Antimony	0.27	31	MG/KG	0.0087

CHF Scale	CHF Value	Sum The Ratios	0.00087
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	*L*

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	*M*

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	*M*
	No Known or Suspected Sediment (Human Endpoint) MC Hazard	☐

Table 23 Comments: Three sediment samples were collected in MRS 1. Sample ID MNSB-FPB-SD-01-01, MNSB-FPB-SD-01-02, MNSB-FPB-SD-01-03. Analytical results report non-detect for explosive compounds. Reference Sections 5.1.4.2, 5.1.4.3, 5.3.0.1, 5.3.1 (entire) and Tables 5-1, 5-2, and 5-3 in the SI report.

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface water and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ■

Table 24 Comments: Surface water is not a medium of concern. Surface water was not sampled. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's sediment and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios
Antimony	0.27	31	MG/KG	0.0087

CHF Scale	CHF Value	Sum The Ratios	0.00087
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	*L*

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	*M*

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	*M*

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ■

Table 25 Comments: Three sediment samples were collected in MRS 1. Sample ID MNSB-FPB-SD-01-01, MNSB-FPB-SD-01-02, MNSB-FPB-SD-01-03. Analytical results report non-detect for explosive compounds. Reference Sections 5.1.4.2, 5.1.4.3, 5.3.0.1, 5.3.1 (entire) and Tables 5-1, 5-2, and 5-3 in the SI report.

Table 26
HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface soil and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Soil MC Hazard ■

Table 26 Comments: Two surface soil samples were collected in MRS 1. Sample ID MNSB-FPB-SS-01-01, MNSB-FPB-SS-01-02. Analytical results report non-detect for explosive compounds. No metals were detected above background concentrations. Reference Sections 5.1.4.2, 5.1.4.3, 5.3.0.1, 5.3.1 (entire) and Tables 5-1, 5-2, and 5-3 in the SI report.

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Only use this table if there are more than five contaminants present at the MRS. This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the media in which these contaminants are present. Then record all contaminants, their maximum concentrations and their comparison values (from Appendix B) in the table below. Calculate and record the ratio for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF for each medium on the appropriate media-specific tables.

Note: Remember not to add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the Contaminant Hazard, Migration Pathway, and Receptor Factors for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the Three-Letter Combination boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding Media Rating box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)					
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)	L	M	M	MML	E
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)	L	M	M	MML	E
Surface Soil (Table 26)					

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the HHE Module Rating box below.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	C
HML	D
MMM	D
HLL	E
MML	E
MLL	F
LLL	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter rating for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical priority for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the MRS or Alternative Priority box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	*E*	*6*
F	7	G	7	F	7
G	*8*			G	8
Evaluation Pending		Evaluation Pending		Evaluation Pending	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		*No Known or Suspected CWM Hazard*		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				*6*	

MRS 2 – WATER RANGE MRSPP

Table A
MRS Background Information

DIRECTIONS: Record the background information below for the MRS to be evaluated. Much of this information is available from DoD databases, such as RMIS. If the MRS is located on a FUDS property, the suitable FUDS property information should be substituted. In the MRS summary, briefly describe the UXO, DMM, or MC that are known or suspected to be present, the exposure setting (the MRS's physical environment), any other incidental non-munitions related contaminants found at the MRS (e.g., benzene, trichloroethylene), and any potentially exposed human and ecological receptors. Include a map of the MRS, if one is available.

Munitions Response Site Name: MRS 2 - Torpedo Test Range

Component: U.S. Navy

Installation/Property Name: Nav Sub Base (FFID: NY29799F127000)

Location (City, County, State): Montauk, Suffolk County, New York

Site Name (RMIS ID)/Project Name (Project No.): Nav Sub Base (C02NY076602)/(RMIS ID C02NY076602R01)

Date Information Entered/Updated: 1/7/2009 10:44:49 AM

Point of Contact (Name/Phone): Rick Gajdek (917-790-8234)

Project Phase (check only one):

☐ PA	■ SI	☐ RI	☐ FS	☐ RD
☐ RA-C	☐ RIP	☐ RA-O	☐ RC	☐ LTM

Media Evaluated (check all that apply):

☐ Groundwater	☐ Sediment (human receptor)
☐ Surface soil	☐ Surface Water (ecological receptor)
☐ Sediment (ecological receptor)	☐ Surface Water (human receptor)

MRS Summary:

MRS Description: Describe the munitions-related activities that occurred at the installation, the dates of operation, and the UXO, DMM (by type of munition, if known) or munitions constituents (by type, if known) known or suspected to be present):

MRS 2 was used as a torpedo test range and consisted of 35052 acres of Block Island Sound tidal water located northeast of Gardiners Island and north and northwest of Fort Pond Bay. The water range was used for the testing of torpedos with inert warheads. No explosive materials were present in the torpedoes The torpedoes were designed to float at the end of their run and were recovered thereafter. Historical documents indicate that approximatly 41 torpedos sank. As MRS 2 is a water range

Description of Pathways for Human and Ecological Receptors:

Description of Receptors (Human and Ecological):

Current and future receptors include: Fishermen and biota.

Table 1

EHE Module: Munitions Type Data Element Table

DIRECTIONS: Below are 11 classifications of munitions and their descriptions. Circle the score(s) that correspond with **all** munitions types known or suspected to be present at the MRS.

Note: The terms practice munitions, small arms, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
Sensitive	◆ All UXO that are considered likely to function upon any interaction with exposed persons [e.g., submunitions, 40mm high-explosive (HE) grenades, white phosphorus (WP) munitions, high-explosive antitank (HEAT) munitions, and practice munitions with sensitive fuzes, but excluding all other practice munitions]. ◆ All hand grenades containing energetic filler. ◆ Bulk primary explosives, or mixtures of these with environmental media, such that the mixture poses an explosive hazardard.	30
High explosive (used or damaged)	◆ All UXO containing a high-explosive filler (e.g., RDX, Composition B), that are not considered "sensitive." ◆ All DMM containing a high-explosive filler that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	25
Pyrotechnic (used or damaged)	◆ All UXO containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades). ◆ All DMM containing pyrotechnic fillers other than white phosphorous (e.g., flares, signals, simulators, smoke grenades) that have: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	20
High explosive (unused)	◆ All DMM containing a high explosive filler that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	15
Propellant	◆ All UXO containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor). ◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor) that are: ▪ Damaged by burning or detonation ▪ Deteriorated to the point of instability.	15
Bulk secondary high explosives, pyrothechnics, or propellant	◆ All DMM containing mostly single-, double-, or triple-based propellant, or composite propellants (e.g., a rocket motor), that are deteriorated. ◆ Bulk secondary high explosives, pyrotechnic compositions, or propellant (not contained in a munition), or mixtures of these with environmental media such that the mixture poses an explosive hazard.	10
Pyrotechnic (not used or damaged)	◆ All DMM containing a pyrotechnic fillers (i.e., red phosphorous), other than white phosphorous filler, that: ▪ Have not been damaged by burning or detonation ▪ Are not deteriorated to the point of instability.	10
Practice	◆ All UXO that are practice munitions that are not associated with a sensitive fuze. ◆ All DMM that are practice munitions that are not associated with a sensitive fuze and that have not: ▪ Been damaged by burning or detonation ▪ Deteriorated to the point of instability.	5
Riot control	◆ All UXO or DMM containing a riot control agent filler (e.g., tear gas).	3
Small arms	◆ All used munitions or DMM that are categorized as small arms ammunition [Physical evidence or historical evidence that no other types of munitions (e.g., grenades, subcaliber training rockets, demolition charges) were used or are present on the MRS is required for selection of this category.].	2
Evidence of no munitions	◆ Following investigation of the MRS, there is physical evidence that there are no UXO or DMM present, or there is historical evidence indicating that no UXO or DMM are present.	*0*
MUNITIONS TYPE	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	*0*

DIRECTIONS: Document any MRS-specific data used in selecting the ***Munitions Type*** classifications in the space provided.

The MRS 2 - Torpedo Range was used to test Mk-13 and Mk-14 torpedos. The torpedos were unarmed (no warhead present) and were designed to float for recovery purposes. The torpedoes were used to test the wet-heater combustion/steam turbine engine only and did not contain any explosive materials. Historic records report that approximatly 41 torpedos sank. Refer to Sections 2.4.1.1, 2.4.2.1, 2.5.1, 4.2.1.1, 4.3.1.1, 4.3.1.2 and Table 2-2 of this SI report for more information.

TABLES 2 THROUGH 9 EXCLUDED AS PER CX GUIDANCE

Table 11

CHE Module: CWM Configuration Data Element Table

DIRECTIONS: Below are seven classifications of CWM configuration and their descriptions. Circle the score(s) that correspond to **all** CWM configurations known or suspected to be present at the MRS.

Note: The terms CWM/UXO, CWM/DMM, physical evidence, and historical evidence are defined in Appendix C of the Primer.

Classification	Description	Score
CWM, explosive configuration either UXO or damaged DMM	The CWM known or suspected of being present at the MRS is: ◆ Explosively configured CWM that are UXO (i.e., CWM/UXO). ◆ Explosively configured CWM that are DMM (i.e., CWM/DMM) that have been damaged.	30
CWM mixed with UXO	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged, or nonexplosively configured CWM/DMM, or CWM not configured as a munition, that are commingled with conventional munitions that are UXO.	25
CWM, explosive configuration that are undamaged DMM	◆ The CWM known or suspected of being present at the MRS are explosively configured CWM/DMM that have not been damaged.	20
CWM, not explosively configured or CWM, bulk container	The CWM known or suspected of being present at the MRS is: ◆ Nonexplosively configured CWM/DMM. ◆ Bulk CWM/DMM (e.g., ton container).	15
CAIS K941 and CAIS K942	◆ The CWM/DMM known or suspected of being present at the MRS is CAIS K941-toxic gas set M-1 or CAIS K942-toxic gas set M-2/E11.	12
CAIS (chemical agent identification sets)	◆ Only CAIS, other than CAIS K941 and K942, are known or suspected of being present at the MRS.	10
Evidence of no CWM	◆ Following investigation, the physical evidence indicates that CWM are not present at the MRS, or the historical evidence indicates that CWM are not present at the MRS.	*0*
CWM CONFIGURATION	**DIRECTIONS:** Record **the single highest score** from above in the box to the right (maximum score = 30).	(*0*)

DIRECTIONS: Document any MRS-specific data used in selecting the ***CWM Configuration*** classifications in the space provided.

Based on the ASR, there are no known or suspected CWM hazards used, stored, or disposed of at Nav Sub Base (USACE 1995, 2004a). Refer to Sections 2.4.0.1 and 2.4.2.1 of the SI Report.

TABLES 12 THROUGH 19 EXCLUDED AS PER CX GUIDANCE

Table 20
Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11–19, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.
4. Circle the appropriate range for the **CHE Module Total** below.
5. Circle the **CHE Module Rating** that corresponds to the range selected and record this value in the **CHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
CWM Hazard Factor Data Elements			
CWM Configuration	Table 11	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

CHE Module Total	CHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected CWM Hazard
CHE MODULE RATING	***No Known or Suspected CWM Hazard***

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ■

Table 21 Comments: Groundwater is not a medium of concern in MRS 2 and no related samples were collected in accordance with the scope of this SI. Refer to Sections 2.3.6.2, 2.3.7.1 and 5.2.0.2 in the SI for further information.

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ■

Table 22 Comments: Surface water is a medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters are dynamic and any MC present would be diluted to levels below concern to human receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☐

Table 23 Comments: Sediment is a medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters and sediment are dynamic and any MC present would be diluted to levels below concern to human receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface water and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ■

Table 24 Comments: Surface water is a medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters are dynamic and any MC present would be diluted to levels below concern to ecological receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's sediment and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☐

Table 25 Comments: Sediment is a medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters and sediment are dynamic and any MC present would be diluted to levels below concern to human receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 26
HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface soil and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Soil MC Hazard ■

Table 26 Comments: Surface soil is not a medium of concern because the medium is not present.

Table 10
Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 1–9, record the data element scores in the **Score** boxes to the right.
2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.
3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.
4. Circle the appropriate range for the **EHE Module Total** below.
5. Circle the **EHE Module Rating** that corresponds to the range selected and record this value in the **EHE Module Rating** box found at the bottom of the table.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 1	0	0
Source of Hazard	Table 2		
Accessibility Factor Data Elements			
Location of Munitions	Table 3		0
Ease of Access	Table 4		
Status of Property	Table 5		
Receptor Factor Data Elements			
Population Density	Table 6		0
Population Near Hazard	Table 7		
Types of Activities/ Structures	Table 8		
Ecological and /or Cultural Resources	Table 9		
EHE MODULE TOTAL			(0)

EHE Module Total	EHE Module Rating
92 to 100	A
82 to 91	B
71 to 81	C
60 to 70	D
48 to 59	E
38 to 47	F
less than 38	G
Alternative Module Ratings	Evaluation Pending
	No Longer Required
	No Known or Suspected Explosive Hazard
EHE MODULE RATING	***No Known or Suspected Explosive Hazard***

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Only use this table if there are more than five contaminants present at the MRS. This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the media in which these contaminants are present. Then record all contaminants, their maximum concentrations and their comparison values (from Appendix B) in the table below. Calculate and record the ratio for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF for each medium on the appropriate media-specific tables.

Note: Remember not to add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the Contaminant Hazard, Migration Pathway, and Receptor Factors for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the Three-Letter Combination boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding Media Rating box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value		Three-Letter Combination (Hs-Ms-Ls)		Media Rating (A-G)
Groundwater (Table 21)							
Surface Water/Human Endpoint (Table 22)							
Sediment/Human Endpoint (Table 23)							
Surface Water/Ecological Endpoint (Table 24)							
Sediment/Ecological Endpoint (Table 25)							
Surface Soil (Table 26)							

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the HHE Module Rating box below.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G
Alternative Module Ratings	***Evaluation Pending***
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter rating for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical priority for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the MRS or Alternative Priority box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		*Evaluation Pending*	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		*No Known or Suspected CWM Hazard*		No Known or Suspected MC Hazard	
MRS or ALTERNATIVE PRIORITY				*Evaluation Pending*	

APPENDIX L – REFERENCE COPIES

Located on CD.

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the groundwater is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in groundwater has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the groundwater to a potential point of exposure (possibly due to geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Groundwater MC Hazard ☐

Table 21 Comments: Groundwater is not a medium of concern in MRS 2 and no related samples were collected in accordance with the scope of this SI. Refer to Sections 2.3.6.2, 2.3.7.1 and 5.2.0.2 in the SI for further information.

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the surface water, select the box at the bottom of the table.

Note: Use dissolved, rather than total, metals analyses when both are available.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	$CHF = \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to geological structures or physical controls).	L

MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L

RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Human Endpoint) MC Hazard ☐

Table 22 Comments: Surface water is a medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters are dynamic and any MC present would be diluted to levels below concern to human receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's groundwater and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for human endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Human Endpoint) MC Hazard ☐

Table 23 Comments: Sediment is a medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters and sediment are dynamic and any MC present would be diluted to levels below concern to human receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface water and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for ecological endpoints present in the surface water, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		
CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface water is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface water has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface water to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface water to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface water to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface water to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard ☐

Table 24 Comments: Surface water is a medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters are dynamic and any MC present would be diluted to levels below concern to ecological receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's sediment and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard for ecological endpoints present in the sediment, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the sediment is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in sediment has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the sediment to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the sediment receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Sediment (Ecological Endpoint) MC Hazard ☐

Table 25 Comments: Sediment is a potential medium of concern in MRS 2, however, sample collection was outside the scope of this SI. The ocean waters and sediment are dynamic and any MC present would be diluted to levels below concern to human receptors. Refer to Sections 2.3.6.1 and 5.2.0.2 of the SI report for further information.

Table 26
HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the maximum concentrations of all contaminants in the MRS's surface soil and their comparison values (from Appendix B) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the ratios for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF by adding the ratios for each medium together, including additional contaminants recorded on Table 27. Based on the CHF, use the CHF Scale to determine and record the CHF Value. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

CHF Scale	CHF Value	Sum The Ratios	
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

CONTAMINANT HAZARD FACTOR	**DIRECTIONS:** Record **the CHF Value** from above in the box to the right (maximum value = H).	

Migratory Pathway Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil migratory pathway at the MRS.

Classification	Description	Value
Evident	Analytical data or observable evidence indicates that contamination in the surface soil is present at, moving toward, or has moved to a point of exposure.	H
Potential	Contamination in surface soil has moved only slightly beyond the source (i.e., tens of feet), could move but is not moving appreciably, or information is not sufficient to make a determination of Evident or Confined.	M
Confined	Information indicates a low potential for contaminant migration from the source via the surface soil to a potential point of exposure (possibly due to presence of geological structures or physical controls).	L
MIGRATORY PATHWAY FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

Receptor Factor

DIRECTIONS: Circle the value that corresponds most closely to the surface soil receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to surface soil to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to surface soil to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to surface soil to which contamination has moved or can move.	L
RECEPTOR FACTOR	**DIRECTIONS:** Record **the single highest value** from above in the box to the right (maximum value = H).	

No Known or Suspected Surface Soil MC Hazard ◻

Table 26 Comments: Surface soil is not a medium of concern because the medium is not present at the MRS.

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Only use this table if there are more than five contaminants present at the MRS. This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the media in which these contaminants are present. Then record all contaminants, their maximum concentrations and their comparison values (from Appendix B) in the table below. Calculate and record the ratio for each contaminant by dividing the maximum concentration by the comparison value. Determine the CHF for each medium on the appropriate media-specific tables.

Note: Remember not to add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

1. Record the letter values (H, M, L) for the Contaminant Hazard, Migration Pathway, and Receptor Factors for the media (from Tables 21–26) in the corresponding boxes below.
2. Record the media's three-letter combinations in the Three-Letter Combination boxes below (three-letter combinations are arranged from Hs to Ms to Ls).
3. Using the reference provided below, determine each media's rating (A–G) and record the letter in the corresponding Media Rating box below.

Media (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A-G)
Groundwater (Table 21)					
Surface Water/Human Endpoint (Table 22)					
Sediment/Human Endpoint (Table 23)					
Surface Water/Ecological Endpoint (Table 24)					
Sediment/Ecological Endpoint (Table 25)					
Surface Soil (Table 26)					

DIRECTIONS (cont.):

4. Select the single highest Media Rating (A is highest; G is lowest) and enter the letter in the HHE Module Rating box below.

Note:
An alternative module rating may be assigned when a module letter rating is inappropriate. An alternative module rating is used when more information is needed to score one or more data elements, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

HHE MODULE RATING	

HHE Ratings (for reference only)	
Combination	**Rating**
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G
Alternative Module Ratings	***Evaluation Pending***
	No Longer Required
	No Known or Suspected MC Hazard

Table 29
MRS Priority

DIRECTIONS: In the chart below, circle the letter rating for each module recorded in Table 10 (EHE), Table 20 (CHE), and Table 28 (HHE). Circle the corresponding numerical priority for each module. If information to determine the module rating is not available, choose the appropriate alternative module rating. The MRS priority is the single highest priority; record this number in the MRS or Alternative Priority box at the bottom of the table.

Note: An MRS assigned Priority 1 has the highest relative priority; an MRS assigned Priority 8 has the lowest relative priority. Only an MRS with CWM known or suspected to be present can be assigned Priority 1; an MRS that has CWM known or suspected to be present cannot be assigned Priority 8.

EHE Rating	Priority	CHE Rating	Priority	HHE Rating	Priority
		A	1		
A	2	B	2	A	2
B	3	C	3	B	3
C	4	D	4	C	4
D	5	E	5	D	5
E	6	F	6	E	6
F	7	G	7	F	7
G	8			G	8
Evaluation Pending		Evaluation Pending		*Evaluation Pending*	
No Longer Required		No Longer Required		No Longer Required	
No Known or Suspected Explosive Hazard		*No Known or Suspected CWM Hazard*		No Known or Suspected MC Hazard	
		MRS or ALTERNATIVE PRIORITY		*Evaluation Pending*	

APPENDIX L – REFERENCE COPIES

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