FINAL

Site Inspection Report for Fort Jay

FUDS Project # **C02NY061101**

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

Prepared for:

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The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

January 2008

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January 2008

CONTRACTOR STATEMENT OF AUTHORSHIP AND INDEPENDENT TECHNICAL REVIEW

Alion Science and Technology Corporation has prepared this Site Inspection Report for Fort Jay, Formerly Used Defense Site (FUDS), Project No. C02NY061101. 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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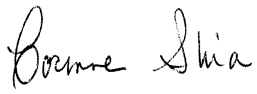
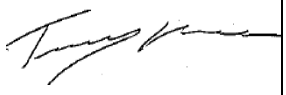
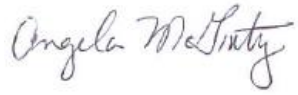
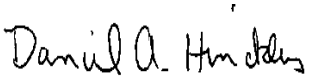
Corinne Shia Deputy Program Manager Alion Science and Technology Corporation	1/9/08	
Tim Reese P.E. Project Manager EA Engineering, Science, and Technology, Inc. (Under contract to Alion Science and Technology Corporation)	1/9/08	
Angela McGinty Task Leader EA Engineering, Science, and Technology, Inc. (Under contract to Alion Science and Technology Corporation)	1/9/08	
Daniel Hinckley, PhD Risk Assessor EA Engineering, Science, and Technology, Inc. (Under contract to Alion Science and Technology Corporation)	1/9/08	
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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

ADR	Automated Data Review
Alion	Alion Science and Technology Corporation
ASR	Archive Search Report
bgs	Below Ground Surface
CAIS	Chemical Agent Identification Sets
CENAB	[U.S. Army] Corps of Engineers North Atlantic Baltimore
CENAN	[U.S. Army] Corps of Engineers North Atlantic New-York
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
CSM	Conceptual Site Model
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DoA	Department of the Army
DoD	Department of Defense
DQI	Data Quality Indicator
DQO	Data Quality Objective
EA	EA Engineering, Science, and Technology, Inc.
EDMS	Environmental Data Management System
EDS	Environmental Data Services, Inc.
EOD	Explosive Ordnance Disposal
EPA	U.S. Environmental Protection Agency
ER	Engineer Regulation
°F	Degrees Fahrenheit
FDE	Findings and Determination of Eligibility
ft	Foot or Feet
FUDS	Formerly Used Defense Site(s)

LIST OF ACRONYMS AND ABBREVIATIONS

FUDSMIS	Formerly Used Defense Site Management Information System
GIPEC	Governors Island Preservation and Education Corporation
GPL	GPL Laboratories, LLLP
GPS	Global Positioning System
HQ	Hazard Quotient
HRS	Hazard Ranking System
HTRW	Hazardous, Toxic, and Radioactive Waste
INPR	Inventory Project Report
MC	Munitions Constituents
MD	Munitions Debris
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDAI	No Department of Defense Action Indicated
NG	Nitroglycerin
NPS	National Park Service
NTCRA	Non-Time Critical Removal Action
NYSDEC	New York State Department of Environmental Conservation
PA	Preliminary Assessment
PARCC	Precision, Accuracy, Representativeness, Completeness, and Comparability
PRG	Preliminary Remediation Goal

LIST OF ACRONYMS AND ABBREVIATIONS

PWP	Programmatic Work Plan
QA/QC	Quality Assurance/ Quality Control
QSM	Quality Systems Manual
RAC	Risk Assessment Code
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RI/FS	Remedial Investigation/Feasibility Study
RL	Reporting Limit
RMIS	Restoration Management Information System
RPD	Relative Percent Difference
SI	Site Inspection
SLERA	Screening Level Ecological Risk Assessment
SS-WP	Site-Specific Work Plan
TCRA	Time Critical Removal Action
T&E	Threatened and Endangered Species
TNT	Trinitrotoluene
TPP	Technical Project Planning
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USC	United States Code
UXO	Unexploded Ordnance

GLOSSARY OF TERMS

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)—Also known as "Superfund," this congressionally enacted legislation provides the methodology for the removal of hazardous substances resultant from past / former operations. Response actions must be performed in accordance with the National Oil and Hazardous Substances Pollution Contingency Plan (United States Army Corps of Engineers [USACE] 2003).

Cultural Debris—Debris found on operational ranges or munitions response sites, which may be removed to facilitate a range clearance or munitions response that is not related to munitions or range operations. Such debris includes, but is not limited to: rebar, household items (refrigerators, washing machines, etc.), automobile parts and automobiles that were not associated with range targets, fence posts, and fence wire (Department of the Army [DoA] 2005).

Discarded Military Munitions (DMM) — Military munitions that have been abandoned without proper disposal or removed from storage in a military magazine or other storage area for the purpose of disposal. The term does not include unexploded ordnance, military munitions that are being held for future use or planned disposal, or military munitions that have been properly disposed of, consistent with applicable environmental laws and regulations. (10 United States Code [USC] 2710(e)(2)) (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)—Locations that were owned by, leased to, or otherwise possessed by the Department of Defense (DoD) are considered FUDS. A FUDS is eligible for the Military Munitions Response Program if the release occurred prior to October 17, 1986; the property was transferred from DoD control prior to October 17, 1986; and the property or project meets other FUDS eligibility criteria. The FUDS Program focuses on compliance and cleanup efforts at FUDS (USACE 2004a).

GLOSSARY OF TERMS

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).

Military Munitions—Military munitions means 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 Department of Defense, 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.) have been 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) Discarded military munitions (DMM), as defined in 10 USC 2710(e)(2); or (C) Munitions constituents (e.g., TNT, Hexahydro-1,3,5-trinitro-1,3,5-triazine [RDX]), 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 unexploded ordnance (UXO), discarded military munitions (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 (MRA)—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 CFR 179.3).

GLOSSARY OF TERMS

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

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 munitions constituents (MC). The DoD adopted the MRSPP under the authority of 10 USC 2710(b). Provisions of 10 USC 2710(b) require that the Department assign to each defense site in the inventory required by 10 USC 2710(a) 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 (710 FR 58016).

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 2000).

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).

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 2004c).

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) (DoA 2005).

GLOSSARY OF TERMS

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 six months to reduce risk to public health or the environment (DoA 2005).

Unexploded Ordnance (UXO)—Military munitions that (A) have been primed, fused, armed, or otherwise prepared for action; (B) have been 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) has prepared the following Site Inspection (SI) Report to document SI activities and findings for the Fort Jay Formerly Used Defense Site (FUDS), Project No. C02NY061101. The Department of Defense (DoD) has 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 the FUDS. This SI is completed under MMRP project No. C02NY061101 and addresses potential MMRP hazards remaining at the Fort Jay FUDS.

ES.2 **SI 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 as well as (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for 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 (MRS) 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 **Fort Jay Site**. Fort Jay, located on Governors Island, is comprised of approximately 173 acres and lies within a few hundred yards of the southern tip of Manhattan, at the confluence of the Hudson River and the East River in New York Harbor. The United States (U.S.) Government acquired Fort Jay from New York in 1800 for the defense of New York Harbor. The Island was used for various military activities between 1800 and 1966. In July 1966, the Secretary of the Army conveyed Fort Jay to the Secretary of Transportation for the use by the U.S. Coast Guard. The U.S. Coast Guard vacated the island in 1996. In 2003, the island was sold and transferred to two parties: 22 acres to the National Park Service (NPS) and 150 acres to the Governors Island Preservation and Education Corporation (GIPEC).

ES.5 **Technical Project Planning.** The SI approach was developed in concert with stakeholders through the USACE's technical project planning (TPP) framework, which was applied at the initial TPP meeting on 25 July 2006. In summary, these agreements, as presented and modified during the TPP meetings and as finalized in the Site Specific Work Plan Addendum (SS-WP), were to inspect the FUDS and complete multimedia sampling in accordance with the data quality objectives (DQOs) and Final SS-WP.

ES.6 Fort Jay consists of four MRSs. Rifle Range #1 is designated MRS 1, Rifle Range #2 is designated MRS 2, the Machine Gun Range is designated MRS 3, and the Skeet Range is designated MRS 4. The remaining lands have been designated Area of Concern (AOC) 1 to include the fortifications of Fort Jay/Columbus, Castle Williams, South Battery, Barbette Battery, and Anti-Aircraft Firing Measures. The FUDS also housed New York Arsenal, several magazines, firing ranges, and a gas chamber on the south side of the island. The gas chamber was used for chemical training with smoke grenades and tear gas. The MRS identification in this SI Report has been revised from the MRS presented in the Final SS-WP to be consistent with the *Supplemental Guidance for Executing Formerly Used Defense Sites (FUDS) Military Munitions Response Program (MMRP) Site Inspections (SI)* dated 16 July 2007 and the Formerly Used Defense Site Management Information System (FUDSMIS).

ES.7 **Qualitative Site Reconnaissance and MEC Assessment**. SI field activities were performed from 16 through 17 March 2007. A qualitative site reconnaissance of the FUDS was performed and based on visual observations and qualitative reconnaissance. The field sampling approach included meandering reconnaissance in and around sampling locations to identify ranges, target areas, MEC, munitions debris (MD), or other areas of interest (areas containing possible bomb craters, backstops, or other areas containing distressed vegetation). The qualitative site reconnaissance was conducted at the four MRSs and AOC 1. No MEC, MD, or small arms were identified during the field work.

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) and the Archives Search Report ASR (*Note: An ASR Supplement was not completed for Fort Jay*). No MEC or small arms have been documented in the four MRSs. Historical documentation and interview reviews indicated the following munitions were found at Fort Jay in AOC 1: 80 rounds of .30-caliber ammunition (1962; the location of small arms ammunition is unknown), smoke grenades (1963), riot gear/tear gas (1963), 13 rounds .45-caliber bullets (1964; the location of small arms ammunition is unknown), cannon balls (1993), and an inert 3-inch projectile (2006). Findings since closure include the cannon balls (1993) and inert 3-inch projectile (2006). The potential risk posed by MEC, assessed through three risk factors

(presence of MEC source, accessibility or pathway presence, and potential receptor contact), is low for MRS 1 through 4 and low to moderate for AOC 1.

ES.9 **MC Sampling and Risk Screening**. A total of 16 soil (12 surface soil and 4 subsurface soil samples) were collected (which included 3 fill background samples and 2 native background samples) during the SI. Samples were analyzed for MC, specifically a target compound list of explosives and target analyte list of metals in accordance with the approved SS-WP.

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 munition-related MC includes the following:

- Rifle Range #1 (MRS 1): Metals (antimony, chromium, copper, iron, lead, nickel, zinc)
- Rifle Range #2 (MRS 2): Metals (antimony, chromium, copper, iron, lead, , nickel, zinc)
- Machine Gun Range (MRS 3): Explosives (nitroglycerin [NG]) and Metals (antimony, copper, iron, lead)
- Skeet Range (MRS 4): Metals (lead)
- Remaining Lands (AOC 1): Explosives (trinitrotoluene [TNT]) and Metals (copper, iron, lead, zinc).

One sample at AOC 1 exceeded human health screening criteria for lead in soil but was within the range of native background samples; therefore, lead is not considered a chemical of potential concern (COPC) at AOC 1 or at any of the MRSs. No other COPC were identified. A screening level ecological risk assessment (SLERA) was required given the former FUDS contains a national park. The SLERA identified several metals as exceeding ecological soil screening criteria within each MRS. However, when compared to native and fill background soil concentrations, the maximum concentrations of all of the metals, although at levels above their respective screening values, were not above the range of native and fill background concentrations. These exceedances were not considered significant; therefore, these metals were not retained as chemicals of potential ecological concern (COPECs). The only sample that exceeded fill background and ecological screening values was FJY-PR-SS-02-01 for copper (sample: 56 ppm; fill background max: 37 ppm); therefore, copper is a COPEC in AOC 1. Using weight of evidence, this exceedance does not justify further studies for MC at AOC 1.

ES.11 **Recommendations.** Based on the findings of the SI, No Department of Defense Action Indicated (NDAI) is recommended for MRS 1, 2, 3, and 4 and a further studies are recommended for AOC 1. Additional studies for AOC 1 should focus on MEC given past MEC/MD discoveries found in multiple locations after transfer to the U.S. Coast Guard in areas outside of the known MRSs. Further evaluation is necessary to determine if this area should be designated

as an MRS. Human health and ecological risk screening assessments do not identify any immediate risk from MC (Table ES-1) at any MRS or the AOC. Neither a time critical removal action (TCRA) nor a non-time critical removal action (NTCRA) is recommended. An Archive Search Report Supplement should be prepared for Fort Jay.

Table ES-1. Summary of Site Recommendations for Fort Jay

(FUDS Project No. C02NY061101)

MRS	Recommendation	Basis for Recommendation	
		MEC	MC
MRS 1 – Rifle Range #1	NDAI TCRA/NTCRA not recommended	MEC Assessment: Low risk No MD/MPPEH found during site inspection. No documentation of historical accounts of MEC or small arms finds.	Risk Screening Assessment: No potential risks to human health or ecological receptors identified through surface samples.
MRS 2 – Rifle Range #2	NDAI TCRA/NTCRA not recommended	MEC Assessment: Low risk No MD/MPPEH found during site inspection. No documentation of historical accounts of MEC or small arms finds.	Risk Screening Assessment: No potential risks to human health or ecological receptors identified through surface samples.
MRS 3 – Machine Gun Range	NDAI TCRA/NTCRA not recommended	MEC Assessment: Low risk No MD/MPPEH found during site inspection. No documentation of historical accounts of MEC or small arms finds.	Risk Screening Assessment: No potential risks to human health or ecological receptors identified through surface samples.
MRS 4 – Skeet Range	NDAI TCRA/NTCRA not recommended	MEC Assessment: Low risk No MD/MPPEH found during site inspection. No documentation of historical accounts of MEC or small arms finds.	Risk Screening Assessment: No potential risks to human health or ecological receptors identified through surface samples.
AOC 1—Remaining Lands	RI/FS Additional studies should focus on MEC TCRA/NTCRA not recommended	MEC Assessment: Low to Moderate risk Tear gas and smoke grenades in Old Fort Jay; cannon balls in the subsurface soil behind building 404; 3-inch projectile at Building 105.	Risk Screening Assessment: No potential risks to human health or ecological receptors identified through surface or subsurface samples. Only one sample exceeded fill background and ecological screening values for copper. Using weight of evidence, this exceedance does not justify RI/FS for MC.

General	1. Prepare an ASR Supplement. The boundary and acreage associated with each MRS should be further delineated in the Supplemental ASR and should be reflective of the former munitions uses at the FUDS. 2. The INPR should be amended to include the land and water located in the Skeet Range fan (MRS 4) beyond the FUDS boundary for investigation and delineation during the RI/FS. 3. For AOC 1, further evaluation of the remaining lands is required to determine the MRS to address potential presence as evidenced by the relevant post closure finds.

FUDS-Formerly Used Defense Site	MRS-Munitions Response Site
MC-Munitions Constituents	NTCRA-Non -Time Critical Removal Action
MD-Munitions Debris	RI/FS-Remedial Investigation/Feasibility Study
MEC-Munitions and Explosives of Concern	TCRA- Time Critical Removal Action

1. INTRODUCTION

1.0.1 This report documents the findings of the Military Munitions Response Program (MMRP) Site Inspection (SI) performed at the Fort Jay Formerly Used Defense Site (FUDS) located off the southern tip of Manhattan, New York, MMRP Project No. C02NY061101. Alion Science and Technology Corporation (Alion), along with its subcontractors [EA Engineering, Science, and Technology, Inc. (EA), Environmental Data Services (EDS), Inc., and General Physics Laboratory, LLLP (GPL)], prepared this report under contract to the U.S. Army Engineering and Support Center, Huntsville (USAESCH). This work is being 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 USAESCH and its contractor, Alion, on the completion of this project in accordance with the SI Performance Work Statement (see Appendix A).

1.0.2 The technical approach to this SI is based on the *Programmatic Work Plan for Formerly Used Defense Sites (FUDS) Military Munitions Response Program (MMRP) Site Inspections at Multiple Sites the Northeast Region* (PWP) (Alion 2005) and the *Final Site-Specific Work Plan Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Fort Jay/Governors Island* (SS-WP) (Alion 2007).

1.1 Project Authorization

1.1.1 The Department of Defense (DoD) has 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 the FUDS for the Army, as DoD's Executive Agent for the FUDS program.

1.1.2 Pursuant to USACE's Engineer Regulation (ER) 200-3-1 (USACE, 10 May 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 §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 as well as (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for 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).

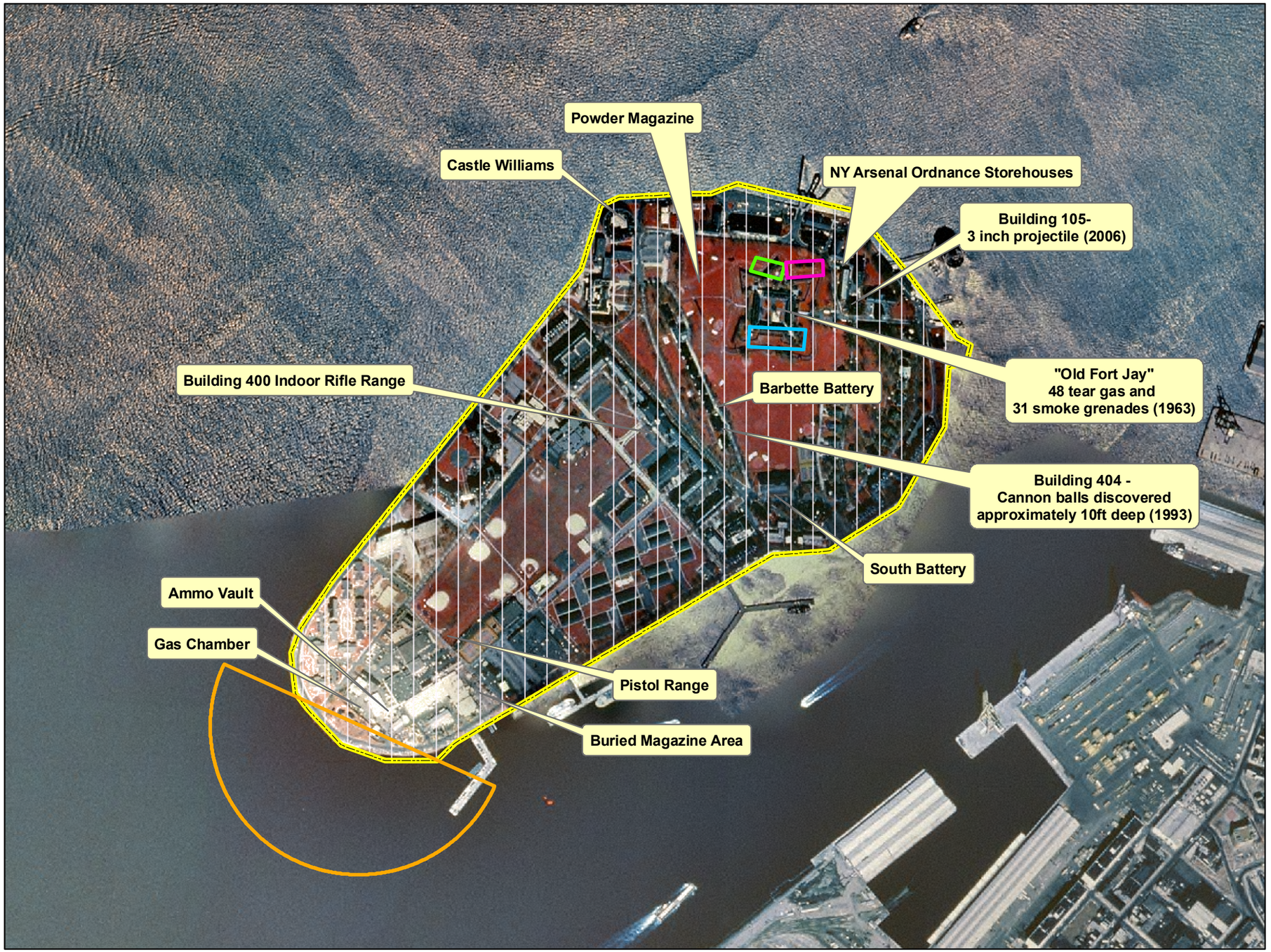
1.2.2 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of this FUDS prior to transfer through records review, qualitative site reconnaissance to assess MEC presence/absence, and sampling where MC might be expected based on the conceptual site 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 Fort Jay, located on Governors Island, is comprised of approximately 173 acres and lies a few hundred yards off the southern tip of Manhattan, at the confluence of the Hudson River and the East River in New York Harbor (National Park Service [NPS] 2006), as shown in Figure 1-1. The North American Datum 83 coordinates for the most central part of the island are Universal Transverse Mercator X (582589) and Y (4504248). This FUDS falls under the geographical jurisdiction of the USACE North Atlantic New York (CENAN). This SI is being completed under DERP-FUDS Project No. C02NY061101 to address potential MMRP hazards remaining at the FUDS.

1.4 Munitions Response Site Prioritization Protocol

1.4.1 This SI Report includes draft MRSPP rankings that apply to the four MRSs identified in this report (Appendix K). The MRSPP scoring will be updated on an annual basis, as appropriate, to incorporate new information.



Fort Jay
New York, New York

Legend

- MRS 1 - Rifle Range #1 [0.43 Acres]
- MRS 2 - Rifle Range #2 [0.43 Acres]
- MRS 3 - Machine Gun Range [0.86 Acres]
- MRS 4 - Skeet Range [0.89 Acres land, 29.11 Acres tidal water]
- Area of Concern 1 [170.39 Acres]
- FUDS Boundary

Note:
AOC 1 includes all land within the FUDS boundary as well as the yet to be defined water range associated with the South Battery, converted to other uses in 1939. Battery Barbette was never completed.

Sources:
United States Department of Agriculture (2002)
United States Army Corps of Engineers (1997)

0 295 590 1,180
Feet

Figure 1-1. General Installation Site Map.

2. SITE DESCRIPTION

2.1 Site Description and History

2.1.1 Originally, the Native Americans of the Manhattan region referred to Governors Island as Pagganck ("Nut Island") after the island's plentiful hickory, oak, and chestnut trees. Its location made the island a perfect fishing camp for local tribes and many residents of the area used the island seasonally. In June 1637, Wouter Van Twiller, representative of Holland, purchased the island from the Native Americans of Manahatas. The island was confiscated by the Dutch Government a year later. In 1664, the English captured New Amsterdam, renaming it New York, and took Nutten Island, which had been left unfortified by the Dutch. The island switched hands between the British and the Dutch over the next 10 years until the British regained exclusive control of the island for the "benefit and accommodation of His Majesty's Governors." Although it was not named officially until 1784, the island had come to be called Governors Island (Governors Island Preservation and Education Corporation [GIPEC] 2006).

2.1.2 The island's strategic location resulted in its use as a military facility by British and American forces for over 200 years. Following the British evacuation of New York in April 1776, Americans fortified the island in fear of further advances by the British Navy. In 1794, with the country in need of a system of coastal defenses, construction began on Fort Jay, on high ground in the center of Governors Island. In 1800, New York transferred the island to the U.S. government for military purposes. Between 1806 and 1809, the Army reconstructed Fort Jay and built Castle Williams on a rocky outcropping facing New York Harbor. During the War of 1812, artillery and infantry troops were concentrated on Governors Island. During the American Civil War, the island was used for recruitment and as a prison for captured Confederate soldiers. Throughout World Wars I and II, the island served as an important supply base for Army ground and air forces. The island continued to serve an important military function until the 1960s (GIPEC 2006).

2.1.3 Physically, the island changed substantially during the early twentieth century. Using rocks and dirt from the excavations for the Lexington Avenue Subway, USACE supervised the deposit of 4,787,000 cubic yards of fill on the south side of Governors Island, adding 103 acres of flat, treeless land by 1912, bringing the total acreage of the island to 173 acres. In 1918, the Army built the Governors Island Railroad, which consisted of 1¾ miles of track, and three flat cars carrying coal, machinery, and supplies from the pier to shops and warehouses. Six years later, a municipal airport was proposed for the island. Instead, Liggett Hall, a large structure designed by McKim, Mead & White, was constructed and became the first Army structure to

house all of the facilities for an entire regiment. Figure 2-1 presents a historic aerial photo of the FUDS from 1954. With the consolidation of U.S. Military forces in 1966, the island was transferred to the U.S. Coast Guard. This was the U.S. Coast Guard's largest installation, serving both as a self-contained residential community, with an on-island population of approximately 3,500, and as a base of operations for the Atlantic Area Command and Maintenance and Logistics Command, and the Captain of the Port of New York (GIPEC 2006).

2.1.4 In 1995, the U.S. Coast Guard closed its facilities on Governors Island. As of September 1996, all residential personnel were relocated. President Clinton designated 22 acres of the island, including the two great forts, as the Governors Island National Monument in January 2001, and on 1 April 2002, President George W. Bush, Governor Pataki, and Mayor Bloomberg announced that the U.S. would sell Governors Island to the people of New York for a nominal cost, and that the island would be used for public benefit. At the time of the transfer, deed restrictions were created that prohibited permanent housing and casinos on the island. The remaining 150 acres of the island was transferred to the people of New York on 31 January 2003, through GIPEC (GIPEC 2006).

2.2 Munitions Response Site Identification and Munitions Information

2.2.1 USACE programmatic range documents (including the Archive Search Report [ASR] and the DERP Fiscal Year 2005 Annual Report to Congress) identified four ranges/MRSs at the Fort Jay FUDS as shown on Figure 1-1. The FUDS encompasses the approximately 173 acres of Fort Jay. Rifle Range #1 is designated MRS 1 and has Restoration Management Information System (RMIS) range identification number C02NY061101R01 (0.43 land acres). Rifle Range #2 is designated MRS 2 and has RMIS range identification number C02NY061101R02 (0.43 land acres). The Machine Gun Range is designated MRS 3 and has RMIS range identification number C02NY061101R03 (0.86 land acres). The Skeet Range is designated MRS 4 and has RMIS range identification number C02NY061101R04 (0.89 land acres and 29.11 water acres). The remaining lands (170.39 acres) are designated Area of Concern (AOC) 1. *Note: An ASR Supplement was not completed for Fort Jay.* Munitions associated with this MRS are derived from the ASR and are summarized on Table 2-2.

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 local demographics and land uses.

2.3.1 Topography and Vegetation

2.3.1.1 Fort Jay is located in the Piedmont lowland physiographic province on the eastern side of Upper New York Bay. The area lies on the eastern edge of the broad lowland known as Newark basin, which was formed in the Triassic period and extends today from the first Watchung Mountain on the west to the Hudson River on the east (USACE 1997 and 2006a). There is very little relief at the FUDS. The highest point is on the north side of the island at the machine gun range, as shown in Figure 2-2 (U.S. Department of Agriculture 2000).

2.3.1.2 Parade grounds are located on the north end of Fort Jay. There also is an open lawn area in the center of the island. Many deciduous trees border the edges of the island (Alion 2006).

2.3.2 Climate

2.3.2.1 Fort Jay is close to the path of most storm and frontal systems that move across North America. Weather conditions most often approach from the westerly direction. The island can experience higher temperatures during the summer and lower temperatures during the winter than would otherwise be expected in a coastal area. However, the frequent passage of weather systems often helps to reduce the length of both warm and cold spells, and they are also a major factor in keeping periods of prolonged air stagnation to a minimum (USACE 1997 and 2006a).

2.3.2.2 During the summer, local area sea breezes often moderate the afternoon heat. The relatively warm water temperature also delays the advent of winter snows. Conversely, the lag in warming of water temperatures keeps spring temperatures relatively cool. July and August are the hottest months with an average monthly temperature of 75 and 74 degrees Fahrenheit (°F), respectfully. The record high temperature occurred in July 1996 with a temperature of 104°F. January is the coldest month with an average monthly temperature of 30.3°F. The record low temperature of -2°F occurred in January 1995 (USACE 1997 and 2006a).

2.3.3 Local Demographics

2.3.3.1 Fort Jay is located on Governors Island between Brooklyn Borough and Manhattan Borough in New York County, New York City, New York. According to 2006 U.S. Census Bureau estimates, there are 1,611,581 people, 738,644 households, and 302,105 families residing in Manhattan. As of the 2000 Census, the population density of New York County was 67,000 persons per square mile (26,000 persons per square kilometer), the highest population density of any county in the United States (U.S. Census Bureau 2000).

2.3.3.2 In 2000, 56.4% of people living in Manhattan were White, 27.18% were Hispanic of any race, 17.39% were Black, 14.14% were from other races, 9.40% were Asian, 0.5% were Native American, and 0.07% were Pacific Islander. A total of 4.14% were from two or more races, and 24.93% reported speaking Spanish at home, 4.12% Chinese, and 2.19% French (U.S. Census Bureau).

2.3.4 Current and Future Land Use

2.3.4.1 NPS currently manages 22 acres of the 173 acres island as a National Monument. GIPEC owns and manages the remaining 150 acres. Currently, GIPEC plans to develop the parkland and waterfront esplanade (Alion 2006). When the second TPP occurred in January 2008, GIPEC had decided to focus the first phase of the development on the 90 acre public park and had chosen their development design.

2.3.5 Geologic Setting

2.3.5.1 Governors Island is located in the Piedmont lowland physiographic province on the eastern side of the Upper New York Bay. The area lies on the eastern edge of the broad lowland known as Newark basin which was formed in the Triassic period and extends today from the first Watchung Mountain on the west to the Hudson River on the east. The Triassic bedrock in this vicinity consists of continental sandstones, shales, and conglomerates. The sandstones and shales known as the Newark series extend to nearly 250 feet (ft) below sea level. In the early Jurassic period, the palisades sill intruded into the Triassic deposits (USACE 1997 and 2006a).

2.3.5.2 The Newark basin deposits are overlain by a sequence of glacial lacustrine clays and glacial drift which was deposited during the Wisconsin stage of glaciation towards the end of the Pleistocene Epoch. Around that time Governors Island lay on the western edge of glacial Lake Hudson, close to its boundary with glacial Lake Hackensack. The southern tip of the Palisades sill projected as a ridge of dry land between the two lakes during this period. Both lakes were created as a result of the terminal moraine laid down at the furthest point of the glacial advance. In the Newark basin area, this moraine extended from a summit on the first Watchung ridge, and looped south through Plainfield and Perth Amboy, before crossing Staten Island into Southern Long Island (USACE 1997 and 2006a).

2.3.5.3 The main geological formations in the FUDS are Stockton Sandstone, Manhattan Schist, and Palisades Diabase. Depth to bedrock ranges from 170 ft to bedrock at or near the surface. Glacial deposits generally range from 25 to 165 ft and cover most bedrock in the area. Recent alluvial deposits of sand, gravel, silt, clay, and peat lie above the glacial deposits. In some areas,

miscellaneous fill has been placed. Lands in the FUDS and the surrounding areas are composed of tidal marsh, reclaimed land, and areas of glacial deposits (USACE 1997 and 2006a).

2.3.5.4 The surface of the FUDS is largely covered by concrete, asphalt, and buildings. The soils underlying these areas have been greatly altered from their original state. The remaining soil of the FUDS is derived from tidal and glacial deposits. The deposits are usually composed of sandy materials. The depth of these deposits ranges from 5 to 32 ft. Below the stratum, there are glacial lake deposits consisting of silt, clayey silt, silty clay, and sand. This deposit has been highly consolidated. Glacial till deposits occur beneath the glacial lake deposits and consist of very dense silts, clays, sand, gravel, and boulders. Bedrock of the Stockton formation consisting of shale and sandstone is found beneath the glacial till deposits. The upper portion of this bedrock has weathered to a hard, silty clay containing interbedded rock fragments (USACE 1997 and 2006a).

2.3.6 Hydrogeologic Setting

2.3.6.1 Fort Jay, on Governors Island, is located on the west side of Long Island, in the upper Bay of New York. The island is affected by semidiurnal tides, which are two nearly equal high waters and two nearly equal low waters each tidal day. The Labrador current extension in the Atlantic Ocean flows along the eastern side of Long Island. The ocean current flows south and has an average speed of 0.5 knots in summer and 0.7 knots in winter. The mean temperature of the surface water is 70°F in summer and 40°F in winter. There is a 10% chance of having waves 5 ft or higher in summer and a 30% chance of this occurrence in winter. Surface water drains directly into the bay. No major streams are located on Governors Island and no flood data are available. If flooding would occur, it would be from localized heavy rainfall and would be for a short duration (USACE 2006a).

2.3.6.2 A small amount of groundwater may exist in an unconfined condition within the coarse-grained fill and underlying sand and gravels. The saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. The groundwater table in the unconsolidated sediments is near the surface, between 4 and 8 ft below land surface and within the dredged sands. Groundwater movement is towards the points of discharge, which would be near the perimeter of the island on the Hudson River or East River. Groundwater is contained in and moves through differentiated geological units composed of gravel, sand, and clay. The underlying crystalline basement rocks are of Precambrian age and not water bearing (USACE 1997 and 2006a).

2.3.6.3 No surface water is present within the FUDS boundary.

2.3.7 Area Water Supply/Groundwater Use

2.3.7.1 The Governors Island water supply is pumped to the island from Manhattan through the Brooklyn Battery Tunnel (Alion 2006).

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 HTRW Center of Expertise guidance, the Army Checklist for Important Ecological Places is completed to determine if a FUDS requires a screening level ecological risk assessment (SLERA) (USACE 2006c and 2007a). The FUDS contains the Governors Island National Monument, but no ecologically sensitive areas. Refer to Table 2-3 for the completed checklist for Fort Jay.

2.3.8.2 Threatened and Endangered Species

2.3.8.2.1 The State of New York State Department of Environmental Conservation (NYSDEC) was contacted regarding the presence of and impact to threatened and endangered (T&E) species for the FUDS. There are no records of known occurrences of rare or state-listed animal or plant species (NYSDEC 2006).

2.3.8.3 Wetlands

2.3.8.3.1 There are no known wetlands at Fort Jay (USACE 1997 and 2006a).

2.3.8.4 Coastal Zones

2.3.8.4.1 Fort Jay is part of New York State's Coastal Management Program administered by the New York Department of State. The SI field activities were completed in accordance with the SS-WP and did not adversely impact coastal zone resources.

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

2.4.0.1 A Summary of previous historic investigations and related discoveries of MC and MEC (if applicable) is provided in the following subsections.

2.4.1 EOD Incidents

2.4.1.1 In the 1960s, the 542nd Ordnance Detachment Unit was stationed at Fort Jay and responded to several incidents on the island. In April 1962, repairmen working on the island uncovered 80 rounds of .30-caliber ammunition while digging near what was then the headquarters of a Colonel Testas. According to the ASR, the building where the munitions were discovered was not noted. In 1964, 13 rounds of .45 caliber bullets were found in an unspecified location (USACE 1997 and 2006a).

2.4.1.2 In June 1962, explosive ordnance disposal (EOD) personnel shipped tear gas grenades from the Consolidated Property Office on Fort Jay for destruction by burning and the residue was shipped to Fort Tilden and Camp Drum. In August 1963, 48 tear gas and 31 smoke grenades were found on the old Fort Jay. According to the ASR, the incident report listed the location as "Old Fort Jay (Dungeon)." The items were removed by the 66th detachment for offsite disposal (USACE 1997 and 2006a).

2.4.1.3 In November 1993, several cannon balls were found in one location by personnel replacing a water line behind Building 404. One of the cannon balls was isolated at the golf course. An Army EOD team determined that this latter canon ball contained black powder. EOD rendered safe the suspected cannon ball using C-4. The black powder was then neutralized (USACE 1997 and 2006a).

2.4.1.4 Of these discoveries, findings since closure include the cannon balls (1993) and inert 3 inch projectile (2006).

2.4.2 Preliminary Assessment/ Inventory Project Report

2.4.2.1 A Preliminary Assessment (PA)/Inventory Project Report (INPR) of Fort Jay was conducted in 1992 under DERP FUDS by the CENAB. The Findings and Determination of Eligibility (FDE), dated 8 June 1992, concluded that the 173 land-acres had been formerly used by the DoD (USACE 1992).

2.4.3 Archive Search Report

2.4.3.1 The USACE's Rock Island District prepared an ASR for Fort Jay in 1997 and 2006. The ASR contains a description of previous investigations performed, a site description, the historical ordnance presence, site eligibility as a FUDS, a visual site inspection, an evaluation of ordnance hazards, site ordnance technical data available, and a description of other environmental hazards. Historical evidence of material potentially presenting an explosive hazard (MPPEH) suggests the

use of small arms, smoothbore projectiles, heavy artillery projectiles, smoke grenades, and tear gas from the 1800s to 1966 when the island was transferred to the U.S. Coast Guard (USACE 2006). *Note: An ASR Supplement was not completed for Fort Jay.*

2.4.4 Lead Remediation

2.4.4.1 According to the ASR, the U.S. Coast Guard conducted lead remediation at the indoor rifle range at Building 400 in 1995. *Note: At this time, the remediation report has not been located after a search through NYSDEC and NPS records, though a reconnaissance of Building 400 during the SI indicates that the indoor rifle range was remediated and completely removed.*

2.4.5 Post TPP Meeting Discovery

2.4.5.1 Subsequent to the technical project planning (TPP) meeting at Fort Jay on 25 July 2006, the Alion Team was notified that a piece of ordnance (a 3-inch projectile) was found behind a wall during demolition activities at Building 105. The Alion Team was accompanied by Mr. Luce of Turner Construction to the location of the ordnance in Building 108, the construction office building. The 3-inch projectile was moved by the demolition company from Building 105 to Building 108 and was observed to be standing upright on a 5-inch window ledge after being moved by site personnel. The Alion Team notified USACE Baltimore District of the discovery and directed property owners to call 911. The New York City Bomb Squad responded and determined that the projectile was inert.

2.5 Citizen Reports of Munitions and Explosives of Concern

2.5.1 Apart from the EOD incidents and post TPP discovery, there have not been any other citizen reports that document MEC findings at Fort Jay. At the TPP meeting, in July 2006, stakeholders also confirmed there have been no reports of MEC findings on the property apart from the incident stated above. (Appendix B, Alion 2006)

2.6 Non-Department of Defense Contamination/Regulatory Status

2.6.1 There is no evidence that activities occurring prior to or after DoD use of the land contributed to present day MEC or munitions debris (MD) and MC findings.

Table 2-1. Range Inventory (USACE 1997, 2006a, and 2007c)

Site Name	Range Name	RMIS Range Number	RAC Score[1]	Acreage
Fort Jay	Rifle Range #1 (MRS 1)	C02NY061101R01	NA	0.43 (land)
	Rifle Range #2 (MRS 2)	C02NY061101R02	NA	0.43 (land)
	Machine Gun Range (MRS 3)	C02NY061101R03	NA	0.86 (land)
	Skeet Range (MRS 4)	C02NY061101R04	NA	0.89 (land) 29.11 (tidal water)
	AOC 1 (Remaining Lands)	NA	NA	170.39 (land)

1 – The overall RAC score for the site is 2 (USACE 1997).

NA – This information is not available.

RAC – Risk Assessment Code Score. The RAC allows a score of 1 to 5.

RMIS – Restoration Management Information System

Table 2-2. Military Munitions Type and Composition (USACE 1997 and 2006a)[1]

Range ID (MRS/AOC)/ Subrange	Munitions ID	Munitions Type	Composition (Filler, Projectile, Body, Propellant, other) [2]	Associated MC Analysis
Rifle Range #1 (MRS 1)	SMALL ARMS (CTT01)	.22 caliber cartridge	Casing–gilding metal (copper and zinc), gilding-metal clad steel, or copper-plated steel Projectile –antimony, lead Propellant – Smokeless Powder[3] - Single (Nitrocellulose) or Double-base (Nitrocellulose and NG)	*MC from rifle/pistol ranges are mainly associated with the impact area; therefore, the projectile constituents in the "Composition" column are carried forward for analysis in this SI. See Note #2.* Explosives: • None Metals: • Antimony • Copper • Iron • Lead • Zinc
		.45 caliber cartridge	Casing - copper alloy, steel, brass, tungsten chrome steel, copper, nickel, gilding metal Projectile - lead, antimony Propellant - Smokeless Powder[3] - Single (Nitrocellulose) or Double-base (Nitrocellulose and NG), pistol powder	Explosives: • None Metals: • Antimony • Copper • Chromium • Iron • Lead • Nickel • Tungsten[8] (no analysis) • Zinc
Rifle Range #2 (MRS 2)	SMALL ARMS (CTT01)	.22 caliber cartridge	Casing–gilding metal (copper and zinc), gilding-metal clad steel, or copper-plated steel Projectile –antimony, lead Propellant – Smokeless Powder[3] - Single (Nitrocellulose) or Double-base (Nitrocellulose and NG)	*MC from rifle/pistol ranges are mainly associated with the impact area; therefore, the projectile constituents in the "Composition" column are carried forward for analysis in this SI. See Note #2.* Explosives: • None Metals: • Antimony • Copper • Iron • Lead • Zinc
		.45 caliber cartridge	Casing - copper alloy, steel, brass, tungsten chrome steel, copper, nickel, gilding metal Projectile - lead, antimony Propellant - Smokeless Powder[3] - Single	Explosives: • None Metals: • Antimony • Copper • Chromium • Iron • Lead

Table 2-2. Military Munitions Type and Composition (USACE 1997 and 2006a)[1]

Range ID (MRS/AOC)/ Subrange	Munitions ID	Munitions Type	Composition (Filler, Projectile, Body, Propellant, other) [2]	Associated MC Analysis
			(Nitrocellulose) or Double-base (Nitrocellulose and NG), pistol powder	• Nickel • Tungsten[8] (no analysis) • Zinc
Machine Gun Range (MRS 3)	SMALL ARMS (CTT01)	.30 caliber cartridge, Ball, M1	Casing - lead, antimony, copper-plated steel Projectile -lead, antimony Propellant -Possible: black powder[7], single or double-base powder (nitrocellulose and/or NG), pyro-cellulose powder, tracer composite	*MC from machine gun ranges are mainly associated with the firing point and the impact area; therefore, the propellant and the projectile constituents in the "Composition" column are carried forward for analysis in this SI.* Explosives: • Black powder[7] (no analysis) • NG • Nitrocellulose (no analysis) • Pyrocellulose (no analysis) Metals: • Antimony • Copper • Iron • Lead
Skeet Range (MRS 4)	SMALL ARMS (CTT01)	12 gage Shotgun Shell, No. 7 ½ or 9 shot	Primer - Barium nitrate, lead styphnate, antimony sulfide, aluminum powder, PETN, tetracene. Projectile - pellets: Lead shot. Propellant - graphite, DNT or smokeless powder[3] - Single (Nitrocellulose) or Double-base (Nitrocellulose and NG), potassium nitrate	*MC from skeet ranges are mainly associated with the impact area; therefore, the projectile constituents in the "Composition" column are carried forward for analysis in this SI. See Note #2.* Explosives: • None Metals: • Lead
AOC 1 (Pistol Range, Buried Magazine Area, Gas Chamber, Bldg 14 Indoor Rifle Range, Cannon Ball Discovery Area, Castle Williams, South Battery, NY Arsenal Ordnance Storehouse, and	Civil War projectiles, Smoothbore	General	Body: steel Filler: Black powder[7] Fuse/Primer: Linear column time fuze; waterproof seacoast fuze adaptor	Explosives: • Black powder[7] (no analysis) Metals: • Iron

Table 2-2. Military Munitions Type and Composition (USACE 1997 and 2006a)[1]

Range ID (MRS/AOC)/ Subrange	Munitions ID	Munitions Type	Composition (Filler, Projectile, Body, Propellant, other) [2]	Associated MC Analysis
Powder Magazine)				
AOC 1 continued (Pistol Range, Buried Magazine Area, Gas Chamber, Bldg 14 Indoor Rifle Range, Cannon Ball Discovery Area, Castle Williams, South Battery, NY Arsenal Ordnance Storehouse, and Powder Magazine)	Heavy Artillery Projectiles of the Civil War (e.g. Solid Shot, Common Shell, Grape Shot)	Unknown	Body: iron, lead, brass Filler: Black powder[7] Fuse/Primer: Wood fuze plug; confederate water cap; water cap fuze plug;	Explosives: • Black powder[7] (no analysis) Metals: • Copper • Iron • Lead • Zinc
	Parrott Systems	General	Body : iron, brass, tin, lead Filler: Black powder[7] Fuse/Primer: Zinc or brass fuze adaptors; Bormann-time fuzes; Parrott Percussion fuzes	Explosives: • Black powder[7] (no analysis) Metals: • Copper • Iron • Lead • Tin[8] (no analysis) • Zinc
	Projectile, 3 inch	M42/M42A1 HE	Body: steel Filler: 0.86 lbs TNT Fuse/Primer: M43 Mechanical Time or Mk IIIA2	Explosives: • TNT[4] Metals: • Iron
		Shell, HE, Mk IX (anti-aircraft)	Body: steel Filler: 0.91 lbs TNT Fuse/Primer: M43A2 – Mechanical time	Explosives: • TNT[4] Metals: • Iron
		M42B2/Shell, Practice	Body: steel Filler: Sand with Black powder[7] spotting charge. Fuze: M43 – Mechanical time	Explosives: • Black powder[7] (no analysis) Metals: • Iron
	Smoke Grenades[5]	Unknown	Body: steel Filler: colored (red, green, yellow or violet) smoke mixture (mostly potassium chlorate, lactose, and a dye) and/or white phosphorus Fuse/Primer: N/A	Metals: • Iron Others: • Smokes and white phosphorus (no analysis[6])
	Riot Grenades/ Tear Gas[5]	Unknown	Body: steel Fuse/Primer: N/A Filler-CN, CS, and/or CR	Metals: • Iron Others: CN, CS, and CR (no analysis[6])

Table 2-2. Military Munitions Type and Composition (USACE 1997 and 2006a)[1]

Range ID (MRS/AOC)/ Subrange	Munitions ID	Munitions Type	Composition (Filler, Projectile, Body, Propellant, other) [2]	Associated MC Analysis

[1] Additional sources for munitions constituents include TM 9-1300-214 and USACE technical data sheets.

[2] Based on available technical manuals, MC identified for site munitions includes the following: **Primer** (potassium chlorate, lead thiocyanate, antimony sulfide, PETN, lead styphnate, barium nitrate, calcium silicade, acacia technical, acetylene black; **Fuze** (mercury fulminate, lead azide, tetryl, lead styphnate); **Tracer** (strontium nitrate, strontium peroxide, magnesium powder, calcium resinate, strontium oxalate, potassium perchlorate);**Incendiary mixtures** (barium nitrate, magnesium/aluminum powder, asphaltum, graphite). These materials when combined typically represent less than 5% of the weight of the material projectile for small and medium caliber munitions. Typical volumes are broken out as follows: Primer (less then 1% or 1 gram), Tracer (less then 1% or < 1 gram), Incendiary (less then 2% or < 2 grams) and fuze (less then 1% or < 1 gram). These materials along with the propellant typically burn as the projectile is fired. Therefore, the primer, fuze, tracer, and incendiary mixtures are not included in the list of Associated MC Analysis. Based on this rationale, MC sampling/analysis typically focuses on primary constituents present in propellants and the projectile/casings in firing points and impact areas. Nitrocellulose is nitrated cotton or wood pulp.

[3] Smokeless Powder – as of 1900 smokeless powder was commonly of the Cordite variety which is composed of is comprised of Nitroglycerine [NG] (30%) and Nitrocellulose (65%).

[4] When TNT and DNT are identified in a munition, the breakdown products are included for munitions constituents analysis (2,4-DNT; 2,6-DNT; 1,3,5-trinitrobenzene; nitrotoluene; 2-amino-4,6-DNT; 4-amino-2,6-DNT).

[5] Tear Gas and smoke grenades are not considered chemical warfare material (CWM) per Department of Army (DoD Munitions Response Terminology; 2003). CWM is not within scope of this SI.

[6] Smokes, white phosphorus, CN, CS, and CR were not analyzed per stakeholder agreements as documented in the Site Specific Work Plan.

[7] Black Powder is comprised of sulfur, charcoal, and saltpeter

[8] Tungsten and tin are not Target Analyte List (TAL) metals; the metals analyses were limited to TAL metals.

AOC=area of concern
AP=Armor Piercing
CN= chloroacetophenone
CS= ortho-chlorobenzylidene-malononitrile
CR= dibenz (b,f)-1,4-oxazepine
CWM=chemical warfare materiel
DNT = dinitrotoluene
DoD=Department of Defense
g = gram
HE=High Explosive
lb=pound(s)
M = model
MC=munitions constituents
Mk=Mark
MRS=Munitions Response Site designation
MEC=Munitions and Explosives of Concern
NG=nitroglycerin
N/A= not applicable
PETN= pentaerythritol tetranitrate
N/A = not applicable
SI=site inspection
TM=Technical Manual
TNT =trinitrotoluene
USACE =U.S. Army Corps of Engineers

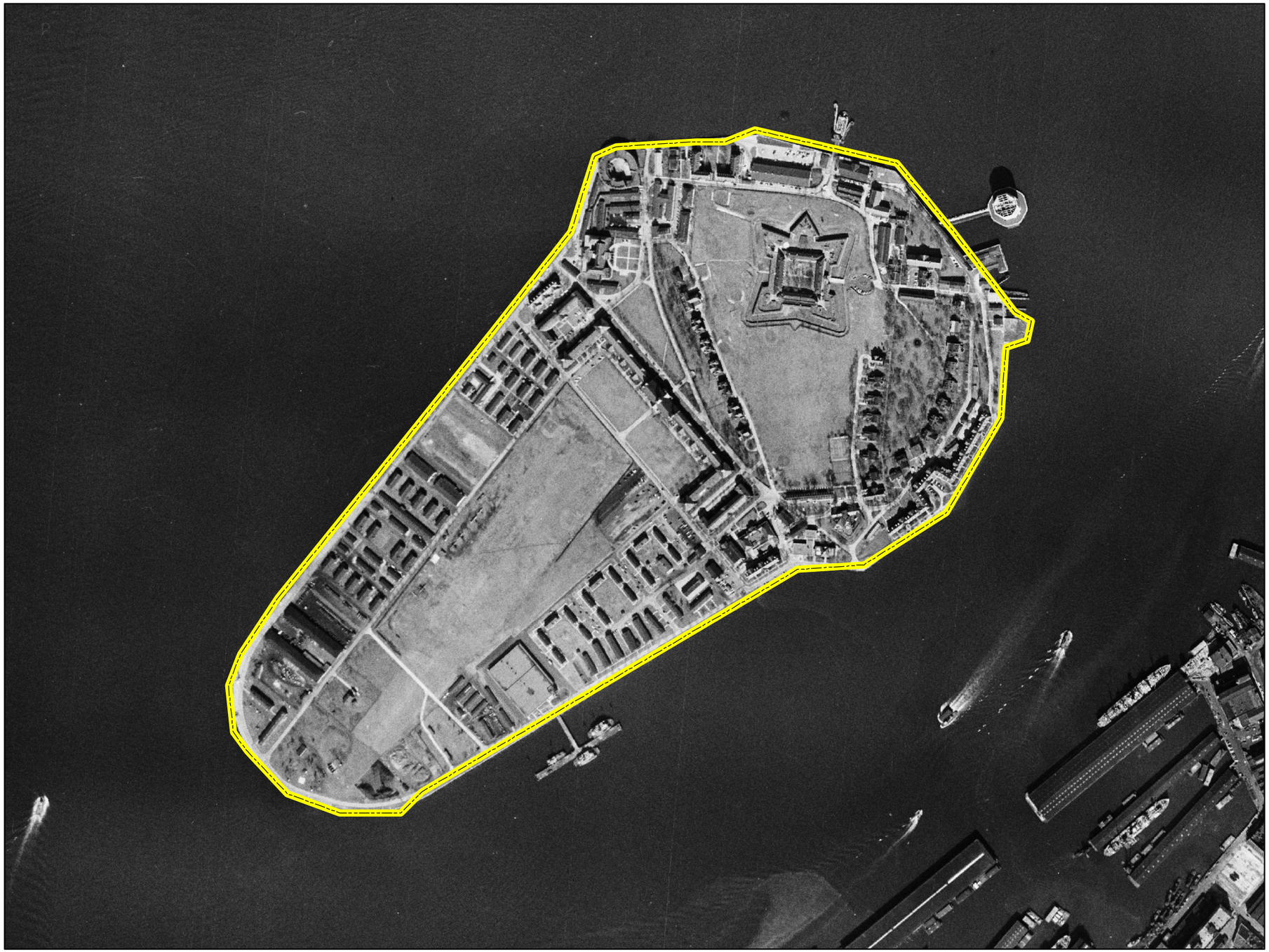
Table 2-3 Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No[1]		Comments
1.	Locally important ecological place identified by the Integrated Natural Resource Management Plan, Base Realignment and Closure (BRAC) Cleanup Plan or Redevelopment Plan, or other official land management plans.		No	
2.	Critical habitat for Federal designated endangered or threatened species. See No. 12 below.		No	
3.	Marine Sanctuary		No	
4.	National Park	Yes		22 Acres of the site were transferred to the National Park Service and designate as the Governors Island National Monument.
5.	Designated Federal Wilderness Area		No	
6.	Areas identified under the Coastal Zone Management Act		No	
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	Yes		22 Acres of the site were transferred to the National Park Service and designated as the Governors Island National Monument.
10.	National Seashore Recreational Area		No	
11.	National Lakeshore Recreational Area		No	
12.	Habitat known to be used by Federal designated or proposed endangered or threatened species		No	
13.	National preserve		No	
14.	National or State Wildlife Refuge		No	
15.	Unit of Coastal Barrier Resources System	Yes		Fort Jay is part of New York State's Coastal Management Program administered by the New York Department of State.
16.	Coastal Barrier (undeveloped)	Yes		Fort Jay is part of New York State's Coastal Management Program administered by the New York Department of State.
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		No	

Table 2-3 Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No[1]		Comments
	animals			
22.	National river reach designated as Recreational		No	
23.	Habitat known to be used by state designated endangered or threatened species		No	
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	
29.	State-designated Natural Areas		No	
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	

[1] One or more Yes responses indicates the need for a SLERA.



Fort Jay
New York, New York

Legend

FUDS Boundary

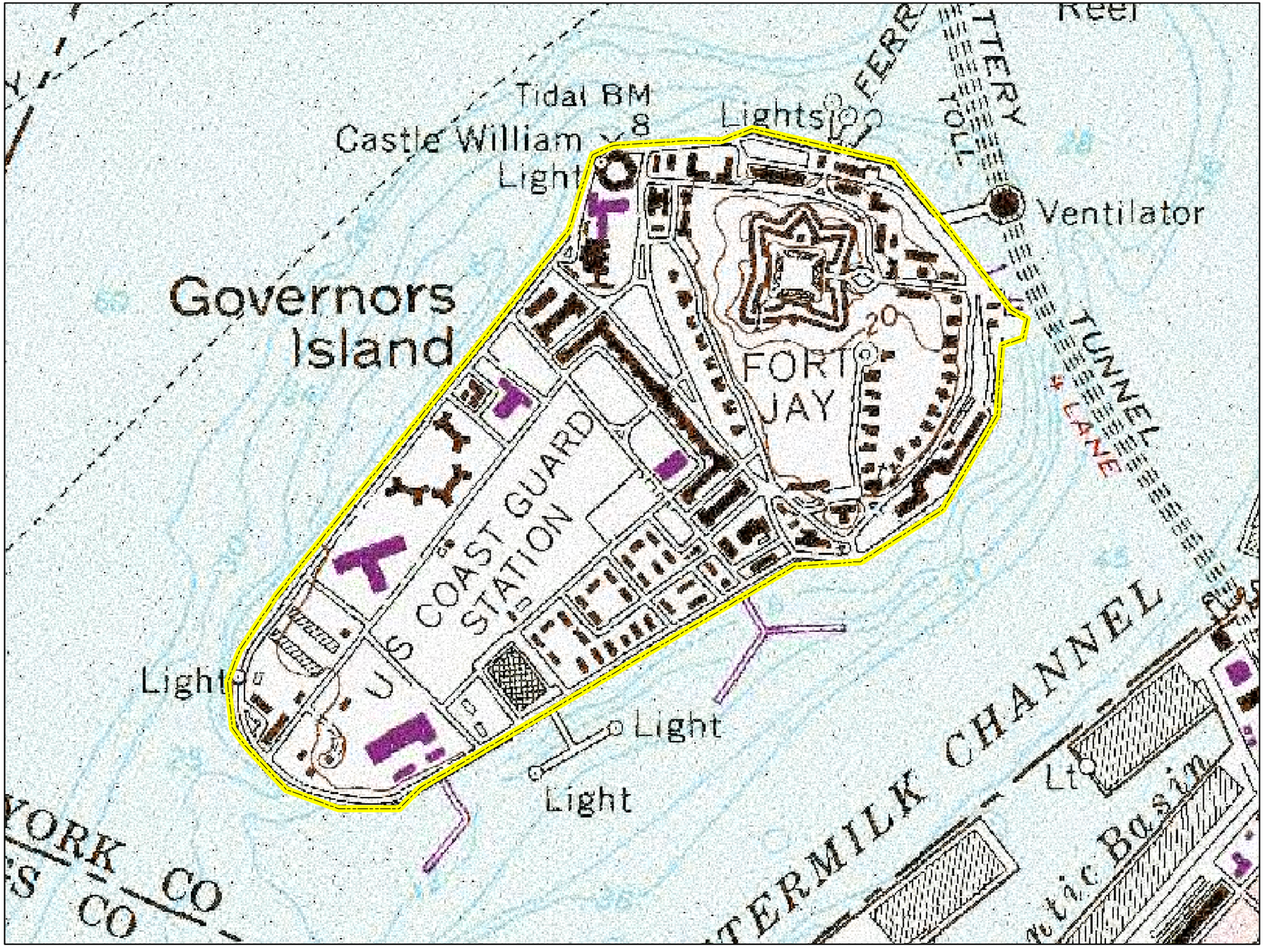
Source:
United States Geological Survey (1954)

N
W E
S

0 300 600 1,200
Feet

Q:\projects\GIS\62023012006\Fort_Jay\FINAL\Figure2-1

Figure 2-1. Historic Site Aerial Photograph.



Fort Jay
New York, New York

Legend

FUDS Boundary

Source:
United States Department of Agriculture (2000)

N
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0 300 600 1,200
Feet

Q:\projects\GIS\62023012006\Fort_Jay\FINAL\Figure2-2

Figure 2-2. Topographic Map.

3. SITE INSPECTION ACTIVITIES

3.1 Technical Project Planning

3.1.1 The first TPP Meeting for Fort Jay was conducted on 22 July 2006 at Governors Island, New York. The Final TPP Memorandum documenting the meeting was issued in October 2006. The meeting participants included representatives from USACE Baltimore District, NYSDEC, NPS, GIPEC, and the Alion Team. Participants in the TPP discussed the results of previous investigations, historical aerial photographs, the CSM, and Data Quality Objectives (DQOs). At that time, six DQOs were defined for this SI (Alion 2006); however, during the development of the SS-WP (Alion 2007), the list of DQOs was revised and combined to the current list of four DQOs[1]. The TPP discussion involved a presentation of general decision rules for completing the SI objectives. These decision rules were summarized in the DQO worksheets and are summarized below.

3.1.2 DQO 1 – Determine if the FUDS requires additional investigation through an RI/FS or if the FUDS may be recommended for No Department of Defense Action Indicated (NDAI) based on the presence or absence of MEC and MC. The basis of recommendation for RI/FS related to the presence/absence of MEC includes:

- Historic data that indicates the presence of MEC or MD
- Visual evidence or anomalies classified as MEC, MD, or 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, etc.)

[1] Based on discussions with USACE, the DQOs were consolidated from six DQOs to four DQOs to be more in-line with the programmatic SI goals. The consolidation does not compromise the intent of the original DQOs.

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

- Maximum concentrations at the FUDS that exceed EPA Region IX Preliminary Remediation Goals (PRGs) based on current and future land use
- Maximum concentrations at the FUDS that exceed EPA interim ecological risk screening values
- Maximum concentrations at the FUDS that exceed site-specific background levels
- Data reporting the presence or absence (less than reporting/quantitation limits for metals and less than the reporting limits for explosives) of analytes for which no screening criteria (decision limits: PRGs, etc.) are available are to be used to support the weight-of-evidence evaluation of MC at the site.

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

3.1.5 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. [2] The basis for recommendations is specified below:

- A TCRA would be recommended if there is a complete pathway between source and receptor and if the MEC and the situation are viewed as 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.
- A non-TCRA (NTCRA) would be recommended if a release or threat of release that poses a risk where more than 6 months planning time is available.

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

[2] MMRP Programmatic guidance has suggested the terminology “emergency response action” be replaced with TCRA and NTCRA. The DQO as written is what was presented in the SS-WP, but the decision criteria match the current guidance.

3.1.7 DQO 3 – Collect, or develop, additional data, as appropriate, for HRS scoring by EPA.

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

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

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

3.1.9 The TPP meeting participants concurred with the DQOs and the general technical approach for the planned SI activities discussed during the TPP (Alion 2006) and as revised and subsequently documented in the Final SS-WP (Alion 2007). In summary, these agreements were to inspect the cited areas of concern and conduct multimedia sampling in accordance with the Final SS-WP; and to complete the data assessment in accordance with the DQOs. Please refer to the Final TPP Memorandum (Alion 2006), attached in Appendix B, for more specific details of the TPP meeting. As part of this SI Report, Alion evaluated the DQOs presented in the SS-WP and completed a DQO attainment verification worksheet to document completion of the DQOs (included in Appendix B).

3.2 Supplemental Records Review

3.2.0.1 State agencies were contacted regarding T&E species and cultural and ecological resources at the FUDS property.

3.2.1 Threatened and Endangered Species

3.2.1.1 The ASR did not indicate the existence of T&E species at Fort Jay (USACE 1997 and 2006a). The Division of Fish, Marine, and Wildlife Resources of NYSDEC also indicated listed animals or plants and significant natural communities are not present on or in the immediate vicinity of the island. NYSDEC determined that the MMRP SI project will not cause adverse impacts to habitat on the island or in the immediate vicinity of the FUDS (NYSDEC 2006).

3.2.2 Cultural and Archaeological Resources

3.2.2.1 The stakeholder present at the TPP meeting noted the importance of conforming to the National Historic Preservation Act of 1966 and the New York State Historic Preservation Act of 1980. Notification letters to the State Historic Preservation Office as well as to NPS and GIPEC

were sent prior to the finalizing the SS-WP. No formal response was provided but at the request of GIPEC and NPS, USACE New York District provided on-site archaeological support personnel who accompanied the field team to sampling locations in areas of historic significance. The field team did not encounter any material of historic significance during field work.

3.3 Site Inspection Field Work

3.3.1 On 15 through 16 March 2007 the Alion field team visited Fort Jay to conduct SI field activities in accordance with the PWP and the Final SS-WP (Alion 2005, 20067). A qualitative site reconnaissance for MEC and sample collection and analysis for possible MC contamination was completed. A total of 10 acres were assessed through qualitative reconnaissance. In accordance with the SS-WP, a total of seven surface soil (and two duplicates), four subsurface soil, and five background samples (3 fill and 2 native soil) were collected.

3.3.2 MEC reconnaissance findings and MC sample results are discussed in Sections 4 and 5, respectively. As-collected sample locations, sample designations, and sampling rationale 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, has been included 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 According to the SS-WP, 14 surface soil samples and 4 subsurface soil samples were to have been collected at Fort Jay. There were two deviations from the field sampling program designed in the Final SS-WP (Alion 2007). The sample for Building 400 (FJY-IR-SS-02-06) was not collected because, upon inspection, the building had been remediated as described in the ASR. The sample proposed for the Gas Chamber (FJY-GC-SS-02-02) was not collected because the area around the sample location was covered with concrete/asphalt and the field team was unable to obtain a soil sample from the area. Because these two locations are no longer potential sources, replacement samples were considered unnecessary. This has been noted in the DQO Verification Worksheets in Appendix B. Additional information pertaining to the field activities, including field notes and forms, is provided in Appendix D.

3.4.2 During the field work, Building 400 (Former Indoor Rifle Range) was inspected by the sampling team in the company of Clara Kelly of GIPEC and it was observed that the building has been remediated as detailed in the ASR.

3.5 Site Inspection Laboratory Data Quality Indicators

3.5.1 This section summarizes the data quality assessment for the Fort Jay SI analytical data. Data were generated by GPL under the DoD Quality Systems Manual (QSM) Version III and validated by a third-party validator (EDS) using EPA Region II Data Validation Guidelines. The data were analyzed using the Automated Data Review (ADR) Version 8.1 based on the DoD QSM Version III guidelines, and the results are included in the Environmental Data Management System (EDMS) database. The detailed GPL and EDS reports are contained in Appendices F and G, respectively, and the following text summarizes the findings. The USACE Memorandum for the Record – CQAR [Corps Quality Assurance Report] of QA Split Samples is included in Appendix G. Data Quality Indicators (DQI) include precision, accuracy, representativeness, completeness, and comparability (PARCC) and sensitivity.

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 (RPD) between the separate measurements (usually matrix spike/matrix spike duplicate [MS/MSD] pairs) and the observed RPD compared to acceptable values, based on Region II Data Validation Guidelines. There were a few MS/MSD pairs that did not achieve acceptable values, and these samples were qualified appropriately (Appendix G). Field precision is measured by the comparison of field duplicate samples, which are 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 which has been spiked with a known concentration is analyzed by the laboratory as the MS, MSD, or Laboratory Control Spike, Surrogate, and Blank Spikes. EDS assessed accuracy according to DoD QSM and Region II Data Validation 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. There were two deviations from the field sampling program designed in the work plan. The sample for Building 400 (FJY-IR-SS-02-06) was not collected because, upon inspection, the building was observed to have been remediated as described in the ASR. The sample proposed for the Gas Chamber (FJY-GC-SS-02-02) was not collected because the area around the sample location was covered with concrete/asphalt and

the field team was unable to obtain a soil sample from the area. Because these two locations are no longer potential sources, replacement samples were considered unnecessary. This has been noted in the DQO Verification Worksheets in Appendix B. All other samples were collected and analyzed as planned; therefore, the representative DQI has been achieved for Fort Jay.

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. As discussed in Appendix G, none of the 612 total analyte results associated with this sample effort was rejected; therefore, the completeness indicator is 100 percent, and the Fort Jay 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 have been previous studies at Fort Jay; however, these study reports have not been available for comparison of reported concentrations from this project. For this SI, standard methods for sampling and analyses were followed as documented in the SS-WP and provide a technically sound basis for data comparisons in the future should additional information become available. Therefore, the comparability DQI has been achieved.

3.5.7 Sensitivity is a measure of the screening criteria as they compare to detection limit . For non-detected analytes, the laboratory reported the MDL for metals consistent with Superfund-type procedures. The RL represents the lowest concentrations at which calibration standards have been assessed and the MDL represents a statistically-derived limit below which the instrument signal cannot be differentiated from instrument noise. Standards were not assessed between the RL and MDL; therefore, any estimated quantitation lower than the RL has higher uncertainty. Additional discussion on data sensitivity is presented in Section 5.1.4.

3.6 Second TPP Meeting

3.6.1 Following the completion of the Draft Final SI Report, the stakeholders had the opportunity to participate in a second TPP meeting to discuss the findings, conclusions, and recommendations of the Draft Final SI Report, review the MRSPP (Appendix K), and confirm that the project objectives and DQOs have been achieved (Alion 2006). The second TPP was held on 3 January 2008 by teleconference. The stakeholders agreed with the findings, conclusions, and recommendations of the SI Report. A copy of the TPP Memorandum is found in Appendix B of this SI Report.

Table 3-1. Sample Location and Field Observations

Location	Sampling Identification	Coordinates (NAD 83 UTM Zone 18N)		Work Plan Rationale for Sampling Locations (Alion 2007)	Comment
		Easting (m)	Northing (m)		
MRS 1	FJY-SA-SS-02-02	583115	4505034	Rifle Range #1	None
MRS 2	FJY-SA-SS-02-03	583183	4505032	Rifle Range #2	None
MRS 3	FJY-MG-SS-02-04	583141	4504915	Machine Gun Range	None
MRS 4	FJY-SR-SS-02-03	582393	4504167	Skeet Range	None
AOC 1	FJY-PR-SS-02-01	582510	4504349	Pistol Range	None
	FJY-BM-SB-03-01	582590	4504249	Buried Magazine area	None
	FJY-GC-SS-02-02	582407	4504230	Gas Chamber	Sample location was covered with concrete/asphalt. Planned soil sample was not collected
	FJY-IR-SS-02-06	582927	4504733	Building 14 Indoor Rifle Range	Building had been remediated as described in the ASR. Planned soil sample was not collected
	FJY-CB-SB-03-01	583088	4504835	Cannon Ball Discovery Area	None
	FJY-CW-SS-02-01	582863	4505101	Castle Williams	None
	FJY-SB-SS-02-05	583132	4504600	South Battery	None
	FJY-AO-SB-03-02	583268	4505033	New York Arsenal Ordnance Storehouse	None
	FJY-PM-SB-03-03	583008	4505004	Powder Magazine	None
Background	FJY-BG-SS-02-01	582771	4504943	Undisturbed soil	None
	FJY-BG-SS-02-02	583353	4504645	Undisturbed soil	None
	FJY-BG-SS-02-03	582919	4504425	Undisturbed soil	None
	FJY-BG-SS-02-04	583429	4504873	Undisturbed soil	None
	FJY-BG-SS-02-05	582564	4504690	Undisturbed soil	None

ASR – Archive Search Report
MEC – Munitions and Explosives of Concern
m – meter
N - north
NAD – North American Datum
UTM – Universe Transverse Mercator

Fort Jay
New York, New York

Legend

- Soil Sample
- Subsurface Sample
- Background Sample
- Geophysical Reconnaissance Route
- MRS 1 - Rifle Range #1 [0.43 Acres]
- MRS 2 - Rifle Range #2 [0.43 Acres]
- MRS 3 - Machine Gun Range [0.86 Acres]
- MRS 4 - Skeet Range [0.89 Acres land, 29.11 Acres tidal water]
- Area of Concern 1 [172.78 Acres]
- Fill/Dredge Material
- FUDS Boundary

Sample ID Designation
"FJY-BG-SS-02-01"
Site Name-Sampling Location-Sample Type-Sample Depth-Sample #

Note:
Area of Concern 1 includes remaining lands within the FUDS boundary

Sources:
United States Department of Agriculture (2002)
United States Army Corps of Engineers (1997)

0 300 600 1,200
Feet

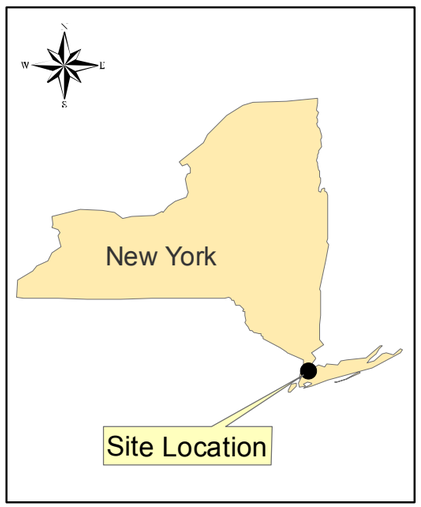

Figure 3-1. Sample Locations and Geophysical Site Reconnaissance Findings.

4. MEC SCREENING LEVEL RISK ASSESSMENT

4.1 Operational History

4.1.1 The island's strategic location resulted in its use as a military facility by British and American forces for over 200 years. Following the British evacuation of New York in April 1776, Americans fortified the island in fear of further advances by the British Navy. In 1794, with the country in need of a system of coastal defenses, construction began on Fort Jay, on high ground in the center of Governors Island. In 1800, New York transferred the island to the U.S. government for military purposes. Between 1806 and 1809, the Army reconstructed Fort Jay and built Castle Williams on a rocky outcropping facing New York Harbor. During the War of 1812, artillery and infantry troops were concentrated on Governors Island. During the American Civil War, the island was used for recruitment and as a prison for captured Confederate soldiers. Throughout World Wars I and II, the island served as an important supply base for Army ground and air forces. The island continued to serve an important military function until the 1960s (GIPEC 2006).

4.1.2 Historical documentation and interview reviews performed as part of the SI indicated munitions including small arms, Civil War projectiles, heavy artillery projectiles, parrot systems, smoke grenades and riot grenades/tear gas were used and/or found at Fort Jay. Historical documents, including the INPR and the ASR, confirmed that MEC, MD, and small arms have been found at the FUDS.

4.1.3 With the consolidation of U.S. Military forces in 1966, the island was transferred to the U.S. Coast Guard. This was the U.S. Coast Guard's largest installation, serving both as a self-contained residential community, with an on-island population of approximately 3,500, and as a base of operations for the Atlantic Area Command and Maintenance and Logistics Command, and the Captain of the Port of New York. The U.S. Coast Guard closed its facilities on Governors Island in 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 FUDS surface within and around the ranges of the FUDS was completed to identify MPPEH/MD/MEC, suspect areas, such as distressed vegetation, stained soil, target remnants, and visual metallic debris. Analog geophysics was used primarily to support anomaly avoidance activities for the field crew. Where appropriate, subsurface anomalies possibly attributable to MEC or MD were documented.

4.2.0.2 The total estimated acreage subject to the qualitative reconnaissance is approximately 1.0 acres.[3]

4.2.1 Rifle Range #1 (MRS 1)

4.2.1.1 MRS 1 encompasses 0.43 acres. The Alion Team completed qualitative reconnaissance of the former range for MPPEH, MEC, MD, and small arms using visual observations and analog geophysics (magnetometer). Site reconnaissance and sampling locations are shown on Figure 3-1. Field observations related to cultural debris, range related features, and MD/MEC finds are presented below:

- This MRS is located on an island accessible to the public (by ferry), with a few occupational residents.
- The only visible evidence of the MRS was impact marks on the stone wall of Ft Jay. No craters or the former target were visible.
- No subsurface anomalies were identified near the impact marks of the MRS.
- No small arms were observed.
- One surface soil (at a depth of 0 to 2 inches) was collected in MRS 1.

4.2.2 Rifle Range #2 (MRS 2)

4.2.2.1 MRS 2 encompasses 0.43 acres. The Alion Team completed qualitative reconnaissance of the former range for MPPEH, MEC, MD, and small arms using visual observations and analog geophysics (magnetometer). Site reconnaissance and sampling locations are shown on Figure 3-1. Field observations related to cultural debris, range related features, and MD/MEC finds are presented below:

- This MRS is located on an island accessible to the public (by ferry), with a few occupational residents.
- The only visible evidence of the MRS was impact marks on the stone wall of Ft Jay. No craters or the former target were visible.
- No subsurface anomalies were identified near the impact marks of the MRS.
- No small arms were observed.
- One surface soil (at a depth of 0 to 2 inches) was collected in MRS 2.

[3] Extent of reconnaissance estimated from global positioning system (GPS) tracks and includes a 25-ft radius around each sample and observations along the GPS tracks covering a 6-ft swath.

4.2.3 Machine Gun Range (MRS 3)

4.2.3.1 MRS 3 encompasses 0.86 acres. The Alion Team completed qualitative reconnaissance of the former range for MPPEH, MEC, MD, and small arms using visual observations and analog geophysics (magnetometer). Site reconnaissance and sampling locations are shown on Figure 3-1. Field observations related to cultural debris, range related features, and MD/MEC finds are presented below:

- This MRS is located on an island accessible to the public (by ferry), with a few occupational residents.
- The only visible evidence of the MRS was impact marks on the stone wall of Ft Jay. No craters or the former target were visible.
- No subsurface anomalies were identified near the impact marks of the MRS.
- No small arms were observed.
- One surface soil plus one duplicate sample (at a depth of 0 to 2 inches) were collected in MRS 3.

4.2.4 Skeet Range (MRS 4)

4.2.4.1 MRS 4 encompasses 0.89 acres. The Alion Team completed qualitative reconnaissance of the former range for MPPEH, MEC, MD, and small arms using visual observations and analog geophysics (magnetometer). Site reconnaissance and sampling locations are shown on Figure 3-1. Field observations related to cultural debris, range related features, and MD/MEC finds are presented below:

- This MRS is located on an island accessible to the public (by ferry), with a few occupational residents.
- There was no visible evidence of the skeet range.
- No subsurface anomalies were identified near the sampling location.
- No small arms were observed.
- One surface soil (at a depth of 0 to 2 inches) was collected in MRS 4.

4.2.5 Remaining Lands (AOC 1)

4.2.5.1 AOC 1 encompasses 170.39 acres and includes 9 areas of munitions use located outside the MRS boundaries and is an area of concern due to previous MEC finds outside historic range boundaries. The Alion Team completed qualitative reconnaissance of the former range areas

for MPPEH, MEC, MD, and small arms within AOC 1 using visual observations and analog geophysics (magnetometer). Site reconnaissance and sampling locations are shown on Figure 3-1. Field observations related to cultural debris, range related features, and MD/MEC finds are presented below:

- This AOC is located on an island accessible to the public (by ferry), with a few occupational residents.
- The only remaining structures present from the site's former use are Castle Williams, South Battery, Old Fort Jay, and Building 400.
- Numerous subsurface anomalies were identified throughout the AOC.
- No MEC, MD, or small arms were observed.
- Three surface soil plus one duplicate sample (at a depth of 0 to 2 inches) and four discrete subsurface soil samples (at a depth of 12 to 18 inches) were collected in AOC 1.

4.2.6 Background Samples

4.2.6.1 Three fill and two native surface soil background samples were collected at locations within the FUDS. Samples collected in the fill area were compared to the fill background samples while samples collected in the native soil were compared to the native background samples. Locations selected were from areas deemed not impacted by DoD or current owner operations. The qualitative reconnaissance and sampling locations are shown on Figure 3-1. There was no observed evidence of MEC or MD at any of the background sample locations.

4.3 MEC Risk Assessment

4.3.0.1 A qualitative MEC assessment for potential explosive safety risk was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the INPR and the ASR (USACE 2006a). An explosive safety risk is the probability for an MEC item to detonate and potentially cause harm as a result of human activities. An explosive safety risk exists if a person can come near or in contact with MEC and act on it to cause 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 each MRS reflects this MEC assessment strategy (Appendix J).

4.3.0.2 The exposure route for an MEC receptor typically is direct contact with an MEC item on the surface or through subsurface activities (e.g., digging during farming or construction). An 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 were used to evaluate the field and historic data to generate an overall hazard assessment rating of either low, moderate, or high. An evaluation of low risk indicates that the MEC type would not result in major injury or the item is insensitive or inert; site characteristics are such that there is limited to no site access and the site is stable; and potential for contact is low for either surface or subsurface based on human receptor activities and the population accessing the FUDS. An evaluation of high risk indicates that the MEC type would result in major injury or the item is sensitive; site characteristics are such that there is frequent access and the FUDS is unstable; and potential for contact is high for either surface or subsurface based on human receptor activities and the population accessing the FUDS.

4.3.1 Rifle Range #1 (MRS 1)

4.3.1.1 Rifle Range #1 was constructed within the moat surrounding Old Fort Jay. It was set up to fire into the walls of the ravelin. In 1963, 13 .45-caliber bullets were brought to Fort Jay's historical office (USACE 1997 and 2006a). The origin of the bullets was not identified in the ASR. No verified small arms were found during the ASR site inspection (USACE 1997 and 2006a) or the site inspection (Alion 2007).

4.3.1.2 No documented injuries have occurred since the FUDS property was transferred. Old Fort Jay is still present as a monument on the site. There are no fences restricting access to the MRS and it accessible to the general public (by ferry). The most likely human receptors are recreational users, employees, and construction workers who may travel through the park on foot or by vehicle.

4.3.1.3 Based on the results of this Site Investigation, and the review of historical records, the extent of the remaining contamination is estimated to be relatively small. The overall MEC risk is considered low.

4.3.2 Rifle Range #2 (MRS 2)

4.3.2.1 Rifle Range #2 was constructed within the moat surrounding Old Fort Jay. It was set up to fire into the walls of the ravelin. Old Fort Jay is still present as a monument on the site. In 1963, 13 .45-caliber bullets were brought to Fort Jay's historical office (USACE 1997 and 2006a). The origin of the bullets was not identified in the ASR. No verified small arms were

found during the ASR site inspection (USACE 1997 and 2006a) or the site inspection (Alion 2007).

4.3.2.2 No documented injuries have occurred since the FUDS property was transferred. Old Fort Jay is still present as a monument on the site. There are no fences restricting access to the MRS and it accessible to the general public (by ferry). The most likely human receptors are recreational users, employees, and construction workers who may travel through the park on foot or by vehicle.

4.3.2.3 Based on the results of this Site Investigation, and the review of historical records, the extent of the remaining contamination is estimated to be relatively small. The overall MEC risk is considered low.

4.3.3 Machine Gun Range (MRS 3)

4.3.3.1 This was a non-standard range set up to fire into the walls of the ravelin. Old Fort Jay is still present as a monument on the site. Eighty rounds of .30-caliber ammunition were found while digging near what was then the headquarters of a Colonel Testas. According to the ASR, the building where the munitions were discovered was not noted (USACE 1997 and 2006a). The origin of the bullets was not identified in the ASR. No verified small arms were found during the ASR site inspection (USACE 1997 and 2006a) or the site inspection (Alion 2007).

4.3.3.2 No documented injuries have occurred since the FUDS property was transferred. Old Fort Jay is still present as a monument on the site. There are no fences restricting access to the MRS and it accessible to the general public (by ferry). The most likely human receptors are recreational users, employees, and construction workers who may travel through the park on foot or by vehicle.

4.3.3.3 Based on the results of this Site Investigation, and the review of historical records, the extent of the remaining contamination is estimated to be relatively small. The overall MEC risk is considered low.

4.3.4 Skeet Range (MRS 4)

4.3.4.1 No verified small arms were found during the ASR site inspection (USACE 1997 and 2006a) or the site inspection (Alion 2007). There was no evidence of a skeet range on the south side of the FUDS.

4.3.4.2 No documented injuries have occurred since the FUDS property was transferred. There is no evidence of the skeet range on the south end of the FUDS. There are no fences restricting access to the FUDS property, and it accessible to the general public (by ferry). The most likely human receptors are recreational users, employees, and construction workers who may travel through the park on foot or by vehicle.

4.3.4.3 Based on the results of this Site Investigation, and the review of historical records, the extent of the remaining contamination is estimated to be relatively small. The overall MEC risk is considered low.

4.3.5 Remaining Lands (AOC 1)

4.3.5.1 As discussed in Sections 3 and 4, MEC and MD have been recovered in AOC 1. Conventional munitions were used at Fort Jay between 1800 and 1966. The ASR also indicated that limited chemical warfare training activities occurred on the island at various times between 1934 and 1944. Table 2-2 lists the munitions types associated with each area of concern.

4.3.5.2 Fort Jay contained fortifications including Fort Jay/Columbus, Castle Williams, South Battery, Barbette Battery, and Anti-Aircraft Firing Measures. The FUDS also housed New York Arsenal, several magazines, firing ranges, and a gas chamber on the south side of the island for chemical training with smoke grenades and tear gas (USACE 1997 and 2006a). CWM training/demonstrations are documented to have occurred at Ft Jay. The Gas Chamber was identified on maps as late as 1953 however later maps (1958 and 1964) showed the building was converted to other uses. Research did not uncover any information indicating these items were not completely used and disposed of on the island (USACE 1997 and 2006a). Barbette Battery was never completed. The only remaining structures present from the site's former use are Castle Williams, South Battery, Old Fort Jay, and Building 400. Much of AOC 1 has been redeveloped over the years.

4.3.5.3 Over the years, munitions have been found at the FUDS, including as late as the SI TPP Meeting in July 2006, when a 3-inch shell was discovered. The munition was found behind the wall of Building 105 during demolition activities (Alion 2006) and determined to be inert. As late as 1944, British cannon balls were found but the locations are unknown. In 1962, 80 rounds of .30-caliber ammunition were found during digging near the quarters of Colonel Testas (location unknown). That same year, tear gas grenades from the consolidated Property Office on Fort Jay were shipped off of the island for destruction by burning. The following year, in 1963, 13 .45-caliber bullets were brought to Fort Jay's historical office. That same year, 48 tear gas and 31 smoke grenades were found in the old Fort Jay. In 1993, several cannon balls containing

black powder were found approximately 10 feet below the surface behind Building 404 (USACE 1997 and 2006a).

4.3.5.4 Fort Jay was assigned a site-wide risk assessment code (RAC) score of 2 on a scale of 1 to 5, with confirmed small arms, cannon balls, and smoke/tear gas grenades, and potential chemical agent identification sets (CAIS). The score indicates a catastrophic hazard severity level and a remote hazard probability. The overall ordnance hazard evaluation was considered critical. Although no MEC/MC was found during the ASR site inspection (USACE 1997 and 2006a) and site inspection (Alion 2007), a 3-inch shell was found in the wall at Building 105 during the TPP meeting (Alion 2006). The 3-inch shell was certified inert by the New York City bomb squad.

4.3.5.5 No documented injuries have occurred since the FUDS property was transferred. There are no fences restricting access to the FUDS property, and it accessible to the general public (by ferry). The most likely human receptors are recreational users, employees, and construction workers who may travel through the park on foot or by vehicle.

4.3.5.6 Based on the results of this Site Investigation, and the review of historical records, the extent of the remaining contamination is estimated to be relatively small. The overall MEC risk is considered low to moderate.

5. MUNITIONS CONSTITUENTS SAMPLING AND ANALYSIS

5.0.1 The analytical results for the MC sampling are presented below along with the screening methodology and the results of the screening assessment. Data for MRS 1 are grouped by media.

5.1 Data Evaluation Methodology

5.1.0.1 The following sections present the process used to evaluate the MC data collected for the FUDS. This process is consistent with the decision rules outlined in Section 3.1. Identification/refinement of MC associated with munitions used at the FUDS is discussed below.

5.1.1 Refinement of Munitions Constituents

5.1.1.1 During the SI process, the Alion Team further evaluated the munitions reportedly used at the FUDS. Research was conducted to refine the specific list of constituents potentially associated with each MRS/range based on munitions reportedly used. Refinement of the list included an evaluation of munitions operations (historical operations accidents, etc., range type), MC expected to be associated with firing points versus impact areas and the impact of overlapping of ranges/uses at the FUDS. Refinement of the MC list is presented in Table 2-2. All samples were analyzed for the full target analyte list of metals. The target compound list of explosives was analyzed in all samples with the exception of FJY-PR-SS-02-01, FJY-SA-SS-02-02, FJY-SA-SS-02-03, and FJY-SR-SS-02-03 in accordance with the approved SS-WP (Alion 2006b). Summary tables are arranged by media and contain the complete analyte lists. *However, the following discussions are limited to those analytes associated with past munitions use.* The revised list of MC for the MRSs are provided below (refer to Table 2-2):

Rifle Range #1 (MRS 1)
- Metals (antimony, chromium, copper, iron[4], lead, nickel, zinc)

Rifle Range #2 (MRS 2)
- Metals (antimony, chromium, copper, iron, lead, nickel, zinc)

Machine Gun Range (MRS 3)
- Explosives (nitroglycerin [NG])
- Metals (antimony, copper, iron, lead)

[4] Iron is an essential nutrient and is excluded from further consideration as a chemical of potential concern/chemical of potential ecological concern (COPC/COPEC). For completeness, iron is listed with the other MC but is not further evaluated as MC. Refer to Section 5.1.3 for additional information regarding the screening process.

Skeet Range (MRS 4)

- Metals (lead)

Remaining Lands (AOC 1)

- Explosives (trinitrotoluene [TNT][5])
- Metals (copper, iron, lead, zinc)

5.1.2 Data Quality

5.1.2.1 All of the samples noted below were collected by Alion, analyzed by GPL, and validated using EPA Region II validation guidance:

- seven surface soil samples (between 0 and 2 inches below ground surface [bgs])
- four subsurface soil samples[6] (between 1 and 2 ft bgs)
- five background surface soil samples (three fill and two native soil)
- two duplicate surface soil samples

5.1.2.2 The first step in the process of identifying chemicals of potential concern (COPCs) and chemicals of potential environmental concern (COPECs) is the evaluation of analytical data on the basis of qualifiers in each medium of concern. Inclusion or exclusion of data on the basis of analytical qualifiers is performed in accordance with EPA guidance (EPA 1989) and considers the following:

- Analytical results bearing the U or UJ qualifiers (indicating that the analyte was not detected at the given reporting/quantitation limit) are retained in the data set.
- Analytical results bearing the J qualifier (indicating that the reported value was estimated) are retained at the measured concentration.

5.1.3 Screening Values

5.1.3.1 Initial screening for metals is conducted against background concentrations (Tables 5-1 through 5-6) to determine which analytes proceed to the human health and ecological screening evaluation. Screening for human health COPCs is conducted by comparing maximum detected chemical concentrations to EPA Region IX PRGs, as shown in Table 5-7. The complete report

[5] When TNT is identified in a munition, the breakdown products are included for munitions constituents analysis (2,4-DNT; 2,6-DNT; 1,3,5-trinitrobenzene; nitrotoluene; 2-amino-4,6-DNT; 4-amino-2,6-DNT).

[6] General human and ecological interaction with soil occurs at a depth of less than 1 ft, which for the purpose of the risk screening was considered to be surface soil. Subsurface soil constitutes soil at a depth greater than 1 ft, where both human and ecological interaction with the soil is much less likely and specific to isolated circumstances; therefore, these "subsurface" soil samples were evaluated in terms of human health risk screening only in accordance with EPA guidance (EPA 1997).

of the analytical results and the analytical quality assurance/quality control (QA/QC) report are included in Appendix F and G, respectively. In accordance with EPA guidance, PRG values used are those at a cancer risk level of $1x10^{-6}$ and a non-cancer hazard quotient (HQ) of 0.1, for the purposes of screening. To account for potential additivity of non-carcinogenic hazards, non-carcinogenic PRGs have been divided by 10 for screening purposes.

5.1.3.2 For the ecological risk screening, the soil sample analytical results are compared to ecological soil screening levels presented in Table 5-8. The maximum site concentration in soil was compared to the corresponding screening value (Table 5-7). The comparison was completed by dividing the maximum concentration by the screening value to produce an HQ. If the maximum concentration was less than the screening value (HQ < 1.0), that analyte was eliminated from COPEC consideration. If the maximum concentration exceeded the screening value (HQ > 1.0), that analyte was retained as a COPEC. Per EPA guidance, the following screening process is utilized:

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

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

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

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.

5. An analyte is eliminated from the list of COPCs/COPECs if the analyte is an essential nutrient of low toxicity, and its reported maximum concentration is unlikely to be associated with adverse health impacts. COPCs/COPECs excluded from further consideration on this basis include iron, magnesium, and potassium.

5.1.3.3 All target analytes (associated with munitions used at the FUDS) detected at concentrations exceeding the MDL were evaluated.

5.1.4 Comparison of Screening Levels with Detection Limits for Non-detected Analytes

5.1.4.1 Current EPA guidance (EPA 1989, 2001) requires that detection limits be addressed, particularly as related to the screening values used to select COPCs/COPECs. If a chemical is never detected, but the detection limit is higher than the screening value, or there is no screening value, then it may or may not be appropriate to designate the chemical as a COPC/COPEC, depending on whether the chemical is FUDS-related or not. There is insufficient information in this case to exclude or include the chemical. This would be noted as a source of uncertainty in the risk assessment screening. The detection limit reported by the laboratory was the reporting limit for organic chemicals (explosives) and to the method detection limit for inorganics (metals) consistent with standard environmental analytical processes as well as CLP methods. Table 5-9 shows a comparison of the reporting limits and screening values for all analytes in soil for those analytes never detected for human health and ecological risk. All soil screening values are higher than the detection limits for the analytes of concern at Fort Jay; consequently, the sensitivity DQI has been achieved for all MC associated with soil at Fort Jay, as identified in Section 5.1.1. Where no toxicological screening values are available, it is not possible to say whether the available reporting limits were sufficient to detect these chemicals at concentrations that may pose risk to human or ecological receptors.

5.2 Conceptual Site Model

5.2.1 CSM diagrams for MRS 1, 2, 3, 4, and AOC 1 are provided in Appendix J. The CSM defines the source(s) (e.g., the secondary source/media), interaction (e.g., the secondary release mechanism, the tertiary source, and the exposure route), and receptors. In this SI Report, the CSM has been revised from those presented in the Final SS-WP to reflect the results of the human health and ecological risk screening.

5.2.2 Current and future potential human receptors for MC are expected to be trespassers/visitors, construction workers, employees, and school children (future) as depicted in the CSM diagram in Appendix J. Residential and industrial screening values were used to represent the following receptor subtypes respectively (school children and trespassers/visitors, construction workers and employees), as these screening values are readily available for use and more specific screening values for those receptor subtypes are not available. The ecological receptors of concern for the MRSs and the AOC include terrestrial plants/invertebrates (insects and worms), benthic organisms, aquatic organisms, terrestrial-feeding/predatory animals, terrestrial feeding/predatory birds, aquatic-feeding mammals, and aquatic-feeding birds.

5.2.3 The media of concern are distinct for each class of receptor and are based on the CSM presented in the Final SS-WP (Alion 2007). The media of concern for human receptors at the

FUDS are surface soil, surface water, sediment, and groundwater. The media of concern for ecological receptors for each MRS are similar to the media of concern for human health. The exception to this statement is that groundwater is not a medium of concern for ecological receptors.

5.2.4 A pathway is considered potentially complete if all of the following conditions are present:

1. Source and mechanism of chemical release (e.g. a munitions-related organic chemical [other than nitrobenzene] is detected or site metal concentration exceeds 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.)

5.2.5 The criteria for determining whether or not a pathway is complete, based on this SI, includes a review of the screening results and the basis for identified screening criteria. Consistent with DQOs, a weight of evidence approach is used to determine if identified COPC/COPEC(s) should be retained and if the pathway for the medium of concern is complete or incomplete. In the case where screening criteria are exceeded, the pathway is deemed incomplete if there is little to no perceived risk, depending on weight of evidence scenarios. The rationale in this first instance is described and explained in the risk screening results sections of this SI Report. If there are no COPC/COPECs identified, no sources are deduced to be present posing a potential risk to the human or ecological receptors. In this latter instance, the pathway is incomplete.

5.3 Background Data Evaluation

5.3.1 Tables 5-1 through 5-6 present a range of concentrations in background soil samples for chemicals detected on-site. A qualitative comparison was made between the range of concentrations for on-site samples and the range of background samples for the metals associated with past munitions use at the FUDS (antimony, copper, chromium, lead, and zinc). Samples collected in the fill area were compared to the fill background samples while samples collected in the native soil were compared to the native background samples. For all four MRSs, the ranges of background concentrations presented in Tables 5-3 through 5-6 are greater than the site concentration for all metal MC at Fort Jay. In those cases where analytes exceed screening

criteria but not background values, a weight of evidence approach is applied to determine if those analytes are considered COPECs in a particular MRS. These instances are documented in the results sections below and conclusions are drawn based on the weight of evidence in each case.

5.4 Rifle Range #1 (MRS 1)

5.4.0.1 As presented in Section 5.1.1, six metals (antimony, chromium, copper, lead, nickel, and zinc) are the MC of interest in MRS 1. Table 5-7 includes a summary of all data including those analytes not specifically associated with the munitions used in MRS 1 (as detailed in Table 2-2).

5.4.1 Groundwater Pathway and Screening Results

5.4.1.1 Groundwater was not considered a potentially complete pathway for the FUDS in the SS-WP (Alion 2007). A small amount of groundwater may exist in an unconfined condition within the coarse-grained fill and underlying sand and gravels; however, the saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. No groundwater sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.4.2 Surface Water and Sediment Pathway and Screening Results

5.4.2.1 There are no permanent, non-tidal, freshwater features at Fort Jay; therefore, surface water and sediment were not considered as potentially complete pathways for MC for MRS 1 in the SS-WP (Alion 2007). No surface water sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.4.3 Terrestrial Pathway and Screening Results

5.4.3.1 Surface soil in MRS 1 was viewed as a potentially complete pathway for human and ecological receptors for MC in the CSM documented in the SS-WP (Alion 2007). One surface soil sample was collected from MRS 1. Table 5-7 presents a summary of soil sample results compared to human health screening values (residential and industrial) and ecological screening criteria. Six metals related to munitions used at the FUDS (antimony, chromium, copper, lead, nickel, and zinc) were detected in the surface soil samples. Antimony, lead, and zinc were detected in surface soil samples above ecological screening criteria; however, the results are within the range of native soil background concentrations for the FUDS (Table 5-3). Since the detections of metal MC are within the range of background concentrations, no surface soil COPCs/COPECs are identified for MRS 1. Based on the sample results, the surface soil pathway in the CSM (Appendix J) is incomplete for all receptors.

5.4.4 Air Pathway

5.4.4.1 Only low levels of metals were detected in soil. Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible. With a negligible air contamination source, there is low potential for the air pathway at MRS 1 to negatively impact any human or environmental receptors. Therefore, the air pathway is incomplete for all receptors in the CSM (Appendix J).

5.5 Rifle Range #2 (MRS 2)

5.5.0.1 As presented in Section 5.1.1, six metals (antimony, chromium, copper, lead, nickel, and zinc) are the MC of interest in MRS 2. Table 5-7 includes a summary of all data including those analytes not specifically associated with the munitions used in MRS 2 (as detailed in Table 2-2).

5.5.1 Groundwater Pathway and Screening Results

5.5.1.1 Groundwater was not considered a potentially complete pathway for the FUDS in the SS-WP (Alion 2007). A small amount of groundwater may exist in an unconfined condition within the coarse-grained fill and underlying sand and gravels; however, the saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. No groundwater sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.5.2 Surface Water and Sediment Pathway and Screening Results

5.5.2.1 There are no permanent, non-tidal, freshwater features at Fort Jay; therefore, surface water and sediment were not considered as potentially complete pathways for MC for MRS 2 in the SS-WP (Alion 2007). No surface water sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.5.3 Terrestrial Pathway and Screening Results

5.5.3.1 Surface soil in MRS 2 was viewed as a potentially complete pathway for human and ecological receptors for MC in the CSM documented in the SS-WP (Alion 2007). One surface soil sample was collected from MRS 2. Table 5-7 presents a summary of soil sample results compared to human health screening values (residential and industrial) and ecological screening criteria. Six metals related to munitions used at the FUDS (antimony, chromium, copper, lead, nickel, and zinc) were detected in the surface soil samples. Antimony, copper, lead, and zinc were detected in surface soil samples above ecological screening criteria; however, the results are within the range of native soil background concentrations for the FUDS (Table 5-4). Since

the detections of metal MC are within the range of background concentrations, no surface soil COPCs/COPECs are identified for MRS 2. Based on the sample results, the surface soil pathway in the CSM (Appendix J) is incomplete for all receptors.

5.5.4 Air Pathway

5.5.4.1 Only low levels of metals were detected in soil. Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible. With a negligible air contamination source, there is low potential for the air pathway at MRS 2 to negatively impact any human or environmental receptors. Therefore, the air pathway is incomplete for all receptors in the CSM (Appendix J).

5.6 Machine Gun Range (MRS 3)

5.6.0.1 As presented in Section 5.1.1, one explosive (NG) and three metals (antimony, copper, and lead) are the MC of interest in MRS 3. Table 5-7 includes a summary of all data including those analytes not specifically associated with the munitions used in MRS 3 (as detailed in Table 2-2).

5.6.1 Groundwater Pathway and Screening Results

5.6.1.1 Groundwater was not considered a potentially complete pathway for the FUDS in the SS-WP (Alion 2007). A small amount of groundwater may exist in an unconfined condition within the coarse-grained fill and underlying sand and gravels; however, the saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. No groundwater sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.6.2 Surface Water and Sediment Pathway and Screening Results

5.6.2.1 There are no permanent, non-tidal, freshwater features at Fort Jay; therefore, surface water and sediment were not considered as potentially complete pathways for MC for MRS 3 in the SS-WP (Alion 2007). No surface water sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.6.3 Terrestrial Pathway and Screening Results

5.6.3.1 Surface soil in MRS 3 was viewed as a potentially complete pathway for human and ecological receptors for MC in the CSM documented in the SS-WP (Alion 2007). One surface soil sample and one duplicate sample were collected from MRS 3. Table 5-7 presents a

summary of soil sample results compared to human health screening values (residential and industrial) and ecological screening criteria. Three metals related to munitions used at the FUDS (antimony, copper, and lead) were detected in the surface soil samples. Antimony and lead were detected in surface soil samples above ecological screening criteria; however, the results are within the range of native soil background concentrations for the FUDS (Table 5-5). Since no explosives were detected and the detections of metal MC are within the range of background concentrations, no surface soil COPCs/COPECs are identified for MRS 3. Based on the sample results, the surface soil pathway in the CSM (Appendix J) is incomplete for all receptors.

5.6.4 Air Pathway

5.6.4.1 Only low levels of metals were detected in soil. Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible. With a negligible air contamination source, there is low potential for the air pathway at MRS 3 to negatively impact any human or environmental receptors. Therefore, the air pathway is incomplete for all receptors in the CSM (Appendix J).

5.7 Skeet Range (MRS 4)

5.7.0.1 As presented in Section 5.1.1, one metal (lead) is the MC of interest in MRS 4. Table 5-7 includes a summary of all data including those analytes not specifically associated with the munitions used in MRS 4 (as detailed in Table 2-2).

5.7.1 Groundwater Pathway and Screening Results

5.7.1.1 Groundwater was not considered a potentially complete pathway for the FUDS in the SS-WP (Alion 2007). A small amount of groundwater may exist in an unconfined condition within the coarse-grained fill and underlying sand and gravels; however, the saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. No groundwater sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.7.2 Surface Water and Sediment Pathway and Screening Results

5.7.2.1 There are no permanent, non-tidal, freshwater features at Fort Jay; therefore, surface water and sediment were not considered as potentially complete pathways for MC for MRS 4 in the SS-WP (Alion 2007). No surface water sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.7.3 Terrestrial Pathway and Screening Results

5.7.3.1 Surface soil in MRS 4 was viewed as a potentially complete pathway for human and ecological receptors for MC in the CSM documented in the SS-WP (Alion 2007). One surface soil sample was collected from MRS 4. Table 5-7 presents a summary of soil sample results compared to human health screening values (residential and industrial) and ecological screening criteria. One metal related to munitions used at the FUDS (lead) was detected in the surface soil samples. Lead was detected in surface soil samples above ecological screening criteria; however, the results are within the range of fill background concentrations for the FUDS (Table 5-6). Since the detections of metal MC are within the range of background concentrations, no surface soil COPCs/COPECs are identified for MRS 4. Based on the sample results, the surface soil pathway in the CSM (Appendix J) is incomplete for all receptors.

5.7.4 Air Pathway

5.7.4.1 Only low levels of metals were detected in soil. Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible. With a negligible air contamination source, there is low potential for the air pathway at MRS 4 to negatively impact any human or environmental receptors. Therefore, the air pathway is incomplete for all receptors in the CSM (Appendix J).

5.8 Remaining Lands (AOC 1)

5.8.0.1 As presented in Section 5.1.1, TNT and its breakdown products along with three metals (copper, lead, and zinc) are the MC of interest in AOC 1. Table 5-7 includes a summary of all data including those analytes not specifically associated with the munitions used in AOC 1 (as detailed in Table 2-2).

5.8.1 Groundwater Pathway and Screening Results

5.8.1.1 Groundwater was not considered a potentially complete pathway for FUDS in the SS-WP (Alion 2007). A small amount of groundwater may exist in an unconfined condition within the coarse-grained fill and underlying sand and gravels; however, the saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. No groundwater sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.8.2 Surface Water and Sediment Pathway and Screening Results

5.8.2.1 There are no permanent, non-tidal, freshwater features at Fort Jay; therefore, surface

water and sediment were not considered as potentially complete pathways for MC for AOC 1 in the SS-WP (Alion 2007). No surface water sampling was conducted in this MRS. The pathway in the CSM is identified as incomplete in this SI Report.

5.8.3 Terrestrial Pathway and Screening Results

5.8.3.1 Surface soil in AOC 1 was viewed as a potentially complete pathway for human and ecological receptors for MC in the CSM documented in the SS-WP (Alion 2007). A total of two surface soil samples plus one duplicate were collected from AOC 1. Table 5-7 presents a summary of soil sample results compared to human health screening values (residential and industrial) and ecological screening criteria. No explosives related to munitions used at the FUDS were detected in surface samples, and the detection limits are lower than the human health and ecological screening criteria. Three metals related to munitions used at the FUDS (copper, lead, and zinc) were detected in the surface soil samples. Only one metal, lead, was detected in a single surface soil sample at a concentration that exceeded human health criteria for soil; however, the lead concentration was within the ranges of concentrations of lead detected in the background samples. Copper, lead, and zinc were detected in surface soil samples above ecological screening criteria; however, the results are within the range of fill and native soil background concentrations for lead and zinc. The only sample that exceeded fill background and ecological screening values was FJY-PR-SS-02-01 for copper (sample: 56 ppm; fill background max: 37 ppm); therefore, copper is a COPEC. Based on the sample results, the surface soil pathway in the CSM (Appendix J) is complete for all receptors with acceptable risk.

5.8.3.2 Four subsurface soil samples were taken at Fort Jay. No explosives related to munitions used at the FUDS were detected in the subsurface soil samples. Five metals related to munitions used at the FUDS (antimony, copper, chromium, lead, and zinc) were detected in the subsurface soil samples. None of the metals detected in subsurface soil samples exceeded human health criteria for soil. Therefore, there were no COPCs identified for subsurface soil. In accordance with EPA guidance, subsurface soil is not evaluated for ecological receptors (EPA 1997). Based on the sample results, the subsurface soil pathway in the CSM (Appendix J) is incomplete for human health receptors with acceptable risk.

5.8.4 Air Pathway

5.8.4.1 Only low levels of metals were detected in soil. Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of COPCs susceptible to being suspended in air is negligible. With a negligible air contamination source, there is low potential for the air pathway at AOC 1 to negatively impact any human or environmental receptors. Therefore, the air pathway is incomplete for all receptors in the CSM (Appendix J).

TABLE 5-1
COMPARISON OF ON-SITE AND FILL BACKGROUND SURFACE SOIL CONCENTRATIONS
FORT JAY MMRP FUDS SITE (AOC 1)

		On-site				Background				Comparisons	
Chemical	Unit	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Site Maximum > Background Maximum	Site Mean > Background Mean
Metals											
ALUMINUM	mg/kg	3930	7010	5470	2/2	4000	6220	5350	3/3	Yes	Yes
ANTIMONY	mg/kg	0.14 UJ	0.4 J	0.270	1/2	0.31 J	0.9 J	0.553	3/3	No	No
ARSENIC	mg/kg	2.1	9.4	5.75	2/2	4.7	11	7.8	3/3	No	No
BARIUM	mg/kg	42.8 J	89.2 J	66.0	2/2	61.1 J	79.8 J	67.9	3/3	Yes	No
BERYLLIUM	mg/kg	0.39	0.48	0.435	2/2	0.31	0.48	0.393	3/3	No	Yes
CADMIUM	mg/kg	0.024 U	1.1	0.562	1/2	0.37 J/J	0.66	0.467	3/3	Yes	Yes
CALCIUM	mg/kg	1900	4870	3380	2/2	1690	2700	2050	3/3	Yes	Yes
CHROMIUM	mg/kg	7.3	19.7	13.5	2/2	10.9	18.5	14.5	3/3	Yes	No
COBALT	mg/kg	5.6	6.1	5.85	2/2	3.7	6.5	5.1	3/3	No	Yes
COPPER	mg/kg	18.4	56	37.2	2/2	28.2	37	33.8	3/3	Yes	Yes
IRON	mg/kg	14600	18700	16600	2/2	9510	14100	11800	3/3	Yes	Yes
LEAD	mg/kg	36.7	249	143	2/2	89.8	269	180	3/3	No	No
MAGNESIUM	mg/kg	2510 J	2610 J	2560	2/2	1470 J	2050 J	1840	3/3	Yes	Yes
MANGANESE	mg/kg	153	275	214	2/2	184	390	316	3/3	No	No
MERCURY	mg/kg	0.021 J	1.3	0.660	2/2	0.13	0.57	0.317	3/3	Yes	Yes
MOLYBDENUM	mg/kg	0.51	1	0.755	2/2	0.47	0.77	0.580	3/3	Yes	Yes
NICKEL	mg/kg	7.3	26.3	16.8	2/2	14.1	20.9	17.1	3/3	Yes	No
POTASSIUM	mg/kg	1150 J	1490 J	1320	2/2	689 J	1040 J	833	3/3	Yes	Yes
SELENIUM	mg/kg	0.19 U	0.75 J	0.470	1/2	0.5 J	0.7 J	0.600	3/3	Yes	No
SILVER	mg/kg	0.19 U	0.29 J	0.240	1/2	0.14 J	0.33 J	0.253	3/3	No	No
SODIUM	mg/kg	152 J	228	190	2/2	132 J	203 J	169	3/3	Yes	Yes
STRONTIUM	mg/kg	8.1	15.5	11.8	2/2	11.3	17.5	14.0	3/3	No	No
THALLIUM	mg/kg	0.38 J	0.58 J	0.480	2/2	0.27 U	0.32 J	0.297	1/3	Yes	Yes
TITANIUM	mg/kg	268 J	406 J	337	2/2	172 J	255 J	227	3/3	Yes	Yes
VANADIUM	mg/kg	22.4	42	32.2	2/2	18.4	40.7	27.8	3/3	Yes	Yes
ZINC	mg/kg	37.5 J	202 J	120	2/2	95.4 J	205 J	152	3/3	No	No

[1]The absolute concentration of the non-detects is equal to the detection limit.
Qualifiers:
J = Analyte is present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
Yellow shaded analytes are those associated with past munitions use.

TABLE 5-2
COMPARISON OF ON-SITE AND NATIVE BACKGROUND SURFACE SOIL CONCENTRATIONS
FORT JAY MMRP FUDS SITE (AOC 1)

		On-site				Background				Comparisons	
Chemical	Unit	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Site Maximum > Background Maximum	Site Mean > Background Mean
Metals											
ALUMINUM	mg/kg	6050	10200	7500	6/6	7340	7350	7340	2/2	Yes	Yes
ANTIMONY	mg/kg	0.16 UJ	0.49 J	0.298	4/6	0.66 J	0.98 J	0.820	2/2	No	No
ARSENIC	mg/kg	3.3	11.4	6.65	6/6	10.6	14	12.3	2/2	No	No
BARIUM	mg/kg	36 J	90.7 J	58.8	6/6	64.3 J	103 J	83.6	2/2	No	No
BERYLLIUM	mg/kg	0.3 /	0.55	0.417	6/6	0.43	0.56	0.495	2/2	No	No
CADMIUM	mg/kg	0.028 U	0.47 J	0.264	4/6	0.42 J	11.9	6.16	2/2	No	No
CALCIUM	mg/kg	273	34200	7210	6/6	2490	4430	3460	2/2	Yes	Yes
CHROMIUM	mg/kg	11.4	21.1	16.5	6/6	18.3	22.4	20.4	2/2	No	No
COBALT	mg/kg	3.4	7.9	5.15	6/6	5.7	6.9	6.3	2/2	Yes	No
COPPER	mg/kg	11.2	84.8 J	43.4	6/6	45.1	94.7	69.9	2/2	No	No
IRON	mg/kg	9940	21900	15400	6/6	13900	16000	15000	2/2	Yes	Yes
LEAD	mg/kg	19.7	424 J	161	6/6	204	502	353	2/2	No	No
MAGNESIUM	mg/kg	1820 J	7020 J	2940	6/6	1900 J	2360 J	2130	2/2	Yes	Yes
MANGANESE	mg/kg	180	442	271	6/6	266	310	288	2/2	Yes	No
MERCURY	mg/kg	0.032 J	0.18	0.134	6/6	0.25	1.7	0.975	2/2	No	No
MOLYBDENUM	mg/kg	0.24 J	1.3	0.683	6/6	0.65	0.74	0.695	2/2	Yes	No
NICKEL	mg/kg	10	30.2	16.6	6/6	20.2	20.8	20.5	2/2	Yes	No
POTASSIUM	mg/kg	435 J	737 J	624	6/6	887 J	904 J	896	2/2	No	No
SELENIUM	mg/kg	0.35 J	0.83 J	0.503	6/6	0.66 J	0.68 J	0.670	2/2	Yes	No
SILVER	mg/kg	0.11 U/U	0.13 J	0.118	1/6	0.14 U	0.34 J	0.240	1/2	No	No
SODIUM	mg/kg	78.6 J	144 J	114	6/6	145 J	183 J	164	2/2	No	No
STRONTIUM	mg/kg	2.6	32	12.1	6/6	17.3	19.3	18.3	2/2	Yes	No
THALLIUM	mg/kg	0.27 U	0.65 J	0.412	4/6	0.34 U	0.45 J	0.395	1/2	Yes	Yes
TITANIUM	mg/kg	123 J	286 J	226	6/6	233 J	275 J	254	2/2	Yes	No
VANADIUM	mg/kg	14.8	36.7	22.3	6/6	30.7	39.6	35.2	2/2	No	No
ZINC	mg/kg	39.2 J	197 J	115	6/6	141 J	275 J	208	2/2	No	No

[1]The absolute concentration of the non-detects is equal to the detection limit.
Qualifiers:
J = Analyte is present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
Yellow shaded analytes are those associated with past munitions use.

TABLE 5-3
COMPARISON OF ON-SITE AND NATIVE BACKGROUND SURFACE SOIL CONCENTRATIONS
FORT JAY MMRP FUDS SITE (MRS 1)

		On-site				Background				Comparisons	
Chemical	Unit	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Site Maximum > Background Maximum	Site Mean > Background Mean
Metals											
ALUMINUM	mg/kg	7530	7530	7530	1/1	7340	7350	7340	2/2	Yes	Yes
ANTIMONY	mg/kg	0.39 J	0.39 J	0.390	1/1	0.66 J	0.98 J	0.820	2/2	No	No
ARSENIC	mg/kg	7.1	7.1	7.1	1/1	10.6	14	12.3	2/2	No	No
BARIUM	mg/kg	46.4 J	46.4 J	46.4	1/1	64.3 J	103 J	83.6	2/2	No	No
BERYLLIUM	mg/kg	0.35	0.35	0.350	1/1	0.43	0.56	0.495	2/2	No	No
CADMIUM	mg/kg	0.29 J	0.29 J	0.290	1/1	0.42 J	11.9	6.16	2/2	No	No
CALCIUM	mg/kg	5720	5720	5720	1/1	2490	4430	3460	2/2	Yes	Yes
CHROMIUM	mg/kg	12.7	12.7	12.7	1/1	18.3	22.4	20.4	2/2	No	No
COBALT	mg/kg	3.3	3.3	3.3	1/1	5.7	6.9	6.3	2/2	No	No
COPPER	mg/kg	20.8	20.8	20.8	1/1	45.1	94.7	69.9	2/2	No	No
IRON	mg/kg	10600	10600	10600	1/1	13900	16000	15000	2/2	No	No
LEAD	mg/kg	75.3	75.3	75.3	1/1	204	502	353	2/2	No	No
MAGNESIUM	mg/kg	3580 J	3580 J	3580	1/1	1900 J	2360 J	2130	2/2	Yes	Yes
MANGANESE	mg/kg	179	179	179	1/1	266	310	288	2/2	No	No
MERCURY	mg/kg	0.2	0.2	0.200	1/1	0.25	1.7	0.975	2/2	No	No
MOLYBDENUM	mg/kg	0.47	0.47	0.470	1/1	0.65	0.74	0.695	2/2	No	No
NICKEL	mg/kg	11.4	11.4	11.4	1/1	20.2	20.8	20.5	2/2	No	No
POTASSIUM	mg/kg	508 J	508 J	508	1/1	887 J	904 J	896	2/2	No	No
SELENIUM	mg/kg	0.28 J	0.28 J	0.280	1/1	0.66 J	0.68 J	0.670	2/2	No	No
SILVER	mg/kg	0.12 U	0.12 U	0.120	0/1	0.14 U	0.34 J	0.240	1/2	No	No
SODIUM	mg/kg	92.2 J	92.2 J	92.2	1/1	145 J	183 J	164	2/2	No	No
STRONTIUM	mg/kg	11.6	11.6	11.6	1/1	17.3	19.3	18.3	2/2	No	No
THALLIUM	mg/kg	0.3 U	0.3 U	0.300	0/1	0.34 U	0.45 J	0.395	1/2	No	No
TITANIUM	mg/kg	305 J	305 J	305	1/1	233 J	275 J	254	2/2	Yes	Yes
VANADIUM	mg/kg	21.7	21.7	21.7	1/1	30.7	39.6	35.2	2/2	No	No
ZINC	mg/kg	71.8 J	71.8 J	71.8	1/1	141 J	275 J	208	2/2	No	No

[1]The absolute concentration of the non-detects is equal to the detection limit.
Qualifiers:
J = Analyte is present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
Yellow shaded analytes are those associated with past munitions use.

TABLE 5-4
COMPARISON OF ON-SITE AND NATIVE BACKGROUND SURFACE SOIL CONCENTRATIONS
FORT JAY MMRP FUDS SITE (MRS 2)

		On-site				Background				Comparisons	
Chemical	Unit	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Site Maximum > Background Maximum	Site Mean > Background Mean
Metals											
ALUMINUM	mg/kg	6430	6430	6430	1/1	7340	7350	7340	2/2	No	No
ANTIMONY	mg/kg	0.47 J	0.47 J	0.470	1/1	0.66 J	0.98 J	0.820	2/2	No	No
ARSENIC	mg/kg	3.6	3.6	3.6	1/1	10.6	14	12.3	2/2	No	No
BARIUM	mg/kg	50.3 J	50.3 J	50.3	1/1	64.3 J	103 J	83.6	2/2	No	No
BERYLLIUM	mg/kg	0.63	0.63	0.630	1/1	0.43	0.56	0.495	2/2	Yes	Yes
CADMIUM	mg/kg	0.15 J	0.15 J	0.150	1/1	0.42 J	11.9	6.16	2/2	No	No
CALCIUM	mg/kg	4380	4380	4380	1/1	2490	4430	3460	2/2	No	Yes
CHROMIUM	mg/kg	15.1	15.1	15.1	1/1	18.3	22.4	20.4	2/2	No	No
COBALT	mg/kg	4.6	4.6	4.6	1/1	5.7	6.9	6.3	2/2	No	No
COPPER	mg/kg	32.8	32.8	32.8	1/1	45.1	94.7	69.9	2/2	No	No
IRON	mg/kg	13300	13300	13300	1/1	13900	16000	15000	2/2	No	No
LEAD	mg/kg	116	116	116	1/1	204	502	353	2/2	No	No
MAGNESIUM	mg/kg	2970 J	2970 J	2970	1/1	1900 J	2360 J	2130	2/2	Yes	Yes
MANGANESE	mg/kg	231	231	231	1/1	266	310	288	2/2	No	No
MERCURY	mg/kg	0.13	0.13	0.130	1/1	0.25	1.7	0.975	2/2	No	No
MOLYBDENUM	mg/kg	0.47	0.47	0.470	1/1	0.65	0.74	0.695	2/2	No	No
NICKEL	mg/kg	15	15	15.0	1/1	20.2	20.8	20.5	2/2	No	No
POTASSIUM	mg/kg	703 J	703 J	703	1/1	887 J	904 J	896	2/2	No	No
SELENIUM	mg/kg	0.23 U	0.23 U	0.230	0/1	0.66 J	0.68 J	0.670	2/2	No	No
SILVER	mg/kg	0.12 U	0.12 U	0.120	0/1	0.14 U	0.34 J	0.240	1/2	No	No
SODIUM	mg/kg	130 J	130 J	130	1/1	145 J	183 J	164	2/2	No	No
STRONTIUM	mg/kg	12.3	12.3	12.3	1/1	17.3	19.3	18.3	2/2	No	No
THALLIUM	mg/kg	0.28 U	0.28 U	0.280	0/1	0.34 U	0.45 J	0.395	1/2	No	No
TITANIUM	mg/kg	292 J	292 J	292	1/1	233 J	275 J	254	2/2	Yes	Yes
VANADIUM	mg/kg	24.5	24.5	24.5	1/1	30.7	39.6	35.2	2/2	No	No
ZINC	mg/kg	114 J	114 J	114	1/1	141 J	275 J	208	2/2	No	No

[1]The absolute concentration of the non-detects is equal to the detection limit.
Qualifiers:
J = Analyte is present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
Yellow shaded analytes are those associated with past munitions use.

TABLE 5-5
COMPARISON OF ON-SITE AND NATIVE BACKGROUND SURFACE SOIL CONCENTRATIONS
FORT JAY MMRP FUDS SITE (MRS 3)

		On-site				Background				Comparisons	
Chemical	Unit	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Site Maximum > Background Maximum	Site Mean > Background Mean
Metals											
ALUMINUM	mg/kg	6610	6990	6800	2/2	7340	7350	7340	2/2	No	No
ANTIMONY	mg/kg	0.27 J	0.29 J	0.280	2/2	0.66 J	0.98 J	0.820	2/2	No	No
ARSENIC	mg/kg	5.2	5.6	5.4	2/2	10.6	14	12.3	2/2	No	No
BARIUM	mg/kg	39.1 J	45.4 J	42.2	2/2	64.3 J	103 J	83.6	2/2	No	No
BERYLLIUM	mg/kg	0.26	0.28	0.270	2/2	0.43	0.56	0.495	2/2	No	No
CADMIUM	mg/kg	0.13 J	0.14 J	0.135	2/2	0.42 J	11.9	6.16	2/2	No	No
CALCIUM	mg/kg	2020	3110	2560	2/2	2490	4430	3460	2/2	No	No
CHROMIUM	mg/kg	10.4	11.3	10.9	2/2	18.3	22.4	20.4	2/2	No	No
COBALT	mg/kg	2.7	2.9	2.8	2/2	5.7	6.9	6.3	2/2	No	No
COPPER	mg/kg	15.2 J	16.8	16.0	2/2	45.1	94.7	69.9	2/2	No	No
IRON	mg/kg	8970	9860	9420	2/2	13900	16000	15000	2/2	No	No
LEAD	mg/kg	64.1 J	66	65.0	2/2	204	502	353	2/2	No	No
MAGNESIUM	mg/kg	1110 J	1320 J	1220	2/2	1900 J	2360 J	2130	2/2	No	No
MANGANESE	mg/kg	144	158	151	2/2	266	310	288	2/2	No	No
MERCURY	mg/kg	0.082	0.096	0.0890	2/2	0.25	1.7	0.975	2/2	No	No
MOLYBDENUM	mg/kg	0.33 J	0.41 J	0.370	2/2	0.65	0.74	0.695	2/2	No	No
NICKEL	mg/kg	6.6	7.1	6.85	2/2	20.2	20.8	20.5	2/2	No	No
POTASSIUM	mg/kg	525 J	587 J	556	2/2	887 J	904 J	896	2/2	No	No
SELENIUM	mg/kg	0.34 J	0.53 J	0.435	2/2	0.66 J	0.68 J	0.670	2/2	No	No
SILVER	mg/kg	0.11 U	0.13 U	0.120	0/2	0.14 U	0.34 J	0.240	1/2	No	No
SODIUM	mg/kg	81 J	96.1 J	88.6	2/2	145 J	183 J	164	2/2	No	No
STRONTIUM	mg/kg	9.1	11.7	10.4	2/2	17.3	19.3	18.3	2/2	No	No
THALLIUM	mg/kg	0.27 U	0.33 U	0.300	0/2	0.34 U	0.45 J	0.395	1/2	No	No
TITANIUM	mg/kg	225 J	248 J	236	2/2	233 J	275 J	254	2/2	No	No
VANADIUM	mg/kg	15	16.6	15.8	2/2	30.7	39.6	35.2	2/2	No	No
ZINC	mg/kg	52 J	56.4 J	54.2	2/2	141 J	275 J	208	2/2	No	No

[1]The absolute concentration of the non-detects is equal to the detection limit.
Qualifiers:
J = Analyte is present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
Yellow shaded analytes are those associated with past munitions use.

TABLE 5-6
COMPARISON OF ON-SITE AND FILL BACKGROUND SURFACE SOIL CONCENTRATIONS
FORT JAY MMRP FUDS SITE (MRS 4)

		On-site				Background				Comparisons	
Chemical	Unit	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Minimum Concentration/Qualifier	Maximum Concentration/Qualifier	Mean Concentration[1]	Detection Frequency	Site Maximum > Background Maximum	Site Mean > Background Mean
Metals											
ALUMINUM	mg/kg	5880	5880	5880	1/1	4000	6220	5350	3/3	No	Yes
ANTIMONY	mg/kg	0.29 J	0.29 J	0.290	1/1	0.31 J	0.9 J	0.553	3/3	No	No
ARSENIC	mg/kg	4.4	4.4	4.4	1/1	4.7	11	7.8	3/3	No	No
BARIUM	mg/kg	86.3 J	86.3 J	86.3	1/1	61.1 J	79.8 J	67.9	3/3	Yes	Yes
BERYLLIUM	mg/kg	0.34	0.34	0.340	1/1	0.31	0.48	0.393	3/3	No	No
CADMIUM	mg/kg	0.22 J	0.22 J	0.220	1/1	0.37 J/J	0.66	0.467	3/3	No	No
CALCIUM	mg/kg	3290	3290	3290	1/1	1690	2700	2050	3/3	Yes	Yes
CHROMIUM	mg/kg	15.2	15.2	15.2	1/1	10.9	18.5	14.5	3/3	No	Yes
COBALT	mg/kg	4.8	4.8	4.8	1/1	3.7	6.5	5.1	3/3	No	No
COPPER	mg/kg	27.2	27.2	27.2	1/1	28.2	37	33.8	3/3	No	No
IRON	mg/kg	12200	12200	12200	1/1	9510	14100	11800	3/3	No	Yes
LEAD	mg/kg	126	126	126	1/1	89.8	269	180	3/3	No	No
MAGNESIUM	mg/kg	2880 J	2880 J	2880	1/1	1470 J	2050 J	1840	3/3	Yes	Yes
MANGANESE	mg/kg	222	222	222	1/1	184	390	316	3/3	No	No
MERCURY	mg/kg	0.34	0.34	0.340	1/1	0.13	0.57	0.317	3/3	No	Yes
MOLYBDENUM	mg/kg	0.56	0.56	0.560	1/1	0.47	0.77	0.580	3/3	No	No
NICKEL	mg/kg	20.7	20.7	20.7	1/1	14.1	20.9	17.1	3/3	No	Yes
POTASSIUM	mg/kg	802 J	802 J	802	1/1	689 J	1040 J	833	3/3	No	No
SELENIUM	mg/kg	0.46 J	0.46 J	0.460	1/1	0.5 J	0.7 J	0.600	3/3	No	No
SILVER	mg/kg	0.11 U	0.11 U	0.110	0/1	0.14 J	0.33 J	0.253	3/3	No	No
SODIUM	mg/kg	133 J	133 J	133	1/1	132 J	203 J	169	3/3	No	No
STRONTIUM	mg/kg	14.3	14.3	14.3	1/1	11.3	17.5	14.0	3/3	No	Yes
THALLIUM	mg/kg	0.35 J	0.35 J	0.350	1/1	0.27 U	0.32 J	0.297	1/3	Yes	Yes
TITANIUM	mg/kg	274 J	274 J	274	1/1	172 J	255 J	227	3/3	Yes	Yes
VANADIUM	mg/kg	22.5	22.5	22.5	1/1	18.4	40.7	27.8	3/3	No	No
ZINC	mg/kg	108 J	108 J	108	1/1	95.4 J	205 J	152	3/3	No	No

[1]The absolute concentration of the non-detects is equal to the detection limit.
Qualifiers:
J = Analyte is present. Reported value may not be accurate or precise.
U = Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
Yellow shaded analytes are those associated with past munitions use.

Sample Name:			USEPA Region IX PRG Residential Screening Value [1]	USEPA Region IX PRG Industrial Screening Value [2]	Ecological Screening Values [3]	FJY-SA-SS-02-02	FJY-SA-SS-02-03	FJY-MG-SS-02-04	FD#2	FJY-SR-SS-02-03	FJY-AO-SB-03-02	FJY-BM-SB-03-01	FJY-CB-SB-03-01	FJY-CW-SS-02-01
Sample Date:						3/16/2007	3/16/2007	3/16/2007	3/16/2007	3/15/2007	3/16/2007	3/15/2007	3/16/2007	3/15/2007
Parent Name:									FJY-MG-SS-02-04					
MRS:						MRS 1	MRS 2	MRS 3	MRS 3	MRS 4	AOC 1	AOC 1	AOC 1	AOC 1
Analyte	**CAS**	**Unit**												
Explosives														
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	180	1800	NSL	-	-	0.012 U	0.012 U	-	0.012 U	0.012 U	0.012 U	0.012 U
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	-	-	0.002 U	0.002 U	-	0.002 U	0.002 U	0.002 U	0.002 U
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.72	2.5	30	-	-	0.014 U	0.014 U	-	0.014 U	0.014 U	0.014 U	0.014 U
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.72	2.5	30	-	-	0.007 U	0.007 U	-	0.007 U	0.007 U	0.007 U	0.007 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	1.2	12	20	-	-	0.01 U	0.01 U	-	0.01 U	0.01 U	0.01 U	0.01 U
2-NITROTOLUENE	88-72-2	mg/kg	0.88	2.2	30	-	-	0.009 U	0.009 U	-	0.009 U	0.009 U	0.009 U	0.009 U
3-NITROTOLUENE	99-08-1	mg/kg	73	100	30	-	-	0.022 U	0.022 U	-	0.022 U	0.022 U	0.022 U	0.022 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	1.2	12	20	-	-	0.006 U	0.006 U	-	0.006 U	0.006 U	0.006 U	0.006 U
4-NITROTOLUENE	99-99-0	mg/kg	12	30	30	-	-	0.036 U	0.036 U	-	0.036 U	0.036 U	0.036 U	0.036 U
HMX	2691-41-0	mg/kg	310	3100	NSL	-	-	0.012 U	0.012 U	-	0.012 U	0.012 U	0.012 U	0.012 U
NITROBENZENE	98-95-3	mg/kg	2	10	40	-	-	0.006 U	0.006 U	-	0.006 U	0.006 U	0.006 U	0.006 U
NITROGLYCERIN	55-63-0	mg/kg	35	120	NSL	-	-	0.04 U	0.04 U	-	0.04 U	0.04 U	0.04 U	0.04 U
PETN	78-11-5	mg/kg	NSL	NSL	NSL	-	-	0.042 U	0.042 U	-	0.042 U	0.042 U	0.042 U	0.042 U
RDX	121-82-4	mg/kg	4.4	16	100	-	-	0.071 U	0.071 U	-	0.071 U	0.071 U	0.071 U	0.071 U
TETRYL	479-45-8	mg/kg	61	620	25	-	-	0.004 U	0.004 U	-	0.004 U	0.004 U	0.004 U	0.004 U
TNT	118-96-7	mg/kg	3.1	31	30	-	-	0.008 U	0.008 U	-	0.008 U	0.008 U	0.008 U	0.008 U
Metals														
ALUMINUM	7429-90-5	mg/kg	7600	10000	pH < 5.5	7530	6430	6610	6990	5880	8180	3930	8240	6090
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27	*0.39 J*	*0.47 J*	*0.29 J*	0.27 J	*0.29 J*	0.23 J	0.14 UJ	0.16 UJ	*0.48 J*
ARSENIC	7440-38-2	mg/kg	0.39	1.6	18	**7.1**	**3.6**	**5.2**	**5.6**	**4.4**	**11.4**	**2.1**	**3.3**	**5.6**
BARIUM	7440-39-3	mg/kg	540	6700	330	46.4 J	50.3 J	39.1 J	45.4 J	86.3 J	56.9 J	42.8 J	47.5 J	90.7 J
BERYLLIUM	7440-41-7	mg/kg	15	190	21	0.35	0.63	0.26	0.28	0.34	0.52	0.39	0.55	0.3
CADMIUM	7440-43-9	mg/kg	3.7	45	0.36	0.29 J	0.15 J	0.13 J	0.14 J	0.22 J	0.28 J	0.024 U	0.028 U	*0.43 J*
CALCIUM	7440-70-2	mg/kg	NUT	NUT	NUT	5720	4380	2020	3110	3290	1780	4870	273	3460
CHROMIUM	7440-47-3	mg/kg	22	64	81	12.7	15.1	10.4	11.3	15.2	17.6	7.3	11.4	20.1
COBALT	7440-48-4	mg/kg	140	1900	13	3.3	4.6	2.7	2.9	4.8	6	5.6	5.2	3.7
COPPER	7440-50-8	mg/kg	310	4100	28	20.8	*32.8*	15.2 J	16.8	27.2	32.9	18.4	11.2	*45.2*
IRON	7439-89-6	mg/kg	2300	10000	NUT	10600	13300	8970	9860	12200	14200	18700	13400	16000
LEAD	7439-92-1	mg/kg	400	800	11	*75.3*	*116*	*64.1 J*	*66*	*126*	164	36.7	19.7	*143*
MAGNESIUM	7439-95-4	mg/kg	NUT	NUT	NUT	3580 J	2970 J	1110 J	1320 J	2880 J	2070 J	2610 J	1820 J	2310 J
MANGANESE	7439-96-5	mg/kg	180	1900	500	179	**231**	144	158	**222**	**281**	153	**442**	**207**
MERCURY	7439-97-6	mg/kg	2.3	31	0.1	*0.2*	*0.13*	0.096	0.082	*0.34*	0.17	0.021 J	0.032 J	*0.17*
MOLYBDENUM	7439-98-7	mg/kg	39	510	2	0.47	0.47	0.33 J	0.41 J	0.56	0.4 J	0.51	0.24 J	1.3
NICKEL	7440-02-0	mg/kg	160	2000	38	11.4	15	6.6	7.1	20.7	30.2	7.3	13.4	14.5
POTASSIUM	7440-09-7	mg/kg	NUT	NUT	NUT	508 J	703 J	525 J	587 J	802 J	729 J	1490 J	435 J	585 J
SELENIUM	7782-49-2	mg/kg	39	510	1	0.28 J	0.23 U	0.34 J	0.53 J	0.46 J	0.37 J	0.19 U	0.47 J	0.43 J
SILVER	7440-22-4	mg/kg	39	510	4.2	0.12 U	0.12 U	0.11 U	0.13 U	0.11 U	0.11 U	0.19 U	0.11 U	0.12 U
SODIUM	7440-23-5	mg/kg	NUT	NUT	NUT	92.2 J	130 J	81 J	96.1 J	133 J	110 J	228	78.6 J	144 J
STRONTIUM	7440-24-6	mg/kg	4700	10000	NSL	11.6	12.3	9.1	11.7	14.3	10	8.1	2.8	14.1
THALLIUM	7440-28-0	mg/kg	0.52	6.7	1	0.3 U	0.28 U	0.27 U	0.33 U	0.35 J	0.51 J	0.38 J	0.27 U	0.37 J
TITANIUM	7440-32-6	mg/kg	10000	10000	NSL	305 J	292 J	225 J	248 J	274 J	286 J	406 J	123 J	249 J
VANADIUM	7440-62-2	mg/kg	7.8	100	7.8	***21.7***	***24.5***	***15***	***16.6***	***22.5***	***36.7***	***22.4***	***14.8***	***18***
ZINC	7440-66-6	mg/kg	2300	10000	50	*71.8 J*	*114 J*	*52 J*	*56.4 J*	*108 J*	119 J	37.5 J	39.2 J	*178 J*

Sample Name:			USEPA Region IX PRG Residential Screening Value [1]	USEPA Region IX PRG Industrial Screening Value [2]	Ecological Screening Values [3]	FD#1	FJY-PM-SB-03-03	FJY-PR-SS-02-01	FJY-SB-SS-02-05	FJY-BG-SS-02-01	FJY-BG-SS-02-02	FJY-BG-SS-02-03	FJY-BG-SS-02-04	FJY-BG-SS-02-05
Sample Date:						3/15/2007	3/16/2007	3/15/2007	3/15/2007	3/15/2007	3/15/2007	3/16/2007	3/16/2007	3/15/2007
Parent Name:						FJY-CW-SS-02-01								
MRS:						AOC 1	AOC 1	AOC 1	AOC 1					
Analyte	**CAS**	**Unit**												
Explosives														
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	180	1800	NSL	0.012 U	0.012 U	-	0.012 U	-	-	-	-	-
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	0.002 U	0.002 U	-	0.002 U	-	-	-	-	-
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.72	2.5	30	0.014 U	0.014 U	-	0.014 U	-	-	-	-	-
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.72	2.5	30	0.007 U	0.007 U	-	0.007 U	-	-	-	-	-
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	1.2	12	20	0.01 U	0.01 U	-	0.01 U	-	-	-	-	-
2-NITROTOLUENE	88-72-2	mg/kg	0.88	2.2	30	0.009 U	0.009 U	-	0.009 U	-	-	-	-	-
3-NITROTOLUENE	99-08-1	mg/kg	73	100	30	0.022 U	0.022 U	-	0.022 U	-	-	-	-	-
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	1.2	12	20	0.006 U	0.006 U	-	0.006 U	-	-	-	-	-
4-NITROTOLUENE	99-99-0	mg/kg	12	30	30	0.036 U	0.036 U	-	0.036 U	-	-	-	-	-
HMX	2691-41-0	mg/kg	310	3100	NSL	0.012 U	0.012 U	-	0.012 U	-	-	-	-	-
NITROBENZENE	98-95-3	mg/kg	2	10	40	0.006 U	0.006 U	-	0.006 U	-	-	-	-	-
NITROGLYCERIN	55-63-0	mg/kg	35	120	NSL	0.04 U	0.04 U	-	0.04 U	-	-	-	-	-
PETN	78-11-5	mg/kg	NSL	NSL	NSL	0.042 U	0.042 U	-	0.042 U	-	-	-	-	-
RDX	121-82-4	mg/kg	4.4	16	100	0.071 U	0.071 U	-	0.071 U	-	-	-	-	-
TETRYL	479-45-8	mg/kg	61	620	25	0.004 U	0.004 U	-	0.004 U	-	-	-	-	-
TNT	118-96-7	mg/kg	3.1	31	30	0.008 U	0.008 U	-	0.008 U	-	-	-	-	-
Metals														
ALUMINUM	7429-90-5	mg/kg	7600	10000	pH < 5.5	6050	10200	7010	6270	5830	7340	4000	7350	6220
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27	*0.49 J*	0.17 UJ	*0.4 J*	0.26 J	*0.45 J*	*0.98 J*	*0.31 J*	*0.66 J*	*0.9 J*
ARSENIC	7440-38-2	mg/kg	0.39	1.6	18	**6.1**	**6.9**	**9.4**	**6.6**	**11**	**10.6**	**4.7**	**14**	**7.7**
BARIUM	7440-39-3	mg/kg	540	6700	330	68.9 J	36 J	89.2 J	52.7 J	61.1 J	103 J	62.8 J	64.3 J	79.8 J
BERYLLIUM	7440-41-7	mg/kg	15	190	21	0.3	0.51	0.48	0.32	0.39	0.43	0.31	0.56	0.48
CADMIUM	7440-43-9	mg/kg	3.7	45	0.36	*0.47 J*	0.029 U	*1.1*	0.35 J	*0.37 J*	***11.9***	*0.37 J*	*0.42 J*	*0.66*
CALCIUM	7440-70-2	mg/kg	NUT	NUT	NUT	3200	369	1900	34200	1760	4430	2700	2490	1690
CHROMIUM	7440-47-3	mg/kg	22	64	81	21.1	16.8	19.7	11.8	14.2	**22.4**	10.9	18.3	18.5
COBALT	7440-48-4	mg/kg	140	1900	13	4.7	7.9	6.1	3.4	5.1	5.7	3.7	6.9	6.5
COPPER	7440-50-8	mg/kg	310	4100	28	*84.8 J*	41.7	*56*	*44.7*	*36.1*	*94.7*	*28.2*	*45.1*	*37*
IRON	7439-89-6	mg/kg	2300	10000	NUT	16700	21900	14600	9940	11700	13900	9510	16000	14100
LEAD	7439-92-1	mg/kg	400	800	11	***424 J***	31.6	*249*	*186*	*182*	***502***	*89.8*	*204*	*269*
MAGNESIUM	7439-95-4	mg/kg	NUT	NUT	NUT	2430 J	2020 J	2510 J	7020 J	1990 J	2360 J	1470 J	1900 J	2050 J
MANGANESE	7439-96-5	mg/kg	180	1900	500	**213**	**305**	**275**	180	**390**	**266**	**184**	**310**	**374**
MERCURY	7439-97-6	mg/kg	2.3	31	0.1	*0.18*	0.083	*1.3*	*0.17*	*0.57*	*1.7*	*0.13*	*0.25*	*0.25*
MOLYBDENUM	7439-98-7	mg/kg	39	510	2	1.1	0.46	1	0.6	0.5	0.74	0.47	0.65	0.77
NICKEL	7440-02-0	mg/kg	160	2000	38	17.7	13.6	26.3	10	16.2	20.2	14.1	20.8	20.9
POTASSIUM	7440-09-7	mg/kg	NUT	NUT	NUT	551 J	709 J	1150 J	737 J	770 J	887 J	689 J	904 J	1040 J
SELENIUM	7782-49-2	mg/kg	39	510	1	0.57 J	0.83 J	0.75 J	0.35 J	0.5 J	0.68 J	0.6 J	0.66 J	0.7 J
SILVER	7440-22-4	mg/kg	39	510	4.2	0.12 U	0.12 U	0.29 J	0.13 J	0.33 J	0.34 J	0.14 J	0.14 U	0.29 J
SODIUM	7440-23-5	mg/kg	NUT	NUT	NUT	142 J	87 J	152 J	120 J	171 J	183 J	132 J	145 J	203 J
STRONTIUM	7440-24-6	mg/kg	4700	10000	NSL	11.3	2.6	15.5	32	11.3	19.3	17.5	17.3	13.1
THALLIUM	7440-28-0	mg/kg	0.52	6.7	1	0.37 J	**0.65 J**	**0.58 J**	0.3 U	0.3 U	0.45 J	0.32 J	0.34 U	0.27 U
TITANIUM	7440-32-6	mg/kg	10000	10000	NSL	261 J	233 J	268 J	206 J	254 J	275 J	172 J	233 J	255 J
VANADIUM	7440-62-2	mg/kg	7.8	100	7.8	***18.4***	**23.5**	***42***	***22.3***	***24.4***	***30.7***	***18.4***	***39.6***	***40.7***
ZINC	7440-66-6	mg/kg	2300	10000	50	*197 J*	49.4 J	*202 J*	*109 J*	*157 J*	*275 J*	*95.4 J*	*141 J*	*205 J*

(1) USEPA Region IX Preliminary Remediation Goals (PRGs) Table, USEPA, December 2004. For non-carcinogens except lead, value shown is equal to 1/10 the residential soil PRG value.
For carcinogens the value shown is equal to the residential soil PRG value.
(2) USEPA Region IX Preliminary Remediation Goals (PRGs) Table, USEPA, December 2004. For non-carcinogens except lead, value shown is equal to 1/10 the industrial soil PRG value.
For carcinogens the value shown is equal to the industrial soil PRG value.
(3) Ecological Screening Value references are found in Table 5-8.

BG=background sample
SB=subsurface soil
SS=surface soil
J=Analyte is present. Reported value may not be accurate or precise.
U=Not detected. The associated number indicates the approximate sample concentration necessary to be detected.
UJ=Not detected, quantitation limit may be inaccurate or imprecise.
mg/kg=milligrams per kilogram
CAS=Chemical Abstract Service
NA=not available
NSL=No Screening Level
NUT=Essential Nutrient
- = analysis not completed for that sample per the SS-WP

Notes:
Blue shaded and bolded values represent exceedance of human health screening criteria.
Blue shaded and italicized values represent exceedance of ecological screening criteria.
Blue shaded, bolded and italicized values represent exceedance of both human health and ecological screening criteria.
Yellow shaded analytes are those associated with past munitions use.

Table 5-8. Soil Ecological Screening Values and Sources

Analyte	Screening Value	Screening Source
Surface Soil (mg/kg)		
1,3,5-TRINITROBENZENE	NSL	
1,3-DINITROBENZENE	NSL	
2,4-DINITROTOLUENE	30	TNT as surrogate
2,6-DINITROTOLUENE	30	TNT as surrogate
2-AMINO-4,6-DINITROTOLUENE	20	Talmage et al. (1999)
2-NITROTOLUENE	30	TNT as surrogate
3-NITROTOLUENE	30	TNT as surrogate
4-AMINO-2,6-DINITROTOLUENE	20	2-amino-4,6-dinitrotoluene as surrgoate
4-NITROTOLUENE	30	TNT as surrogate
HMX	NSL	
NITROBENZENE	40	Efroymson et al. (1997b)
NITROGLYCERIN	NSL	
PERCHLORATE	NSL	
PETN	NSL	
RDX	100	Talmage et al. (1999)
TETRYL	25	Talmage et al. (1999)
TNT	30	Talmage et al. (1999)
ALUMINUM	pH < 5.5	USEPA (2003)
ANTIMONY	0.27	USEPA (2005a)
ARSENIC	18	USEPA (2005b)
BARIUM	330	USEPA (2005c)
BERYLLIUM	21	USEPA (2005d)
CADMIUM	0.36	USEPA (2005e)
CALCIUM	NSL	Essential Nutrient
CHROMIUM	81	USEPA (2005f)
COBALT	13	USEPA (2005g)
COPPER	28	USEPA (2007a)
IRON	NSL	Essential Nutrient
LEAD	11	USEPA (2005h)
MAGNESIUM	NSL	Essential Nutrient
MANGANESE	500	Efroymson et al. (1997a)
MERCURY	0.1	Efroymson et al. (1997b)
MOLYBDENUM	2	Efroymson et al. (1997a)
NICKEL	38	USEPA (2007b)
POTASSIUM	NSL	Essential Nutrient
SELENIUM	1	Efroymson et al. (1997a)
SILVER	4.2	USEPA (2006b)
SODIUM	NSL	Essential Nutrient
STRONTIUM	NSL	
THALLIUM	1	Efroymson et al. (1997a)
TITANIUM	NSL	
VANADIUM	7.8	USEPA (2005i)
ZINC	50	Efroymson et al. (1997a)

NSL - No screening level
mg/kg = milligram per kilogram
Yellow shaded analytes are those associated with past munitions use.

Efroymson, R.A., M.E. Will, G.W. Suter, and A.C. Wooten. 1997a. Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision. Oak Ridge National Lab Report ES/ER/TM-85/R3.

Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997b. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision. U.S. Department of Energy, Office of Environmental Management. November.

Talmage, S.S., D.M. Opresko, C.J. Maxwell, J.E. Welsh, M. Cretella, P.H. Reno, and F.B. Daniel. 1999. Nitroaromatic munition compounds: Environmental effects and screening values. Reviews in Environmental Contamination and Toxicology. 161: 1-156

U.S. Environmental Protection Agency (USEPA). 2003. Ecological Soil Screening Levels for Aluminum, Interim Final. OSWER Directive 9285.7-60. November.

U.S. Environmental Protection Agency (USEPA). 2005a. Ecological Soil Screening Levels for Antimony Interim Final. OSWER Directive 9285.7-61. February.

U.S. Environmental Protection Agency (USEPA). 2005b. Ecological Soil Screening Levels for Arsenic Interim Final. OSWER Directive 9285.7-62. March.

U.S. Environmental Protection Agency (USEPA). 2005c. Ecological Soil Screening Levels for Barium Interim Final. OSWER Directive 9285.7-63. February.

Table 5-8. Soil Ecological Screening Values and Sources

U.S. Environmental Protection Agency (USEPA). 2005d. Ecological Soil Screening Levels for Beryllium Interim Final. OSWER Directive 9285.7-64. February.

U.S. Environmental Protection Agency (USEPA). 2005e. Ecological Soil Screening Levels for Cadmium Interim Final. OSWER Directive 9285.7-65. March.

U.S. Environmental Protection Agency (USEPA). 2005f. Ecological Soil Screening Levels for Chromium Interim Final. OSWER Directive 9285.7-66. March.

U.S. Environmental Protection Agency (USEPA). 2005g. Ecological Soil Screening Levels for Cobalt Interim Final. OSWER Directive 9285.7-67. March.

U.S. Environmental Protection Agency (USEPA). 2005h. Ecological Soil Screening Level for Lead, Interim Final. OSWER Directive 9285.7-70. March.

U.S. Environmental Protection Agency (USEPA). 2005i. Ecological Soil Screening Level for Vanadium, Interim Final. OSWER Directive 9285.7-75. April.

U.S. Environmental Protection Agency (USEPA). 2006a. National Recommended Water Quality Criteria. Available from http://www.epa.gov/waterscience/criteria/nrwqc-2006.pdf

U.S. Environmental Protection Agency (USEPA). 2006b. Ecological Soil Screening Levels for Silver, Interim Final. OSWER Directive 9285.7-77. October

U.S. Environmental Protection Agency (USEPA). 2007a. Ecological Soil Screening Level for Copper, Interim Final. OSWER Directive 9285.7-68. February.

U.S. Environmental Protection Agency (USEPA). 2007b. Ecological Soil Screening Level for Nickel. OSWER Directive 9285.7-76. March.

Table 5-9
Non-Detection Concentrations and Screening Values at Fort Jay MMRP FUDS Site

Analyte	Cas no.	Units	Minimum Non-Detect Concentration	Maximum Non-Detect Concentration	USEPA Region IX PRG Screening Value (1)	Ecological Screening Values (2)
Surface Soil						
Explosives						
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	0.04	0.04	180	NSL
1,3-DINITROBENZENE	99-65-0	mg/kg	0.04	0.04	0.61	NSL
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	0.72	30
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	0.72	30
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	1.2	20
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	0.88	30
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	73	30
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	1.2	20
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	12	30
HMX	2691-41-0	mg/kg	0.08	0.08	310	NSL
NITROBENZENE	98-95-3	mg/kg	0.04	0.04	2	40
NITROGLYCERIN	55-63-0	mg/kg	4	4	35	NSL
PETN	78-11-5	mg/kg	0.2	0.2	NSL	NSL
RDX	121-82-4	mg/kg	0.08	0.08	4.4	100
TETRYL	479-45-8	mg/kg	0.08	0.08	61	25
TNT	118-96-7	mg/kg	0.04	0.04	3.1	30

(1) USEPA Region IX Preliminary Remediation Goals (PRGs) Table, USEPA, December 2004. For non-carcinogens except lead, value shown is equal to 1/10 the PRG value. For
(2) Ecological Screening Value refernces are found in Table 5-8.

NSL=No Screening Level
mg/kg = milligram per kilogram
Yellow shaded analytes are those associated with past munitions use.

6. SUMMARY AND CONCLUSIONS

6.0.1 Fort Jay was used for various military activities between 1800 and 1966. Munitions used at the FUDS include small arms, civil war projectiles, heavy artillery projectiles, parrot systems, smoke grenades, and riot grenades/tear gas. One MRS at Fort Jay was identified and addressed in this SI consistent with the MMRP Inventory in the DERP Fiscal Year 2005 Annual Report to Congress (DoD 2005). The designated range includes approximately 173 acres of land located within the FUDS property boundary.

6.1 Rifle Range #1 (MRS 1)

6.1.1 MRS 1 consists of 0.43 land acres. No documented injuries have occurred at the FUDS. No MEC, MD, MPPEH, small arms, or subsurface anomalies were identified during the SI reconnaissance. The MRS sits at a national monument within the national park system. Access is fairly restricted (by ferry only). The overall MEC risk is considered low.

6.1.2 A summary of the results and conclusions of the risk screening is presented below and included in Table 6-1. No COPCs were reported for the human health screening assessment for MRS 1. A SLERA was performed to assess the ecological risk at the FUDS. Of the six metal MC, three exceeded the ecological screening criteria, yet remained within the range of background concentrations detected at the FUDS. No COPECs were reported for the ecological screening assessment for MRS 1. Based on these screening results, the surface soil pathway for all receptors is considered incomplete for MRS.

6.2 Rifle Range #2 (MRS 2)

6.2.1 MRS 2 consists of 0.43 land acres. No documented injuries have occurred at the FUDS. No MEC, MD, MPPEH, small arms, or subsurface anomalies were identified during the SI reconnaissance. The MRS sits at a national monument within the national park system. Access is fairly restricted (by ferry only). The overall MEC risk is considered low.

6.2.2 A summary of the results and conclusions of the risk screening is presented below and included in Table 6-1. No COPCs were reported for the human health screening assessment for MRS 1. A SLERA was performed to assess the ecological risk at the FUDS. Of the six metal MC, four exceeded the ecological screening criteria, yet remained within the range of background concentrations detected at the FUDS. No COPECs were reported for the ecological screening assessment for MRS 2. Based on these screening results, the surface soil pathway for all receptors is considered incomplete for MRS 2.

6.3 Machine Gun Range (MRS 3)

6.3.1 MRS 3 consists of 0.86 land acres. No documented injuries have occurred at the FUDS. No MEC, MD, MPPEH, small arms, or subsurface anomalies were identified during the SI reconnaissance. Access is fairly restricted (by ferry only). The overall MEC risk is considered low.

6.3.2 A summary of the results and conclusions of the risk screening is presented below and included in Table 6-1. No COPCs were reported for the human health screening assessment for MRS 1. A SLERA was performed to assess the ecological risk at the FUDS. Of the three metal MC, two exceeded the ecological screening criteria, yet remained within the range of background concentrations detected at the FUDS. No COPECs were reported for the ecological screening assessment for MRS 3. Based on these screening results, the surface soil pathway for all receptors is considered incomplete for MRS 3.

6.4 Skeet Range (MRS 4)

6.4.1 MRS 4 consists of 0.89 land acres and 29.11 water acres. No documented injuries have occurred at the FUDS. No MEC, MD, MPPEH, small arms, or subsurface anomalies were identified during the SI reconnaissance. Access is fairly restricted (by ferry only). The overall MEC risk is considered low.

6.4.2 A summary of the results and conclusions of the risk screening is presented below and included in Table 6-1. No COPCs were reported for the human health screening assessment for MRS 1. A SLERA was performed to assess the ecological risk at the FUDS. Of the one metal MC, one exceeded the ecological screening criteria, yet remained within the range of background concentrations detected at the FUDS. No COPECs were reported for the ecological screening assessment for MRS 4. Based on these screening results, the surface soil pathway for all receptors is considered incomplete for MRS 4.

6.5 Remaining Lands (AOC 1)

6.5.1 AOC 1 consists of approximately 169 land acres and is bordered by the southern tip of Manhattan and the confluence of the Hudson River and the East River in New York Harbor. Documented MEC discoveries have occurred at numerous times since the 1940s and included .30 and .45 ammunition (1962 and 1964); tear gas and smoke grenades (1963); cannon balls (1993); and a 3-inch projectile discovered during the TPP site walk (2006). No documented injuries have occurred at the FUDS. Qualitative reconnaissance covered approximately 9 acres during the SI. No MEC/MD or subsurface anomalies were identified during the SI

reconnaissance. The FUDS contains a national monument within the national park system. Access is fairly restricted (by ferry only). The overall MEC risk is considered low to moderate.

6.5.2 A summary of the results and conclusions of the risk screening is presented below and included in Table 6-1. Lead concentrations at AOC 1 were greater than human health screening values for one surface soil sample but the values is within the range of background lead concentrations. None of the metals detected in subsurface soil samples exceeded human health criteria for soil. Therefore, there were no COPCs identified for subsurface soil. A SLERA was performed to assess the ecological risk at the FUDS. Copper, lead, and zinc were detected in surface soil samples above ecological screening criteria; however, the results are within the range of fill and native soil background concentrations for lead and zinc. One sample exceeded fill background and ecological screening for copper; therefore, copper is a COPEC. Using weight of evidence, this exceedance does not justify additional studies for MC. In accordance with EPA guidance, subsurface soil is not evaluated for ecological receptors (EPA 1997). Based on these screening results, the surface soil pathway and subsurface soil pathway for all receptors is considered complete for AOC 1 with acceptable risk.

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

Medium of Concern	Human Health COPCs[1]					Ecological COPECs (SLERA)[2]				
	MRS 1	MRS 2	MRS 3	MRS 4	AOC 1	MRS 1	MRS 2	MRS 3	MRS 4	AOC 1
Surface Soil	No exceedances of EPA Region IX screening values.	No exceedances of EPA Region IX screening values.	No exceedances of EPA Region IX screening values.	No exceedances of EPA Region IX screening values.	Lead exceeded EPA Region IX screening values. Site lead concentrations are less than the maximum background sample concentration.	Ecological screening criteria were exceeded for antimony, lead, and zinc, however maximum site concentrations of these metals are less than the maximum background sample concentration.	Ecological screening criteria were exceeded for antimony, copper, lead, and zinc, however maximum site concentrations of these metals are less than the maximum background sample concentration.	Ecological screening criteria were exceeded for antimony and lead, however maximum site concentrations of these metals are less than the maximum background sample concentration.	Ecological screening criteria were exceeded for lead, however maximum site concentrations of these metals are less than the maximum background sample concentration.	Ecological screening criteria were exceeded for copper, lead, and zinc, however maximum site concentrations of these metals are less than the maximum background sample concentration for lead and zinc. Copper exceeded fill background and ecological screening values and is a COPEC.
Subsurface Soil	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No exceedances of EPA Region IX screening values	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

1 For the Human Health Risk Screen, EPA Region IX PRG screening values were used for soil comparisons. See Table 5-7 for the screening values.
2 For Ecological Risk Screen, the screening values identified in Tables 5-8 were applied.

7. RECOMMENDATIONS FOR FURTHER ACTION

7.0.1 Fort Jay FUDS has four designated MRSs and one AOC, and the recommendations for these MRSs are presented below:

- ***MRS 1 –*** NDAI is recommended for this MRS. The MEC assessment indicates a low risk. No verified small arms have been found at the MRS since the 1940s. Human health and ecological risk screening assessments did not identify any immediate risk from MC.
- ***MRS 2 –*** NDAI is recommended for this MRS. The MEC assessment indicates a low risk. No verified small arms have been found at the MRS since the 1940s. Human health and ecological risk screening assessments did not identify any immediate risk from MC.
- ***MRS 3 –*** NDAI is recommended for this MRS. The MEC assessment indicates a low risk. No verified small arms have been found at the MRS since the 1940s. Human health and ecological risk screening assessments did not identify any immediate risk from MC.
- ***MRS 4 –*** NDAI is recommended for this MRS. The MEC assessment indicates a low risk. No verified small arms have been found at the MRS since the 1940s. Human health and ecological risk screening assessments did not identify any immediate risk from MC.
- ***AOC 1 –*** Further studies are recommended for this AOC because MEC has been found in multiple locations after transfer to the U.S. Coast Guard in areas outside of the known MRSs. These additional studies should focus on MEC. These additional studies should determine the need to designate an MRS and to proceed to investigate the extent of contamination and evaluate the risk of the AOC to human health and the environment. If an MRS is designated, an MRSPP score should be established. The MEC assessment completed in this SI indicates a low to moderate risk. MEC/MD has been found at Fort Jay since the 1940s. Human health and ecological risk screening assessments did not identify any immediate risk from MC.

7.0.2 A TCRA/NTCRA is not recommended for the MRSs or AOC addressed in this SI.

7.0.3 Prepare an ASR Supplement. The boundary and acreage associated with each MRS should be further delineated in the Supplemental ASR and should be reflective of the former munitions uses at the FUDS.

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APPENDIX A - SCOPE OF WORK

Located on CD.

APPENDIX B - TPP MEMORANDUM

- TPP Memorandum #1 (Located on CD)
- DQO Verification Worksheets

APPENDIX C - INTERVIEW DOCUMENTATION

Appendix not used.

APPENDIX D - FIELD NOTES AND FIELD FORMS

- Daily Quality Control Reports
- Logbook
- Fieldsheets
- Chains of Custody(s)

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	03-15-07-01	**Date:** 03-15-07	
Project Name:	Ft. Jay/Governors Island C02NY061101	**Contract Number:** W912DY-04-D-0017	
Location of Work:	Ft. Jay/Governors Island, NY		
Description of Work:	Surface and subsurface soil sampling		
Weather:	Mostly cloudy and breezy	**Rainfall:** none	**Temperature:** **Min.** 41ºF **Max.** 58ºF

1. Work performed today by Alion Team.

Meeting with project team to go over site rules/procedures for sampling procedure.

Health and Safety briefing.

Recorded the description of sample locations while performing sample collection.

Reconnaissance Acreage / Discussion:

Travel paths to sample locations were collected via meandering path from vehicle location to sample point.

Travel routes were cleared for MPPEH prior to mobilizing sampling gear to locations. Visual inspection was conducted around sample locations.

Samples Collected:

FJY-SR-SS-02-03	FJY-BG-SS-02-01	FJY-SB-SS-02-05
FJY-PR-SS-02-01	FJY-CW-SS-02-01 (QA # 1, DUP # 1)	FJY-BG-SS-02-02
FJY-BM-SB-03-01	FJY-BG-SS-02-05	

Field Tests:

Schonstedt checked ok.

Benchmarks surveyed with handheld GPS unit

Calibration of Instruments:

None

Other:

None.

2. Work performed today by other subcontractors.

None.

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)

None

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

None

5. List material and equipment received.

None.

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 safety violations.

9. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)

Field team arrived at Fort Jay/Governors Island via ferry at 1:00 pm in the company of Carissa Scarpa (CENAN Archeologist). On arrival on the island, Mr. Edward Lorenzini of NPS and Ms. Clara Kelly of GIPEC were briefed on the activities that will be conducted and a request was made for access to Building 400 (former indoor rifle range). Benchmark was obtained on the side of Building 107 (NPS office). The field team then proceeded to collect 8 surface/subsurface soil samples, 1 QA sample, and 1 field duplicate sample as indicated in the SS-WP. The surface soil samples were collected at the skeet range, pistol range, Castle Williams, South Battery and Background samples 01, 02 and 05. Subsurface sample was collected at the buried magazine area using hand auger at about 3 ft. Subsurface soil was screened using a wire mesh to ensure that no archeological items were unearthed. Subsurface soil sample was collected in the presence of Carissa Scarpa (CENAN Archeologist) . No anomaly was observed during sample collection.

When the field team got to the location of the gas chamber, it was observed that the whole area around the gas chamber was covered with asphalt/concrete and the field team was unable to obtain soil sample from the area. Also, Building 400 (Former Indoor Rifle Range) was inspected by the sampling team in the company of Clara Kelly of GIPEC. It was observed that the building has been remediated as detailed in the ASR. Photographs were taken to document the interior of the building and sample for Building 400 (former indoor rifle range) was not collected.

Field work was completed at 4:50PM and the sampling team departed the Ft. Jay/Governors Island at 5:00pm via ferry to Manhattan.

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 Mitchell
Quality Control System Manager

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	03-16-07-01	**Date:** 03-16-07	
Project Name:	Ft. Jay/Governors Island C02NY061101	**Contract Number:** W912DY-04-D-0017	
Location of Work:	Ft. Jay/Governors Island, NY		
Description of Work:	Surface and subsurface soil sampling		
Weather:	Mostly cloudy and breezy. Less than 1inch of snow on the ground. Hale/ice predicted for the day.	**Rainfall:** Light Rainfall Hale/ ice throughout the day	**Temperature:** **Min.** 28ºF **Max.** 32ºF

1. Work performed today by Alion Team.

Project team discussed plan for obtaining the remaining samples before the weather deteriorates.

Health and Safety briefing.

Recorded the description of sample locations while performing sample collection.

Reconnaissance Acreage / Discussion:

Travel paths to sample locations were collected via meandering path from vehicle location to sample point.

Travel routes were cleared for MPPEH prior to mobilizing sampling gear to locations. Visual inspection was conducted around sample locations.

Samples Collected:

FJY-BG-SS-02-04	FJY-CB-SB-03-01	FJY-SA-SS-02-03
FJY-MG-SS-02-04 (QA # 2, DUP # 2)	FJY-PM-SB-03-03	FJY-AO-SB-03-02
FJY-BG-SS-02-03	FJY-SA-SS-02-02	

Field Tests:

Schonstedt checked ok.

Benchmarks surveyed with handheld GPS unit

Calibration of Instruments:

None

Other:

None.

2. Work performed today by other subcontractors.

None.

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)
None
4. List type and location of tests performed and results of these tests.
None
5. List material and equipment received.
None.
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 safety violations.
9. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Field team arrived at the Fort Jay/Governors Island via ferry at 7.30 am. Benchmark was obtained and the field team quickly moved to collect samples planned for the day. 5 surface soil samples, 3 subsurface soil samples, 1 QA sample, 1 field duplicate sample as indicated in the SS-WP. The surface soil samples were collected at the machine gun range and small arms range. The subsurface samples were collected in the presence of Carissa Scarpa (CENAN Archeologist) at New York Arsenal Ordnance Storehouse, Canon Ball discovery area and Powder Magazine area. At each subsurface sampling location, a wire mesh was used to screen the soil and no anomaly was discovered. The samples were collected with hand auger at about 3 ft. Two background samples were also collected at the areas designated in the workplan. Photographs of sample locations were taken and GPS coordinates were recorded. Field work was completed at 10:53 am and Mr. Edward Lorenzini of the NPS and Ms. Clara Kelly of GIPEC were briefed before the field team departed the island via ferry at 12:00 noon. Samples for GPL Laboratories were picked up by the lab at the Loveton, MD office on 03/19/07. QA samples were sent via FEDEX to STL on 03/19/07 for arrival on 03/20/07.

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 Mitchell
Quality Control System Manager

SITE ENTRY AND EXIT LOG

Project/Site : FUDS SI - Northeast
Project No.: Ft Jay

Date	Name	Representing	Time In	Time Out
3/15	Timothy REESE	Alion Team	13:00	1700
3/15/07	John Owoyemi	Alion Team	13:00	1700
3-15-07	Stuart Carr	HFA	1300	1700
3/15/07	Carissa Scarpa	USACE-NYD	130	1500
3/16/07	Timothy REESE	Alion Team	0730	1200
3/16/07	John Owoyemi	Alion Team	0730	1200
3/16/07	Carissa Scarpa	USACE-NYD	0900	1200
3-16-07	Stuart Carr	HFA	0730	1200

ACCIDENT PREVENTION PLAN REVIEW RECORD

SITE: _Fort Jay / Governors Island_____

Project No._C02NY061101_____

I have read the Accident Prevention Plan and have been briefed on the nature, level, and degree of exposure likely as a result of participation of field activities. I agree to conform to all the requirements of this Plan.

Name	Signature	Affiliation	Date
Tim REESE		Alion Team	3/15/07
Carissa Scarpa		USAE-NYP	3/15/07
Stuart Carr		HPA	3-15-07
John Quyen		Alion Team	3-15-07

DAILY SITE SAFETY JOURNAL

DATE: 15 MAR 07	PROJECT: Fort Jay
SUXOS: S. Carr	PM: Tim Rose
SSO:	QCO: John Orgeni

AREA / ITEMS INSPECTED	SAT	UNSAT
Proper work attire (PPE)	✓	
Vehicle condition	✓	
Emergency equipment	✓	
Safe demolition procedures	NA	
Field office, inside	NA	
Field office grounds	NA	

[ ] 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: Stuart Carr

DAILY SITE SAFETY JOURNAL

Page 1 of 2

DATE: 16 MAR 07	PROJECT: Fort Jay
SUXOS: S. Carr	PM: Tim Reese
SSO:	QCO: John Owczarzak

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	

- [+] 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: Scott Carr

F-13

"Rite in the Rain"
ALL-WEATHER WRITING PAPER

ALL-WEATHER

ENVIRONMENTAL FIELD BOOK

Name JOHN OWOYEMI (FIELD TEAM LEADER)

Address 15 LOVETON CIRCLE
SPARKS MD 21152

Phone 410 771-4950 x5280

Project MMRP SI
FT JAY/GOVERNORS ISLAND
C02NY061101

This book is printed on "Rite in the Rain" All-Weather Writing Paper - A unique paper created to shed water and enhance the written image. It is widely used throughout the world for recording critical field data in all kinds of weather. For best results, use a pencil or an all-weather pen.

Specifications for this Book

Page Pattern		Cover Options	
Left Page	Right Page	Polyester Cover	Fabrikoid Cover
Columnar	Tel. Grid	Item No. 56x	Item No. 560F

CONTENTS

Field Team

1. John Owoyemi (Alion Team)
2. Tim Reese (Alion Team)
3. Stuart Carr (Alion Team)
4. Carissa Scarpa (CENAN)

Reference Page Index

Location Ft Jay/Governors Island Date 03/15/07

Project / Client C02NY061101 (USACE/ALION)

Weather: Mostly Cloudy and breeze. Highs around 57°F/58°F.

Arrived onsite via ferry ride at around 2.08pm. The field team arrived in the Company of Carissa Scarpa of CENAN (Designated Archeologist).

The team then proceeded to Building 107 and met Ms. Clara Kelly of GIPEC and Mr. Edward Lorenzini of NPS. They were briefed of the field work to be conducted and access to Building 400 (indoor rifle range) was discussed. Ms. Kelly promised to take the field team to the Building at 3pm. She provided flash light since the interior of the building may be dark.

Location Ft Jay/Governors Island Date 03/15/07

Project / Client C02NY061101 (USACE)

Benchmark was obtained near Building 107.

E 583284

N 4504563

Heath and Safety briefing and overview of Sampling activities was conducted. Present at the briefing include

Tim Reese Stuart Carr

John Onyeni Carissa Scarpa

1405 EST – FJY-SR-SS-02-03

N 582362

E 4504181

3/15 Composite Surface Soil Sample was obtained in jar for Metals. Photo 275 Meandered around the Sample location. No anomaly discovered.

4

Location Ft Jay/Governors Island Date 03/15/07

Project / Client CO2NY061101 (~~CENAB~~/USACE)

Sampers 3/15

Field team proceeded to next Sampling location.

1430EST: FJY-PR-SS-02-01

N: 582581

E: 4504261

Composite Surface Soil Sample Was ~~data~~ Collected at 1 inch using a Scoop. Photo # 265. The area was visually observed and the team did not discover any ~~ANOMALY~~. 3/15 The Field team then moved to the next Sampling location

1445: Buried Magazine area FJY-BM-~~SB~~-03-01

Using a hand auger, the team dug 3ft to obtain Subsurface Soil Samples. The Soil

Location Ft Jay/Governors Island Date 3/15/07

Project / Client CO2NY061101 (USACE)

Sampers

Was Screened using a wire mesh in the presence of CENAN Archeologist (Capnas Scampa). No anomaly was discovered in the Soil apart from a 1 inch metal slag. Soil Sample Was Collected in a glass ja

N: 582570

E: 4504268

While the Sampling team was Planning on the next Sampling event, Mr. Reade ~~and~~ Alvin and Clara Kelly of NPS ~~Mr~~ inspected Building 400 (Former Indoor Rifle range). Photographs were taken to document the Interior of the building and to show that

Location Ft Jay/Governors Island Date 3/15/07

Project / Client CO2NY061101 (USACE)

Sampler: [illegible]

the floor is Covered with Concrete and there was no way the team Could Obtain a Soil Sample based on the Condition on the Interior of the building.

3/15

Mrs. Ms. Carissa Scarpato of KEMAN left the Island since all the Subsurface Samples planned for the day has been Collected and the Sampling team proceeded to the next Sampling location.

1510EST FJY-BG-SS-02-05
N 582564
E 450694
Photo ID 264 & 263
Composite Surface Soil

Location Ft Jay/Governors Island Date 3/15/07

Project / Client CO2NY061101 (USACE)

Sampler: [illegible]

Collected at 2 inches below Ground Surface.

1605EST — FJY-BG-SS-02-01
N 582775
E 450495
Sandy Silty Soil
Surface Soil Sample (Composite) Obtained. Photo taken. Moved to the next Sampling location.

1615 — FJY-CW-SS-02-01
N 582859
E 450509
Field team inspected the area around Castle Williams

8

Location Ft Jay/Governors Island Date 3/15/07

Project / Client CO2NY061101 (ASDCE)

visually. Samples (surface Soil) was obtained for Metals, explosives, field dup and QA. Photographs of the side of the Castle along Marking on the wall was taken. Sample location was moved as far as possible to the Castle wall. The Field team then Walked around the Castle in a meadering path and moved to the next Samping location.

1645 EST — FJY-BG-SS-02-02

N 583289

4504563

Location Ft Jay/Governors Island Date 3/15/07

Project / Client CO2NY061101 (USACE

Surface background Sample was obtained at the location. The Soil is Sandy Silty and Sample location is Pretty Close to the Shoreline. Photo of the Sample location was also taken.

While Sample FJY-BG-SS-02-0 Was being Collected, UXO technicians and Project Manager were inspecting the around Battery 6-itery which is in close proximity to Where the background Sample was obtained.

Location Ft Jay/Governors Island Date 3/15/07

Project / Client USACE (C02NY061101

1647 FJY-SB-SS-02-25

N: 583126

E: 4504610

Photo No: 217, 218

Sample location was visually inspected and UXO tech Meandered around the location. NO anomaly found. Surface Soil Sample was obtained (Metals/Explosives). Soil Sample appears to be Sandy and dark.

Location Ft Jay/Governors Island Date 3/15/07

Project / Client C02NY061101 (USACE)

1649 EST. The field team moved all field equipments back to the ferry loading station and also took benchmarks near Building 107.

N 583282

E 4504563.

Team Concluded field activities for the day and boarded the ferry for Manhattan. The crew left all equipment and Vehicle on the Island following the advise of the Site owners.

Location Ft Jay/Governors Island Date 3/16/07

Project / Client CO2NY061101 (USACE)

The field team arrived the Island at 0730 and outlined how to quickly collected the remaining surface/subsurface Samples because of the bad weather (Hale/ICE) predicted for the day.

The team held a Short briefing on health/safety and Sampling location. and Sample equipments were arranged in order of need and the hand auger was decontaminated.

Location Ft Jay/Governors Island Date 3/16/07

Project / Client CO2NY061101 (USACE)

0756 EST

Benchmark obtained on the Side of building 107.

Sampling team proceeded to the first Sampling location for the day

0810 EST (FJI-BG-SS-02-04)

N 853428

E 4504870

Sample location is close to the Shoreline. Soil is clean and loamy in nature. Surface Soil

12 14

Location Ft Jay/Governors Island Date 03/16/07

Project / Client (C02NY06110) USACE

Collected for Metals only.

Photograph taken and recorded Photo ID: 210

Then proceeded to the next Sampling location

0830 (3/16) EST

FJY-MG-SS-02-04

Field team moved in a meandering path around the Machine gun range. Signs of bullet hit apparent on walls of building.

15

Location Ft Jay/Governors Island Date 3/16/07

Project / Client (C02NY06110) USACE

N: 583140

E: 4504900

Surface Soil obtained at about 2 inches below the ground surface. Sample Collected for Metals, Explosives, field duplicate and QA SPLIT. Soil is loamy in nature.

Photographs taken.

Photo ID: 208

12

16

Location Ft Jay/Governors Island Date 3/16/07

Project / Client (C02NY06101) USACE

0846 EST

FJY-BG-SS-02-03

Sampling location for background Sample 03-

N: 582917

E: 4504423

Soil Sample Collected at about 2 inches below the ground surface using a new scoop. Soil appears to be clean and loamy.

Location Ft Jay/Governors Island Date 3/16/07

Project / Client (C02NY06101) USACE

17

Photo of Sampling location taken; Photo ID 207

After the field team Collected background Sample 03, We drove to the ferry terminal on the Island to Pick up Carissa Scarpa (CENAN Archeologist)

905- Met Carissa Scarpa at the ferry terminal on the Island and proceeded to the next Sampling location

Location Ft Jay | Governors Island Date 3/16/07

Project / Client (C02NY061101) USACE

0920 EST (FJY-A0-SB-03-02)

N: 583260

E: 505031

The Sampling team arrived in the Company of CEWAN's Archeologist to obtain subsurface Soil Sample at the former New York Arsenal Ordnance storehouse. Light Snow began falling and Weather began to deteriorate.

Hand auger was used to Collect Subsurface Soil Samples at about 2ft below Ground Surface. All Collected Soil Samples were

Location Ft Jay | Governors Island Date 3/16/07

Project / Client (C02NY061101) USACE

was passed through a wire mesh. No discovery Collected Subsurface Soil Sample to be tested for Metals| explosives. Equipment decontaminated with usmq DI water. Photo taken: 3/16 PHOTO ID 254

1001 EST FJY-CB-SB-02-06

Weather: Hale & Snow. Very windy and Cold.

N 583084

E 450483 2

Subsurface Soil Collected. Sieved Sample through wire mesh. Photo taken. No discovery. Soil is Clay| Sandy (3ft below Ground Surface.

20

Location Ft Jay/Governors Island Date 3/16/07

Project / Client (CONY061101) USACE

Sample Collected in the Presence of CENAN's Archeologist. 3/16

1015 EST FJY-PM-SB-08-08
Subsurface Soil
N: 582960
E: 4505001

Photo taken Subsurface Soil
Collected at 3ft deep Sample was Sieved through a wire mesh

1040 FJY-SA-SS-02-02
N 583119
E 4505037
Surface Soil Sample. Photo taken

10.42 FJY-SA-SS-02-03
N 583180
E 4503038

Briefed GIPEC & NPS on fieldwork
Demobilized from Site

21

Location Date

Project / Client

3/16/07

GPL LABORATORIES, LLLP

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

Contract #/Billing Reference

2 of 2 Pgs.

Project: MMRP SI (C02NY061101)
Client: Alion
Send Results To: Corinne Shig
Address: 3975 Fair Ridge Drive
Suite #125, South, Fairfax VA 22033
Phone: 703 259-5147

Turnaround Time: STD
# of Containers: 4 4 2
Container Type: 8 oz Jar
Preservative Used: None
Type of Analysis: Explosives 8330 (HPLC) | PETN 8330 (HPLC) | Nitroglycerin 8330 (HPLC) | Nitrates 300.0/6010B | Mercury 7471A (CVAA)

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Explosives	PETN	Nitroglycerin	Nitrates	Mercury						Lab Cooler No. / CLIENT COMMENTS
FJY-CB-SB-03-01	3/14/07	10:00	Soil	J.O	X	X	X	X	X						
FJY-DM-SB-03-03	3/16/07	10:15			X	X	X	X	X						
FJY-SA-SS-02-02	3/14/07	10:40						X	X						
FJY-SA-SS-02-03	3/16-07	10:45						X	X						
FD #1	3/15/07	—			X	X	X	X	X						
FD #2	3/16/07	—			X	X	X	X	X						

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
John Dwyer	3/19/07 11:45am				
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, LLLP

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

Contract #/Billing Reference:

Project:	MMRP SI (Corn Hudson 01)
Client:	Alion
Send Results To:	Corinne Shia
Address:	3975 Fair Ridge Drive
	Suite 125 South Fairfax VA 22033
Phone:	703 259 - 5147

Turnaround Time	Std →
# of Containers	1/A
Container Type	8oz Jars
Preservative Used	None
Type of Analysis	Explosives 8330A/8330A; PETN 8330A mod.; Nitroguanidine 8330A/8330A mod.; Metals 3050/6010B; Mercury 7471A/7471A

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Explosives 8330A/8330A	PETN 8330A mod.	Nitroguanidine 8330A/8330A mod.	Metals 3050/6010B	Mercury 7471A/7471A						Lab Cooler No.	CLIENT COMMENTS
FJY-SR-SS-02-03	3/15/07	14:05	Soil	J.O.				X	X							
FJY-PR-SS-02-01	3/15/07	14:30	↓	5 ↓				X	X							
FJY-BM-SB-03-01	3/15/07	14:45		5	X	X	X	X	X							
FJY-B4-SS-02-08	3/15/07	15:10		6				X	X							
FJY-B4-SS-02-0[illegible]	3/15/07	16:05						X	X							
FJY-MW-SS-02-0[illegible]	3/15/07	16:15			X	X	X	X	X							
FJY-B4-SS-02-[illegible]	3/15/07	16:45						X	X							
FJY-~~B4~~ SB-SS-02-05	3/15/07	16:35			X	X	X	X	X							
FJY-B4-SS-02-04	3/16/07	08:10						X	X							
FJY-MW-SS-02-04	3/16/07	08:30			X	X	X	X	X							
FJY-BG-SS-02-03	3/16/07	08:46						X	X							
FJY-AG-SB-03-02	3/16/07	09:20	↓	↓	X	X	X	X	X							

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
John Onyemi	3/19/07 11:45am			[signature]	[illegible]

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

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

G.P. W.O. ______________

STL Denver
4955 Yarrow Street
4955 Yarrow Street
Arvada, CO 80002
phone 303-736-0100 fax 303-431-7171

Chain of Custody Record

SEVERN TRENT STL

Severn Trent Laboratories, Inc.

Client Contact	Project Manager: Corinne Shig	Site Contact: Tim Reese	Date: 3/19/07	COC No:
Alion Science and Technology Corporation	Tel/Fax: 703-259-5147	Lab Contact:	Carrier: FEDEX	1 of 1 COCs
3975 Fair Ridge Drive Suite 105 South	Analysis Turnaround Time			Job No.
Fairfax VA 22033	Calendar (C) or Work Days (W) Standard			
703.259.5147 Phone	TAT if different from Below _____			SDG No.
703.259.5248 FAX	☐ 2 weeks			
Project Name:MMRP SI (C02NY061101)	☐ 1 week			
Site:Fort Jay/Governors Island	☐ 2 days			
P O #	☐ 1 day			

Sample Identification	Sample Date	Sample Time	Sample Type	Matrix	# of Cont.	Filtered Sample	Metals (3050)	Mercury (7414A)	Explosives (8330m)	Pe TN (8330A mod)	Nitroglycerin (8330m)	Sample Specific Notes:
QA #1	3/15/07	—	Composite	Soil	1		X	X	X	X	X	
QA #2	3/16/07	—	↓	↓	↓		X	X	X	X	X	

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification
☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*

Special Instructions/QC Requirements & Comments:

Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
John Awyemi	EA ENGINEERING (ALION)	3/19/07 12:22			
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:
Relinquished by:	Company:	Date/Time:	Received by:	Company:	Date/Time:

APPENDIX E - PHOTO DOCUMENTATION LOG

PHOTOGRAPHIC LOG

Project/Site: Fort Jay/Governors Island
Project No.: C02NY061101

Date	Taken By	Photo ID	Description
3/15/2007	J.Owoyemi	E.1	Collecting Subsurface Soil in the Canon Ball Discovery Area
3/15/2007	J.Owoyemi	E.2	Interior of Building 400 (Indoor Rifle Range)
3/15/2007	J.Owoyemi	E.3	Entrance of Building 400 showing concrete flooring (Indoor Rifle Range)
3/15/2007	J.Owoyemi	E.4	Surface Soil Sampling at the Machine Gun Range
3/16/2007	J.Owoyemi	E.5	Sieving Subsurface Soil Sample through a Wire Mesh
3/16/2007	J.Owoyemi	E.6	Planned area for Gas Chamber Surface Soil Sample was covered with Concrete/Asphalt
3/16/2007	J.Owoyemi	E.7	Castle Williams Interior Wall showing sign of Munitions Impact
3/16/2007	J.Owoyemi	E.8	UXO Tech clearing a Surface Soil Sampling Location at the Pistol Range Location
3/16/2007	J.Owoyemi	E.9	South View of Castle Williams
3/15/2007	J.Owoyemi	E.10	Background Surface Soil Sample Location
3/16/2007	J.Owoyemi	E.11	South end of the Gas Chamber covered with Concrete and Asphalt
3/16/2007	J.Owoyemi	E.12	E.12 – Collection of Subsurface Soil Sample at the Powder Magazine Area.

E.1– Collecting Subsurface Soil in the Canon Ball Discovery Area

E.2 – Interior of Remediated Building 400 (Indoor Rifle Range)

E.3 – Entrance of Building 400 showing concrete flooring (Indoor Rifle Range)

E.4 – Surface Soil Sampling at the Machine Gun Range

E.5 –Sieving Subsurface Soil Sample through a Wire Mesh

E.6 – Planned area for Gas Chamber Surface Soil Sample was covered with Concrete/Asphalt

E.7 – Castle Williams Interior Wall showing Munitions Impact

E.8 – UXO Tech clearing a Surface Soil Sampling Location at the Pistol Range Location

E.9 – South View of Castle Williams

E.10 –Surface Soil Sample Location

E.11 – South end of the Gas Chamber covered with Concrete and Asphalt

E.12 – Collection of Subsurface Soil Sample at the Powder Magazine Area.

APPENDIX F - ANALYTICAL DATA

- ADR Library
- ADR EDDs
- EDMS
- Analytical Summary Reports
- Analytical Data Reports
- SEDD Deliverable

Located on CD.

APPENDIX G - ANALYTICAL DATA QA/QC REPORT

- Validated Data from EDS.
- USACE Memorandum for Record-CQAR of QA Split Samples

Located on CD

APPENDIX H - GEOGRAPHIC INFORMATION SYSTEMS DATA

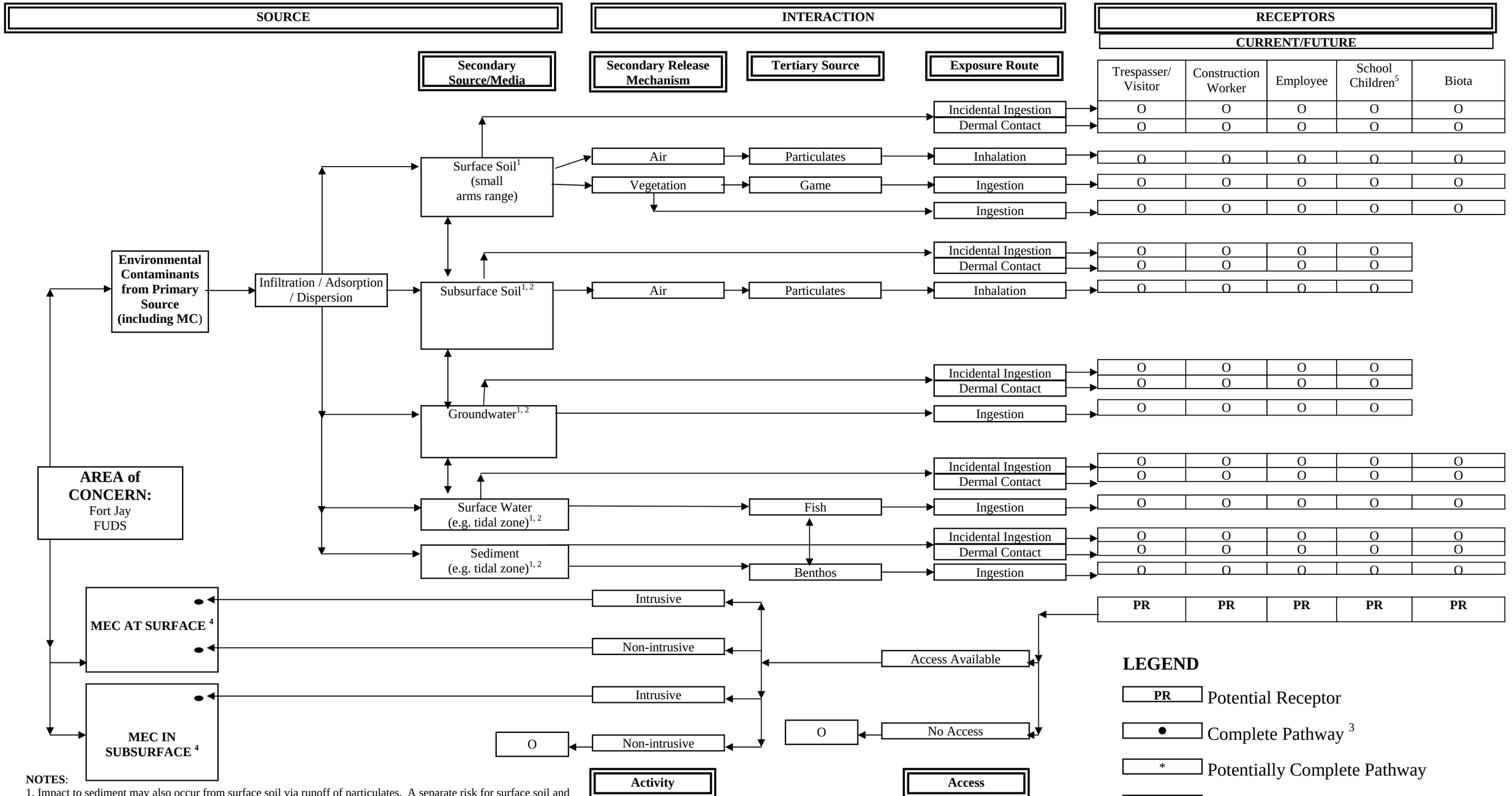
Located on CD.

APPENDIX I - GEOPHYSICAL DATA

Appendix not used.

APPENDIX J - CONCEPTUAL SITE MODEL

- MRS 1
- MRS 2
- MRS 3
- MRS 4
- AOC 1



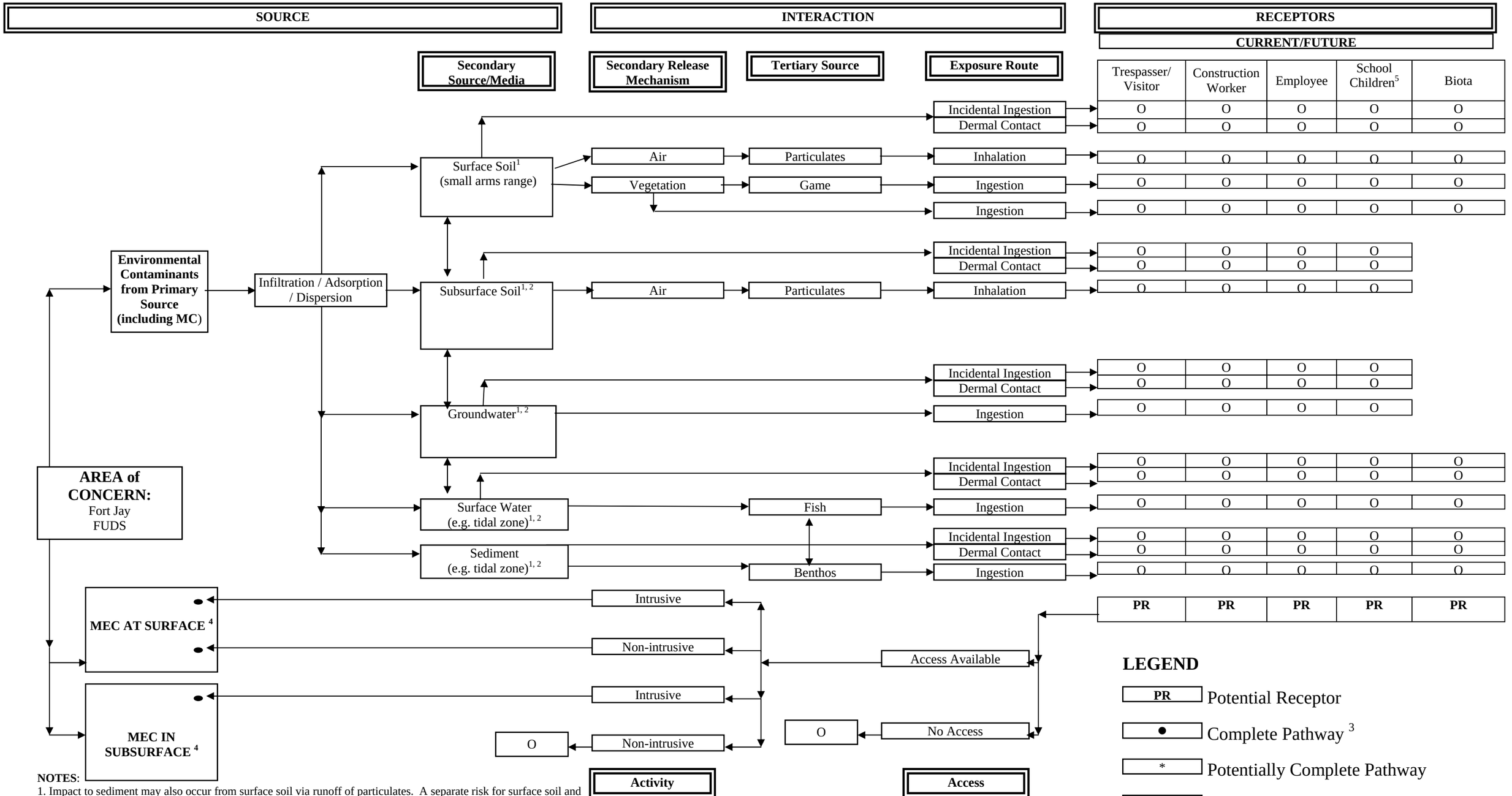
NOTES:

1. Impact to sediment may also occur from surface soil via runoff of particulates. A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water may also occur from infiltration of groundwater.
2. Subsurface Soil: Small arms are not expected to be found in the subsurface. Groundwater: The saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. Surface water/Sediment: There are no permanent, non-tidal, freshwater features at Fort Jay. Air: Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible.
3. If a munitions-related chemical is detected above background (other than nitrobenzene), than a given pathway is complete. A complete pathway may or may not pose risk to the specific receptor.
4. Interaction between a potential receptor and MEC has two components: access and activity.
5. School children are a future receptor for this AOC. GIPEC intends to build a school on Fort Jay.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT JAY MMRP FUDS SITE

MRS 1 – Rifle Range #1

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.* EM1110-1-1200.



NOTES:
1. Impact to sediment may also occur from surface soil via runoff of particulates. A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water may also occur from infiltration of groundwater.
2. Subsurface Soil: Small arms are not expected to be found in the subsurface. Groundwater: The saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. Surface water/Sediment: There are no permanent, non-tidal, freshwater features at Fort Jay. Air: Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible.
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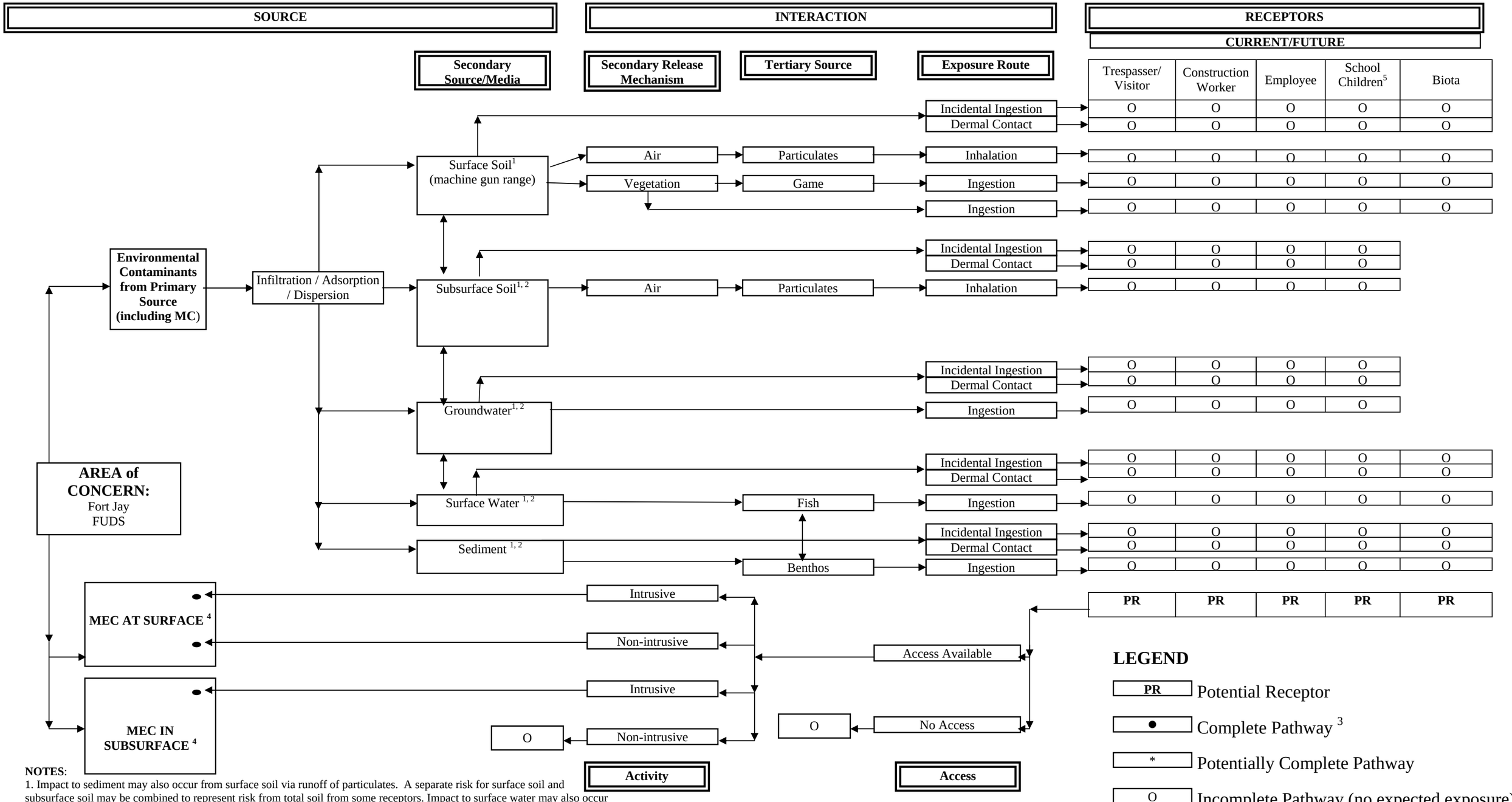
DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT JAY MMRP FUDS SITE

MRS 2 – Rifle Range #2

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.* EM1110-1-1200.

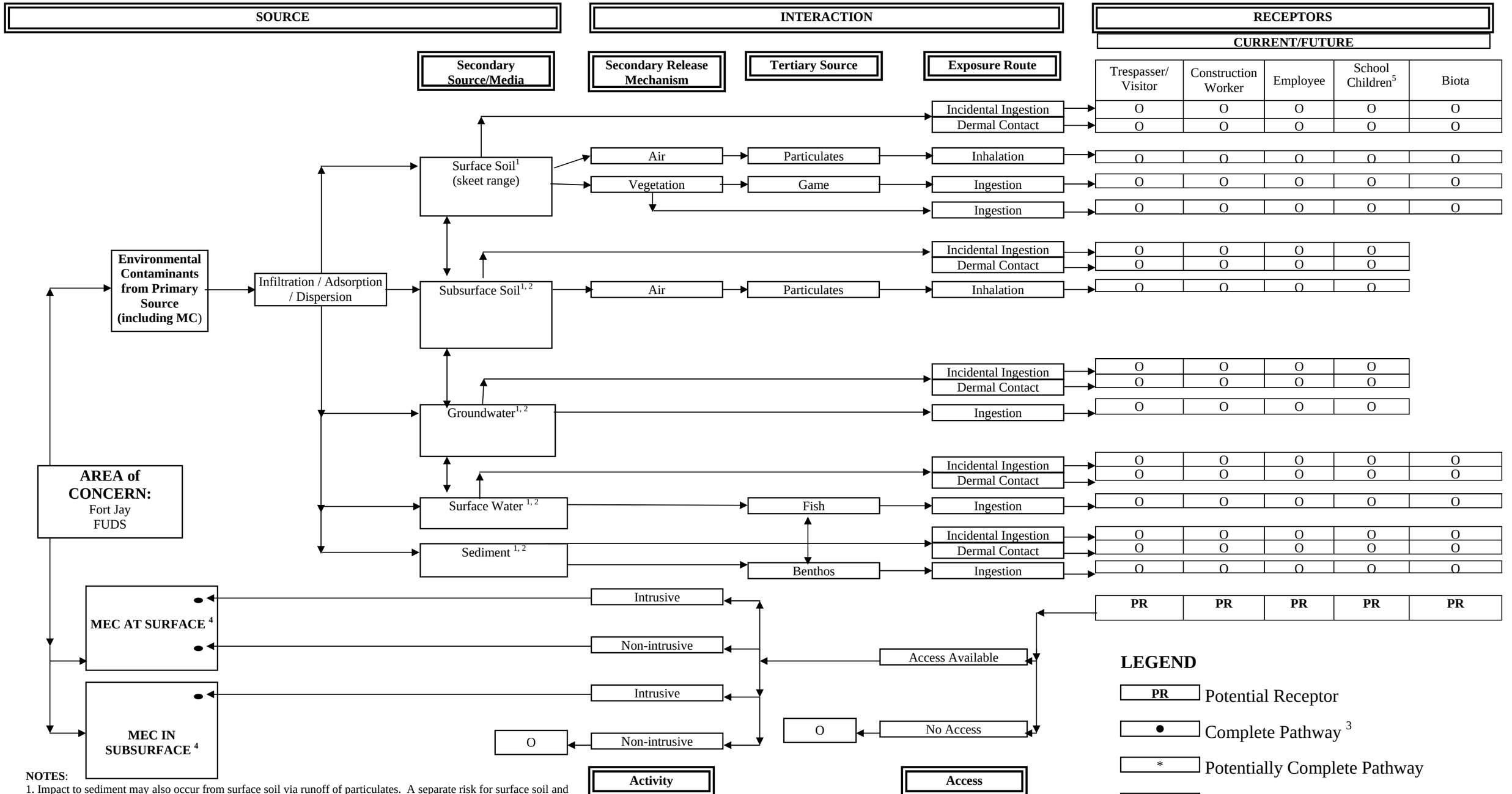


NOTES:
1. Impact to sediment may also occur from surface soil via runoff of particulates. A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water may also occur from infiltration of groundwater.
2. Subsurface Soil: Small arms are not expected to be found in the subsurface. Groundwater: The saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. Surface water/Sediment: There are no permanent, non-tidal, freshwater features at Fort Jay. Air: Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible.3. If a munitions-related chemical is detected above background (other than nitrobenzene), than a given pathway is complete. A complete pathway may or may not pose risk to the specific receptor.
4. Interaction between a potential receptor and MEC has two components: access and activity.
5. School children are a future receptor for this AOC. GIPEC intends to build a school on Fort Jay.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT JAY MMRP FUDS SITE

MRS 3 – Machine Gun Range

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.* EM1110-1-1200.

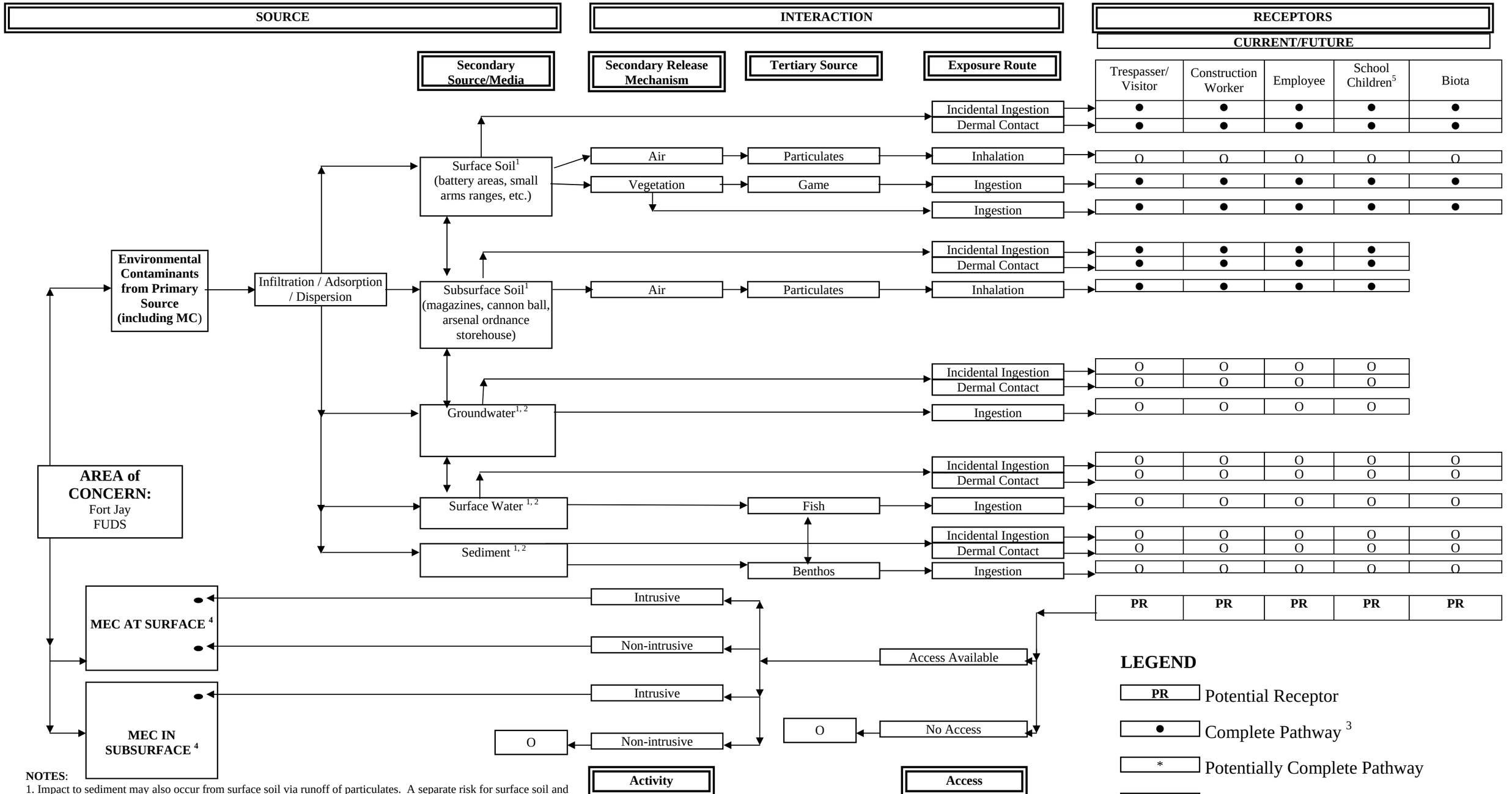


NOTES:
1. Impact to sediment may also occur from surface soil via runoff of particulates. A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water may also occur from infiltration of groundwater.
2. Subsurface Soil: Small arms are not expected to be found in the subsurface. Groundwater: The saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. Surface water/Sediment: There are no permanent, non-tidal, freshwater features at Fort Jay. Air: Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible.3. If a munitions-related chemical is detected above background (other than nitrobenzene), than a given pathway is complete. A complete pathway may or may not pose risk to the specific receptor.
4. Interaction between a potential receptor and MEC has two components: access and activity.
5. School children are a future receptor for this AOC. GIPEC intends to build a school on Fort Jay.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT JAY MMRP FUDS SITE

MRS 4 – Skeet Range

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.* EM1110-1-1200.



NOTES:

1. Impact to sediment may also occur from surface soil via runoff of particulates. A separate risk for surface soil and subsurface soil may be combined to represent risk from total soil from some receptors. Impact to surface water may also occur from infiltration of groundwater.
2. Groundwater: The saturated, permeable portions of these units are not thick enough to provide sufficient quantities of groundwater to pump. Surface water/Sediment: There are no permanent, non-tidal, freshwater features at Fort Jay. Air: Given the non-volatile nature of the constituents detected, the suspension of constituents in air is limited to airborne particulates. Therefore, the fraction of MC susceptible to being suspended in air is negligible.3. If a munitions-related chemical is detected above background (other than nitrobenzene), than a given pathway is complete. A complete pathway may or may not pose risk to the specific receptor.
4. Interaction between a potential receptor and MEC has two components: access and activity
5. School children are a future receptor for this AOC. GIPEC intends to build a school on Fort Jay.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR FORT JAY MMRP FUDS SITE

AOC 1 – Remaining Lands

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.* EM1110-1-1200.

APPENDIX K - MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL RESULTS

- MRS 1
- MRS 2
- MRS 3
- MRS 4

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: Rifle Range #1 - MRS 1

Component: U.S. Army

Installation/Property Name: Fort Jay

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

Site Name (RMIS ID)/Project Name (Project No.): Fort Jay (C02NY061101R01)/(C02NY061101)

Date Information Entered/Updated: July 31 2007/ September 7, 2007/November 2, 2007/ December 27, 2007

Point of Contact (Name/Phone): Helen Kim/917-790-8332

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):

Fort Jay was used for various military activities between 1800 and 1966. Conventional practice munitions used at the FUDS, including small arms, civil war projectiles, heavy artillery projectiles, parrot systems, smoke grenades and riot grenades/tear gas. This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired.

Land Portion - Description of Pathways for Human and Ecological Receptors: Surface Soil.

Description of Receptors (Human and Ecological): Receptors include trespassers/visitors, construction workers, employees, school children, 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 hazard.	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, pyrotechnics, 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**

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

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

This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).

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** (circled)
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.

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
	This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).	

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).	**5**

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

This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired. In 1963, 13 .45-caliber bullets were brought to Fort Jay's historical office. The origin of the bullets is not identified and could have been from MRS 1. See Table 2-2 of the SI Report and Section 4.3.1 of the SI Report (USACE 1997, 2006a, and 2007c).

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*** classification in the space provided.

The 22 acres of the Island is managed by NPS and the remaining acres managed by GIPEC is open to the public for tourism and sightseeing. See Section 2.1, 2.2 and 2.3.4 of the SI Report.

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*** classification in the space provided.

The MRS is jointly owned by NPS and GIPEC (USACE 1997). See Section 2.1 of the SI Report.

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*** classification in the space provided.

U.S. Census Bureau (2000) cited there are 66,940.1 persons per square mile in New York City, New York. See Section 2.3.3 of the SI Report.

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*** classification in the space provided.

There are more than 738,644 households located within 2 miles of Fort Jay (U.S. Census 2000). See Section 2.3 of the SI Report.

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/structure 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.

Fort Jay is located on Governors Island between Brooklyn Borough and Manhattan Borough in New York County, New York City, New York. Local demographics suggest more than 738,644 households in Manhattan (U.S. Census 2000). Currently, the MRS is owned by NPS and GIPEC. Future land use may include mixed land use development (e.g., educational facilities and commercial development). See Section 2.1, 2.3.3, and 2.3.4 of the SI Report.

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** (circled)
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*** classification in the space provided.

There are no ecological resources present on the MRS (USACE 1999). USACE New York District provided on-site archaeological support personnel who accompanied the field team to sampling locations in areas of historic significance. Refer to Sections 2.3.8 and 3.2 of the SI Report.

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	**5**	**20**
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			**41**

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	**F**

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.

CWM training/demonstrations are documented to have occurred at Ft Jay. The Gas Chamber was identified on maps as late as 1953 however later maps (1958 and 1964) showed the building was converted to other uses. Research did not uncover any information indicating these items were not completely used and disposed of on the island (USACE 1997 and 2006a). See Section 4.3.5 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		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

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	**Alternate 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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No Known or Suspected Groundwater MC Hazard			☑

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 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 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.

Evaluation Note: No surface water samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the site'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 human endpoints present in the sediment, select the box at the bottom of the table.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard			☑

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.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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

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.

Evaluation Note: Sample FJY-SA-SS-02-02. No explosives were detected and the detections of metal MC are within the range of background concentrations.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

No Known or Suspected Surface Soil MC 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)	Not Applicable (N/A)	N/A	N/A	N/A	N/A
Surface Water/Human Endpoint (Table 22)	N/A	N/A	N/A	N/A	N/A
Sediment/Human Endpoint (Table 23)	N/A	N/A	N/A	N/A	N/A
Surface Water/Ecological Endpoint (Table 24)	N/A	N/A	N/A	N/A	N/A
Sediment/Ecological Endpoint (Table 25)	N/A	N/A	N/A	N/A	N/A
Surface Soil (Table 26)	N/A	N/A	N/A	N/A	N/A

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 media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

Evaluation Note: N/A=not applicable

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				**7**	

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: Rifle Range #2 - MRS 2

Component: U.S. Army

Installation/Property Name: Fort Jay

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

Site Name (RMIS ID)/Project Name (Project No.): Fort Jay (C02NY061101R02)/(C02NY061101)

Date Information Entered/Updated: July 31 2007/ September 7, 2007/November 2, 2007/ December 27, 2007

Point of Contact (Name/Phone): Helen Kim/917-790-8332

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):

Fort Jay was used for various military activities between 1800 and 1966. Conventional practice munitions used at the FUDS, including small arms, civil war projectiles, heavy artillery projectiles, parrot systems, smoke grenades and riot grenades/tear gas. This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired.

Land Portion - Description of Pathways for Human and Ecological Receptors: Surface Soil.

Description of Receptors (Human and Ecological): Receptors include trespassers/visitors, construction workers, employees, school children, 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 hazard.	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, pyrotechnics, 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**

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

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

This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).

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** (circled)
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.

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
	This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).	

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).	**5**

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

This MRS was a rifle range where 0.22 and 0.45 caliber weapons were fired. In 1963, 13 .45-caliber bullets were brought to Fort Jay's historical office. The origin of the bullets is not identified and could have been from MRS 2. See Table 2-2 of the SI Report and Section 4.3.2 of the SI Report (USACE 1997, 2006a, and 2007c).

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*** classification in the space provided.

The 22 acres of the Island is managed by NPS and the remaining150 acres managed by GIPEC is open to the public for tourism and sightseeing. See Section 2.1, 2.2 and 2.3.4 of the SI Report.

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*** classification in the space provided.

The MRS is jointly owned by NPS and GIPEC (USACE 1997). See Section 2.1 of the SI Report.

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*** classification in the space provided.

U.S. Census Bureau (2000) cited there are 66,940.1 persons per square mile in New York City, New York. See Section 2.3.3 of the SI Report.

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*** classification in the space provided.

There are more than 738,644 households located within 2 miles of Fort Jay (U.S. Census 2000). See Section 2.3 of the SI Report.

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/structure 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.

Fort Jay is located on Governors Island between Brooklyn Borough and Manhattan Borough in New York County, New York City, New York. Local demographics suggest more than 738,644 households in Manhattan (U.S. Census 2000). Currently, the MRS is owned by NPS and GIPEC. Future land use may include mixed land use development (e.g., educational facilities and commercial development). See Section 2.1, 2.3.3, and 2.3.4 of the SI Report.

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*** classification in the space provided.

There are no ecological resources present on the MRS (USACE 1999). USACE New York District provided on-site archaeological support personnel who accompanied the field team to sampling locations in areas of historic significance. Refer to Sections 2.3.8 and 3.2 of the SI Report.

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	**5**	**20**
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			**41**

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	**F**

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.

CWM training/demonstrations are documented to have occurred at Ft Jay. The Gas Chamber was identified on maps as late as 1953 however later maps (1958 and 1964) showed the building was converted to other uses. Research did not uncover any information indicating these items were not completely used and disposed of on the island (USACE 1997 and 2006a). See Section 4.3.5 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		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

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	**Alternate 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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
		No Known or Suspected Groundwater MC Hazard	☑

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 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 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.

Evaluation Note: No surface water samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).		**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the site'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 human endpoints present in the sediment, select the box at the bottom of the table.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard			☑

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.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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

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.

Evaluation Note: Sample FJY-SA-SS-02-03. No explosives were detected and the detections of metal MC are within the range of background concentrations.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

No Known or Suspected Surface Soil MC 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)	Not Applicable (N/A)	N/A	N/A	N/A	N/A
Surface Water/Human Endpoint (Table 22)	N/A	N/A	N/A	N/A	N/A
Sediment/Human Endpoint (Table 23)	N/A	N/A	N/A	N/A	N/A
Surface Water/Ecological Endpoint (Table 24)	N/A	N/A	N/A	N/A	N/A
Sediment/Ecological Endpoint (Table 25)	N/A	N/A	N/A	N/A	N/A
Surface Soil (Table 26)	N/A	N/A	N/A	N/A	N/A

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 media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

Evaluation Note: N/A=not applicable

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				**7**	

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: Machine Gun Range - MRS 3

Component: U.S. Army

Installation/Property Name: Fort Jay

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

Site Name (RMIS ID)/Project Name (Project No.): Fort Jay (C02NY061101R03)/(C02NY061101)

Date Information Entered/Updated: July 31 2007/ September 7, 2007/November 2, 2007/ December 27, 2007

Point of Contact (Name/Phone): Helen Kim/917-790-8332

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):

Fort Jay was used for various military activities between 1800 and 1966. Conventional practice munitions used at the FUDS, including small arms, civil war projectiles, heavy artillery projectiles, parrot systems, smoke grenades and riot grenades/tear gas. This MRS was a machine gun range where .30 caliber weapons were fired.

Land Portion - Description of Pathways for Human and Ecological Receptors: Surface Soil.

Description of Receptors (Human and Ecological): Receptors include trespassers/visitors, construction workers, employees, school children, 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 hazard.	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, pyrotechnics, 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**

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

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

This MRS was a machine gun range where .30 caliber weapons were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).

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.

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
This MRS was a machine gun range where .30 caliber weapons were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).		

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).	**5**

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

This MRS was a machine gun range where .30 caliber weapons were fired. Eighty rounds of .30-caliber ammunition while digging near what was then the headquarters of a Colonel Testas. According to the ASR, the building where the munitions were discovered was not noted (USACE 1997 and 2006a). See Table 2-2 of the SI Report and Section 4.3.3 of the SI Report (USACE 1997, 2006a, and 2007c).

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*** classification in the space provided.

The 22 acres of the Island is managed by NPS and the remaining150 acres managed by GIPEC is open to the public for tourism and sightseeing. See Section 2.1, 2.2 and 2.3.4 of the SI Report.

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*** classification in the space provided.

The MRS is jointly owned by NPS and GIPEC (USACE 1997). See Section 2.1 of the SI Report.

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*** classification in the space provided.

U.S. Census Bureau (2000) cited there are 66,940.1 persons per square mile in New York City, New York. See Section 2.3.3 of the SI Report.

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*** classification in the space provided.

There are more than 738,644 households located within 2 miles of Fort Jay (U.S. Census 2000). See Section 2.3 of the SI Report.

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/structure 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.

Fort Jay is located on Governors Island between Brooklyn Borough and Manhattan Borough in New York County, New York City, New York. Local demographics suggest more than 738,644 households in Manhattan (U.S. Census 2000). Currently, the MRS is owned by NPS and GIPEC. Future land use may include mixed land use development (e.g., educational facilities and commercial development). See Section 2.1, 2.3.3, and 2.3.4 of the SI Report.

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*** classification in the space provided.

There are no ecological resources present on the MRS (USACE 1999). USACE New York District provided on-site archaeological support personnel who accompanied the field team to sampling locations in areas of historic significance. Refer to Sections 2.3.8 and 3.2 of the SI Report.

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	**5**	**20**
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			**41**

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	**F**

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.

CWM training/demonstrations are documented to have occurred at Ft Jay. The Gas Chamber was identified on maps as late as 1953 however later maps (1958 and 1964) showed the building was converted to other uses. Research did not uncover any information indicating these items were not completely used and disposed of on the island (USACE 1997 and 2006a). See Section 4.3.5 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		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

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	**Alternate 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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No Known or Suspected Groundwater MC Hazard			☑

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 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 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.

Evaluation Note: No surface water samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).		**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the site'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 human endpoints present in the sediment, select the box at the bottom of the table.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard			☑

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.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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

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.

Evaluation Note: Samples FJY-MG-SS-02-04 and FD#2 (FJY-MG-SS-02-04). No explosives were detected and the detections of metal MC are within the range of background concentrations.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

No Known or Suspected Surface Soil MC 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)	Not Applicable (N/A)	N/A	N/A	N/A	N/A
Surface Water/Human Endpoint (Table 22)	N/A	N/A	N/A	N/A	N/A
Sediment/Human Endpoint (Table 23)	N/A	N/A	N/A	N/A	N/A
Surface Water/Ecological Endpoint (Table 24)	N/A	N/A	N/A	N/A	N/A
Sediment/Ecological Endpoint (Table 25)	N/A	N/A	N/A	N/A	N/A
Surface Soil (Table 26)	N/A	N/A	N/A	N/A	N/A

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 media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

Evaluation Note: N/A=not applicable

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				**7**	

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: Skeet Range - MRS 4

Component: U.S. Army

Installation/Property Name: Fort Jay

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

Site Name (RMIS ID)/Project Name (Project No.): Fort Jay (C02NY061101R04)/(C02NY061101)

Date Information Entered/Updated: July 31 2007/ September 7, 2007/November 2, 2007/ December 27, 2007

Point of Contact (Name/Phone): Julie Kaiser/ 410-962-4006

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):

Fort Jay was used for various military activities between 1800 and 1966. Conventional practice munitions used at the FUDS, including small arms, civil war projectiles, heavy artillery projectiles, parrot systems, smoke grenades and riot grenades/tear gas. This MRS was a skeet range where shotgun shells were fired.

Land Portion - Description of Pathways for Human and Ecological Receptors: Surface Soil.

Description of Receptors (Human and Ecological): Receptors include trespassers/visitors, construction workers, employees, school children, 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 hazard.	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, pyrotechnics, 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**

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

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

This MRS was a skeet range where shotgun shells were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).

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** (circled)
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.

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
	This MRS was a skeet range where shotgun shells were fired. See Table 2-2 of the SI Report (USACE 1997, 2006a, and 2007c).	

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).	**5**

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

This MRS was a skeet range where shotgun shells were fired. See Table 2-2 of the SI Report and Section 4.3.4 of the SI Report (USACE 1997, 2006a, and 2007c).

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*** classification in the space provided.

The 22 acres of the Island is managed by NPS and the remaining150 acres managed by GIPEC is open to the public for tourism and sightseeing. See Section 2.1, 2.2 and 2.3.4 of the SI Report.

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*** classification in the space provided.

The MRS is jointly owned by NPS and GIPEC (USACE 1997). See Section 2.1 of the SI Report.

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*** classification in the space provided.

U.S. Census Bureau (2000) cited there are 66,940.1 persons per square mile in New York City, New York. See Section 2.3.3 of the SI Report.

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*** classification in the space provided.

There are more than 738,644 households located within 2 miles of Fort Jay (U.S. Census 2000). See Section 2.3 of the SI Report.

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/structure 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.

Fort Jay is located on Governors Island between Brooklyn Borough and Manhattan Borough in New York County, New York City, New York. Local demographics suggest more than 738,644 households in Manhattan (U.S. Census 2000). Currently, the MRS is owned by NPS and GIPEC. Future land use may include mixed land use development (e.g., educational facilities and commercial development). See Section 2.1, 2.3.3, and 2.3.4 of the SI Report.

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** (circled)
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*** classification in the space provided.

There are no ecological resources present on the MRS (USACE 1999). USACE New York District provided on-site archaeological support personnel who accompanied the field team to sampling locations in areas of historic significance. Refer to Sections 2.3.8 and 3.2 of the SI Report.

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	**5**	**20**
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			**41**

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	**F**

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.

CWM training/demonstrations are documented to have occurred at Ft Jay. The Gas Chamber was identified on maps as late as 1953 however later maps (1958 and 1964) showed the building was converted to other uses. Research did not uncover any information indicating these items were not completely used and disposed of on the island (USACE 1997 and 2006a). See Section 4.3.5 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		
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			

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	**Alternate 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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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.

Evaluation Note: No groundwater samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No Known or Suspected Groundwater MC Hazard			☑

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 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 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.

Evaluation Note: No surface water samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

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

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

DIRECTIONS: Record the **maximum concentrations** of all contaminants in the site'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 human endpoints present in the sediment, select the box at the bottom of the table.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
CHF Scale	**CHF Value**	**Sum The Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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).	**Not Applicable (N/A)**

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

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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.

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

Evaluation Note: No surface water samples collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No Known or Suspected Surface Water (Ecological Endpoint) MC Hazard			☑

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.

Evaluation Note: No sediment samples were collected in accordance with stakeholder agreements as documented in the TPP Memo and Final SS-WP.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**N/A**

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).	**N/A**

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

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.

Evaluation Note: Sample FJY-SR-SS-02-03. No explosives were detected and the detections of metal MC are within the range of background concentrations.

Contaminant	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratio
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**	$CHF = \sum \frac{\text{[Maximum Concentration of Contaminant]}}{\text{[Comparison Value for Contaminant]}}$	
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).	**Not Applicable (N/A)**

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).	**(N/A)**

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).	**(N/A)**

No Known or Suspected Surface Soil MC 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)	Not Applicable (N/A)	N/A	N/A	N/A	N/A
Surface Water/Human Endpoint (Table 22)	N/A	N/A	N/A	N/A	N/A
Sediment/Human Endpoint (Table 23)	N/A	N/A	N/A	N/A	N/A
Surface Water/Ecological Endpoint (Table 24)	N/A	N/A	N/A	N/A	N/A
Sediment/Ecological Endpoint (Table 25)	N/A	N/A	N/A	N/A	N/A
Surface Soil (Table 26)	N/A	N/A	N/A	N/A	N/A

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 media, contamination at an MRS was previously addressed, or there is no reason to suspect contamination was ever present at an MRS.

Evaluation Note: N/A=not applicable

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				**7**	

APPENDIX L - REFERENCE COPIES

Located on CD.

RESPONSE TO COMMENTS

PROJECT: FORT JAY/GOVERNORS ISLAND FUDS MMRP SITE INSPECTION (SI) C02NY061101			
COMMENTS			
		REVIEW: DRAFT FINAL SI REPORT DATE: 8 January 2008 NAME: Dena Saslaw, National Park Service	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	As per our conversations, and this email, NPS is okay with the final report as presented and has no additional comments.	A-ACCEPTED/CONCUR. Comment acknowledged. No response required.

PROJECT: FORT JAY/GOVERNORS ISLAND FUDS MMRP SITE INSPECTION (SI) C02NY061101			
COMMENTS			
		REVIEW: DRAFT FINAL SI REPORT DATE: 8 January 2008 NAME: Claire Kelly, GIPEC	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	This e-mail is to indicate that the Governors Island Preservation and Education Corporation has reviewed the SI Report and participated in the review conference call on 1/3/08 for the Fort Jay site and has no comment for the record at this time.	A-ACCEPTED/CONCUR. Comment acknowledged. No response required.

PROJECT: FORT JAY/GOVERNORS ISLAND FUDS MMRP SITE INSPECTION (SI) C02NY061101			
COMMENTS			
		REVIEW: DRAFT FINAL SI REPORT DATE: 3 January 2008 NAME: Chek Beng Ng, P.E., New York State Department of Environmental Conservation Division of Environmental Remediation	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	Thank you for the opportunity to review the Fort Jay draft final Site Inspection Report dated November 2007. Fort Jay is located in Governors Island, NY, close to New York City. Governors Island comprises of 172 acres and several batteries, ranges, and ordinance warehouses existed on the island. Currently, the National Park Service manages 22 acres of the island while the remaining 150 acres is jointly owned by the State and City of New York. In summary, the investigation found various metals (antimony, lead, zinc, copper) which exceeded ecological screening criteria in the surface soil samples. However, these exceedances are below the concentrations observed in the background samples. As such, all areas surveyed in this report did not pose any potential risks to human or ecological receptors. The Department does not have any comments on the draft final Site Inspection Report. If you have any questions, please do not hesitate to contact me.	A-ACCEPTED/CONCUR. Comment acknowledged. No response required.