FINAL

Site Inspection Report for Suffolk AAF Bombing and Gunnery Range, Suffolk County, NY

DERP FUDS Project No. **C02NY071301**

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

Prepared for:
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.50 caliber projectiles and copper jackets found at the strafing target, Ground Gunnery/Skip Bombing Sub-range "A", Suffolk AAFB&G Range, NY

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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.

December 2009

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SCIENCE AND TECHNOLOGY

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December 2009

CONTRACTOR STATEMENT OF AUTHORSHIP AND INDEPENDENT TECHNICAL REVIEW

Alion Science and Technology Corporation prepared this Site Inspection Report for Suffolk AAF Bombing and Gunnery Range, Suffolk County, NY, Formerly Used Defense Site (FUDS), Project No. C02NY071301. An independent technical review was 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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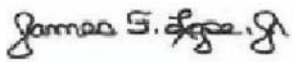
Jim Lape Risk Assessor Integral Consulting, Inc. (Under contract to Alion Science and Technology Corporation)	12/18/09	
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Significant concerns and explanation of the resolutions are documented within the project file.

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LIST OF ACRONYMS AND ABBREVIATIONS

AA	Anti-aircraft
AAF	Army Air Field
ADR	Automated Data Review
Alion	Alion Science and Technology Corporation
AN	Army Navy
ASR	Archive Search Report
BG	Background
bgs	Below ground surface
CAS	Chemical Abstract Service
CDQAR	Chemical Data Quality Assessment Report
CENAB	Corps of Engineers North Atlantic Baltimore
CENAN	Corps of Engineers North Atlantic Division New England
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHE	Chemical Warfare Materiel Hazard Evaluation
CONUS	Continental United States
COPC	Chemical of Potential Concern
COPEC	Chemical of Potential Ecological Concern
CSM	Conceptual Site Model
CTT	Closed Transferring and Transferred
CWM	Chemical Warfare Materiel
CX	Center of Expertise
DA	Department of the Army
DERP	Defense Environmental Restoration Program
DMM	Discarded Military Munitions
DNB	Dinitrobenzene
DNT	Dinitrotoluene
DoD	Department of Defense
DoI	Department of Interior
DQI	Data Quality Indicator
DQO	Data Quality Objective
Eco-SSL	Ecological Soil Screening Level
EDMS	Environmental Data Management Systems
EDS	Environmental Data Services, Inc.
EHE	Explosive Hazard Evaluation
EM	Engineering Manual
EOD	Explosive Ordnance Disposal
EP	Engineering Pamphlet
ER	Engineer Regulation

LIST OF ACRONYMS AND ABBREVIATIONS

˚F	Degree (s) Fahrenheit
FD	Field Duplicate
FDE	Findings and Determination of Eligibility
ft	Foot or Feet
FUDS	Formerly Used Defense Site(s)
FUDSMIS	FUDS Management Information System
GIS	Geographic Information Systems
GP	General Purpose
GPL	GPL Laboratories, LLLP
GPS	Global Positioning System
GSA	General Services Administration
GW	Groundwater
HE	High-explosive
HHE	Health Hazard Evaluation
HHRA	Human Health Risk Assessment
HRS	Hazard Ranking System
HTRW	Hazardous Toxic and Radioactive Waste
HQ	Hazard Quotient
ID	Identification
In.	Inch (es)
INPR	Inventory Project Report
IRIS	EPA's Integrated Risk Information System
ITRC	Interstate Technology and Regulatory Council
J	Analyte is present. Reported value may not be accurate or precise
lb(s)	pound(s)
LLLP	Limited Liability Limited Partnership
m	meter
M	Model
MC	Munitions Constituents
MCL	Maximum Contaminant Level
MD	Munitions Debris
MDL	Method Detection Limit
MEC	Munitions and Explosives of Concern
MFR	Memorandum for Record
mg/kg	Milligram per kilogram
mi	mile(s)
Mk	Mark

LIST OF ACRONYMS AND ABBREVIATIONS

mm	millimeter(s)
MMRP	Military Munitions Response Program
MPPEH	Material Potentially Presenting an Explosive Hazard
MQO	Measurement Quality Objective
MRA	Munitions Response Area
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
MS/MSD	Matrix Spike/Matrix Spike Duplicate
msl	Mean Sea Level
NAD	North American Datum
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
ND	No Detected Results
NDAI	No Department of Defense Action Indicated
NG	Nitroglycerin
NPL	National Priorities List
NSL	No Screening Level
NTCRA	Non-Time Critical Removal Action
NYDOS	New York Department of State Division of Coastal Resources
NYSDEC	New York Department of Environmental Conservation
NYSOPRHP	New York State Office of Parks, Recreation, and Historic Preservation
OEW	Ordnance and Explosive Waste
ORNL	Oak Ridge National Laboratory
PAOI	Potential Area of Interest
PFSP	Programmatic Field Sampling Plan
PGM	Program Manager
PM	Project Manager
PMMQL	Preferred Maximum Method Quantitation Limits
PWP	Programmatic Work Plan
PWS	Performance Work Statement
QA	Quality Assurances
QC	Quality Control
QR	Qualitative Reconnaissance
RAC	Risk Assessment Code
RBC	Risk-Based Concentration
RC	Range Complex
RCWM	Recovered Chemical Waste Materiel
RDX	Hexahydro-1,3,5-trinitro-1,3,5-triazine
RfD	Reference Dose
RI/FS	Remedial Investigation /Feasibility Study

LIST OF ACRONYMS AND ABBREVIATIONS

RL	Reporting Limit
RMIS	Range Management Information System
SB	Subsurface soil
SCA	Suffolk County Airfield
SCDHS	Suffolk County Department of Health Services
SHPO	State Historic Preservation Office
SI	Site Inspection
SL	Screening Level
SLERA	Screening Level Ecological Risk Assessment
SS	Surface Soil
SSL	Soil Screening Level
SS-WP	Final Site-Specific Work Plan Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Suffolk County AAF Bombing and Gunnery Range
T&E	Threatened and Endangered
TCRA	Time Critical Removal Action
Tetryl	Methyl-2,4,6-trinitrophenylnitramine
TNB	Trinitrobenzene
TNT	Trinitrotoluene
TPP	Technical Project Planning
U	Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs)
µg/L	Microgram per liter
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UT	Unorganized Territory
UTM	Universal Transverse Mercator
UXO	Unexploded Ordnance
WOE	Weight of Evidence
WP	White Phosphorous

GLOSSARY OF TERMS

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

Discarded Military Munitions (DMM) – Military munitions that 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 USC 2710(e)(2)) (Department of the Army [DA] 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 (DA 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 (DA 2005).

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

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 (DA 2005).

GLOSSARY OF TERMS

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

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

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

Munitions Debris (MD) – Remnants of munitions (e.g., fragments, penetrators, projectiles, shell casings, links, fins) remaining after munitions use, demilitarization, or disposal (DA 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 Code of Federal Regulations [CFR] 179.3).

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

GLOSSARY OF TERMS

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

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

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)) (DA 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)) (DA 2005).

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

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

Time Critical Removal Action (TCRA) – Removal actions conducted to respond to an imminent danger posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within 6 months to reduce risk to public health or the environment (DA 2005).

Unexploded Ordnance (UXO) – Military munitions that (A) have been primed, fuzed, 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)) (DA 2005).

EXECUTIVE SUMMARY

ES.1 Under contract with the United States Army Corps of Engineers (USACE), Alion Science and Technology Corporation (Alion) prepared this Site Inspection (SI) Report to document SI activities and findings for the Suffolk County Army Air Field (AAF) Bombing and Gunnery Range Formerly Used Defense Site (FUDS), Property No. C02NY071301, located in Suffolk County, West Hampton, New York. 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 FUDS. This SI is completed under MMRP Project No. C02NY071301 and addresses potential MMRP hazards remaining at the Suffolk County AAF Bombing and Gunnery Range FUDS.

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

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

ES.4 **Suffolk County AAF Bombing and Gunnery Range**. The former Suffolk County AAF Bombing and Gunnery Range is approximately two miles north of Westhampton Beach, New York and occupies approximately 9,224 acres. The site is situated in a relatively flat area and is south of, and partially within, the Central Pine Barrens in Suffolk County. The Atlantic Ocean lies approximately three miles to the south of the former Suffolk County AAF. The Suffolk County AAF Bombing and Gunnery Range FUDS was activated in 1943 for bombing, strafing, and rocket fire training exercises. Military use of the Suffolk County AAF site ceased in 1946. Currently, New York State and Suffolk County own the majority of the property. The northern

portion of the FUDS is located within the Long Island Central Pine Barrens Groundwater Conservation area and is under the stewardship of the Central Pine Barrens Joint Planning and Policy Commission. With the exception of a two target silhouettes constructed of painted boulders, a destroyer, and an aircraft carrier, no military structures remain at the former Suffolk County AAF Bombing and Gunnery Range.

ES.5 **Technical Project Planning.** The SI approach was developed in concert with stakeholders through USACE's technical project planning (TPP) framework, which was applied at the initial TPP meeting on 10 July 2008. Stakeholders agreed to the SI approach as presented and modified during the TPP meeting and finalized in the Site-Specific Work Plan (SS-WP). In summary, these agreements were to inspect the MRS and complete soil sampling in accordance with the Data Quality Objectives (DQOs) and Final SS-WP.

ES.6 USACE programmatic range documents identified one MRS area at the Suffolk County AAF Bombing and Gunnery Range FUDS: MRS 1, Range Complex (Range Management Information System [RMIS] Range ID No. C02NY071301R01), which includes Ground Gunnery/Skip Bombing "A" (C02NY071301R01-SR01), Ground Gunnery/Rocket Range "B" (C02NY071301R01-SR02), Bombing Range (C02NY071301R01-SR03), and Strafing Range (C02NY071301R01-SR04).

ES.7 **Qualitative Site Reconnaissance and Munitions and Explosives of Concern Assessment**. SI field activities were performed on April 27, 28, and 29, 2008. A qualitative site reconnaissance, including analog geophysics and visual observations, of the FUDS was performed over approximately 5.8 acres of land. The field sampling approach included magnetometer-assisted reconnaissance following a meandering path in and around sampling locations to identify the presence/absence of MEC/munitions debris (MD) or other areas of interest (i.e. areas containing indications of munitions use) at the FUDS. During the SI site visit and sampling activities, no MEC was discovered. MD (small arms, practice bombs, practice rockets) was observed within MRS 1. Several subsurface anomalies were recorded throughout the FUDS; however, consistent within the scope of this SI, the nature of the anomalies could not be determined. Additionally, cultural debris (refuse/trash) was observed on the surface of the ground between within the FUDS.

ES.8 A qualitative MEC screening level risk assessment was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the Inventory Project Report (INPR), Archives Search Report (ASR), and the ASR Supplement. The ASR states that prior to transferring the property, the Commanding Officer at the Suffolk County Air Force Base

requested that the ranges be inspected and decontaminated. A Bomb and Shell Disposal Team report of decontamination, dated 11 June 1946, indicated the following items were discovered and removed during the course of clearing the Suffolk County AAF ranges: two un-fuzed 6-lb M69 oil incendiary bombs, eleven 4-lb M54 incendiary bombs, five 4-lb M50Al incendiary bombs, several sand-filled practice rockets and 100-lb practice bomb remnants, as well as three unexpended M1 black powder spotting charges.

The ASR includes a Suffolk County Police Department Emergency Service Section Incident Report, dated 1 July 1996, documenting the recovery and destruction of a suspected 4.5-inch M8 high explosive (HE) rocket on the former Suffolk County AAF Bombing and Gunnery Range land. However, an Air Force Explosive Ordnance Disposal (EOD) response to the same incident identified this item to be a M9 4.5-inch practice rocket.

During the 1997 ASR site visit, the inspection team discovered an AN-M20 or AN-M18 100-lb bomb burster tube with an intact point-detonating fuze. This item was reported to the local police bomb disposal team which properly disposed of the item. Additionally, the team found M38A2 100-lb practice bomb and M1 spotting charge debris, as well as several .50 caliber shell casings. Since these discoveries, no additional finds have been reported. MD observed during the Alion 2009 SI fieldwork included .50 caliber shell casings and bullets, one M38A2 100-lb practice bomb, and several 2.25-inch practice rocket bodies and nose cones. The potential hazard posed by MEC, assessed through three risk factors (i.e., presence of MEC source, accessibility or pathway presence, and potential receptor contact), is moderate for MRS 1 due to munitions findings (multiple since closure, some suspected HE items), location (generally remote, Long Island Central Pine Barrens Conservation area), and current use (limited recreational use).

ES.9 **Munitions Constituents Sampling and Risk Screening**. Surface soil samples were collected at 20 locations, subsurface soil samples at eight locations, and two groundwater samples were collected within MRS 1. In addition, five surface soil samples and two groundwater samples were collected outside of the MRS to support background comparison of metals analyses.

ES.10 A list of MC potentially associated with munitions used at MRS 1 was developed and used to support analysis of results and the risk screening. The list of site-specific MC analyzed at MRS 1 includes explosives (Dinitrotoluene [DNT] and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, Nitroglycerin (NG), Trinitrotoluene (TNT) and TNT breakdown products {2-amino-4,6-DNT, 4-amino-2,6-DNT, nitrobenzene, 2,6-DNT, and 1,3,5-Trinitrobenzene [TNB]},

Tetryl (N-Metryl-N,2,4,6-tetranitroaniline), RDX (Hexahydro-1,3,5-trinitro-1,3,5-triazine) and metals (aluminum, antimony, barium, copper, iron, lead, and nickel).

No explosive analytes were detected in surface soil therefore explosives were not identified as Chemicals of Potential Concern (COPC) in surface soil. All seven metals were detected in surface soil samples from MRS 1. Antimony, copper, iron and lead exceeded maximum background levels (i.e., complete pathway in surface soil). Concentrations of antimony and iron in surface soil exceeded background and human health screening values and were identified as COPCs; however, based on a weight-of-evidence (WOE) approach (e.g., minimal number of samples exceeded screening criteria, iron is not a hazardous substance under CERCLA), these analytes were determined not to pose unacceptable risks to human receptors. Concentrations of antimony, copper and lead in surface soil exceeded the respective ecological screening values and the background sample concentrations; therefore, antimony, copper, and lead were identified as Chemicals of Potential Ecological Concern (COPEC) and were identified as presenting potential risks to ecological receptors.

In subsurface soil, explosive analytes were not detected and were therefore not identified as COPCs. Metals in subsurface soil did not exceed human screening levels, therefore no COPCs were identified; however, copper and lead in subsurface soil exceeded maximum background concentrations (i.e., complete pathway in subsurface soil).

In groundwater, no explosives were detected; however, aluminum, iron, and lead exceeded human health screening criteria and were identified as COPCs. A WOE evaluation for iron and lead indicates that exposures to these analytes are not likely to produce unacceptable risks. Aluminum did not exceed background groundwater levels; therefore, aluminum concentrations in groundwater are not attributable to activities related to past military use of the FUDS. Barium, copper, iron, lead and nickel were above maximum background levels; therefore, the groundwater pathway is complete.

ES.11 **Recommendations.** MRS 1 was assessed during this SI of the Suffolk County AAF Bombing and Gunnery Range FUDS. An RI/FS designation is recommended at MRS 1. Future studies should address both MEC and MC (surface soil only). The MEC hazard is moderate based on the use of practice munitions (non-sensitive fuzes, black powder spotting charges) and possible HE use even though there is limited site accessibility. Antimony and lead were designated as COPCs in surface soil and aluminum, iron, and lead were identified as COPCs in groundwater. Based on a WOE evaluation, none of these analytes were identified to pose unacceptable risks to human receptors. Antimony, copper, and lead in surface soil exceeded their

respective ecological screening levels and may pose potential risks to biota. Neither a TCRA nor a non-TCRA is recommended at this FUDS for MRS 1 (Table ES-1).

Table ES-1 Summary of Site Recommendations for Suffolk County AAF Bombing and Gunnery Range (FUDS Project No. C02NY071301)

MRS	Recommendation	Basis for Recommendation	
		MEC	MC
MRS 1 - Range Complex	RI/FS TCRA/NTCRA not recommended	MEC Assessment: Moderate hazard Approximately 20 munitions items were found during a site clearance conducted in 1946 by the military. Additional munitions discoveries were made in 1996 by the Suffolk County Police Department and in 1997 during the ASR site visit. MD (small arms casings and bullets, practice rockets, practice bombs) was found during the 2009 Alion site inspection.	*Risk Screening Assessment:* Exposure to three metals MC in surface soil may pose a potential risk to ecological receptors. No unacceptable risks were identified for COPCs in surface/subsurface soil or groundwater. *Surface Soil:* No explosives were detected; therefore, no COPCs or COPECs were identified for explosive analytes. Detections of antimony and iron in surface soil exceed human health screening levels; therefore, antimony and lead were identified as COPCs, but were determined to not pose a potential risk to human health. Antimony, copper and lead exceed ecological screening criteria and were identified as COPECs. Based on a WOE evaluation, antimony, copper, and lead are anticipated to pose a potential risk to biota. *Subsurface Soil*: No explosives or metals exceeded human health criteria; therefore, no COPCs were identified. *Groundwater*: Aluminum, iron, and lead in groundwater exceed human health screening levels and were identified as COPCs. Aluminum did not exceed background. No analytes were found to pose unacceptable risks to human health based on a WOE evaluation.

COPC – Chemical of Potential Concern
COPEC – Chemical of Ecological Potential Concern
FUDS – Formerly Used Defense Site
MC – Munitions Constituents
MD – Munitions Debris
MEC – Munitions and Explosives of Concern
MRS – Munitions Response Site
NTCRA – Non-Time Critical Removal Action
RI/FS – Remedial Investigation/Feasibility Study
TCRA – Time Critical Removal Action
WOE – Weight-of-evidence

1. INTRODUCTION

1.0.1 This report documents the findings of the Military Munitions Response Program (MMRP) Site Inspection (SI) performed at the Suffolk County Army Air Field (AAF) Bombing and Gunnery Range Formerly Used Defense Site (FUDS) located in Suffolk County, New York with the MMRP Project No. C02NY071301. Alion Science and Technology Corporation (Alion), along with its subcontractors (Environmental Data Services, Inc. [EDS]; Integral Consulting Inc.; and GPL Laboratories, LLLP [GPL]); prepared this report under contract to the United States Army Engineering and Support Center, Huntsville (USAESCH). 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 Division Baltimore (CENAB). CENAB is working with Corps of Engineers North Atlantic Division New York (CENAN) and its contractor, Alion, on the completion of this project in accordance with the SI Performance Work Statement (Appendix A).

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

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 200-3-1 (USACE 2004b) and the *Management Guidance for the Defense Environmental Restoration Program (DERP)* (DoD 2001), USACE is conducting FUDS response activities in accordance with the DERP statute (10 USC 2701 et seq.), the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) (42 USC Section 9620), Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations

Part 300). As such, USACE is conducting SIs, as set forth in the NCP, to evaluate hazardous substance releases or threatened releases from eligible FUDS.

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

1.2 Project Scope and Objectives

1.2.1 The primary objective of the MMRP SI is to determine whether or not the FUDS project warrants further response action under CERCLA. The SI collects the minimum amount of information necessary to make this determination. The SI also (i) determines the potential need for a removal action; (ii) collects or develops additional data, as appropriate, for potential Hazard Ranking System (HRS) scoring by the U.S. Environmental Protection Agency (USEPA); 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 site (MRS) using the Munitions Response Site Prioritization Protocol (MRSPP).

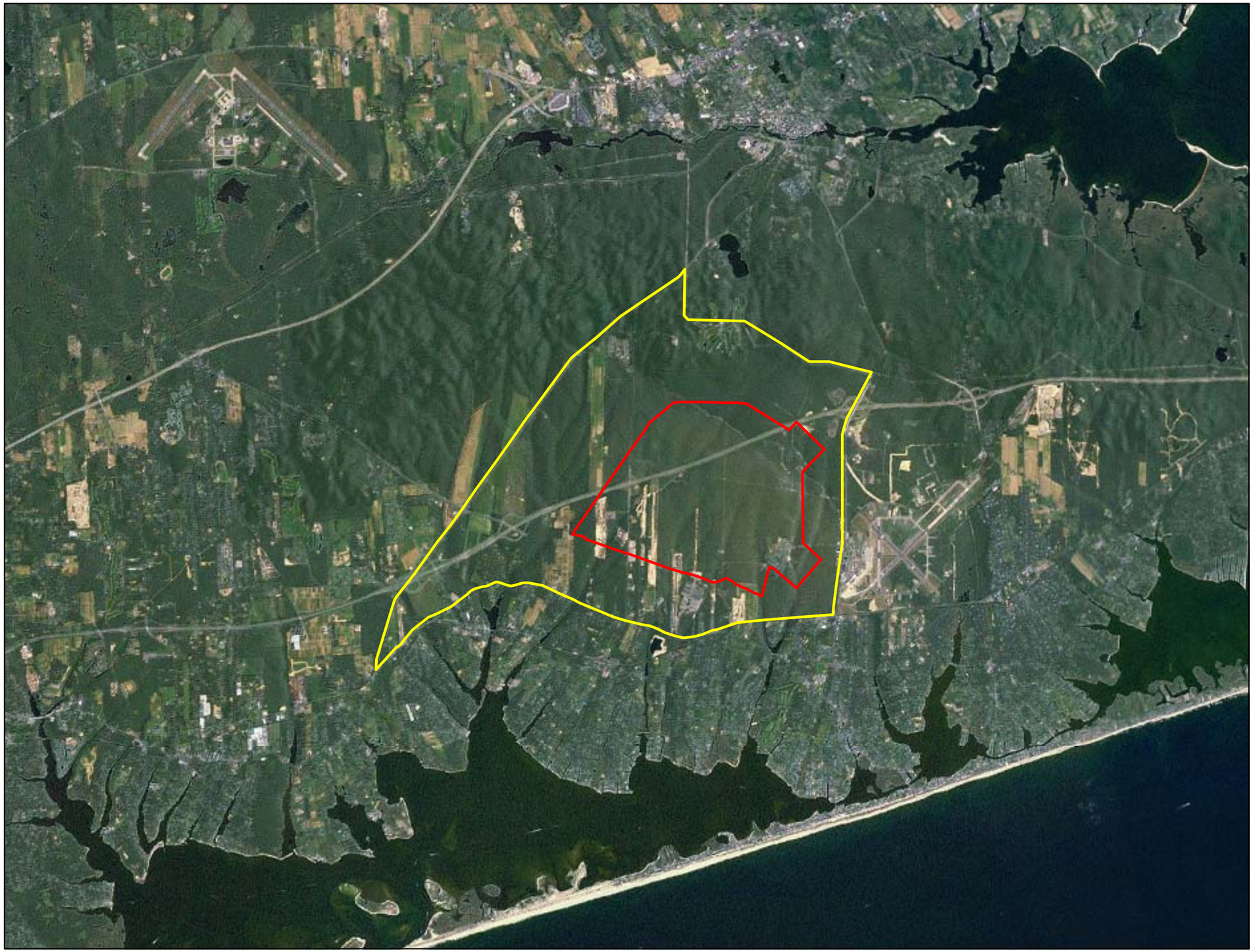
1.2.2 The scope of the SI is restricted to the evaluation of the presence of MEC or MC related to historical use of this FUDS prior to property transfer. The evaluation is performed through records review, qualitative site reconnaissance to assess MEC presence/absence, and sampling where MC might be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

1.3 Project Location

1.3.1 The Suffolk County AAF Bombing and Gunnery Range FUDS is located in Westhampton, Suffolk County, New York (Figure 1-1). The North American Datum (NAD) 1983 Universal Transverse Mercator (UTM), UTM zone 18N, easting (X) and northing (Y) coordinates for the approximate center of the FUDS area are 695810.00 meters (m) and 4524807.00 m, respectively. This FUDS falls under the geographical jurisdiction of USACE New York District and is being completed under DERP-FUDS Project No. C02NY071301 to address potential MMRP hazards remaining at the FUDS (USACE 2004a).

1.4 Munitions Response Site Prioritization Protocol

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



Suffolk County AAF Bombing and Gunnery Range

Westhampton, New York
Suffolk County

Legend

- MRS 1 – Range Complex
- FUDS Boundary

Imagery Source: ESRI ArcGIS Online
ICubed Imagery Prime World 2D

N
W E
S

Feet
0 3,800 7,600 15,200

Figure 1-1. General Site Location and MRS Area.

2. SITE DESCRIPTION

2.1 Site Description and History

2.1.1 The Suffolk County AAF Bombing and Gunnery Range FUDS is approximately two miles north of Westhampton Beach, New York and occupies approximately 9,224 acres (Figure 2-1). The site is situated in a relatively flat area just to the south and partially within the Central Pine Barrens in Suffolk County. The Atlantic Ocean lies approximately three miles to the south of the FUDS. The Suffolk County AAF range was activated in 1943 for bombing, strafing, and rocket fire training exercises during World War II. Military use of the range ceased in 1946 (USACE 1997). Currently, New York State and Suffolk County own a majority of the property. The northern portion of the FUDS is located within the Long Island Central Pine Barrens Groundwater Conservation area and is under the stewardship of the Central Pine Barrens Joint Planning and Policy Commission (Alion 2008b). With the exception of two target silhouettes constructed of painted boulders (a destroyer and an aircraft carrier), no military structures remain at the FUDS (USACE 1997).

2.1.2 Construction on the Suffolk County AAF ranges and adjacent Suffolk County Air Force Base (AFB) began in November 1942. Development of the bombing and gunnery ranges consisted of the clearance and development of the area into four separate ranges; a bombing range, a strafing range, and two 1,500 by 3,000 feet scoring ranges. Construction of targets and facilities in the range areas consisted of 23 strafing targets, 25 bombing targets, 12 target pits, two range houses, and two range towers. Bombing and strafing targets included elaborately constructed wooden trains, tanks, trucks, ammo storage buildings, planes, submarines, and houses. Ship silhouette targets, with features outlined in white stone, were also constructed. Figure 2-2 depicts the approximate locations of the various targets and ranges at the Suffolk County AAF FUDS. An additional skeet range was also constructed in the vicinity of the Suffolk County AAF property, but due to its proximity to the Suffolk County AFB, this range was included in the DERP FUDS for the Suffolk County AFB (USACE 1997).

2.1.3 The Suffolk County AAF was first activated on 17 May 1943 as a gunnery training range for fighter pilots and instructors flying training missions out of the Suffolk County AFB and Mitchel Field Army Air Base, Garden City, New York. The fighter groups trained at the Suffolk County AAF Bombing and Gunnery Range received gunnery, bombing, small arms, and rocketry training before going overseas in World War II. Historical documents state that the bulk of the training exercises were carried out using P-47 Thunderbolt aircraft employing .50 caliber machine guns, practice bombs, and practice rockets. However, during brief live fire exercises

between May 1943 and January 1944, 100-lb and 500-lb high explosive (HE) bombs, incendiary bombs and 4.5-inch HE rockets were deployed against the targets. The training exercises lasted less then one year resulting in the destruction of the majority of the targets and structures. No chemical warfare material (CWM) was known to be used at the ranges located within Suffolk County AAF Bombing and Gunnery Range (USACE 1997).

2.1.4 The Suffolk County AAF served as a Combined Air Defense Training Area. Air Signal Aircraft Warning Fighter Control and Anti-Aircraft (AA) units engaged in exercises in air defense. Although the aforementioned soldiers possibly camped in portions of the Suffolk County AAF Bombing and Gunnery Range bombing and gunnery range area, no evidence exists to support AA firing at or in close proximity to the Suffolk County AFB or the Suffolk County AAF Bombing and Gunnery Range ranges (USACE 1997).

2.1.5 On 8 November 1945, the Suffolk County AFB and the Suffolk County AAF Bombing and Gunnery Range lands were declared excess to the needs of the Army Air Forces by order of the Commanding General, Army Service Forces (USACE 1997). Custody of the Suffolk County AAF Bombing and Gunnery Range lands was transferred to the New York District Corps of Engineers on 14 January 1946. Further custody of the property was transferred to the Federal Farm Mortgage Corporation and War Assets Administration on 11 January 1946 and 16 April 1946, respectively (USACE 1997). Upon site closure, large portions of the Suffolk County AAF Bombing and Gunnery Range lands were returned to New York State and Suffolk County (USACE 1997). Additional parcels were purchased by private companies for light industrial uses and sand/gravel quarrying. The northern portion of the Suffolk County AAF Bombing and Gunnery Range was later designated part of the Long Island Central Pine Barrens Groundwater Conservation area (Alion 2008b).

2.2 Munitions Response Site Identification and Munitions Information

2.2.1 The ASR Supplement identified Range Complex (MRS 1) as the only area of interest at the Suffolk AAF FUDS (USACE 2004a) (Table 2-1). MRS 1 includes four sub-ranges: Ground Gunnery/Skip Bombing "A", Ground Gunnery/Rocket Range "B", a Bombing Range and a Strafing Range. Figure 2-2 identifies the FUDS boundary as well as MRS 1 (USACE 2004a). The list of munitions types associated with MRS 1,and their compositions, were derived from the ASR, ASR Supplement and other USACE data sources and are summarized in Table 2-2 (USACE 1997 and 2004a).

2.2.2 According to the ASR Supplement, MRS 1 comprises approximately 3,121 acres. Figure 2-3 identifies the FUDS boundary and the range fans associated with each sub-range that composes MRS 1 (USACE 2004a). The total FUDS property boundary is 9,224.6 acres of land.

2.3 Physical Setting

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

2.3.1 Topography and Vegetation

2.3.1.1 The Suffolk County AAF Bombing and Gunnery Range FUDS has elevations that range from approximately 33 feet to 75 feet above mean sea level (msl) at the central portion of the former range (USGS 1956). The surface topography is generally flat with subtle rolling terrain with an overall slope of 0.5 percent. A topographic map of the project site is presented in Figure 2-3.

2.3.1.2 The site photographs in the ASR indicate that the Suffolk County AAF Bombing and Gunnery Range land is moderately to heavily vegetated. According to the Central Pine Barrens Region website, prevalent tree species include shrubby scrub oak (*Quercus ilicifolia*), pitch pine (*Pinus rigida*), white pine (*Pinus strobus*) and to a lesser extent red maple (*Acer rubrum*). Other small tree, plant, and shrub species found near the project site include black huckleberry (*Gaylussacia baccata*), blueberry (*Vaccinium pallidum and V. angustifolium*), sheep laurel (*Kalmia latifolia*), wintergreen (*Gaultheria procumbens*) and poison ivy (*Toxicodendron radicans*) (Nature Conservancy 2008).

2.3.2 Climate

2.3.2.1 The local climate is representative of the humid continental type common to the northeastern United States. The average yearly rainfall - typically falling in March, April, and August - is 46 inches. Winters are relatively mild with an average temperature of 30.9 degrees Fahrenheit. The record low was -7 degrees Fahrenheit set in January of 1988. The average yearly snowfall is approximately 29 inches. During the summer months, the average temperature is 71.1 degrees Fahrenheit with a record of 101 degrees Fahrenheit set in July of 1991. The average annual temperature is 52.2 degrees Fahrenheit. The sun shines 65 percent of the time in the summer and 50 percent in the winter (USACE 1997).

2.3.3 Local Demographics

2.3.3.1 The population density of Suffolk County is 1,593 people per square mile (mi^2). The 2007 Census population estimate for Suffolk County is 1,469,715 people. The 2006 estimate of the number of housing units in Suffolk County is 542,956 housing units (U.S. Census Bureau 2008). A U.S. National Guard housing development is located in the southeastern portion of the FUDS. Numerous other permanent residents are located in the southern portion of the FUDS (Figure 2-2). More than 26 residences are located within two miles of the MRS boundaries (Figures 2-1 and 2-3) (Google Earth 2009 and NYGIS 2004). Residential and other structures are present south (Westhampton) of the MRS 1 range boundary. Recreational areas are located within the FUDS boundary and within two miles of the MRS (Google Earth 2009).

2.3.4 Current and Future Land Use

2.3.4.1 New York State and Suffolk County own a majority of the FUDS property. New York State Department of Environmental Conservation (NYSDEC) personnel stated during the Technical Project Planning (TPP) meeting that the northern portion of the FUDS is located within the Long Island Central Pine Barrens Groundwater Conservation area. The conservation area was established in 1993 by the Long Island Pine Barrens Protection Act to preserve and protect the land overlaying the Magothy aquifer. There are also numerous walking trails throughout the central portion of the Suffolk County AAF Bombing and Gunnery Range FUDS. Although there is a fence in the central portion of the FUDS it only restricts entrance to the site from the Sunrise Highway (Route 27). Review of Suffolk County tax and real estate maps indicate that the FUDS property had been slated for extensive residential development; however, NYSDEC noted during the TPP meeting that development will not occur since the objective of the Long Island Central Pine Barrens is to protect the groundwater aquifer. Extensive development within this area could negatively affect groundwater quality; therefore, future land use is expected to be similar to current uses. There are several large sand and/or gravel quarries located in the western portion of the FUDS which can be seen on Figure 2-1. A private golf course is located in the northern section of the site. A small tract in the southern portion of the FUDS is used for residential and light industrial purposes (Alion 2008b and USACE 1997).

2.3.5 Geologic Setting

2.3.5.1 The geologic unit mapped beneath the surficial glacial deposits is the Gardiners Clay which pinches out to the north of the site. This unit, located at depths greater than 155 feet below the ground surface (bgs) consists of a 40-foot-thick layer of green and gray clay, silt and clayey or silty sand, with some clayey gravel. This unit has a low bulk hydraulic conductivity and tends to confine water in the underlying aquifer (USACE 1997).

2.3.5.2 Underlying the Gardiners Clay deposits are the Magothy Formation and the Raritan Formation (consisting of a clay layer underlain by the Lloyd Sand Member). The Lloyd Sand Member has a moderate overall hydraulic conductivity and consists of sand and gravel interbeds with occasional lenses of clay and silt. The beds in the Lloyd Sand Member are encountered at a depth of approximately 400 ft bgs and are approximately parallel to the bedrock surface below. Bedrock in and around the Suffolk County AAF Bombing and Gunnery Range FUDS is encountered at an approximate depth of 400-1,600 feet bgs. The bedrock consists of Precambrian or Cambro-Ordivician Walloomsac schist, gneiss, granite or Inwood marble (Brock and Brock 1999).

2.3.5.3 Surface soils at the site either belong to the Riverhead-Plymouth-Carver Association or the Plymouth-Carver Association, the latter comprising approximately 75-80 percent of the soils at Suffolk County AAF Bombing and Gunnery Range area. These soil associations are similar with only subtle variations between the separate units. Soils are characterized as deep, excessively well drained, fine to coarse-textured loamy sands over thick layers of stratified coarse sand and gravel. These soils, derived from glacial deposits, have very low moisture capacity making them unsuitable for agricultural purposes. Typically, the local soils only support selected natural vegetation (USACE 1997). The remaining surface soils at the Suffolk County AAF Bombing and Gunnery Range FUDS are comprised of Haven sandy loam and cut and fill material brought in for developed areas in the southern portion of the FUDS (USDA 2008).

2.3.6 Hydrogeologic Setting

2.3.6.1 Three aquifers and two aquitards are present beneath the Suffolk County AAF Bombing and Gunnery Range FUDS. Overlying the crystalline bedrock, is the Lloyd Aquifer which is present from approximately 400 – 1,000 feet bgs. The Lloyd aquifer correlates to the Lloyd sand member of the Raritan Formation. Overlying the Lloyd is the Raritan clay member, an aquiclude (a porous formation that absorbs water slowly) present beneath and south of the site. Overlying the Raritan clay is the Magothy aquifer a water bearing unit which correlates to the Magothy Formation. The Magothy aquifer is present throughout the site at a depth of approximately 150-400 ft bgs. Overlying the Magothy is the Gardiners clay, an aquiclude present beneath the Suffolk County AAF Bombing and Gunnery Range FUDS. Overlying the Gardiners clay and the Magothy is the upper glacial aquifer. The upper glacial aquifer is a predominately sand and gravel unit which extends from roughly 150 ft to ground surface and was deposited during the Wisconsin-aged glaciation (USGS 1982).

2.3.7 Area Water Supply/Groundwater Use

2.3.7.1 The majority of potable water in the Westhampton area is obtained from the upper glacial (water-table) aquifer and the Magothy aquifer. To a lesser extent, water is also drawn from the Lloyd (deep) aquifer for public and private use. Depth to groundwater in the site vicinity ranges from 4.5 feet to 37 feet bgs (USGS 1982). Based on hydrological data gathered from the direct-push borings within MRS 1 during the SI field event, the depth to groundwater varies from 15 feet bgs to at least 45 feet bgs. Approximately 90% of the FUDS lies within the Long Island Central Pine Barrens Groundwater Conservation area (Alion 2008a).

2.3.8 Sensitive Environments

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

2.3.8.1 Army Checklist for Important Ecological Places

2.3.8.1.1 In accordance with USACE Hazardous, Toxic, and Radioactive Waste guidance, the Army Checklist for Important Ecological Places is used to determine if a FUDS requires a screening-level ecological risk assessment (USACE 2006) (Table 2-3). In the case of the Suffolk AAF, the property does not contain wetland areas. There are no federal rare, threatened or endangered species that were identified in the vicinity of the Suffolk AAF Bombing and Gunnery Range. However, there are state listed rare, threatened, or endangered species that were identified in the vicinity of the FUDS (NYSDEC 2009). The exact location of these species was not given. During the 2009 site inspection it is believed that none of these species were observed. NYSDEC indicated that the property is not situated within the New York Coastal Zone (NYDOS 2004). It was determined that a screening level ecological risk assessment is required for this site.

2.3.8.2 Wetlands

2.3.8.2.1 Wetlands are not present at the Suffolk AAF Bombing and Gunnery Range FUDS according to the U.S. Fish and Wildlife Service (USFWS 1998). No wetlands were encountered during the field sampling activities conducted at the Suffolk AAF Bombing and Gunnery Range FUDS. The field sampling activities were minimally intrusive in nature and did not negatively impact the FUDS property.

2.3.8.3 Coastal Zones

2.3.8.3.1 The Suffolk AAF Bombing and Gunnery Range is not situated within the New York Coastal Zone (NYDOS 2004).

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

2.4.0.1 A summary of previous historical investigations and related discoveries of MEC and MC is provided in the following subsections.

2.4.1 Inventory Project Report

2.4.1.1 USACE issued the Inventory Project Report (INPR) for the Suffolk AAF Bombing and Gunnery Range FUDS in June 1991. The INPR determined that the present condition of the project site was the result of prior DoD ownership, utilization, or activity. The INPR indicated an environmental restoration project was an appropriate undertaking within the purview of the DERP for FUDS. A site survey summary, project survey summary, risk assessment code (RAC) score, and the Findings and Determination of Eligibility were included in the INPR. The INPR concluded that the property was used as a gunnery training base. No munitions were discovered during the 1991 site visit. USACE determined that ordnance may still exist on the site due to past use. A RAC score was not assigned to the site due to insufficient information (USACE 1991).

2.4.2 Archives Search Report

2.4.2.1 The USACE prepared the ASR Findings for Suffolk AAF Bombing and Gunnery Range in September 1997 (USACE 1997). The ASR Findings included results of previous investigations at the site, a property description, the historical property summary, site eligibility as a FUDS, a visual site inspection, MEC/Recovered Chemical Warfare Materiel (RCWM) technical data, an evaluation of MEC/RCWM presence at the site, and recommendations. The ASR also includes ordnance technical data sheets, physical and chemical characteristics data sheets, maps, interview transcripts, a visual inspection property report and photographs, and a preliminary assessment form.

2.4.2.2 The ASR states that prior to transferring the property, the Commanding Officer at the Suffolk County Air Force Base requested that the ranges be inspected and decontaminated. A Bomb and Shell Disposal Team report of decontamination, dated 11 June 1946, showed the following items were discovered and removed during the course of clearing the Suffolk County AAF Bombing and Gunnery Range: two un-fuzed 6-lb M69 oil incendiary bombs, eleven 4-lb

M54 incendiary bombs, five 4-lb M50Al incendiary bombs, several sand-filled practice rockets and 100-lb practice bomb remnants, as well as three unexpended M1 black powder spotting charges (USACE 1997).

2.4.2.3 The ASR includes a Suffolk County Police Department Emergency Service Section Incident Report, dated 1 July 1996, documenting the recovery and destruction of a suspected 4.5-inch M8 HE rocket on the Suffolk County AAF Bombing and Gunnery Range. However, an Air Force Explosive Ordnance Disposal (EOD) response to the same incident identified this item to be a M9 4.5-inch practice rocket (USACE 1997).

2.4.2.4 During the 1997 ASR site visit of the Suffolk County AAF Bombing and Gunnery Range FUDS, the inspection team discovered an AN-M20 or AN-M18 100-lb bomb burster tube with an intact point-detonating fuze. This item was reported to the local police bomb disposal team who properly disposed of the item. Additionally, this team found M38A2 100-lb practice bomb and M1 spotting charge debris as well as several .50 caliber shell casings (USACE 1997).

2.4.2.5 As detailed in Section 2.3 of the SS-WP, the ASR reported that conventional weaponry was used at Suffolk County AAF Bombing and Gunnery Range (Alion 2008b; USACE 1997). The details of the munitions and associated MC used at Suffolk County AAF Bombing and Gunnery Range are presented in Section 2.6.2 (Table 2-2). No documentation was found to indicate the use or storage of CWM at Suffolk County AAF Bombing and Gunnery Range. Maps of the locations of the former targets and FUDS boundary are provided in the ASR and are shown on Figure 2-2. The ASR concluded that the Suffolk County AAF Bombing and Gunnery Range FUDS be carried forward to the SI phase (USACE 1997).

2.4.3 2004 Archive Search Report Supplement

2.4.3.1 The ASR Supplement was prepared for the FUDS in 2004 and documented the range boundaries of the FUDS based on historical documents, munitions used, and other information related to the property (USACE 2004a). The ASR Supplement identified one range complex, which was assigned Range Management Information System [RMIS] Range Identification (ID) C02NY071301R01. Range Complex (MRS 1) consisted of 3,121 acres. As Table 2-1 indicates, four sub-ranges are encompassed by this range complex: Ground Gunnery/Skip Bombing "A", Ground Gunnery/Rocket Range "B", a Bombing Range and a Strafing Range. The ASR Supplement assigned a RAC score of 2 to the FUDS as a whole. RAC score indicates the level of MEC risk associated with the area. RAC scores range from 1, being the highest category of risk, to 5, being the lowest (USACE 2004a).

2.4.3.2 The information provided in the ASR Supplement was combined with the information regarding specific munitions presented in the ASR and the SI site visit and used to generate Table 2-2, which lists the military munitions type and composition for the FUDS. USACE technical documents, technical manuals, and other technical resources, were used to identify the list of MC associated with each munitions type. As noted in Table 2-2, small arms primer typically comprises 5% or less of the total ammunition weight. The primer is combusted when fired and expended while in flight (during strafing activities); therefore, MC associated with the primer was not evaluated. Analysis of MC related to components of the projectile is conducted in those instances where a complete projectile is expected to be found. This approach was used in accordance with stakeholder agreements at the TPP meeting (Alion 2008a) and the Final SS-WP (Alion 2008b). A copy of the 2004 ASR Supplement is provided in Appendix L.

2.5 Citizen Reports of Munitions and Explosives of Concern

2.5.1 As discussed in Sections 2.4.2 and 2.4.3, since military use of the FUDS ceased, reports of munitions finds were documented by the Suffolk County Police Department Emergency Service Section and Air Force Explosive Ordnance Disposal. Local long time residents interviewed by the ASR team recall the sound of machine guns and explosions emanating from the area of the Suffolk County AAF Bombing and Gunnery Range. Several of the residents report finding .50 caliber shell casings in the area. One resident remembered observing shell casings and large and small practice bombs within the area during the 1970's. None of the interviewees recall any accidents or incidents as a result of MEC presence (USACE 1997).

2.6 Non-Department of Defense Contamination/Regulatory Status

2.6.1 The Suffolk County Police Department operates a small arms range in the south-central portion of the FUDS (outside of the MRS). No sampling was undertaken in proximity to the Police Department firing range. There is no other evidence, based on historical review and stakeholder comments, of activities occurring prior to or after DoD use of the area which would contribute to potential MEC, MD, or MC presence.

Table 2-1. Potential Risk from Munitions and Explosives of Concern (USACE 2004a)

Site Name	Range Name	Sub-range Name	RMIS ID	Acreage	RAC Score	Type Of Munitions	Munitions ID
Suffolk County AAF Bombing and Gunnery Range	Range Complex	N/A	C02NY071301R01	3,121	2	.50 Cal. Machine Gun Small Arms, General AN-M30, General Purpose Bomb, 100 lbs AN-M64 & AN-M64A1, GP Bomb, 500 lbs AN-M50, Incendiary Bomb, 4 lbs AN-M54, Incendiary Bomb, 4 lbs AN-M69 Incendiary Bomb, 6 lbs M38A2, Practice Bomb, 100 lbs 4.5-inch, Barrage Rocket, HE, M8	SMALL ARMS (CTT01) BOMBS, HIGH EXPLOSIVE (CTT07) BOMBS, (INCENDIARY, PHOTOFLASH) (CTT08) BOMBS, (WP)(CTT09) BOMBS, PRACTICE (CTT10) GROUND ROCKETS, LIVE (CTT11)
		Ground Gunnery/ Skip Bombing "A"	C02NY071301R01-SR01	1,317	2		
		Ground Gunnery/ Rocket Range "B"	C02NY071301R01-SR02	1,331	2		
		Bombing Range	C02NY071301R01-SR03	1,600	2		
		Strafing Range	C02NY071301R01-SR04	2,920	5		

AAF = Army Air Field
AN = (standardized for use by both the) Army and Navy
CTT = Closed Transferring or Transferred
GP = General Purpose
HE = High Explosive
ID = Identification
M = Model
MRS = Munitions Response Site NA = not applicable
RAC = Risk Assessment Code
RMIS = Range Management Information System
WP = White Phosphorus

Table 2-2. Military Munitions Type and Composition (USACE 1997 and other sources)					
Range ID (MRS)	**Sub-range**	**Munitions ID**	**Munitions Type**	**Composition (explosives and metallic components)**	**Associated MC Analysis[d]**
MRS 1 – Range Complex	Ground Gunnery/Skip Bombing "A" Ground Gunnery/Rocket Range "B" Bombing Range Strafing Range	Small Arms (CTT01)	General Small Arms – 0.50 caliber and smaller	**Projectile:** .50 cal: lead, antimony, cupro-nickel, and Soft Steel (iron, carbon). **Tracer[d]:** Strontium nitrate, calcium resinate, strontium oxalate, magnesium **Propellant[e]:** Single or Double-base powder (Nitrocellulose[b] and nitroglycerin [NG]) or IMR 5010 powder Nitrocellulose, dinitrotoluene [DNT], potassium sulfate, graphite or IMR 4814 powder (nitrocellulose, 2,4-DNT). **Primer[d]:** Barium nitrate, lead styphnate, antimony sulphide, calcium silicate, tetracene.	Explosives: • NG • DNT[a] • TNT[a] • Tetryl • RDX Metals: • Aluminum [e] • Antimony • Barium [e] • Copper • Iron [e] • Lead • Nickel
		Bombs High Explosive (CTT07)	GP Bombs, AN-M30 – 100 lbs HE, AN-M64 & AN-M64A1 – 500 lbs, HE	**Body:** Sheet steel (iron) **Filler:** 50/50 Amatol (ammonium nitrate and trinitrotoluene [TNT]) or Tritonal (TNT and flaked aluminum) or Composition B (RDX, TNT & wax) **Nose & Tail Fuze Primer:** Lead thiocyanate, potassium chlorate, ground glass, barium nitrate, TNT. Black powder[d] (sodium nitrate or potassium nitrate, charcoal and sulfur) delay. **Nose & Tail Fuze Detonator:** Potassium chlorate, antimony sulfide, lead azide, carborundum, tetryl. Black powder[c] (sodium nitrate or potassium nitrate, charcoal and sulfur) delay.	
		Bombs Practice (CTT10)	Practice Bomb, M38A2 – 100lbs	**Body:** Sheet metal (iron) **Filler:** Sand **Spotting charge (if used):** M1A1 Black powder (potassium nitrate, charcoal, sulfur) or M5 for snow covered (black powder[d] with dark smoke mixture.)	

Table 2-2. Military Munitions Type and Composition (USACE 1997 and other sources)					
Range ID (MRS)	**Sub-range**	**Munitions ID**	**Munitions Type**	**Composition (explosives and metallic components)**	**Associated MC Analysis[d]**
		Bombs Incendiary, Photoflash (CTT08) and Bombs WP (CTT09)	Bombs Incendiary, Photoflash, WP AN-M54, AN-M69, AN-M50	AN-M50 **Body***:* Common steel or aluminum **Filler:** Thickened gasoline or Thermate (iron oxide, barium nitrate, aluminum powder, sulfur) **Burster:** Black powder[c] (sodium nitrate or potassium nitrate, charcoal and sulfur). AN-M54 **Body:** Common steel or aluminum **Filler:** Thermite (iron oxide, aluminum powder) **Burster:** Black powder[c] (sodium nitrate or potassium nitrate, charcoal and sulfur). AN-M69 **Body:** Common steel or aluminum **Filler:** Gelled gasoline **Igniter:** White phosphorus[f]	
		Ground Rockets, Live (CTT11)	4.5-inch, Barrage Rocket, HE, M8	**Body:** Steel or aluminum **Propellant:** Solvent extruded double base (nitrocellulose[b], NG, diphenylamine) **Filler:** TNT **Fuze (PD M40):** Detonator (lead azide, tetryl) **Booster:** Tetryl **Igniter:** Electric squib (lead thiocyanate, potassium chlorate)	

AN = (Standardized for use by both the) Army and Navy
CTT = Closed Transferring or Transferred
DNT = Dinitrotoluene
HE = High Explosive
GP = General Purpose
ID = Identification
M = Model
Mk = Mark
MC = Munitions Constituents
MRS = Munitions Response Site
NG = Nitroglycerine
RDX = Hexahydro-1,3,5-trinitro-1,3,5-triazine
Tetryl = Methyl-2,4,6-trinitrophenylnitramine
TNT = Trinitrotoluene
WP = White Phosphorus

Table 2-2. Military Munitions Type and Composition (USACE 1997 and other sources)

Range ID (MRS)	Sub-range	Munitions ID	Munitions Type	Composition (explosives and metallic components)	Associated MC Analysis[d]

[a] DNT and TNT and their break-down products currently on the approved PWP (Alion 2005) explosives analysis using method 8330A list (2,4- and 2,6-dinitrotoluene; 2-Amino-4,6-dinitrotoluene; 2- and 3-nitrotoluene; 4-Amino-2,6-dinitrotoluene; 4-nitrotoluene and 2,4,6-trinitrotoluene; 1,3,5-trinitrobenzene; 1,3-dinitrobenzene) were analyzed.

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

[c] Black powder is a rapidly burning material that, when fired, leaves little residue as either decomposition products or un-combusted compounds and the constituents of black powder are not expected to persist in the environment above background concentrations for a significant period of time after initial exposure. Black powder is not anticipated to be present or detected after the operations ceased over 50 years ago, therefore no constituents of black powder were analyzed (Interstate Technology and Regulatory Council [ITRC], 2003).

[d] Explosives for small arms (.50 cal.) are present in the propellant and primer. The MC associated with the propellant (NG, DNT) and primer is found at the firing point; the firing point for strafing was located in the air and associated with the aircraft. The propellant and primer residues would have been combusted, widely dispersed, and unlikely to be deposited at the MRS; therefore, explosive MC for small arms were not included in the analysis. Similarly, metals present within the tracer are expended and dissipated along the flight path of the projectile and are not likely to be deposited at the impact area.

[e] Chemicals that are not CERCLA hazardous substances (e.g., aluminum, barium, iron) can be reported in the SI; however, the SI risk evaluation and conclusions will include a discussion of the limitations of the FUDS program to respond to such chemicals. Non-CERCLA chemical concentrations will not provide the basis for a RI/FS recommendation for MC in the SI report.

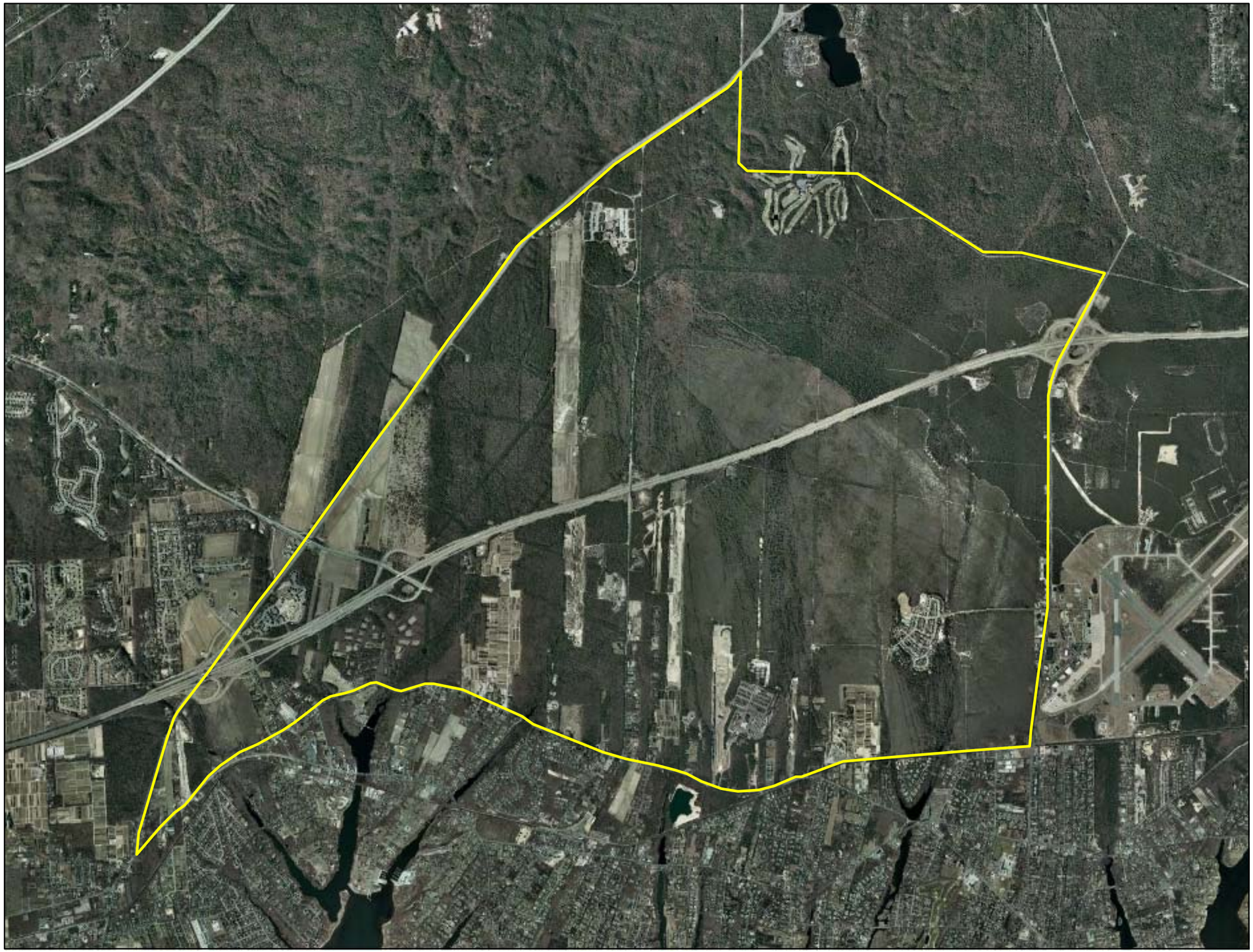
[f] White phosphorous was present in small quantities (~ 1 lb) within the igniter of the AN-M69; therefore, this explosive is not suspected to have a detectable negative impact on the environment. Additionally, white phosphorous typically burns and is expended rapidly when used as an igniter in an incendiary bomb.

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
1.	Locally important ecological place identified by the Integrated Natural Resource Management Plan, Base Realignment and Closure Act Cleanup Plan or Redevelopment Plan, or other official land management plans.		No	
2.	Critical habitat for Federally designated endangered or threatened species. See No. 12 below.		No	There is no evidence of federally endangered and/or threatened species within the Suffolk AAF Bombing and Gunnery Range (Appendix L T&E Letters).
3.	Marine Sanctuary		No	
4.	National Park		No	
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		No	
10.	National Seashore Recreational Area		No	
11.	National Lakeshore Recreational Area		No	
12.	Habitat known to be used by Federally designated or proposed endangered or threatened species		No	There is no evidence of federally endangered and/or threatened species within the Suffolk AAF Bombing and Gunnery Range (Appendix L T&E Letters).
13.	National preserve		No	
14.	National or State Wildlife Refuge		No	
15.	Unit of Coastal Barrier Resources System		No	
16.	Coastal Barrier (undeveloped)		No	
17.	Federal land designated for protection of natural ecosystems		No	
18.	Administratively Proposed Federal Wilderness Area		No	
19.	Spawning areas critical for the maintenance of fish/shellfish species within river, lake, or coastal tidal waters		No	

Table 2-3. Army Checklist for Important Ecological Places

No.	Checklist Item	Yes / No		Comments
20.	Migratory pathways and feeding areas critical for maintenance of anadromous fish species within river reaches or areas in lakes or coastal tidal waters in which fish spend extended periods of time		No	
21.	Terrestrial areas utilized for breeding by large or dense aggregations of animals		No	
22.	National river reach designated as Recreational		No	
23.	Habitat known to be used by state designated endangered or threatened species	Yes		There is evidence of state endangered and/or threatened species (Bald Eagle, Piping Plover, pine pinion moth and dwarf pine) within Suffolk AAF Bombing and Gunnery Range (Appendix L, T&E response letters).
24.	Habitat known to be used by species under review as to its Federal endangered or threatened status		No	
25.	Coastal Barrier (partially developed)		No	
26.	Federally designated Scenic or Wild River		No	
27.	State land designated for wildlife or game management		No	
28.	State-designated Scenic or Wild River		No	
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	



Suffolk County AAF Bombing and Gunnery Range

Westhampton, New York
Suffolk County

Legend

FUDS Boundary

Imagery Source: ESRI ArcGIS Online
ICubed Imagery Prime World 2D

N
W E
S

Feet
0 1,850 3,700 7,400

Figure 2-1. Historic Site Layout

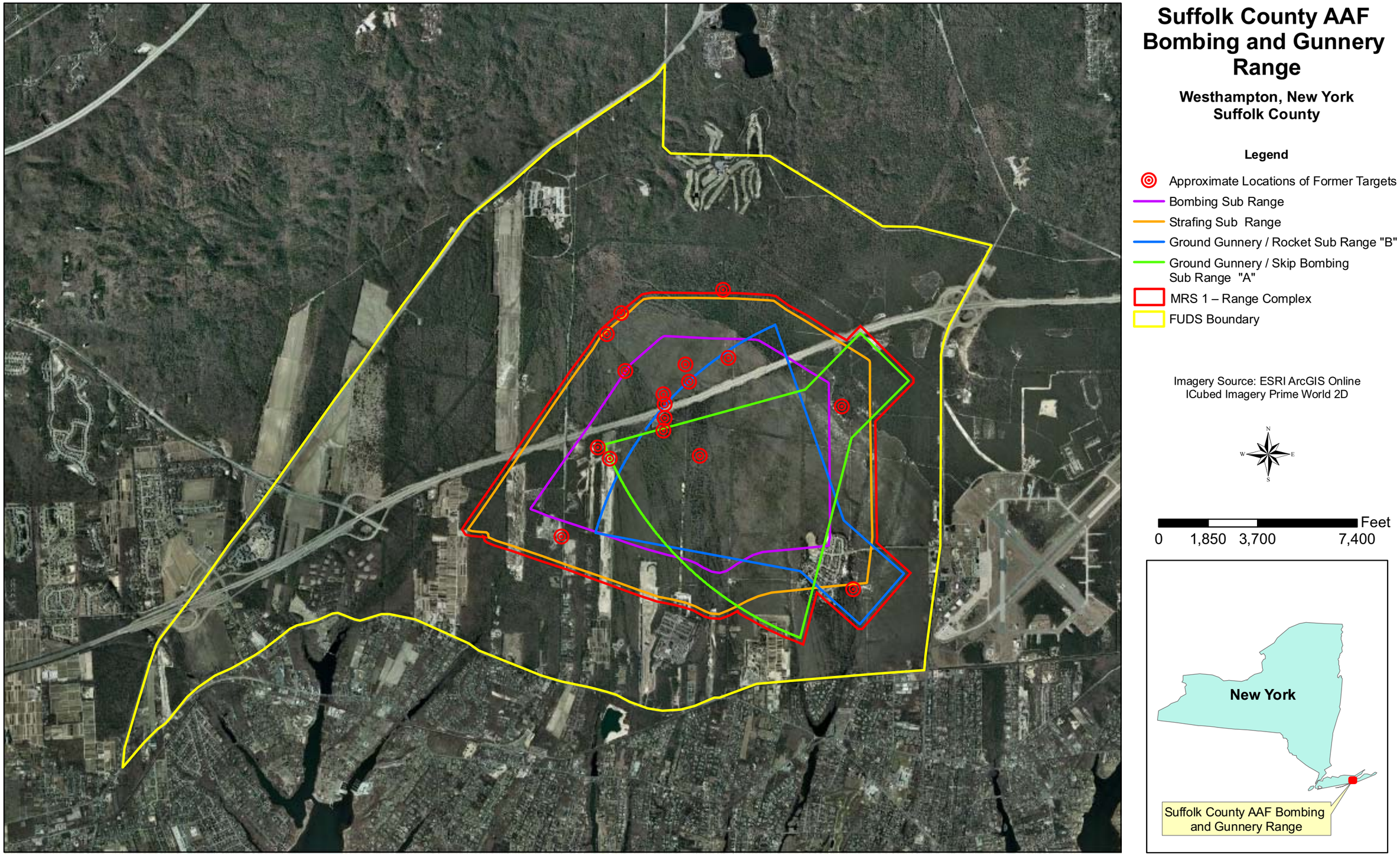


Figure 2-2. Munitions Response Site Boundary and Subranges

Suffolk County AAF Bombing and Gunnery Range

Westhampton, New York
Suffolk County

Legend

National Wetland Inventory

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- FUDS Boundary
- MRS 1 – Range Complex

Imagery Source: ESRI ArcGIS Online
NGS Topo 2D

Wetland Information: United States Department of Interior - Fish and Wildlife Service (1998)

N
W E
S

0 1,900 3,800 7,600 Feet

Figure 2-3. Site Location, Topography and Wetlands.

3. SITE INSPECTION ACTIVITIES

3.1 Technical Project Planning

3.1.1 The first TPP Meeting for Suffolk County AAF Bombing and Gunnery Range was conducted on 10 July 2008 at the Gabreski Airport Administrative Office, West Hampton, New York. The Final TPP Memorandum documenting the meeting was issued in September 2008 (Alion 2008a). Representatives from the New York State Department of Environmental Conservation (NYSDEC), U.S. Army Corps of Engineers (USACE) Baltimore District, USACE New York District, Gabreski Airport, the U.S. National Guard, and Alion Science and Technology participated in this meeting. The participants in the TPP meeting discussed the results of previous investigations, historical and current aerial photographs, the CSM, and Data Quality Objectives (DQOs).

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

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

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

- Maximum concentrations at the FUDS exceed USEPA Regional Screening Values based on current and future land use.
- Maximum concentrations at the FUDS exceed USEPA interim ecological risk screening values.

- Maximum concentrations at the FUDS exceed site-specific background levels.

- Data indicating the presence or absence (less than Method Detection Limits [MDL] for metals and less than the Reporting Limit [RL] for explosives)[1] of analytes for which no screening criteria are available are to be used to support the weight-of-evidence evaluation of MC at the FUDS.

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

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

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

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

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

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

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

[1] Future SI Reports (i.e., all FUDS in FY 09 and beyond) will report non-detections to the RL for both metals and explosives.

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

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

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

3.2 Supplemental Records Review

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

3.2.1 Threatened and Endangered Species

3.2.1.1 State listed threatened or endangered (T&E) species were documented at Suffolk County AAF Bombing and Gunnery Range (USACE 1997 and Appendix L consultation response letters). The New York State Department of Environmental Conservation, Division of Fish, Wildlife and Marine Resource was contacted and identified the piping plover, pine pinion moth and several plant species including the dwarf pine as state listed T&E species that may be present at the FUDS (NYSDEC 2009 and USFWS 2009). The U.S. Department of Interior Fish and Wildlife Service (USFWS) were also contacted regarding the presence of federally listed T&E species. The USFWS responded that no federally listed T&E species were known to be present within the FUDS. The complete list of species is provided in Appendix L of this SI Report. Field activities were conducted in a manner to avoid any adverse impact to any species or habitats that may be unidentified within the FUDS.

3.2.2 Cultural and Archaeological Resources

3.2.2.1 There is little information in the ASR Findings regarding cultural or archaeological resources for the Suffolk County AAF Bombing and Gunnery Range property (USACE 1997). USACE/Alion consulted with the New York State Office of Parks, Recreation, and Historic Preservation and New York Landmarks Commission to ensure cultural, archaeological and water resources were not present at the Suffolk County AAF Bombing and Gunnery Range and/or

would not be disturbed during field activities. The New York Natural Heritage Program identified the Long Island Central Pine Barrens Groundwater Conservation area as being located within the FUDS property. No adjustments were required to the sampling design to avoid impacts with cultural resources (Appendix L, Section 106 Consultation Letters).

3.3 Site Inspection Fieldwork

3.3.1 Site Inspection Munitions and Explosives of Concern Field Observations

3.3.1.1 On 27, 28, 29, and 30 April 2009, the Alion field team visited the Suffolk County AAF Bombing and Gunnery Range to conduct SI field activities in accordance with the Programmatic Work Plan and the Final SS-WP (Alion 2005 and 2008b). A qualitative reconnaissance based on both visual observations and magnetometer-assisted analog geophysics was completed. A visual reconnaissance of the site surface was completed to identify Material Potentially Presenting an Explosive Hazard (MPPEH)/Munitions Debris (MD)/MEC, suspect areas and visual metallic debris associated with munitions. Analog geophysics was used to support anomaly avoidance activities for the field crew. An estimated 5.8 acres of land[2] were assessed during the field work using both analog and visual qualitative reconnaissance. This included 5.5 acres of analog geophysical qualitative reconnaissance (QR) for the meandering path between sampling locations and 0.3 acres of analog geophysical QR around sample locations. Figures 3-1a and 3-1b show the qualitative reconnaissance paths within the MRS.

3.3.1.2 **MRS 1 – Range Complex:** MEC reconnaissance findings and MC sample results are discussed in Sections 4 and 5, respectively. As-collected sample locations, sample designations, sampling rationale, and field observations are summarized in Table 3-1. Sampling locations are depicted on Figure 3-1. Additional information pertaining to the field activities, including field notes, forms, and chains of custody, are provided in Appendix D. Photo locations from the SI site visit are shown on Figure 3-2 and a photo documentation log is included in Appendix E.

Range Complex (MRS 1) encompasses approximately 3,121 acres and includes four overlapping sub-ranges (Ground Gunnery/Skip Bombing "A", Ground Gunnery/Rocket Range "B", a Bombing Range and a Strafing Range). Alion completed analog QR of MRS 1 using a ferrous metal geophysics detector (Schonstedt magnetometer) following a meandering path. Site reconnaissance findings are shown on Figures 3-1a and 3-1b. A photograph log is included in Appendix E, and the photograph locations are shown on Figure 3-2. Area observations are presented below.

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

- The FUDS is largely unpopulated. In general, MRS 1 is densely vegetated, undeveloped land. One small residential development is located in the southeastern portion of the MRS. Several sand and gravel quarries are located in the western portion of the MRS. A major highway bisects the MRS trending from the northeast corner to the southwest. One secondary road (oriented north-south) is located in the western region of the MRS. Numerous dirt trails, suitable for walking or all-terrain vehicles, cross the MRS and are visible in the aerial photos (Figure 3-1). Travel off of these trails is undesirable due to the dense underbrush and numerous low coniferous trees. Although no physical barriers prevent access to MRS 1 or the FUDS, access to the majority of the site is limited due to the terrain and lack of roads or walking trails.
- Five subsurface anomalies were detected. These anomalies were not identified since intrusive investigations are not within the SI scope. In some areas (e.g., Ground Gunnery / Rocket Sub-range "B" target area) metal cultural debris was detected by the Schonstedt and was observed on the surface while walking in the vicinity of the target areas. The surface debris observed in this area consisted of spent shotgun shells, .50 caliber bullet cores, .50 caliber copper jackets, cans, metal containers, appliances and miscellaneous metallic objects. Photos E.7 – E.10 show examples of this debris at the strafing range impact area.
- A submarine and a carrier outline target were observed in the northern portion of the MRS as well as target scares from the strafing and rocket range located in the eastern portion of the MRS.
- No MEC was observed.

MD observed included .50 caliber shell casings and bullets, one M38A2 100-lb practice bomb, and several 2.25-inch practice rocket bodies and nose cones.

3.3.2 Site Inspection Munitions Constituents Samples Collected

3.3.2.1 A total of 20 surface soil samples (zero to six inches bgs), eight subsurface soil samples (six to twelve inches bgs), and two groundwater samples were collected for analysis of select explosives and metals. In addition to these samples, five background surface soil samples and two background groundwater sample were collected for metals comparison.

3.3.2.2 **MRS 1 – Range Complex:** A total of 20 surface soil and eight subsurface soil samples were collected at MRS 1. Sample location SCA-RC-SS-01-13 was collected near a partially buried, suspected M38A2 100-lb practice bomb in the northern portion of MRS near the carrier target silhouette. Samples SCA-RC-SS-01-04, SCA-RC-SB-02-04, SCA-RC-SS-01-18, SCA-

RC-SS-01-03 and SCA-RC-SB-01-03 were collected at locations where numerous .50 caliber spent bullets were observed in the vicinity of the strafing and rocket range in the eastern portion of the MRS. Additionally, two groundwater samples were collected within MRS 1.

3.3.2.3 **Background Samples:** As presented in the Final SS-WP (Alion 2008b), five surface soil samples were collected north and northeast of the MRS 1 boundary. All background samples were analyzed for select metals only (aluminum, antimony, barium, iron, copper, lead and nickel). Additionally, two background groundwater samples were collected to the north of the FUDS and were analyzed for a select group of metals (aluminum, antimony, barium, iron, copper, lead and nickel).

3.4 Work Plan Deviations and Field Determinations

3.4.1 Deviations from the Final SS-WP (Alion 2008b) occurred with respect to sample locations, and inability to collect one soil and one groundwater sample. Most samples were moved slightly due to the site conditions (e.g., topography, inaccessibility) and to areas where sampling media were present in adequate quantities for sampling. As described in Section 3.3.2.2, several samples (SCA-RC-SS-01-13, SCA-RC-SS-01-04, SCA-RC-SB-02-04, SCA-RC-SS-01-18, SCA-RC-SS-01-03 and SCA-RC-SB-01-03) were relocated to the areas near surface MD findings in order to bias the sample results. These deviations were minor in nature and did not affect the quality of data collected.

3.4.2 One groundwater sample (SCA-RC-GW-00-01) could not be collected due to the greater than expected depth to groundwater. Three attempts were made to collect groundwater samples in the vicinity of the proposed sampling location using direct-push boring technology. Boreholes were advanced to depths of up to 50 feet bgs without encountering groundwater. Equipment limitations such as the inability of the peristaltic pump to draw water from depths greater than 45 feet bgs and the limited quantity of direct-push rods made further attempts to collect groundwater samples at this location impractical. However, two groundwater samples were collected successfully in the southeastern and northwestern portions of the FUDS and are suitable to achieve DQO 1.

3.4.3 Additionally, one surface soil sample (SCA-RC-SS-01-15) could not be collected do to extreme vegetative cover. A large swath of land (approximately 5 acres in size) in and around sample location SCA-RC-SS-01-15 was completely overgrown with brambles, thickets, heavy vegetation and poison ivy. The field team attempted to access this area but failed to get adequately close to the sample location making collection of a soil sample inappropriate. It was necessary to move sample location SCA-RC-SS-01-20 to the south, slightly outside the MRS

boundary, because a concrete/asphalt company located just to the north of the sample location had expanded since the aerial photo used for this SI was created. The area where the original sample location was placed was paved over or disturbed due to the expansion of a concrete/asphalt company. This deviation in sample location does not negatively impact the data quality or negate the validity of the sample results. A total of twenty surface soil and eight subsurface soil samples were collected from MRS 1. All background soil and groundwater samples were collected as planned.

3.4.4 The inability to collect the one surface soil sample and the one groundwater sample should not negatively affect DQO 1. Refer to the DQO Verification Worksheet included in Appendix B.

3.5 Site Inspection Laboratory Data Quality Indicators

3.5.1 This section summarizes the data quality assessment for the Suffolk AAF Bombing and Gunnery Range SI analytical data. Data were generated by GPL under the 2006 DoD Quality Systems Manual Version (QSM) III[3] (DoD 2006) and validated by a third-party validator (EDS) using USEPA Region I Functional Guidelines. The detailed GPL and EDS reports are contained in Appendices F and G, respectively. The data were also analyzed using the Automated Data Review Version 8.1 based on the DoD QSM Version III guidelines, and these results are included in the electronic document management systems (EDMS) database. Data Quality Indicators (DQIs) include precision, accuracy, representativeness, completeness, and comparability as well as sensitivity. At Suffolk AAF Bombing and Gunnery Range, no quality assurance split samples were collected in accordance with USACE direction. Therefore, the USACE Memorandum for Record-CQAR of Quality Assurance Split Samples is not applicable to this Draft SI Report. However, CENAB will provide a Chemical Data Quality Assessment Report (CDQAR) for inclusion in Appendix G of the Final SI Report.

3.5.2 Precision is a measure of the reproducibility of repetitive measurements of the same process under similar conditions. Precision is determined by measuring the agreement among individual measurements of the same property, under similar conditions, and is calculated as an absolute value. The degree of agreement was expressed as the relative percent difference between the separate measurements (usually matrix spike/matrix spike duplicate [MS/MSD] pairs) and the observed relative percent difference compared to acceptable values. Any differences between MS/MSD pairs for the Suffolk AAF Bombing and Gunnery Range data were examined and any affected sample results qualified as discussed in the Region I Functional

[3] The latest version of the DoD QSM, Version 4.1, was issued in April 2009; however, this version was not available during the generation of the data for this SI. Note also that this version of the QSM did not take effect until October 2009.

Guidelines. The MS/MSD samples achieved acceptable values, and these samples were qualified appropriately (Appendix G). Field precision is measured by the comparison of field duplicate samples, which is also discussed as appropriate in Appendix G.

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

3.5.4 Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is achieved through proper development of the field sampling program during the TPP and work plan development. Deviations from the Final SS-WP were minor: sample locations were moved slightly due to site-specific conditions. The samples were collected and analyzed as proposed; therefore the representative DQI was achieved for Suffolk AAF Bombing and Gunnery Range.

3.5.5 Completeness is a measure of the amount of valid data obtained from a measurement system compared to the amount that was expected to be obtained under normal conditions. Data are complete and valid if the data achieve all acceptance criteria including accuracy, precision, and any other criteria specified by the particular analytical method being used. None of the 118 total analyte results associated with this sample effort was rejected; therefore, the completeness indicator is 100 percent. The Suffolk AAF Bombing and Gunnery Range data meet the completeness data quality indicator.

3.5.6 Comparability expresses the confidence with which one data set can be compared to another. There are no previous analyses of MC at Suffolk AAF Bombing and Gunnery Range for comparison of reported concentrations from this project. Standard methods for sampling and analyses were applied in assessing and comparing site and background data as documented in the SS-WP; therefore, the comparability DQI was achieved with respect to these analyses.

3.5.7 Sensitivity is a measure of the screening criteria as they compare to detection limits. If screening criteria are below detection limits (i.e., RL for organics and MDL for inorganics), the certainty of the “non-detected” data to indicate that MCs are present at levels at which no unacceptable risks may occur is called into question.

The laboratory reported to the RL for organics (which represents the lowest concentration at which calibration standards were assessed) and the MDL for inorganics (which represents the minimum concentration of metal that can be measured and reported with 99% confidence that the analyte concentration is greater than zero). Consequently, if sensitivity MQOs were achieved for MCs, the RLs (organics) and MDLs (inorganics) are adequate to detect risks at levels of concern for the identified receptor. In this instance, non-detected data sufficiently indicates that no unacceptable risk to receptors is present from the sample or group of samples.

The MQO for sensitivity was achieved for most analyte/receptor/matrix combinations with the exception of NG in soil. In addition, no human health soil screening values were available for 1,3,5-TNB and 1,3-DNB and no ecological soil screening values were available for 1,3,5-TNB, 1,3-DNB, NG, and iron. Uncertainties associated with the single case in which the MQO for sensitivity was not met, and with the absence of screening values, are discussed within the context of analytical sample results in Section 5. This discussion indicates that for this particular FUDS, the absence of screening values does not undermine the certainty with which the determinations of risk for human and ecological receptors can be made.

3.6 Second Technical Project Planning Meeting

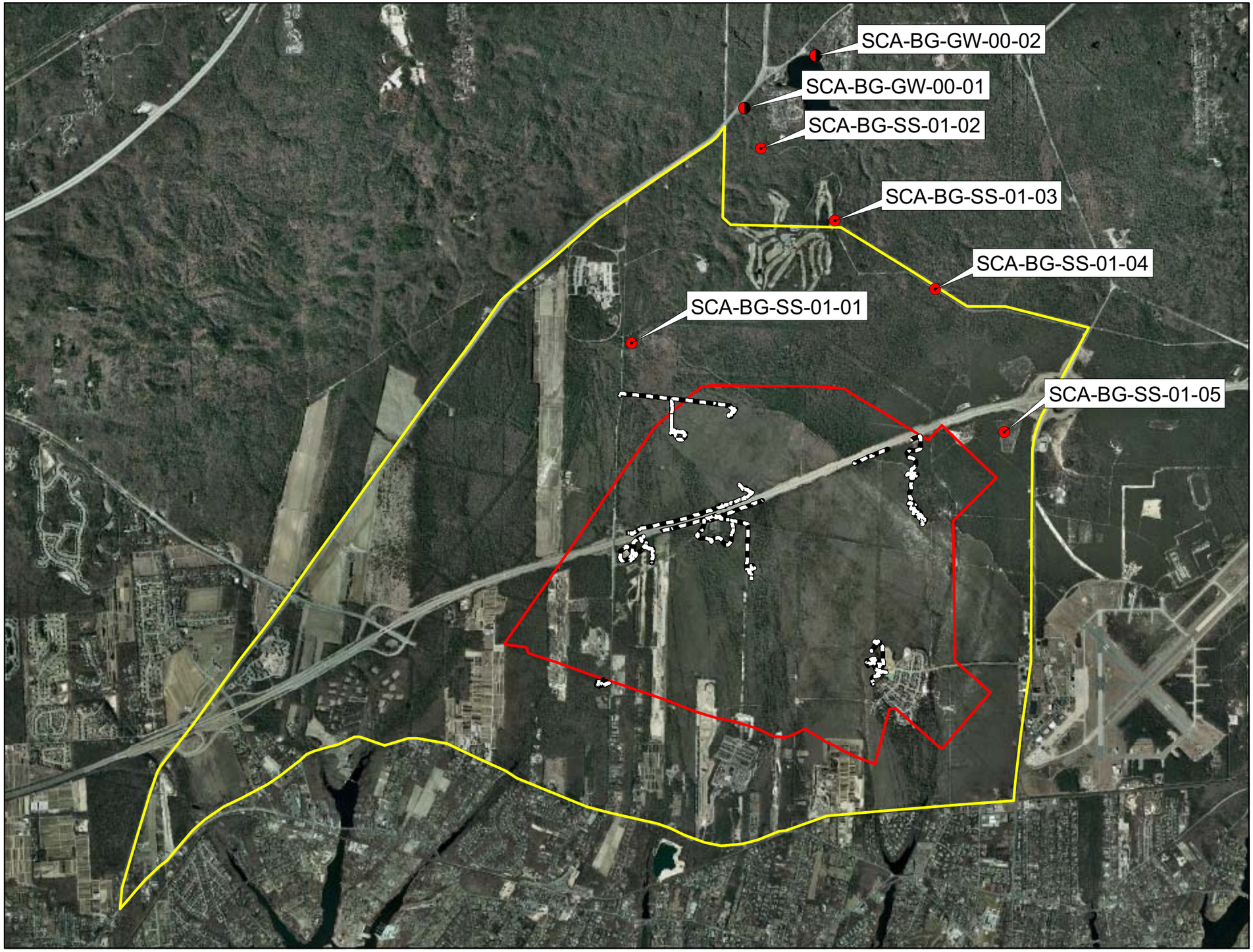
3.6.1 Following the completion of the Draft Final SI Report, the stakeholders will have an opportunity to participate in a second TPP meeting to discuss the findings, conclusions, and recommendations of the Draft Final SI Report; review the MRSPP (Appendix K); and confirm that the project objectives and DQOs were achieved (Alion 2008a and b).

Table 3-1. Suffolk County AAF Bombing and Gunnery Range Sample Location Descriptions

Location	Sampling ID	Coordinates (NAD83, CONUS UTM Zone 18N)		Sampling Locations
		Easting(m)	Northing(m)	
MRS 1 - Range Complex No. 1	SCA-RC-SS-01-01	696879.4	4524142.8	Near former target locations within MRS 1
	SCA-RC-SS-01-02	696867.6	4523967.8	Near former target locations within MRS 1 and surface MD (.50 caliber projectile).
	SCA-RC-SS-01-03	697206.3	4525459.4	Near former target locations within MRS 1
	SCA-RC-SS-01-04	697130.2	4525573.3	Near former target locations within MRS 1
	SCA-RC-SS-01-05	695388.8	4525644.2	Near former target locations within MRS 1
	SCA-RC-SS-01-06	695175.8	4525301.0	Near former target locations within MRS 1 and subsurface anomaly.
	SCA-RC-SS-01-07	695570.6	4524684.8	Near former target locations within MRS 1
	SCA-RC-SS-01-08	694326.9	4524795.0	Near former target locations within MRS 1
	SCA-RC-SS-01-09	694551.1	4524794.0	Near former target locations within MRS 1
	SCA-RC-SS-01-10	695099.0	4525262.1	Near former target locations within MRS 1 and subsurface anomaly.
	SCA-RC-SS-01-11	695163.4	4525433.9	Near former target locations within MRS 1
	SCA-RC-SS-01-12	695280.1	4526409.2	Near former target locations within MRS 1 and surface MD (practice bomb).
	SCA-RC-SS-01-13	694723.6	4526143.4	Near former target locations within MRS 1
	SCA-RC-SS-01-14	695429.2	4525600.2	Near former target locations within MRS 1
	SCA-RC-SS-01-15	-	-	Could not access. Not collected.
	SCA-RC-SS-01-16	695567.2	4524777.6	Near former target locations within MRS 1
	SCA-RC-SS-01-17	695519.4	4524781.3	Near former target locations within MRS 1
	SCA-RC-SS-01-18	697182.4	4525492.7	Near former target locations within MRS 1 and surface MD (.50 caliber projectile).
	SCA-RC-SS-01-19	696841.0	4524044.7	Near former target locations within MRS 1
	SCA-RC-SS-01-20	694078.7	4523543.6	Near former target locations within MRS 1
	SCA-RC-SS-01-21	694162.5	4523571.1	Near former target locations within MRS 1
	SCA-RC-SB-02-01	696879.4	4524142.8	Same location as sample SCA-RC-SS-01-01
	SCA-RC-SB-02-02	696867.6	4523967.8	Same location as sample SCA-RC-SS-01-02
	SCA-RC-SB-02-03	697206.3	4525459.4	Same location as sample SCA-RC-SS-01-03
	SCA-RC-SB-02-04	697130.2	4525573.3	Same location as sample SCA-RC-SS-01-04
	SCA-RC-SB-02-05	695388.8	4525644.2	Same location as sample SCA-RC-SS-01-05
	SCA-RC-SB-02-06	695175.8	4525301.0	Same location as sample SCA-RC-SS-01-06
	SCA-RC-SB-02-07	695570.6	4524684.8	Same location as sample SCA-RC-SS-01-07
	SCA-RC-SB-02-08	694326.9	4524795.0	Same location as sample SCA-RC-SS-01-08
	SCA-RC-GW-00-01	695179.2	4529475.4	Attempted sample. No GW encountered.
	SCA-RC-GW-00-01	696538.1	4525946.4	Attempted sample. No GW encountered.
	SCA-RC-GW-00-01	696569.4	4525963.5	Attempted sample. No GW encountered.
	SCA-RC-GW-00-02	694408.2	4525131.4	Collected in western MRS.
	SCA-RC-GW-00-03	696945.0	4523838.5	Collected in southeastern MRS.

Background Samples	SCA -BG-SS-01-01	694189.8	4527013.3	Background for metals. Taken northwest of the quadrangle, outside of the FUDS.
	SCA -BG-SS-01-02	695373.7	4529082.9	Background for metals. Taken northwest of the quadrangle, outside of the FUDS.
	SCA -BG-SS-01-03	696174.6	4528398.1	Background for metals. Taken northwest of the quadrangle, outside of the FUDS.
	SCA -BG-SS-01-04	697242.9	4527768.6	Background for metals. Taken northeast of the MRS 1, outside of the FUDS.
	SCA -BG-SS-01-05	698044.8	4526365.2	Background for metals. Taken northeast of MRS 1.
	SCA -BG-GW-00-01	695179.3	4529475.4	Background for metals. Collected north of the FUDS.
	SCA -BG-GW-00-02	695863.6	4530058.5	Background for metals. Collected north of the FUDS.

BG= Background
FUDS = Formerly Used Defense Site
GW = Groundwater
MRS = Munitions Response Site
NAD = North American Datum
RC = Range Complex
SB = Subsurface Soil
SCA = Suffolk County Airfield
SS = Surface Soil
UTM = Universal Transverse Mercator



Suffolk County AAF Bombing and Gunnery Range

Westhampton, New York
Suffolk County

Legend

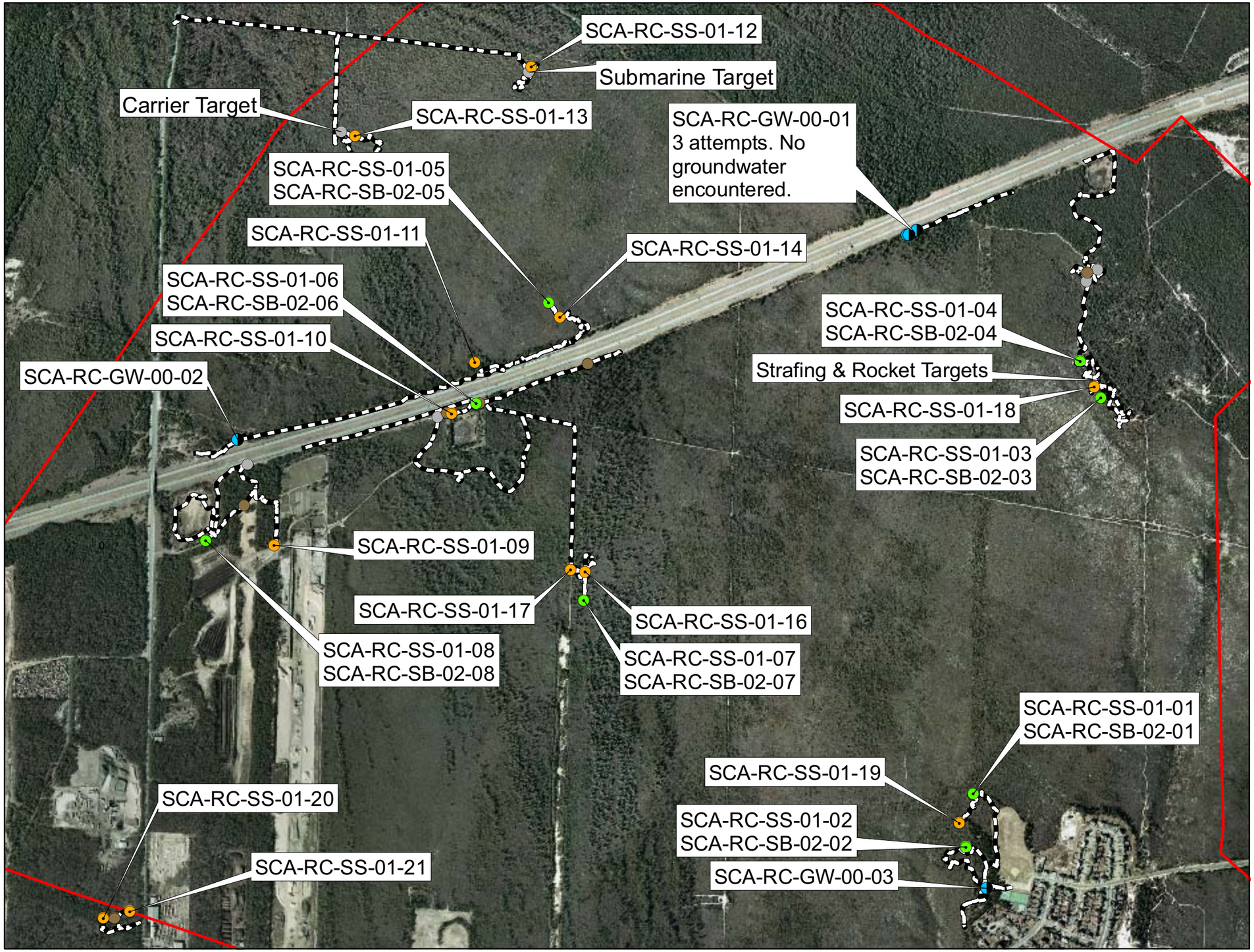
- Background Groundwater Sample
- Backgound Surface Soil Sample
- Geophysical Reconnaissance Route
- MRS 1 – Range Complex
- FUDS Boundary

Imagery Source: ESRI ArcGIS Online
ICubed Imagery Prime World 2D

N
W E
S

Feet
0 1,850 3,700 7,400

Figure 3-1a. Background Sample Locations and Geophysical Reconnaissance Route.



Suffolk County AAF Bombing and Gunnery Range

Westhampton, New York
Suffolk County

Legend

- Background Groundwater Sample
- Backgound Surface Soil Sample
- Groundwater Sample
- Surface Soil Sample
- Surface/Subsurface Soil Sample

Surface Anomaly

- Subsurface Anomaly
- Surface Anomaly
- Geophysical Reconnaissance Route
- MRS 1 – Range Complex
- FUDS Boundary

Imagery Source: ESRI ArcGIS Online
ICubed Imagery Prime World 2D

N
W E
S

0 600 1,200 2,400 Feet

Figure 3-1b. Sample Locations and Geophysical Reconnaissance Route.

Suffolk County AAF Bombing and Gunnery Range

Westhampton, New York
Suffolk County

Legend

- Photo Locations
- MRS 1 – Range Complex
- FUDS Boundary

Photo E.11
Photo E.9
Photo E.7
Photo E.8
Photo E.10
Photo E.17
Photo E.18
Photo E.12 & E.13
Photo E.3
Photo E.16
Photo E.1
Photo E.5
Photo E.4
Photo E.2
Photo E.6
Photo E.15
Photo E.14

Imagery Source: ESRI ArcGIS Online
ICubed Imagery Prime World 2D

N
W E
S

0 1,700 3,400 6,800 Feet

New York

Suffolk County AAF Bombing and Gunnery Range

Figure 3-2. Site Inspection Photograph Locations

4. MUNITIONS AND EXPLOSIVES OF CONCERN SCREENING LEVEL RISK ASSESSMENT

4.1 Munitions and Explosives of Concern Risk Assessment

4.1.0.1 A qualitative MEC screening level risk assessment was conducted based on the SI qualitative reconnaissance, as well as historical data documented in the INPR, ASR, and ASR Supplement (USACE 1991, 1997 and 2004a). A qualitative risk evaluation assesses the potential explosive safety risk at the FUDS and communicates the hazard that may exist at the FUDS and the potential causes of this hazard (USAESCH 2001).

4.1.0.2 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 comes near or in contact with MEC and acts on it to cause a detonation. The potential for an explosive safety risk depends on the presence of three elements (USAESCH 2001):

- Ordnance and Explosive Factors - a source (presence of MEC)
- Site Characteristics Factors – accessibility and stability
- Human Factors – a receptor (person) and interaction (e.g., touching or picking up an item).

Each of these primary risk factors was used to evaluate the field and historic data to generate an overall hazard assessment rating of either low, moderate, or high (Table 4-1). The CSM for MRS 1 reflects this MEC assessment strategy (Appendix J).

4.1.0.3 The MEC source is based on the MEC type, sensitivity, density and depth distribution (Table 4-1). The type of MEC dictates the likelihood and severity of exposure, and thereby injury, if the MEC functions when encountered. MEC sensitivity affects the likelihood of an MEC item functioning as designed when encountered by a receptor (e.g. pressure from stepping on the item, fuze activation from moving the item, etc.). MEC quantity/density and depth are generally unknown during the SI and are evaluated during follow on studies (RI/FS).

4.1.0.4 Site characteristics refer to the physical conditions of the site and natural events that occur at a site (Table 4-1). Site accessibility affects the likelihood of receptor contact with MEC and include man-made (e.g., walls or fences) or natural barriers (e.g., terrain, topography, vegetation) that may prevent access to the site. An MEC item tends to remain in place unless disturbed through human or natural forces (e.g., frost heaving, erosion, tidal or wave action). If

MEC movement occurs, the probability of direct human contact may increase, but not necessarily result in direct contact or exposure.

4.1.0.5 Human interaction includes the type of activities that exist at the site, the population of people that may have access, and the frequency of that access (Table 4-1). Activities are generally classified as recreational (hiking, camping, etc.) and occupational (farming, industrial, etc.). Activities at a site generate an exposure route for an MEC receptor. The MEC exposure route is typically direct contact with an MEC item on the surface or through subsurface activities (e.g., digging during construction). The area population and frequency of use determines the likelihood of a receptor to encounter MEC. The risk to the surrounding population is based on the type and location of the site, access restrictions, natural and/or man-made barriers, and the surrounding population.

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

Table 4-1. MEC Risk Assessment Categories

Risk	MEC Type	MEC Sensitivity	Site Access	Site Stability	Human Interaction
High	MEC that will cause an individual's death if detonated by an individual's activities	Very sensitive - Handling or movement may cause detonation	No Restriction - No man-made/natural barriers (e.g., no fence, gentle sloping terrain, no vegetation that restricts access, no water that restricts access)	Site Unstable - MEC most likely will be exposed by natural events	High potential for and frequency of contact (e.g., general public has open and frequent access, high potential for surface/subsurface intrusive activity)
Moderate	MEC that will cause major injury to an individual if detonated by an individual's activities	Less sensitive - Fuzed but may be moved safely if identified as such by a UXO Technician	Limited Restriction - Man-made barriers, vegetation that restricts access, water, snow or ice cover, and/or terrain restricts access	Moderately Stable - MEC may be exposed by natural events	Moderate potential for and frequency of contact (e.g., a limited number of the general public has open and somewhat frequent access, few site uses, surface/subsurface intrusive activity possible)
Low	MEC that will cause minor injury to an individual if detonated by an individual's activities	May have functioned correctly or is unfuzed but has a residual risk	All points of entry are controlled (man-made/natural barriers)	Stable Site - MEC should not be exposed by natural events	Low potential for and frequency of contact (e.g., no general public access, infrequent site access primarily by site personnel, no subsurface activity)
None	Inert MEC or scrap (MD), will cause no injury	Inert MEC or scrap (MD), will cause no injury	-	-	-

4.2 Munitions and Explosives of Concern Hazard Assessment

4.2.1 MRS 1 – Range Complex

4.2.1.1 As discussed in Section 2.4.2 and 4.1.2, no MEC was found at this FUDS during the Alion 2009 SI. However, since military use of the FUDS ended in 1946, several items of MEC and MD were discovered (detailed in 2.4.2 and 4.1.2). These items were destroyed or removed by police and EOD teams (USACE 1997). MD found during the Alion 2009 SI was inert. The overall MEC hazard is moderate and is summarized in Table 4-2. The potential MEC pathway is reflected as such in the CSM (Appendix J).

Table 4-2. MRS 1 – Range Complex Hazard Impact Assessment			
	Historical Observations (USACE 1991, 1997)	**Alion Site Inspection Observations**	**Qualitative Site Hazard**
MEC Type and Sensitivity			
Munitions Type	1946: two un-fuzed 6-lb M69 oil incendiary bombs, eleven 4-lb M54 incendiary bombs, five 4-lb M50Al incendiary bombs, several sand-filled practice rockets and 100-lb practice bomb remnants as well as three unexpended M1 black powder spotting charges 1997: M9 4.5-inch practice rocket; an AN-M20 or AN-M18 100-lb bomb burster tube with an intact point-detonating fuze; M38A2 100-lb practice bomb; M1 spotting charge debris; .50 caliber shell casings	MD observed: .50 caliber shell casings, bullets and jackets, one M38A2 100-lb practice bomb, and 2.25-inch practice rocket bodies and nose cones.	Moderate
MEC Sensitivity	Moderate to low	Low to Inert	Moderate
Site Access and Stability			
Accessibility	Limited restriction – No man-made restrictions. Non-DoD control.	Limited restriction – No man-made restrictions. A large percentage of the MRS is densely vegetated and undeveloped. Limited travel ways (e.g., trails, roads)	Moderate
Site Stability	Stable	Stable	Low
Human Interaction			
Population, Frequency of Use, Types of Activities	No documented injuries. MRS is approximately 1 mile from Westhampton, NY. There are greater than 26 inhabited structures within 2 miles of the MRS.	Visitor/trespassers, employees and construction workers have access to a portion of the MRS. Few site uses. Limited-low use by the public.	Moderate
Overall Site Hazard Ranking	Moderate		

4.3 Suffolk County AAF B&G Range FUDS MEC Hazard Summary

4.3.1 Table 4-2 summarizes the qualitative MEC hazard at MRS 1 at the Suffolk County AAF Bombing and Gunnery Range FUDS. Based on this qualitative MEC risk evaluation, the hazard to human receptors via contact with MEC at the FUDS is moderate due to the expected MEC

source (MEC/MD found historically and as late as 1997 and MD discovered during this SI), site characteristics (the site is stable with limited restrictions to access), and human interaction (public and employees may access the part of the site with some degree of frequency). Further evaluation of the MEC presence at this FUDS is recommended.

5. MUNITIONS CONSTITUENTS SAMPLING AND ANALYSIS

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

5.1 Data Evaluation Methodology

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

5.1.1 Refinement of Munitions Constituents

5.1.1.1 During the SI process, Alion evaluated MCs potentially associated with Suffolk County AAF Bombing and Gunnery Range. MCs were identified based on knowledge of munitions historically used at the FUDS. Information on historic use was obtained from munitions data sheets, historical documents, and other munitions reference documents.

5.1.1.2 The list of MCs identified for evaluation at MRS 1 at Suffolk County AAF Bombing and Gunnery Range is provided below and presented in further detail in Table 2-2.

Range Complex (MRS 1)

- Explosives (DNT and DNT breakdown products {2,4-DNT, 2,6-DNT, 2-amino-4,6-DNT, 2-nitrotoluene, 3-nitrotoluene, 4-amino-2,6-DNT, and 4-nitrotoluene}, NG, RDX, tetryl, and TNT and TNT breakdown products {2,4,6-TNT, 1,3,5-TNB, 1,3-DNB, 2-amino-4,6-DNT, 4-amino-2,6-DNT})

- Metals (aluminum[4], antimony, barium[4] , copper, iron[4], lead, and nickel)

5.1.2 Data Quality

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

1. Twenty surface soil samples[5] (collected 0-6 inches bgs)
2. Three duplicate[6] surface soil samples
3. Five background surface soil samples[7]
4. Eight subsurface soil samples (collected 6-12 inches bgs)
5. Two groundwater samples[8]
6. One duplicate[6] groundwater sample
7. Two background groundwater samples

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

- Analytical results bearing the U qualifier (indicating that the analyte was not detected at the given detection limit) were retained in the data set. The detection limit was used for non-detected samples. One of two detection limit types was used for this purpose, depending on the chemical class. For inorganics, the method detection limit (MDL) was used for non-detected samples[9]. For organics, the reporting limit (RL) was used for non-detected samples.

[4] Aluminum, barium and iron are not classified as hazardous substances under CERCLA. As per USACE guidance regarding non-CERCLA hazardous substances, the screening results for these MC will not be used as the sole basis for determining an RI/FS recommendation for the site.
[5] One surface soil sample (SCA-RC-SS-01-15) could not be collected do to extreme vegetative cover. A large swath of land (approximately 5 acres in size) in and around sample location SCA-RC-SS-01-15 was completely overgrown with brambles, thickets, heavy vegetation and poison ivy.
[6] Duplicate samples were treated as discrete samples. Duplicates were not averaged for the purpose of this risk screening.
[7] The physical characteristics of the surface and subsurface soils are similar at the FUDS; therefore background surface soil samples were used in background comparisons for both surface and subsurface soils.
[8] One groundwater sample (SCA-RC-GW-00-01) could not be collected due to the greater than expected depth to groundwater.
[9] Reporting limits were reported for antimony in the following five non-detected samples: SCA-BG-SS-01-05; SCA-RC-SB-02-08; SCA-RC-SS-01-16; SCA-RC-SS-01-07; and SCA-RC-SB-02-04. These values were assigned during the data validation process.

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

5.1.3 Screening Values

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

5.1.3.2 For the HHRA, EPA regional screening levels (SLs) for residential soil and industrial soil were selected as the screening criteria to select COPCs in soil. The SLs, referred to in this section as "regional SLs" (USEPA 2009a). SLs are developed from toxicity values and standard exposure factors to estimate contaminant concentrations that are protective of humans, including sensitive subgroups, over a lifetime. The regional SLs for residential and industrial soils consider exposures through direct contact (e.g., ingestion, dermal contact, inhalation of particulates and vapors). Incidental ingestion and dermal contact were identified as exposure pathways that could occur for MCs in surface soil at the FUDS (i.e., potentially complete pathways). Incidental ingestion, dermal contact, and inhalation of particulates were identified as potentially complete pathways for MCs in subsurface at the FUDS (Alion 2008b) Because the potentially complete pathways for surface and subsurface soils are limited to the pathways considered in the regional SLs, the regional SLs are appropriate screening tools for the HHRA. Regional tap water SLs available for screening groundwater reflect potential exposures via ingestion of drinking water and inhalation of volatile organic chemicals released during use of contaminated groundwater. Potentially complete pathways identified for MCs in groundwater in the SS-WP for human receptors included drinking water ingestion, incidental ingestion, and dermal contact. Potential exposures via dermal contact with groundwater are not considered within the regional SLs. The uncertainty associated with this limitation in the available groundwater SLs applied in the HHRA will be discussed in the Section 5.1.4.3 and Section 5.4.2.4.

5.1.3.3 No regional tap water SL is available for lead. Instead, the groundwater water screening criterion adopted for the HHRA is based on the maximum contaminant level (MCL) set under EPA's National Primary Drinking Water Regulations (EPA 2009b). MCLs are enforceable standards of the highest level of a contaminant that is allowed to be present in drinking water.

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

5.1.3.5 The regional SLs for direct contact with soil and tap water correspond to typical risk thresholds of a one-in-one million (1E-06) cancer risk or a non-carcinogenic hazard quotient (HQ) of 1.0. The HHRA screening levels for 2,4-DNT, 2-nitrotoluene, 4-nitrotoluene, RDX, and 2,4,6-TNT are based on carcinogenic endpoints. The HHRA screening levels for the explosives 1,3,5-TNB, 1,3-DNB, 2,6-DNT, 2-amino-4,6-DNT, 3-nitrotoluene, 4-amino-2,6-DNT, NG and tetryl, and the metals, aluminum, antimony, barium, copper, iron, lead (soil screening values) and nickel are based on non-carcinogenic endpoints. The MCL for lead, adopted for the screening criterion for groundwater in the HHRA, is not solely health based, but rather incorporates consideration of both feasibility and the effectiveness of available treatment technology and costs.

5.1.3.6 As discussed in the SS-WP (Alion 2008b) screening values derived from non-carcinogenic endpoints were divided by ten to provide a means to account for potential occurrence of adverse non-carcinogenic health effects due to exposure to multiple non-carcinogens. The exception to this adjustment is for lead. In the case of lead, regional SLs for soil are based on a blood lead level rather than a chronic daily intake as used for the other non-carcinogens; and regional tap water SLs are not solely health based; therefore, no adjustments were made to the lead SLs for use in evaluating soils. The application of HHRA screening values is described in Sections 5.1.3.10 and 5.1.3.11. Results of the HHRA are discussed in Section 5.4 and presented in Table 5-1 and 5-2.

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

5.1.3.8 Ecological soil screening levels (eco-SSLs) were used to screen for COPECs in soil. Eco-SSLs are screening level benchmark concentrations for contaminants in soil that have been determined to be protective of terrestrial-based ecological receptors that commonly come into

contact with soil or ingest biota that live in or on the soil. These benchmark concentrations generally are used for screening-level purposes to identify COPECs in upland soils that may require further evaluation. Eco-SSLs are derived using information on toxicity and estimated ingestion exposure doses for terrestrial ecological receptors. As described in the SS-WP CSM diagram for Suffolk County AAF Bombing and Gunnery Range, potentially complete transfer pathways for surface soils to an ecological receptor at the FUDS are incidental ingestion of, and dermal contact with MC in surface soil and ingestion of vegetation and game exposed to MC in surface soils. EPA guidance (2005d) states that because dermal and inhalation pathways are generally less significant compared to ingestion, they do not warrant inclusion in the derivation of eco-SSLs. Therefore, the eco-SSLs derived using exposure assumptions for ingestion only, are determined to be adequate for the purposes of the SLERA.

5.1.3.9 Eco-SSLs were used to screen all metals except iron, for which no screening level was available. No eco-SSLs were available from EPA for any of the explosives evaluated at the FUDS. Consistent with previous SLERAs completed under this program, screening values were obtained from Talmage et al. (1999) for these MCs. The eco-SSLs of 30 mg/kg for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on toxicity data for 2,4,6-TNT. There is no conclusive evidence on the dominant process by which 2,4,6-TNT is reduced in soil. One study indicated bacterial degradation of 2,4,6-TNT to 2- and 4- amino-DNT occurs under aerobic and anaerobic conditions (Vorbeck et al. 1998). An *in vitro* study completed in a *Psuedomonas bacterium* species suggests that 2,4,6-TNT breaks down to 2,4-DNT (Haidour and Ramos 1996). Laboratory studies support the observations of Haidour and Ramos (1996) that bacteria strains can generate 2,4-DNT from TNT (Martin et al. 1997). These findings provide some support for the use of TNT as a surrogate for DNT and DNT breakdown products. In addition the eco-SSL of 80 mg/kg for 2-amino-4,6-DNT is based on data for the chemical isomer, 4-amino-2,6-DNT. There is some uncertainty associated with adopting surrogate screening values for the MCs from 2,4,6-TNT and 4-amino-2,6-DNT. Some screening values are based on limited data; a limited amount of data were available for the derivation of eco-SSLs for 2-amino-4,6-DNT, 4-amino-2,6-DNT, RDX and tetryl. These eco-SSLs were derived using data from a single study in plants. No eco-SSLs were available for 1,3,5-TNB, 1,3-DNB and NG. No suitable surrogates were available for any of these MCs. The application of the ecological screening values is described in Sections 5.1.3.10 and 5.1.3.12. Results of the SLERA are discussed in Section 5.4 and presented in Tables 5-1.

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

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

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

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

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

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

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

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

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

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

5.1.4.1 The usability of the analytical data for making conclusions regarding risk was evaluated by comparing the RLs for explosives and the MDLs for metals never-detected in site samples to their respective screening values used for human health (Table 5-3) and ecological (Table 5-4) risk screening. If a chemical was not detected, but the detection limit (i.e., RL for explosives and

MDL for metals) was higher than the screening value, then the MQO for sensitivity was not met. Such non-detects will not be usable for demonstrating whether contamination is greater or less than the decision limit. Where no screening values are available, no conclusions can be drawn regarding the adequacy of the RLs for screening risk, and as a result, uncertainty is introduced into the risk assessment. In these instances, a weight-of-evidence approach is used in making risk-based decisions.

5.1.4.2 Table 5-3 shows a comparison of the RLs and human health screening values for all analytes not detected in soil and groundwater by media. In surface soil, all of the explosives analyzed were not detected above their respective RLs. In subsurface soil, none of the explosives were detected above their respective RLs; however, 3-nitrotoluene was detected above its MDL. With the exception of NG, the RLs for all never-detected MCs were lower than the respective soil screening criteria for soil adopted for the HHRA. The RL of 4 mg/kg for NG exceeds the residential soil screening value of 0.61 mg/kg, but not the industrial soil screening value of 6.2 mg/kg. Because the RL exceeds the screening value of 0.61 mg/kg adopted for NG, the MQO for sensitivity was not met and any reported non-detects (<RL) do not demonstrate NG contamination is less than the selected screening criteria. However, as described in Section 5.1.3.6, the residential screening value used in the HHRA is adjusted to account for the potential cumulative effect of simultaneous exposure to multiple non-carcinogens. Under the methodology employed in the HHRA for cumulative non-carcinogenic risk, ten chemicals are assumed to elicit toxic effects on the same target organ. At this FUDS, 20 MCs were identified. Each of these MCs is not anticipated to act by the same non-carcinogenic mode of action or at the same target organ. Further, 11 of these MCs were organics that were not detected with RLs greater than ten times lower than the respective screening value. Considering these factors, the RL for NG is determined to be adequate for the HHRA screening at Suffolk County AAF Bombing and Gunnery Range. As described in Section 5.1.3.4, the regional SLs for 2,-amino-4,6-DNT and 4-amino-2,6-DNT are based on toxicity information for 2,4-DNT. The RLs of 0.04 mg/kg for the amino-DNT isomers are below both the residential and industrial screening criteria developed from regional SLs for use in the HHRA (15 and 200 mg/kg, 2-amino-4,6-DNT; 15 and 190 mg/kg, 4-amino-2,6-DNT). Any uncertainties in the application of these screening levels to the risk assessment are, therefore, determined not to be significant for the HHRA.

5.1.4.3 In groundwater, none of the explosives analyzed were detected above their respective RLs. Of these never-detected analytes, 2-nitrotoluene and NG were the only MCs that had an RL that exceeded its screening criterion adopted for the HHRA (i.e., 2-nitrotoluene RL = 0.4 µg/L and screening criteria = 0.31 µg/L; NG RL = 20 µg/L and screening criteria, 0.37 µg/L). Because the RL is above the HHRA screening value for these two MCs, the MQO for sensitivity was not

met and any reported non-detects do not demonstrate contamination is less than the selected screening criteria. The disparity between the RL and screening criterion for 2-nitorotoluene was small and therefore, the 2-nitrotolune RL is considered adequate for the HHRA. For NG, as was the case for the screening criterion in soil, the regional SL was reduced to a factor of ten to account for potential exposure to multiple non-carcinogens. The adjustment results in a conservative screening level for NG, however, even if no adjustment was made to account for the potential for simultaneous non-carcinogenic exposures, the NG RL exceeds the regional tap water SL. Therefore, uncertainty associated with the inability to detect risk significant concentrations for human receptors exposed to NG via groundwater is introduced into the HHRA. As described in Section 5.1.3.4, the regional SLs for 2-amino-4,6-DNT and 4-amino-2,6-DNT isomers selected as MCs for the FUDS are based on toxicity information for 2,4-DNT. The RLs of 0.2 µg/L for the MCs are below screening criterion developed from regional SLs for use in the HHRA (7.3 µg/L, 2-amino-4,6-DNT and 4-amino-2,6-DNT), and therefore any uncertainties regarding the application of these screening levels to the HRRA are determined not to be significant. The lack of a dermal component in the screening levels used for explosives in the HRRA is not considered to be significant because the chemicals are relatively to highly soluble, and therefore the skin will provide an effective barrier to penetration. The ingestion pathway, which is represented in the EPA tap water SLs, is the most significant exposure for the explosive MCs.

5.1.4.4 With the exception of antimony, all of the metal MCs were detected in groundwater. The antimony MDL of 2.2 µg/L was elevated above the HHRA screening value of 1.5 µg/L. Because the antimony MDL is above the HHRA screening value, the antimony MQO for sensitivity was not met, and any reported non-detects do not demonstrate contamination less than the selected screening criteria. As described in Section 5.1.3.6, the HHRA screening value was derived by dividing the EPA regional tap water SL of 15 µg/L for antimony by a factor of ten to account for potential simultaneous exposure to multiple non-carcinogenic compounds. Although 20 MC were identified for groundwater at MRS 1, the majority of these MCs were not detected at RLs that were well below their screening level. Each of these MCs is not anticipated to act by the same non-carcinogenic mode of action or at the same target organ. The unadjusted EPA regional tap water SL of 15 µg/L for antimony falls above the MDL of 2.2 ug/L and only slightly below the RL of 20 µg/L for antimony. Considering these factors, the MDL for antimony is determined to be adequate for the HHRA screening at Suffolk County AAF Bombing and Gunnery Range.

5.1.4.5 Table 5-4 shows a comparison of the RLs and ecological screening values for analytes not detected in soil. All of the reporting limits for soil were below their respective soil SLs. The RLs for all of the not detected explosive MCs with screening values in soil at MRS 1 were below

their respective ecological screening values used in the SLERA. As described in Section 5.1.3.9 the use of surrogate values for screening values introduces some uncertainty into the risk assessment. The eco-SSL for 2,4,6-TNT was adopted for 2,4-DNT, 2,6-DNT, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene. The RLs of 0.04 mg/kg for 2,4-DNT and 2,6-DNT and 0.08 mg/kg for 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are well below the soil screening value of 30 mg/kg adopted for these MC in the SLERA. In addition, the eco-SSL for 2-amino-4,6-DNT was adopted for 4-amino-2,6-DNT. The RL for 4-amino-2,6-DNT of 0.04 mg/kg is well below the soil screening value of 80 mg/kg adopted for this MC in the SLERA. Therefore, any uncertainties associated with the use of 2,4,6-TNT and 2-amino-4,6-DNT as surrogates for these MCs are determined not to be significant for the SLERA. No ecological screening values are available for 1,3,5-TNB, 1,3-DNB or NG in soil; therefore, no conclusion regarding the adequacy of the RL for these MCs can be made.

5.2 Conceptual Site Model

5.2.0.1 The CSM diagram for Suffolk County AAF Bombing and Gunnery Range is provided in Appendix J. The CSM defines the source(s) (e.g., the secondary source/media), interaction (e.g., secondary release mechanism, tertiary source, exposure route), and receptors at the FUDS and provides an overview of complete and potentially complete pathways. The CSM is limited to those areas potentially impacted by MEC and/or MCs based on the site use and history. These areas are shown in Figure 2-2. In this SI Report, the CSM was revised from the version presented in the SS-WP to reflect the results of the human and ecological risk screening.

5.2.0.2 Current and future potential human receptors for surface soils at the Suffolk County AAF Bombing and Gunnery Range FUDS are expected to be residents, visitors/trespassers, employees, and construction workers. In addition, subsurface soil was also assumed to be a potentially complete exposure pathway for construction workers. Potential human receptors for groundwater include residents, visitors/trespassers, employees and construction workers. In the HHRA, the soil screening values for the visitors/trespassers and residents were based on regional SLs for direct contact with residential soil. The screening values used for employees and construction workers were based on the regional SLs for direct contact with industrial soil. The screening values for groundwater for all human receptors were based on regional SLs for tap water. The ecological receptors of concern for the FUDS are biota. Media specific screening values selected for the SLERA were applied uniformly to all ecological receptors. Surface water and sediment are not media of concern as there are no permanent surface water bodies in MRS 1 (Alion 2008b).

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

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

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

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

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

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

5.2.0.5 Once it has been determined that complete pathways exist between media and receptors, comparisons of maximum detected site concentrations to risk-based screening values are used to determine if the MC is a COPC or COPEC, depending on the risk screening being conducted (human health and ecological respectively). In the case that an MC is never-detected and the MQO for sensitivity is not met (i.e., for explosives RLs are greater than the respective screening levels for human or ecological receptors) the pathway remains potentially complete. Using a weight-of-evidence approach, a RI/FS may be recommended for MC where COPC and/or COPEC are identified. An NDAI designation may be recommended for MC if no COPCs or COPECs are identified through the risk screening process or if the weight-of-evidence evaluation indicates that COPCs/COPECs do not pose an unacceptable risk to the exposed receptor.

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

5.3 Background Data Evaluation

5.3.0.1 During the SI field activities, five background surface soil samples were obtained outside of the MRS from the north and northeastern portion of the FUDS. Background subsurface soils were not collected, however because similar geologic conditions are present in the surface and subsurface soils within the FUDS, background samples obtained from surface soil were used for background comparisons for both surface and subsurface soils. In addition two background groundwater samples were obtained from pre-existing wells located in the northwestern portion (within the Bombing sub-range and Ground Gunnery / Rocket sub-range "B") of the FUDS, Comparisons of concentrations of metals in background soil and groundwater samples to on-site soil (i.e., both surface and subsurface) and groundwater samples are shown in Tables 5-5 and 5-6, respectively.

5.3.0.2 In surface soil within MRS 1, barium, copper, iron, lead and nickel exhibited a maximum and/or mean concentration that was greater than the respective mean or maximum background value. Antimony was not detected in background soil and infrequently detected in site soils. The maximum detected antimony concentration in site soils was well above the MDL and RL for this MC and is a reliable indication that site antimony is elevated relative to background.

5.3.0.3 In subsurface soil within MRS 1, the site mean concentrations for every metal exceeded the mean background value. However, this comparison is not meaningful for antimony as it was not detected in site or background soils, resulting in a mean that reflects only the MDL. Only the site maximums for copper and lead exceeded their respective background values.

5.3.0.4 In groundwater, site barium, copper, iron, lead, and nickel had higher maximum and mean concentrations compared to background maximum and mean values. Antimony was not detected in site or background groundwater samples; consequently, a background comparison for antimony in groundwater is not meaningful for the SI evaluation.

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

5.4 Range Complex (MRS 1)

5.4.0.1 As presented in Section 5.1.1 the explosives DNT and DNT breakdown products, NG, RDX, tetryl, and TNT and TNT breakdown products and the metals aluminum, antimony,

barium, copper, iron, lead and nickel, were identified as MCs at MRS 1. Soils (both surface and subsurface) and groundwater were identified as media of concern for this area. Table 5-1 and 5-2 present results of the screening level analysis in these media. Details of the analysis and the resulting conclusions are provided below. Section 5.4.1 presents both the surface and subsurface soil screening analysis with the surface soil discussion preceding the subsurface. Section 5.4.2 presents the groundwater screening analysis discussion.

5.4.1 Soil Pathway and Screening Results

5.4.1.1 Surface soil was identified as a medium with a potentially complete pathway for residents, visitors/trespassers, employees, construction workers, and biota. As described in the SS-WP for Suffolk County AAF Bombing and Gunnery Range, incidental ingestion and dermal contact were identified as potential transfer pathways for MCs in surface soil to human receptors. For biota, incidental ingestion and dermal contact with MCs in surface soils as well as ingestion of vegetation and game exposed to MCs in surface soil were identified as potentially complete exposure pathways. A total of 23 surface soil samples, including three duplicates, were collected from within MRS 1. As previously discussed, one surface soil sample (SCA-RC-SS-01-15) could not be collected due to site-specific conditions which prevented access to the proposed location. All samples were analyzed for the explosives DNT and DNT breakdown products, NG, RDX, tetryl, and TNT and TNT breakdown products and the metals aluminum, antimony, barium, copper, iron, lead and nickel. Table 5-1 presents the analytical results for surface soils along with the human health and ecological screening values described previously in Section 5.1.3.

5.4.1.2 None of the explosives were detected in concentrations above their respective RLs in surface soil at MRS 1. Except for NG, the RLs for the not detected explosives were below the screening criteria selected for the HHRA, which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for risks to human receptors. Because the RL is above the NG screening value of 0.61 mg/kg, the MQO for sensitivity was not met and any reported non-detects for NG (<RL) do not demonstrate NG contamination is less than the selected screening criteria. As described in Section 5.1.4.2, the RL for NG is determined to be adequate for the HHRA screening at Suffolk County AAF Bombing and Gunnery Range.

5.4.1.3 All of the metals identified as MC at MRS 1 were detected in surface soil samples. Antimony, barium, copper, iron, lead and nickel were detected at a mean and/or maximum concentration that exceeded the background mean or maximum. Antimony and iron were detected at concentrations that exceeded their respective HHRA screening criteria used for screening soil for the resident and visitor/trespasser groups. These metals were identified as COPCs. The following factors were considered in a weight-of-evidence evaluation to determine

the risk significance for the two COPCs in surface soil at MRS 1:

- Antimony
  - Five of twenty three surface soil samples exceeded the HHRA screening criterion selected for residents and visitors/trespassers.
  - None of the twenty three surface soil samples exceeded the HHRA screening criterion selected for employees or construction workers.
  - None of the five background soil concentrations exceeded the HHRA screening criteria selected for residents, visitors/trespassers, employees, and construction workers.
  - Antimony was not detected in background surface soil samples, and the surface soil concentrations in MRS 1 were determined to be elevated relative to background.
- Iron
  - One of twenty three surface soil samples exceeded the HHRA screening criterion selected for residents and visitors/trespassers.
  - None of the twenty three surface soil samples exceeded the HHRA screening criterion selected for employees or construction workers.
  - One of the five background soil concentrations exceeded the HHRA screening criterion selected for residents and visitors/trespassers
  - None of the five background soil concentrations exceeded the HHRA screening criterion selected for employees and construction workers.
  - None of the 23 site surface soil concentrations exceeded the maximum background concentration.
  - 12 of 23 site surface soil concentrations exceeded the mean background concentration. The background maximum concentration exceeded the maximum detected in MRS 1; however, the mean concentration for MRS 1 exceeded the background mean.
  - Iron is not defined as a hazardous substance under CERCLA.

For antimony, of the 23 total surface soil samples in MRS 1, only five exceeded the 3.1 mg/kg HHRA screening criteria used for residents and visitors/trespassers (maximum concentration detected, 16.2 mg/kg). As described in Section 5.1.3.6, the HHRA screening value was derived by dividing the EPA regional SL for residential soil for antimony by ten to account for potential simultaneous exposure to multiple non-carcinogenic compounds. None of the site antimony concentrations exceed the unadjusted antimony EPA regional SL for residential soil. Given the infrequent detection of antimony in MRS 1, and the conservative HHRA screening level exposure to antimony in surface soil are not determined to represent an unacceptable risk to

human receptors. For iron, only the maximum value of 5,940 mg/kg detected in the MRS 1 surface soils exceeded the HHRA residential screening level of 5,500 mg/kg, and this exceedence was minimal. The background maximum concentration of 10,400 mg/kg for iron also exceeded this HHRA screening level. As with antimony, the HHRA screening level was derived by scaling the EPA regional SL for residential soil by a factor of ten to account for potential simultaneous exposure to multiple non-carcinogenic compounds. Thus the site maximum concentration would be well below the 55,000 mg/kg value used by EPA as the regional SL for iron in residential soils. Given the very slight exceedence of one sample, and considering the conservative HHRA screening level exposure to iron in surface soil is not determined to represent an unacceptable risk to human receptors. Therefore, while antimony and iron are COPCs for surface soil at MRS 1, based on the weight-of-evidence site surface soil is not considered to represent an unacceptable risk to human receptors.

5.4.1.4 As described above in Section 5.4.1.2, no explosive MCs were detected in surface soil at MRS 1. As shown in Table 5-4, the RLs for each of the MCs that have a screening value available were below the ecological screening criteria selected for the SLERA. This confirms the ability of the analytical techniques used to detect the MCs at levels sufficient to screen for risks to ecological receptors.

5.4.1.5 No eco-SSLs were available for 1,2-DNB, 1,3,5-TNB, or NG; therefore, a similar comparison for these MCs cannot be made. All three of these MC have relatively low octanol-water partitioning coefficients (K_{ow}) on the order of 1.2-2.7 (Talmage et al. 1999 and U.S. NLM 2008). In general, K_{ow} in this range indicate inefficient partitioning into the lipid component of organisms and a low ability to bioconcentrate or biomagnify up the food chain (USEPA 2005d and USEPA 2008b). In addition, NG is readily biodegradable, a characteristic which also makes food chain exposures unlikely (USACHPPM 2007). Based on the fact that 1,3-DNB, 1,3,5-TNB, and NG were not detected above their respective analytical RLs, and considering fate and transport characteristics, these MCs were not identified as COPECs in MRS 1. The decision is not expected to introduce an unacceptable level of uncertainty into the SLERA.

5.4.1.6 As described in Section 5.4.1.3, all of the metals identified as MC at MRS 1 were detected in surface soil samples. Of these, only antimony, barium, copper, iron, lead and nickel were detected at a maximum and/or mean concentration that exceeded their respective background maximum or mean concentrations. Maximum concentrations for three of the detected MCs exceeded the screening criteria selected for the SLERA; and were identified as COPECs. Maximum HQs for these MCs were as follows: antimony, HQ = 60; copper, HQ = 7.7:

and lead, HQ = 31. The following factors were considered in a weight-of-evidence evaluation to determine the risk significance for all three metal COPECs in surface soil as MRS 1:

- Antimony
  - Five of twenty three site surface soil samples exceed the eco-SSL.
  - None of the five background samples exceed the eco-SSL.
  - Antimony was not detected in background soil samples, and the surface soil concentrations in MRS 1 were therefore determined to be elevated relative to background.
  - The maximum HQ for site surface samples is 60.

- Copper
  - Four of twenty three site surface soil samples exceed the eco-SSL.
  - None of the five background samples exceed the eco-SSL.
  - Seven of twenty three site surface soil concentrations exceed the maximum background concentration.
  - Twenty two of twenty three site surface soil concentrations exceed the mean background concentration.
  - The maximum HQ for the site surface samples is 7.7.

- Lead
  - Nine of twenty three site surface soil samples exceed the eco-SSL.
  - None of the background soil samples exceed the eco-SSL.
  - Nine of twenty three site surface soil samples exceed the maximum background concentration.
  - Twenty one of twenty three site surface soil concentrations exceed the mean background concentration.
  - The maximum HQ for the site surface samples is 31.

The maximum HQs for all three COPECs were well above one (1) with a range from 7.7 for copper to 60 for antimony. The site sampling contains three or more locations where the concentrations of each COPEC exceeded the eco-SSL by approximately three or more. In addition, the maximum background concentrations for all three of these COPECs did not exceed the respective eco-SSLs Based on the weight-of-evidence surface soil may present a potential risk to biota at MRS 1.

5.4.1.7 Subsurface soil was identified as a medium with a potentially completed pathway for construction workers. As described in the SS-WP for Suffolk County AAF Bombing and Gunnery Range, incidental ingestion, dermal contact, and inhalation of particulates/vapors were identified as potential transfer pathways for MCs in subsurface soil to construction workers. A total of eight subsurface soil samples were collected from within MRS 1. All samples were analyzed for the explosives, DNT and DNT breakdown products, NG, RDX, tetryl, and TNT and TNT breakdown products and the metals aluminum, antimony, barium, copper, iron, lead and nickel. Table 5-1 presents the analytical results for subsurface soils along with the human health and ecological screening values described previously in Section 5.1.3.

5.4.1.8 Of the explosives, only 3-nitrotoluene was detected in concentrations above its respective MDL in subsurface soil at MRS 1, however, this quantity is below the respective RL. As described in Section 5.4.1.2 and shown in Table 5-3, the RLs for the not detected explosives were below the screening criteria used for construction workers, which confirms the ability of the analytical techniques to detect the MCs at levels sufficient to screen for risks to human receptors. Only one sample from MRS 1 exhibited a detection of 3-nitrotoluene. Both the estimated detected concentration and the RL for this sample were well below the construction worker HHRA screening criterion for 3-nitrotoluene. Although the pathway is complete for human receptors, no explosive COPCs were identified in surface soils at MRS 1.

5.4.1.9 Except for antimony, all of the metal MCs were detected in subsurface soil samples from MRS 1. The site maximum and/or mean concentrations for the detected MCs were greater than the respective background maximum or mean. The maximum detected concentrations for all metals detected in the MRS 1 subsurface soil were below their HHRA screening levels. Similarly, the maximum MDL and RL for antimony (not detected) were below its screening level selected for screening construction worker exposures. Even though the subsurface soil pathway is complete for human receptors, no COPCs were identified.

5.4.2 Groundwater Pathway and Screening Results

5.4.2.1 Groundwater was identified as a medium with a potentially complete pathway for residents, visitors/trespassers, employees and construction workers at MRS 1. As described in the SS-WP (Alion 2008b), drinking water ingestion, incidental ingestion, and dermal contact were identified as potential transfer pathways for MCs in groundwater to human receptors. Two groundwater samples and one duplicate groundwater sample were collected from within MRS 1. As previously discussed, one groundwater sample (SCA-RC-GW-00-01) could not be collected due to site specific hydrologic conditions and equipment constraints. All samples were analyzed for the explosives DNT and DNT breakdown products, NG, RDX, tetryl, and TNT and TNT

breakdown products and the metals aluminum, antimony, barium, copper, iron, lead and nickel. Table 5-2 presents the analytical results for groundwater, along with the human health screening values described previously in Section 5.1.3.

5.4.2.2 No explosives were detected in concentrations above their respective RLs in groundwater collected at MRS 1. Except for 2-nitrotoluene and NG, the RLs for the explosive MCs were below their respective HHRA screening levels (Table 5-3), which confirms the ability of the analytical techniques used to detect the MCs at levels sufficient to screen for risks to human receptors. Because the RLs are above the HHRA screening values for these two MC, the MQOs for sensitivity was not met and any reported non-detects do not demonstrate contamination is less than the selected screening criteria. As described in Section 5.1.4.3, the RL for 2-nitrotolune is considered adequate for the HHRA. For NG, as described in Section 5.1.3.6 the EPA regional tap water SL was scaled to a factor of ten to account for potential exposure to multiple non-carcinogens, however, the NG RL of 20 µg/L exceeds even the unadjusted EPA regional residential tap water concentration of 3.7 µg/L. However, given the fact that NG was not detected at risk significant levels in the soil, this MC is unlikely to be present at risk significant levels for humans exposed to groundwater at MRS 1. No explosives were identified as COPCs in groundwater at MRS 1.

5.4.2.3 All of the metal MCs except antimony were detected in site and background groundwater samples. The antimony MDL of 2.2 µg/L exceeded the HHRA screening criteria of 1.5 µg/L; therefore, the MQO for sensitivity was not met and any reported non-detects do not demonstrate contamination is less than the selected screening criterion. However, as discussed in Section 5.1.4.4, the MDL for antimony is considered adequate for the HHRA.

5.4.2.4 For the detected metals in groundwater, the site maximum and/or mean concentrations exceeded the background maximum or mean concentrations for barium, copper, iron, lead and nickel. As described in Section 5.1.3.2 dermal exposure (a potentially complete pathway at the FUDS) is not considered within the derivation of the regional SLs for tapwater, which provide the basis for the screening criteria developed for the HHRA. Therefore, some uncertainty regarding the ability of these screening levels to protect against all potentially complete pathways identified at the FUDS is present. However, oral exposure to drinking water is considered to be the most significant exposure pathway at the FUDS. USEPA (2004) concludes that dermal exposure to antimony, barium, copper, and nickel will contribute less than 10 percent of the oral dose value (relative contributions are modeled using a default exposure scenario which considers showering for 35 minutes per day and drinking 2 liters of water per day). The screening criterion for lead is not solely risk based; therefore, a similar comparison regarding the

relative contribution of various exposure pathways to total exposure is not meaningful in the context of determining the adequacy of the screening criterion. Aluminum and iron are non-CERCLA chemicals. Of the metals elevated over background concentrations, only iron and lead had site maximum concentrations that exceed the HHRA screening criteria for tap water and were identified as COPCs. Aluminum also was selected as a COPC because the maximum site concentration exceeded the HHRA screening criterion. However, the site maximum and mean concentrations are below the respective background concentrations and no additional risk exists based on FUDS related activities.

The following factors were considered in a weight-of-evidence evaluation to determine the risk significance for iron and lead in groundwater at MRS 1:

- Iron
    - Three of three site groundwater samples exceed the HHRA screening criterion.
    - Two of two background groundwater samples exceed the HHRA screening criterion.
    - One of three site groundwater concentrations exceeds the background maximum groundwater concentration. The highest iron concentration was 39,100 ug/L.
    - One of three site ground water concentrations exceeds the background mean groundwater concentration.
    - Iron is not defined as a hazardous substance under CERCLA.

- Lead
    - Two of three site groundwater samples exceed the HHRA screening criterion.
    - None of the two background groundwater samples exceed the HHRA screening criterion.
    - Two of three site ground water concentrations exceed the background maximum groundwater concentration. The highest lead concentration was 26 ug/L.
    - Two of three site groundwater concentrations exceed the background mean groundwater concentration.

The HHRA screening criteria of iron was derived by reducing the EPA regional tap water concentration by a factor of ten to account for simultaneous exposure to multiple MCs. Although twenty MCs were identified for groundwater at MRS 1, the majority were not detected at RLs that were well below the screening criteria. All of the site and background groundwater concentrations exceed this conservative HHRA screening value used for iron. However, only the site maximum concentration exceeds the unadjusted EPA regional tap water concentration, and by only by a factor of 1.5. Based on the conservatism in the HHRA screening value used to

evaluate iron in groundwater, the exposure to concentrations detected in MRS 1 are not likely to produce unacceptable risks to human receptors. The screening criteria used for iron is 2,600 ug/L.

For lead, site concentrations exceed the screening criterion used in the HHRA. The lead screening value of 15µg/L is an action level that triggers corrective actions by water providers when more than 10 percent of tap water samples exceed this value. Although the site groundwater exceeds this lead action level, the maximum is only 1.7 times higher and reflects raw groundwater rather than finished tap water. The weight-of-evidence for human exposures to lead in groundwater from MRS 1 indicates that these concentrations are not likely to produce unacceptable risks. Therefore, while iron and lead are COPCs for groundwater at MRS 1, based on the weight-of-evidence evaluation, site groundwater is not considered to represent an unacceptable risk to human receptors.

Table 5-1 Summary of Soil Analytical Results

			Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco-SSLs						
		Sample Name:				SCA-RC-SS-01-01	SCA-RC-SS-01-02	SCA-RC-SS-01-03	SCA-RC-SS-01-04	FD #1	SCA-RC-SS-01-05
		Sample Date:				4/29/2009	4/29/2009	4/28/2009	4/28/2009	4/28/2009	4/29/2009
		Parent Name:								SCA-RC-SS-01-04	
		MRS:				MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1
Analyte	CAS	Unit	(mg/kg)	(mg/kg)	(mg/kg)						
Explosives											
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	220	2,700	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	19	79	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15	200 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZ	121-82-4	mg/kg	5.5	24	100 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILI	479-45-8	mg/kg	24	250	25 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Metals											
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	7,000.00 J	2,750.00 J	751.00 J	784.00 J	710.00 J	1,880.00 J
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	0.18 U	0.20 U	***3.50***	***16.20***	***15.50***	0.17 U
BARIUM	7440-39-3	mg/kg	1,500	19,000	330 [g]	9.40	7.60	1.00	1.40	1.70	4.60
COPPER	7440-50-8	mg/kg	310	4,100	28 [h]	1.70	1.50	11.80	*81.60*	*76.10*	1.50
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	**5,940.00**	3,360.00	1,410.00	2,400.00	4,990.00	1,930.00
LEAD	7439-92-1	mg/kg	400	800	11 [i]	4.10	7.60	*37.00*	*345.00*	*346.00*	*11.50*
NICKEL	7440-02-0	mg/kg	150	2,000	38 [j]	3.10	1.30	0.48 J	0.60 J	0.46 J	0.92

[a] Screening levels for residential and industrial soils are derived from ORNL 2009. ORNL. 2009. Screening levels for chemical contaminants. Available at:epa-prgs.ornl.gov/chemicals/index.shtml. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.

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

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

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156. Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT. The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

[e] EPA. 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 23 July 2009.

[f] EPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 23 July 2009.

[g] EPA. 2005b. Ecological Soil Screening Level for Barium. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf. Accessed 23 July 2009.

[h] EPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 23 July 2009.

[i] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 23 July 2009.

[j] EPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 23 July 2009.

CAS = Chemical Abstract Service.
eco-SSL = Ecological soil screening level.
EPA = United States Environmental Protection Agency.
FD = Field duplicate.
IRIS = EPA's Integrated Risk Information System.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
NSL = No screening level.
ORNL = Oak Ridge National Laboratory.
RfD = Reference dose.
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) (with exceptions for antimony described in the text in Section 5.1.2.1).
- = Not analyzed.

Shaded and bolded values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).

Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-1 Summary of Soil Analytical Results

			Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco-SSLs						
		Sample Name:				FD #2	SCA-RC-SS-01-06	SCA-RC-SS-01-07	SCA-RC-SS-01-08	SCA-RC-SS-01-09	SCA-RC-SS-01-10
		Sample Date:				4/29/2009	4/28/2009	4/28/2009	4/28/2009	4/28/2009	4/28/2009
		Parent Name:				SCA-RC-SS-01-05					
		MRS:				MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1
Analyte	CAS	Unit	(mg/kg)	(mg/kg)	(mg/kg)						
Explosives											
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	220	2,700	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	19	79	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15	200 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZ	121-82-4	mg/kg	5.5	24	100 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILI	479-45-8	mg/kg	24	250	25 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Metals											
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	1,880.00 J	3,510.00 J	673.00 J	1,560.00 J	1,300.00 J	4,080.00 J
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	***3.20***	0.22 U	1.80 U	0.21 U	0.16 U	0.22 U
BARIUM	7440-39-3	mg/kg	1,500	19,000	330 [g]	4.10	5.60	3.90	2.40	3.20	5.60
COPPER	7440-50-8	mg/kg	310	4,100	28 [h]	1.60	1.70	1.20	0.68 J	1.20	2.10
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	2,010.00	3,680.00	977.00	1,720.00	1,430.00	4,110.00
LEAD	7439-92-1	mg/kg	400	800	11 [i]	9.10	7.30	9.60	2.30	5.10	8.60
NICKEL	7440-02-0	mg/kg	150	2,000	38 [j]	0.58 J	1.80	0.42 J	0.63 J	0.68 J	1.60

[a] Screening levels for residential and industrial soils are derived from ORNL 2009. ORNL. 2009. Screening levels for chemical contaminants. Available at:epa-prgs.ornl.gov/chemicals/index.shtml. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.

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

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

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156. Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT. The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

[e] EPA. 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 23 July 2009.

[f] EPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 23 July 2009.

[g] EPA. 2005b. Ecological Soil Screening Level for Barium. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf. Accessed 23 July 2009.

[h] EPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 23 July 2009.

[i] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 23 July 2009.

[j] EPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 23 July 2009.

CAS = Chemical Abstract Service.
eco-SSL = Ecological soil screening level.
EPA = United States Environmental Protection Agency.
FD = Field duplicate.
IRIS = EPA's Integrated Risk Information System.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
NSL = No screening level.
ORNL = Oak Ridge National Laboratory.
RfD = Reference dose.
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) (with exceptions for antimony described in the text in Section 5.1.2.1).
- = Not analyzed.

Shaded and bolded values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).
Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-1 Summary of Soil Analytical Results

Analyte	CAS	Unit	Screening Levels Residential Soil Direct Contact [a,b] (mg/kg)	Screening Levels Industrial Soil- Direct [a,b] (mg/kg)	Interim Eco-SSLs (mg/kg)	SCA-RC-SS-01-11 4/29/2009 MRS 1	SCA-RC-SS-01-12 4/30/2009 MRS 1	SCA-RC-SS-01-13 4/30/2009 MRS 1	FD #3 4/30/2009 SCA-RC-SS-01-13 MRS 1	SCA-RC-SS-01-14 4/29/2009 MRS 1	SCA-RC-SS-01-16 4/28/2009 MRS 1
Explosives											
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	220	2,700	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	19	79	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15	200 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZ	121-82-4	mg/kg	5.5	24	100 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILI	479-45-8	mg/kg	24	250	25 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Metals											
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	1,010.00 J	3,320.00 J	2,520.00 J	2,690.00 J	1,870.00 J	2,190.00 J
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	0.17 U	0.17 U	0.17 U	0.16 U	0.17 U	2.00 U
BARIUM	7440-39-3	mg/kg	1,500	19,000	330 [g]	2.10	4.80	6.40	7.50	5.20	7.40
COPPER	7440-50-8	mg/kg	310	4,100	28 [h]	1.20	2.90	1.60	2.00	1.40	2.60
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	1,490.00	3,620.00	3,000.00	3,200.00	1,920.00	3,060.00
LEAD	7439-92-1	mg/kg	400	800	11 [i]	7.30	*11.30*	5.50	5.90	4.80	*50.70*
NICKEL	7440-02-0	mg/kg	150	2,000	38 [j]	0.53 J	1.20	0.93	1.00	0.60 J	1.00

[a] Screening levels for residential and industrial soils are derived from ORNL 2009. ORNL. 2009. Screening levels for chemical contaminants. Available at:epa-prgs.ornl.gov/chemicals/index.shtml. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.

[b] For non-carcinogens, with the exception of lead, the soil residential and industrial soil screening level was divided by 10. No adjustment was

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

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156. Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT. The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

[e] EPA. 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 23 July 2009.

[f] EPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 23 July 2009.

[g] EPA. 2005b. Ecological Soil Screening Level for Barium. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf. Accessed 23 July 2009.

[h] EPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 23 July 2009.

[i] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 23 July 2009.

[j] EPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 23 July 2009.

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eco-SSL = Ecological soil screening level.
EPA = United States Environmental Protection Agency.
FD = Field duplicate.
IRIS = EPA's Integrated Risk Information System.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
NSL = No screening level.
ORNL = Oak Ridge National Laboratory.
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Shaded and bolded values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).

Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-1 Summary of Soil Analytical Results

			Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco-SSLs						
		Sample Name:				SCA-RC-SS-01-17	SCA-RC-SS-01-18	SCA-RC-SS-01-19	SCA-RC-SS-01-20	SCA-RC-SS-01-21	SCA-RC-SB-02-01
		Sample Date:				4/28/2009	4/28/2009	4/29/2009	4/27/2009	4/27/2009	4/29/2009
		Parent Name:									
		MRS:				MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1
Analyte	CAS	Unit	(mg/kg)	(mg/kg)	(mg/kg)						
Explosives											
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	220	2,700	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	19	79	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15	200 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZ	121-82-4	mg/kg	5.5	24	100 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILI	479-45-8	mg/kg	24	250	25 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Metals											
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	4,230.00 J	702.00 J	2,520.00 J	1,110.00 J	3,430.00 J	6,780.00 J
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	0.21 U	***5.10***	0.17 U	0.20 U	0.23 U	0.17 U
BARIUM	7440-39-3	mg/kg	1,500	19,000	330 [g]	5.20	1.00	4.70	2.30	10.90	9.20
COPPER	7440-50-8	mg/kg	310	4,100	28 [h]	1.00	*215.00*	1.80	1.40	*90.90*	1.80
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	4,020.00	1,530.00	2,780.00	1,920.00	3,970.00	5,610.00
LEAD	7439-92-1	mg/kg	400	800	11 [i]	2.80	*52.10*	7.80	*15.20*	*11.50*	4.00
NICKEL	7440-02-0	mg/kg	150	2,000	38 [j]	1.50	0.50 J	0.99	0.39 J	1.50	3.00

[a] Screening levels for residential and industrial soils are derived from ORNL 2009. ORNL. 2009. Screening levels for chemical contaminants. Available at:epa-prgs.ornl.gov/chemicals/index.shtml. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.

[b] For non-carcinogens, with the exception of lead, the soil residential and industrial soil screening level was divided by 10. No adjustment was

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

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156. Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT. The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

[e] EPA. 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 23 July 2009.

[f] EPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 23 July 2009.

[g] EPA. 2005b. Ecological Soil Screening Level for Barium. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf. Accessed 23 July 2009.

[h] EPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 23 July 2009.

[i] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 23 July 2009.

[j] EPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 23 July 2009.

CAS = Chemical Abstract Service.
eco-SSL = Ecological soil screening level.
EPA = United States Environmental Protection Agency.
FD = Field duplicate.
IRIS = EPA's Integrated Risk Information System.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
NSL = No screening level.
ORNL = Oak Ridge National Laboratory.
RfD = Reference dose.
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) (with exceptions for antimony described in the text in Section 5.1.2.1).
- = Not analyzed.

Shaded and bolded values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).
Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-1 Summary of Soil Analytical Results

			Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco-SSLs						
Sample Name:						SCA-RC-SB-02-02	SCA-RC-SB-02-03	SCA-RC-SB-02-04	SCA-RC-SB-02-05	SCA-RC-SB-02-06	SCA-RC-SB-02-07	SCA-RC-SB-02-08
Sample Date:						4/29/2009	4/28/2009	4/28/2009	4/29/2009	4/28/2009	4/28/2009	4/28/2009
Parent Name:												
MRS:						MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1	MRS 1
Analyte	**CAS**	**Unit**	**(mg/kg)**	**(mg/kg)**	**(mg/kg)**							
Explosives												
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	220	2,700	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	19	79	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15	200 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	0.08 U	0.08 U	0.04 J	0.08 U	0.08 U	0.08 U	0.08 U
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U	0.04 U
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZ	121-82-4	mg/kg	5.5	24	100 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILI	479-45-8	mg/kg	24	250	25 [d]	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U	0.08 U
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U	4.00 U
Metals												
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	5,290.00 J	608.00 J	883.00 J	2,460.00 J	5,840.00 J	4,210.00 J	2,850.00 J
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	0.17 U	0.21 U	1.90 U	0.16 U	0.22 U	0.22 U	2.00 U
BARIUM	7440-39-3	mg/kg	1,500	19,000	330 [g]	9.60	1.80	1.30	6.30	8.90	5.90	4.60
COPPER	7440-50-8	mg/kg	310	4,100	28 [h]	1.50	6.80	*86.30*	1.20	2.10	0.72 J	1.40
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	4,780.00	966.00	1,520.00	2,580.00	5,410.00	4,090.00	3,220.00
LEAD	7439-92-1	mg/kg	400	800	11 [i]	3.10	35.30	587.00	2.30	3.80	2.20	5.20
NICKEL	7440-02-0	mg/kg	150	2,000	38 [j]	2.70	0.12 J	0.22 J	0.96	2.60	1.70	1.00

[a] Screening levels for residential and industrial soils are derived from ORNL 2009. ORNL. 2009. Screening levels for chemical contaminants.
Available at:epa-prgs.ornl.gov/chemicals/index.shtml. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.
[b] For non-carcinogens, with the exception of lead, the soil residential and industrial soil screening level was divided by 10. No adjustment was
[c] The ORNL screening level for 2-amino-4,6-dinitrotoluene and 4-amino-2,6-dinitrotoluene is based on toxicity information for 2,4-dinitrotoluene (from EPA's IRIS).
[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156.
Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT.
The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.
[e] EPA. 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 23 July 2009.
[f] EPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 23 July 2009.
[g] EPA. 2005b. Ecological Soil Screening Level for Barium. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf. Accessed 23 July 2009.
[h] EPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 23 July 2009.
[i] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 23 July 2009.
[j] EPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 23 July 2009.

CAS = Chemical Abstract Service.
eco-SSL = Ecological soil screening level.
EPA = United States Environmental Protection Agency.
FD = Field duplicate.
IRIS = EPA's Integrated Risk Information System.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
NSL = No screening level.
ORNL = Oak Ridge National Laboratory.
RfD = Reference dose.
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) (with exceptions for antimony described in the text in Section 5.1.2.1).
- = Not analyzed.

Shaded and bolded values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).
Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-1 Summary of Soil Analytical Results

			Screening Levels Residential Soil Direct Contact [a,b]	Screening Levels Industrial Soil- Direct [a,b]	Interim Eco-SSLs					
		Sample Name:				SCA-BG-SS-01-01	SCA-BG-SS-01-02	SCA-BG-SS-01-03	SCA-BG-SS-01-04	SCA-BG-SS-01-05
		Sample Date:				4/27/2009	4/30/2009	4/30/2009	4/30/2009	4/27/2009
		Parent Name:								
		MRS:								
Analyte	CAS	Unit	(mg/kg)	(mg/kg)	(mg/kg)					
Explosives										
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	220	2,700	NSL	-	-	-	-	-
1,3-DINITROBENZENE	99-65-0	mg/kg	0.61	6.2	NSL	-	-	-	-	-
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	19	79	30 [d]	-	-	-	-	-
2,4-DINITROTOLUENE	121-14-2	mg/kg	1.6	5.5	30 [d]	-	-	-	-	-
2,6-DINITROTOLUENE	606-20-2	mg/kg	6.1	62	30 [d]	-	-	-	-	-
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	15	200 [c]	80 [d]	-	-	-	-	-
2-NITROTOLUENE	88-72-2	mg/kg	2.9	13	30 [d]	-	-	-	-	-
3-NITROTOLUENE	99-08-1	mg/kg	120	1,200	30 [d]	-	-	-	-	-
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	15 [c]	190 [c]	80 [d]	-	-	-	-	-
4-NITROTOLUENE	99-99-0	mg/kg	30	110	30 [d]	-	-	-	-	-
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZ	121-82-4	mg/kg	5.5	24	100 [d]	-	-	-	-	-
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILI	479-45-8	mg/kg	24	250	25 [d]	-	-	-	-	-
NITROGLYCERINE	55-63-0	mg/kg	0.61	6.2	NSL	-	-	-	-	-
Metals										
ALUMINUM	7429-90-5	mg/kg	7,700	99,000	pH > 5.5 [e]	**10,600.00 J**	216.00 J	224.00 J	798.00 J	668.00 J
ANTIMONY	7440-36-0	mg/kg	3.1	41	0.27 [f]	0.25 U	0.16 U	0.16 U	0.16 U	1.80 U
BARIUM	7440-39-3	mg/kg	1,500	19,000	330 [g]	14.40	0.86	1.70	2.50	1.20
COPPER	7440-50-8	mg/kg	310	4,100	28 [h]	2.20	0.18 J	0.53 J	1.10	0.45 J
IRON	7439-89-6	mg/kg	5,500	72,000	NSL	**10,400.00**	285.00	228.00	1,070.00	974.00
LEAD	7439-92-1	mg/kg	400	800	11 [i]	*11.00*	1.60	2.00	1.20	3.30
NICKEL	7440-02-0	mg/kg	150	2,000	38 [j]	3.40	0.10 J	0.10 J	0.73	0.36 J

[a] Screening levels for residential and industrial soils are derived from ORNL 2009. ORNL. 2009. Screening levels for chemical contaminants. Available at:epa-prgs.ornl.gov/chemicals/index.shtml. U.S. Department of Energy, Oak Ridge National Laboratory and U.S. Environmental Protection Agency.

[b] For non-carcinogens, with the exception of lead, the soil residential and industrial soil screening level was divided by 10. No adjustment was

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

[d] Talmage et al. 1999. Nitroaromatic munition compounds: environmental effects and screening values. Rev. Environ. Contam. Toxicol. 161: 1-156. Values for 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-nitrotoluene, 3-nitrotoluene, and 4-nitrotoluene are based on the toxicity of 2,4,6-TNT. The value for 4-amino-2,6-dinitrotoluene is based on the toxicity of 2-amino-4,6-dinitrotoluene.

[e] EPA. 2003. Ecological Soil Screening Level for Aluminum. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 23 July 2009.

[f] EPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 23 July 2009.

[g] EPA. 2005b. Ecological Soil Screening Level for Barium. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf. Accessed 23 July 2009.

[h] EPA. 2007a. Ecological Soil Screening Level for Copper. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 23 July 2009.

[i] EPA. 2005c. Ecological Soil Screening Level for Lead. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 23 July 2009.

[j] EPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 23 July 2009.

CAS = Chemical Abstract Service.
eco-SSL = Ecological soil screening level.
EPA = United States Environmental Protection Agency.
FD = Field duplicate.
IRIS = EPA's Integrated Risk Information System.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
NSL = No screening level.
ORNL = Oak Ridge National Laboratory.
RfD = Reference dose.
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) (with exceptions for antimony described in the text in Section 5.1.2.1).
- = Not analyzed.

Shaded and bolded values represent exceedance of human health screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, surface soils were compared to both residential and industrial screening criteria; subsurface soils were compared to industrial screening criteria only).
Shaded and italicized values represent exceedance of ecological screening criteria (In accordance with the receptors outlined in the SS-WP Addendum, subsurface soils were not compared to ecological screening values)

Table 5-2 Summary of Groundwater Analytical Results

			Human Health Levels of Concern [a, b]					
		Sample Name:		SCA-RC-GW-00-02	SCA-RC-GW-00-03	FD #1	SCA-BG-GW-00-01	SCA-BG-GW-00-02
		Sample Date:		4/27/2009	4/29/2009	4/29/2009	4/29/2009	4/29/2009
		Parent Name:				SCA-RC-GW-00-03		
		MRS:		MRS 1	MRS 1	MRS 1		
Analyte	**CAS**	**Unit**	**(µg/L)**					
Explosives								
1,3,5-TRINITROBENZENE	99-35-4	µg/L	110	0.20 U	0.20 U	0.20 U	-	-
1,3-DINITROBENZENE	99-65-0	µg/L	0.37	0.20 U	0.20 U	0.20 U	-	-
2,4,6-TRINITROTOLUENE	118-96-7	µg/L	2.2	0.20 U	0.20 U	0.20 U	-	-
2,4-DINITROTOLUENE	121-14-2	µg/L	0.22	0.20 U	0.20 U	0.20 U	-	-
2,6-DINITROTOLUENE	606-20-2	µg/L	3.7	0.20 U	0.20 U	0.20 U	-	-
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	µg/L	7.3 [c]	0.20 U	0.20 U	0.20 U	-	-
2-NITROTOLUENE	88-72-2	µg/L	0.31	0.40 U	0.40 U	0.40 U	-	-
3-NITROTOLUENE	99-08-1	µg/L	73	0.40 U	0.40 U	0.40 U	-	-
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	µg/L	7.3 [c]	0.20 U	0.20 U	0.20 U	-	-
4-NITROTOLUENE	99-99-0	µg/L	4.2	0.40 U	0.40 U	0.40 U	-	-
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE)	121-82-4	µg/L	0.61	0.40 U	0.40 U	0.40 U	-	-
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILINE)	479-45-8	µg/L	15	0.40 U	0.40 U	0.40 U	-	-
NITROGLYCERINE	55-63-0	µg/L	0.37	20.00 U	20.00 U	20.00 U	-	-
Metals								
ALUMINUM	7429-90-5	µg/L	3,700	**6,020.00 J**	**6,070.00 J**	**5,450.00 J**	**5,930.00 J**	**6,950.00 J**
ANTIMONY	7440-36-0	µg/L	2	2.20 U	2.20 U	2.20 U	2.20 U	2.20 U
BARIUM	7440-39-3	µg/L	730	209.00	47.40	35.30	54.90	50.90
COPPER	7440-50-8	µg/L	150	88.50	42.90	21.50	35.30	48.80
IRON	7439-89-6	µg/L	2,600	**39,100.00**	**20,200.00**	**11,900.00**	**23,300.00**	**19,100.00**
LEAD	7439-92-1	µg/L	15 [d]	**26.00**	**18.40**	10.20	11.20	12.30
NICKEL	7440-02-0	µg/L	73	71.10	30.80	27.70	36.80	29.00

[a] Screening levels for groundwater are derived from USEPA 2009. Regional Screening Levels. Available from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/index.htm. Accessed 23 July 2009.

[b] The screening level for non-carcinogens with the exception of lead were divided by 10 to account for potential exposure to multiple non-carcinogens. No adjustments were made for carcinogens or lead.

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

[d] The screening level for lead is the constituents MCL. USEPA 2009. National Drinking Water Criteria, List of Contaminants and MCLs. U.S. Environmental Protection Agency. Available at: http://www.epa.gov/ogwdw/consumer/pdf/mcl.pdf. Accessed 23 January 2009.

CAS = Chemical Abstract Service.
FD = Field duplicate.
IRIS = EPA's Integrated Risk Information System.
J = Analyte is present. Reported value may not be accurate or precise.
µg/L = Microgram per liter.
MRS = Munitions Response Site.
U = Not detected. Values for organics are reporting limits (RLs); values for inorganics are method detection limits (MDLs) .
USEPA = United States Environmental Protection Agency.
- = Not analyzed.

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

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

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Screening Value - Resident, Trespasser/Visitor [b]	Screening Value - Workers [b]
Surface and Subsurface Soil						
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	0.04	0.04	220	2700
1,3-DINITROBENZENE	99-65-0	mg/kg	0.04	0.04	0.61	6.2
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	0.04	0.04	19	79
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	1.6	5.5
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	6.1	62
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	15	200
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	2.9	13
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	15	190
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	30	110
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE)	121-82-4	mg/kg	0.08	0.08	5.5	24
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILINE)	479-45-8	mg/kg	0.08	0.08	24	250
NITROGLYCERINE	55-63-0	mg/kg	4	4	0.61	6.2
Groundwater						
1,3,5-TRINITROBENZENE	99-35-4	µg/L	0.2	0.2	110	110
1,3-DINITROBENZENE	99-65-0	µg/L	0.2	0.2	0.37	0.37
2,4,6-TRINITROTOLUENE	118-96-7	µg/L	0.2	0.2	2.2	2.2
2,4-DINITROTOLUENE	121-14-2	µg/L	0.2	0.2	0.22	0.22
2,6-DINITROTOLUENE	606-20-2	µg/L	0.2	0.2	3.7	3.7
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	µg/L	0.2	0.2	7.3	7.3
2-NITROTOLUENE	88-72-2	µg/L	0.4	0.4	0.31	0.31
3-NITROTOLUENE	99-08-1	µg/L	0.4	0.4	73	73
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	µg/L	0.2	0.2	7.3	7.3
4-NITROTOLUENE	99-99-0	µg/L	0.4	0.4	4.2	4.2
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE)	121-82-4	µg/L	0.4	0.4	0.61	0.61
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILINE)	479-45-8	µg/L	0.4	0.4	15	15
NITROGLYCERINE	55-63-0	µg/L	20	20	0.37	0.37
ANTIMONY	7440-36-0	µg/L	2.2	2.2	1.5	1.5

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

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

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

Analyte	CAS	Units	Minimum Non-Detect Concentration [a]	Maximum Non-Detect Concentration [a]	Ecological Screening Value [b]
Surface Soil					
1,3,5-TRINITROBENZENE	99-35-4	mg/kg	0.04	0.04	NSL
1,3-DINITROBENZENE	99-65-0	mg/kg	0.04	0.04	NSL
2,4,6-TRINITROTOLUENE	118-96-7	mg/kg	0.04	0.04	30
2,4-DINITROTOLUENE	121-14-2	mg/kg	0.04	0.04	30
2,6-DINITROTOLUENE	606-20-2	mg/kg	0.04	0.04	30
2-AMINO-4,6-DINITROTOLUENE	35572-78-2	mg/kg	0.04	0.04	80
2-NITROTOLUENE	88-72-2	mg/kg	0.08	0.08	30
3-NITROTOLUENE	99-08-1	mg/kg	0.08	0.08	30
4-AMINO-2,6-DINITROTOLUENE	19406-51-0	mg/kg	0.04	0.04	80
4-NITROTOLUENE	99-99-0	mg/kg	0.08	0.08	30
RDX (HEXAHYDRO-1,3,5-TRINITRO-1,3,5-TRIAZINE)	121-82-4	mg/kg	0.08	0.08	100
TETRYL (N-METRYL-N,2,4,6-TETRANITROANILINE)	479-45-8	mg/kg	0.08	0.08	25
NITROGLYCERINE	55-63-0	mg/kg	4	4	NSL

[a] Detection limits are reporting limits.
[b] Sources and derivations of screening criteria for all media are detailed in Tables 5-1 through 5-2.

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

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

	Onsite: MRS 1				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Detection Frequency	Minimum Concentration/Qualifier (mg/kg) [a]	Maximum Concentration/Qualifier (mg/kg)	Mean Concentration (mg/kg) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
Surface Soil										
ALUMINUM	23/23	673 J	7,000 J	2,280	5/5	216 J	10,600 J	2,500	NO	NO
ANTIMONY	5/23	3.20	16.2	2.04	0/5	ND	ND	ND	YES	YES
BARIUM	23/23	1.00	10.9	4.70	5/5	0.86	14.4	4.13	NO	YES
COPPER	23/23	0.68 J	215	21.9	5/5	0.18 J	2.20	0.89	YES	YES
IRON	23/23	977	5940	2,800	5/5	228	10,400	2,590	NO	YES
LEAD	23/23	2.30	346	42.1	5/5	1.20	11.0	3.82	YES	YES
NICKEL	23/23	0.39 J	3.10	0.99	5/5	0.10 J	3.40	0.937	NO	YES
Subsurface Soil										
ALUMINUM	8/8	608 J	6,780 J	3163	5/5	216 J	10,600 J	2,500	NO	YES
ANTIMONY	0/8	ND	ND	0.35	0/5	ND	ND	0.25	--	--
BARIUM	8/8	1.30	9.6	5.49	5/5	0.86	14.4	4.13	NO	YES
COPPER	8/8	0.72 J	86.3	14.3	5/5	0.18 J	2.20	0.89	YES	YES
IRON	8/8	966	5,610	3,224	5/5	228	10,400	2,590	NO	YES
LEAD	8/8	2.20	587	91.3	5/5	1.20	11.0	3.82	YES	YES
NICKEL	8/8	0.96	3.00	1.33	5/5	0.10 J	3.40	0.937	NO	YES

[a] Minimum concentration of analyte detected.
[b] Non detects are carried forth as one-half of the detection limit (as detailed in Section 5.1.2.2 of the text) in the calculation of the mean concentration.

-- = Chemical not detected in site or background samples therefore comparison is not meaningful.
J = Analyte is present. Reported value may not be accurate or precise.
mg/kg = Milligram per kilogram.
MRS = Munitions Response Site.
ND= No detected results.

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

	Onsite: MRS 1				Background				Comparisons	
Chemical	Detection Frequency	Minimum Concentration/Qualifier (µg/L) [a]	Maximum Concentration/Qualifier (µg/L)	Mean Concentration (µg/L) [b]	Detection Frequency	Minimum Concentration/Qualifier (µg/L) [a]	Maximum Concentration/Qualifier (µg/L)	Mean Concentration (µg/L) [b]	Site Maximum > Background Maximum	Site Mean > Background Mean
ALUMINUM	3/3	5,450 J	6,070 J	5,847	2/2	5,930 J	6,950 J	6,440	NO	NO
ANTIMONY	0/3	ND	ND	1.10	0/2	ND	ND	1.10	--	--
BARIUM	3/3	35.3	209	97.2	2/2	50.9	54.9	52.9	YES	YES
COPPER	3/3	21.5	88.5	51.0	2/2	35.3	48.8	42.1	YES	YES
IRON	3/3	11,900	39,100	23,733	2/2	19,100	23,300	21,200	YES	NO
LEAD	3/3	10.2	26.0	18.1	2/2	11.2	12.3	11.8	YES	YES
NICKEL	3/3	27.7	71.1	43.2	2/2	29.0	36.8	32.9	YES	YES

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

-- = Chemical not detected in site or background samples therefore comparison is not meaningful.
J = Analyte is present. Reported value may not be accurate or precise.
µg/L = Microgram per liter.
MRS = Munitions Response Site.

6. SUMMARY AND CONCLUSIONS

6.0.1 The Suffolk County AAF Bombing and Gunnery Range is approximately two miles north of Westhampton, New York and occupies approximately 9,224 acres (Figure 3). The site is situated in a relatively flat area just to the south, and partially within, the Central Pine Barrens in Suffolk County. The Atlantic Ocean lies approximately three miles to the south of the range. The Suffolk County AAF Bombing and Gunnery Range was activated in 1943 for bombing, strafing and rocket fire training exercises during World War II. Military use of the Suffolk County AAF Bombing and Gunnery Range site ceased in 1946 (USACE 1997). Currently, New York State and Suffolk County own the majority of the property. Approximately 90 % of the FUDS is within the Long Island Central Pine Barrens Groundwater Conservation area and is under the stewardship of the Central Pine Barrens Joint Planning and Policy Commission (Alion 2008b). With the exception of a two target silhouettes constructed of painted boulders, a destroyer and an aircraft carrier, no military structures remain at the FUDS (USACE 1997).

6.0.2 During the SI, one MRS was identified in the Suffolk County AAF Bombing and Gunnery Range FUDS, as follows:

- MRS 1 – Range Complex

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

6.1 Range Complex (MRS 1)

6.1.0.1 Potential human receptors for MRS 1 include residents, visitors/trespassers, employees, and construction workers. Potential ecological receptors are biota.

6.1.0.2 Since military use of the Suffolk County AAF Bombing and Gunnery Range ceased, several historical reports of munitions finds have been documented. The finds were disposed of by Police Bomb Squad or Air Force EOD personnel. The overall MEC hazard at MRS 1 is moderate based on the MEC source (MEC/MD found historically and as late as 1997 and MD discovered during this SI), site characteristics (the site is stable with limited restrictions to access), and human interaction (public and employees may access part of the site with some degree of frequency).

6.1.0.3 Soil, both surface and subsurface, and groundwater are media with potentially complete exposure pathways for human receptors in MRS 1. In addition, surface soil was a medium with

potentially complete pathways for ecological receptors in MRS 1. In surface soils, the presence of antimony, barium, copper, iron, lead and nickel above their respective background values resulted in the determination of a complete pathway for humans and biota. Antimony and iron were identified as COPCs in surface soil; however, based on a weight-of-evidence evaluation, surface soil was not determined to represent an unacceptable risk to human receptors. Antimony, copper, and lead were identified as COPECs in surface soil. The weight-of-evidence evaluation for these three COPECs indicates that exposure to surface soil may represent a potential risk to biota.

6.1.0.4 For subsurface soil, the only receptor population with potentially complete pathways was construction workers. The surface soil pathway is complete for construction workers based on the detection of 3-nitrotoluene and elevated levels of all MC metals, except antimony, relative to background. No MCs were detected at levels exceeding the associated screening criterion identified for construction workers; therefore, no COPCs were identified for subsurface soils.

6.1.0.5 The groundwater pathway is complete for human receptors based on the presence of barium, copper, iron, lead, and nickel at elevated levels relative to background. Maximum concentrations of aluminum, iron, and lead exceeded their associated screening criteria in the HHRA, and were identified as COPCs for groundwater. Site maximum and mean concentrations of aluminum did not exceed the background maximum and mean values; and therefore, additional risks for this MC from FUDS related activities were not identified. Based on the weight-of-evidence evaluation employed for iron and lead, groundwater at MRS 1 was not determined to represent an unacceptable risk to human receptors.

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

Medium of Concern	Human Health COPCs (HHRA) [a]	Ecological COPECs (SLERA)[a]
	Range Complex (MRS 1)	**Range Complex (MRS 1)**
Surface Soil	Antimony and Iron exceed screening criteria and background. COPCs. WOE evaluation indicates unacceptable risks are not likely.	Antimony, Copper, and Lead exceed screening criteria and background. COPECs. WOE evaluation indicates potential risks for receptors to all three COPECs.
Subsurface Soil	No exceedance of screening criteria. No COPCs.	NA
Groundwater	Aluminum, Iron, and Lead exceed screening criteria. COPCs. Aluminum does not exceed background; therefore, no additional risks from FUDS activities. WOE evaluation for iron and lead indicates that exposures not likely to produce unacceptable risks.	NA

[a] Sources and derivations of screening levels for all receptors and environmental media in the HHRA and SLERA are detailed in Tables 5-1 through 5-6.

COPC = Chemical of potential concern.
COPEC = Chemical of potential environmental concern.
HHRA = Human health risk assessment.
MRS = Munitions Response Site.
NA = Not applicable. No potentially completed pathways for the indicated receptor group.
SLERA = Screening level ecological risk assessment.
WOE = Weight-of-evidence.

7. RECOMMENDATIONS FOR FURTHER ACTION

7.0.1 One MRS was identified at the Suffolk County AAF Bombing and Gunnery Range FUDS. MRS 1, Range Complex encompasses approximately 9,224 acres and includes four sub-ranges: Ground Gunnery/Skip Bombing "A", Ground Gunnery/Rocket Range "B", Bombing Range and Strafing Range.

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

MRS 1 (Range Complex) – An RI/FS is recommended at MRS 1. Future studies should focus on MEC and MC (surface soil). Historical documentation indicates that several munitions items have been found including practice bombs remnants and intact rockets. Additionally, the 1997 USACE inspection team discovered an M38A2 100-lb practice bomb, a bomb burster tube and M1 spotting charge debris as well as several .50 caliber shell casings. During the Alion 2009 SI, no MEC was found. MD observed during this SI included .50 caliber shell casings and bullets, debris from one M38A2 100-lb practice bomb, and 2.25-inch practice rocket bodies and nose cones. Based on these historical MEC/MD finds, and the limited reconnaissance conducted in the area, there is a reasonable probability that MEC or MD may be present within the MRS. Based on the MEC source (MEC/MD found historically and as late as 1997 and MD discovered during this SI), site characteristics (the site is stable with limited restrictions to access), and human interaction (public and employees may access part of the site with some degree of frequency) the MEC risk assessment determines that the MEC hazard was moderate.

Antimony and iron were detected in surface soil at concentrations exceeding both background and their respective human health screening levels. A WOE evaluation indicates that antimony and iron do not pose unacceptable risks to human receptors. Antimony, copper, and lead were detected in surface soil at concentrations exceeding both background and their respective ecological screening levels. A WOE evaluation indicates potential risks to biota from antimony, copper, and lead and warrants further evaluation to confirm the findings of this SI. In subsurface soil, there were no exceedances of screening criteria.

Of the analytes detected in groundwater, aluminum, iron, and lead exceed their associated screening criteria. Aluminum did not exceed background levels and therefore does not

pose additional risks based on former FUDS activities. Based on a WOE evaluation, exposures to iron and lead are not expected to produce unacceptable risks to human receptors.

7.0.3 Neither a TCRA nor a NTCRA are recommended for MRS 1 at Suffolk County AAF Bombing and Gunnery Range.

8. REFERENCES

Alion Science and Technology Corporation (Alion). 2005. *Programmatic Work Plan for Formerly Used Defense Sites Military Munitions Response Program Site Inspections at Multiple Sites in the Northeast Region.*

Alion. 2008a. *Technical Project Planning Memorandum for Suffolk County AAF Bombing and Gunnery Range.* Meeting Minutes of the 10 July 2008 Meeting. Final September 2008.

Alion. 2008b. *Final Site-Specific Work Plan Addendum to the MMRP Programmatic Work Plan for the Site Inspection of Suffolk County AAF Bombing and Gunnery Range. Project Number C02NY071301*. December 2008.

Brock, P. C., and Brock, P. W. G., 1999, *Geology of Long Island and Metropolitan New York*, SUNY Stony Brook, April 24, 1999, p. 13-15.

Department of the Army (DA). 2005. Office of the Assistant Secretary, Installations and Environment, Memorandum for the Assistant Chief of Staff for Installation Management, Munitions Response Terminology.

Department of Defense (DoD), Office of the Deputy Under Secretary of Defense, Installations and Environment. 2001. *Management Guidance for the Defense Environmental Restoration Program (DERP).* 28 September 2001.

DoD, Office of the Deputy Under Secretary of Defense, Installations and Environment. 2007. *Munitions Response Site Prioritization Protocol Primer*. April 2007.

DoD, Office of the Secretary. 2005. *32 Code of Federal Regulations Part 179.*

DoD. 2006. Quality Systems Manual for Environmental Laboratories. Final. Version 3.

GPL Laboratories, LLLP. 2005. *Laboratory Method Detection Limits and Reporting Limits for MMRP Project.*

Google Earth. 2009. Aerial Imagery. http://earth.google.com/

Haïdour, A. and J. Ramos. 1996. Identification of products resulting from the biological reduction of 2,4,6-trinitrotoulene, 2,4-dinitrotoluene, and 2,6-dinitrotoluene by *Pseudomonas* sp. *Environ. Sci. Technol*. 30: 2365-2370.

Interstate Technology and Regulatory Council (ITRC). 2003. *Characterization and Remediation of Soils at Closed Small Arms Firing Ranges.*

Martin, J.L., S. D. Comfort, P. J. Shea, T.A. Kokojohn, and R.A. Drijber. 1997. *Denitration of 2,4,6-trinitroluene by Pseudomonas savastanoi*. Can. J. Microiol 43; 447-455.

Nature Conservancy. 2008. *Central Pine Barrens of Long Island, New York* http://www.nature.org/wherewework/northamerica/states/newyork/preserves/art10990.html

New York Department of State (NYDOS) Division of Coastal Resources. 2004. http://nyswaterfronts.com/maps_relief.asp

New York State Office of Parks, Recreation, and Historic Preservation (NYSOPRHP). 2009. State Historic Preservation Office (SHPO) Consultation Response Letter for Suffolk County AAF Bombing and Gunnery Range. 22 February 2009.

New York State Department of Environmental Conservation (NYSDEC). 2009. Threatened and Endangered Species Consultation Response Letter for Suffolk County AAF Bombing and Gunnery Range. January 2009.

New York Geographic Information Systems Clearinghouse (NYGIS). 2004. http://www.nysgis.state.ny.us/ Accessed December 2008.

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

United States Army Center for Health Promotion and Preventative Medicine (USACHPPM). 2007. *Fact Sheet: Environmental Fate and Transport – Nitroglycerin.* 92-026-0507. Office of the Deputy for Technical Services.

United States Army Corps of Engineers (USACE). 1991. *Inventory Project Report (INPR) for DERP-FUDS Site No. C02NY0713, Suffolk County AAF Bombing and Gunnery Range, Suffolk County, New York.* June 1991.

USACE. 1997. *Archives Search Report (ASR) Findings Suffolk AAF Gunnery and Bombing Range, Westhampton, New York.* September 1997.

USACE. 2003. *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Wastes (HTRW) Projects.* EM 1110-1-1200.

USACE. 2004a. Archives Search Report (ASR) Supplement, Suffolk County AAF Bombing and Gunnery Range, 2004.

USACE. 2004b. Defense Environmental Restoration Program DERP FUDS Program Policy. ER 200-3-1.

USACE. 2006. *Procedure for Preliminary Assessment and Site Inspection Teams That Encounter UXO White Gathering Non-UXO Field Data, Military Munitions Center of Expertise, Interim Guidance Document 0605. March 16.*

USACE. 2007. *Ordnance and Explosives Response EP 1110-1-18 with Errata Sheet*. 4 December.

United States Army Engineering and Support Center, Huntsville (USAESCH). 2001. *Interim Guidance Ordnance and Explosives Risk Impact Assessment, 27 March 2001.*

United States Census Bureau. 2008. United States Census. http://www.census.gov/index.html. Accessed December 2008.

United States Department of Agriculture (USDA) Natural Resources Conservation Service. 2008. *Soils map.* *http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx*.

United States Environmental Protection Agency (USEPA). 1989a. *Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A). Interim Final.* Report No. EPA/540/1-89/002. Office of Emergency and Remedial Response, Washington, D.C. December.

USEPA. 1989b. Risk assessment guidance for superfund, vol. II: environmental evaluation manual. EPA/540/1-89/001. U.S. EPA, Office of Emergency and Remedial Response, Washington DC. 57 pp.

USEPA. 2003a. Ecological soil screening level for iron, interim final. OSWER Directive 9285.7-69. U.S. EPA, Office of Solid Waste and Emergency Response, Washington, DC.

USEPA. 2003b. Ecological Soil Screening Level for Aluminum. Available at: http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_aluminum.pdf. Accessed 23 July 2009.

USEPA. 2004. Risk assessment guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part E, Supplemental guidance for dermal risk assessment). EPA/540/R/99/005. U.S. EPA, Office of Solid Waste and Emergency Response, Washington, D.C. November 2003, Revised February 2005.

USEPA. 2005a. Ecological Soil Screening Level for Antimony. Available at: http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_antimony.pdf. Accessed 23 July 2008.

USEPA. 2005b. Ecological Soil Screening Level for Barium. Available at: http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_barium.pdf. Accessed 23 July 2009.

USEPA. 2005c. Ecological Soil Screening Level for Lead. Available at: http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_lead.pdf. Accessed 23 July 2008.

USEPA. 2005d. *Guidance for developing ecological soil screening levels.* OSWER Directive 9285.7-55. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C. November 2003, Revised February 2005.

USEPA. 2007a. Ecological Soil Screening Level for Copper. Available at: http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf. Accessed 23 July 2009.

USEPA. 2007b. Ecological Soil Screening Level for Nickel. Available at: http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_nickel.pdf. Accessed 23 July 2009.

USEPA. 2009a. Regional Screening Levels. Available from http://www.epa.gov/reg3hwmd/risk/human/rbconcentration_table/Generic_Tables/index.htm. Accessed July 2009.

USEPA 2009b. National Drinking Water Criteria, List of Contaminants and MCLs. U.S. Environmental Protection Agency. Available at: http://www.epa.gov/ogwdw/consumer/pdf/mcl.pdf. Accessed 23 January 2009.

United States Fish and Wildlife Service (USFWS). 1998. *Wetlands Information.* Available from http://wetlandsfws.er.usgs.gov/.

USFWS. 2009. *Endangered and Threatened Species Consultation.* [Letter]. 27 January 2009.

USFWS. 2009. Section 106 Consultation Request Response Letter for Suffolk County AAF Bombing and Gunnery Range. 1 March 2009.

United States Geological Survey (USGS). 1956. Eastport Quadrangle, Suffolk Co. 7.5 minute series topographic map. http://store.usgs.gov/b2c_usgs/usgs/maplocator

USGS. 1982. *Geohydrologic appraisal of water resources of the South Fork, Long Island, New York.* U.S. Geological Survey Water Supply Paper 2073, 1982

USGS. 2008. *Groundwater levels for New York* Available at http://nwis.waterdata.usgs.gov/ny/nwis/gwlevels/?site_no=405121072415601&

United States National Library of Medicine (US NLM). 2008. Chemical Information Specialized Information Services. Available at: http://chem.sis.nlm.nih.gov/

Vorbeck, C., H. Lenke, P. Fischer, J.C. Spain, and H.J. Knackmuss. 1998. *Initial reductive reactions in aerobic microbial metabolism of 2,4,6'-trinitrotoluene*. Appl. Environ. Microbiol. 64: 246-252

APPENDIX A – SCOPE OF WORK

Located on CD.

APPENDIX B – TECHNICAL PROJECT PLANNING MEMORANDUM

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

Data Quality Objective Verification Worksheet			
Site: Suffolk County AAF Bombing and Gunnery Range			
Project: FUDS MMRP SI Project Number C02NY071301			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine if the site requires additional investigation through a remedial investigation/feasibility study (RI/FS) or if the site may be recommended for No Department of Defense Action Indicated (NDAI) based on the presence or absence of munitions and explosives of concern (MEC) and munitions constituents (MC).	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk - MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC	Yes ☑ No ☐	
Media of Interest	MEC - Surface soil or sediment MC - Surface soil, subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	MEC and MC: Areas where military munition-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.	Yes ☑ No ☐	
Number of Samples Required	MEC – Analog geophysical and visual reconnaissance data will be collected to accomplish this objective. These data will be collected using "meandering path" to and from the sampling points. The UXO Technician will collect data on an approximate 6-ft wide path using the geophysical equipment. The visual reach of observations is approximately 12 ft, and may be limited by the presence of vegetation. Once at the individual sampling point, the geophysical equipment will be used to assess an approximately 25-ft diameter circle for anomalies around the sampling point as site conditions permit. In some areas, there may be limitations to the ability to complete geophysical and visual observations. The total estimated area on the paths to/from the sampling locations is approximately 184,700 ft², and the area around the sampling locations is approximately 11,800 ft². MC – 21 surface soil samples, 8 subsurface soil samples, 3 groundwater samples, (5 background soil samples and 2 background groundwater samples).	Yes ☑ No ☐	Analog geophysical reconnaisance was performed on 251,341 ft^2, therefore achieving the DQO. One groundwater sample (SCA-RC-GW-00-01) could not be collected due to the greater than expected depth to groundwater. Three attempts were made to collect groundwater samples in the vicinity of the proposed sampling location using direct-push boring technology. Boreholes were advanced to depths of up to 50 feet bgs without encountering groundwater. Equipment limitations and the limited quantity of direct-push rods made further attempts to collect groundwater samples at this location impractical. The area near soil sample SCA-RC-SS-01-15 was completely overgrown and could not be accessed. No corrective actions were required to satisfy DQO. 20 surface soil, 2 site groundwater samples and 8 sub surface soil samples as well as the background (5 soil and 2 groundwwater samples) were successfully corrected; therefore, DQO was achieved.
Data Quality Objective Verification Worksheet			

Site: Suffolk County AAF Bombing and Gunnery Range			
Project: FUDS MMRP SI Project Number C02NY071301			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Reference Concentration of Interest or Other Performance Criteria	MEC: If historic data indicate the presence of MEC and one anomaly classified as MPPEH, or confirmed MEC are found with the magnetometer, or if physical evidence indicating the presence of MEC are found during the visual inspection, then an RI/FS may be recommended. If no anomalies, MPPEH, or confirmed MEC are found, or if the UXO Technician indicates that there is no potential hazard from past use of munitions or MEC discoveries, then an NDAI designation may be recommended. In each of these instances, all lines of evidence (e.g., historic data, field data, etc.) will be used to make a final decision for an NDAI designation or RI/FS recommendation. In both instances (RI/FS or NDAI), all lines of evidence (e.g., historic data, field data etc. for both MEC and MC) will be used to make a final decision for an NDAI or RI/FS.	Yes ☑ No ☐	
	MC: If the maximum concentrations measured at the site exceed USEPA Regional Screening Levels based on current and future land use, or USEPA interim ecological risk screening values, or site-specific background levels (highest value and mean value), then an RI/FS may be recommended for the site. If the maximum concentrations measured at the site do not exceed USEPA Regional Screening Levels or ecological risk screening values, then an NDAI designation may be recommended. In summary, all lines of evidence including secondary lines of evidence, such as historic data, field data, and comparison to regional background concentration ranges for metals (if available), will be used to make a final decision for an NDAI designation or RI/FS. Screening values selected for comparison at this site are specified in the chemical-specific measurement quality objective (MQO) tables.	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysics with a handheld analog magnetometer was used to collect related data. The magnetometer is accurate to an approximate depth of 2 ft. Global Positioning System (GPS) equipment was used to log locations of MEC items encountered by the magnetometer, subsurface anamolies, and the path of qualitative reconnissance. Visual observations provided a continuous source of additional information which was noted in the field log book, if appropriate. Munitions and munitions related debris were observed during field activities. Photographs were taken documentating the items found. Geophysical methods/procedures are described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC are described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.	Yes ☑ No ☐	

Data Quality Objective Verification Worksheet			
Site: Suffolk County AAF Bombing and Gunnery Range			
Project: FUDS MMRP SI Project Number C02NY071301			
DQO Statement Number: **1 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Analytical Method	MEC: Analytical methods are not used with analog magnetometry. However, trained UXO professionals, engineers, and scientists reviewed all data to determine whether evidence gathered indicates the presence or absence of MEC. This analysis were subject to an independent review within the Alion Team, by the USACE North Atlantic New England (CENAE), USACE Baltimore District Design Center (CENAB), and USACE Center of Expertise. Explosives Methods–8330A, 8330A (mod) for nitroglycerine; Metals Methods–6010B (reduced) and Method 6020 for water; Explosives Prep Methods - 8330A, 8330A (mod) for nitroglycerine; Metals Prep Method – 3050B, 3050 (mod) for water prep method 3010B.	Yes ☑ No ☐	

Data Quality Objective Verification Worksheet			
Site: Suffolk County AAF Bombing and Gunnery Range			
Project: FUDS MMRP SI Project Number C02NY071301			
DQO Statement Number: **2 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Determine the potential need for a Time-Critical Removal Action (TCRA) for MEC and MC by collecting data from previous investigations/reports, conducting site visits, performing analog geophysical activities, and by collecting MC samples.	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk - MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	MEC or Material Potentially Presenting an Explosive Hazard (MPPEH) and MC	Yes ☑ No ☐	
Media of Interest	MEC - Surface soil/subsurface and sediment MC - Surface soil, subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	Areas where military munitions-related operations occurred and/or where MEC or MPPEH has been identified historically based on existing documentation and interviews.	Yes ☑ No ☐	
Number of Samples Required	Refer to DQO 1 for MC/MEC sampling parameters.	Yes ☑ No ☐	
Reference Concentration of Interest or Other Performance Criteria	If MC is reported in samples collected at the FUDS at concentrations exceeding screening criteria and those exceedances result in unacceptable risk and an imminent threat to receptors as identified through human health and ecological risk assessments or if one piece of confirmed MEC is found with the magnetometer or if physical evidence indicating the presence of MEC is found during the visual inspection, and if the item(s) is determined by a qualified UXO-Technician, explosive ordnance disposal (EOD) unit, and/or the USACE to be an immediate or imminent threat, then one of two actions may be initiated:		
	TCRA - If there is a complete pathway between source and receptor and the MEC and the situation is viewed as an "imminent danger threat posed by the release or threat of a release, where cleanup or stabilization actions must be initiated within six months to reduce risk to public health or the environment", the Alion Team will immediately notify the Military Munitions Design Center Project Manager at USACE and the property owner. USACE will determine, with input from the Alion Team and stakeholders, whether or not a TCRA will be implemented.	Yes ☑ No ☐	
	Non-TCRA - A non-TCRA (NTCRA) may be initiated in response to a release or threat of release that poses a risk where more than six months planning time is available.	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	MEC: Geophysical methods/procedures are described in detail in Section 3 of the SS-WP, and the Field Activities section of the programmatic field sampling plan (PFSP). MC: Sampling methods for MC are described in detail in Section 4 of the SS-WP, and Field Activities section of the PFSP.	Yes ☑ No ☐	
Analytical Method	Refer to DQO 1 for MEC and MC analytical methods to be incorporated.	Yes ☑ No ☐	

Data Quality Objective Verification Worksheet			
Site: Suffolk County AAF Bombing and Gunnery Range			
Project: FUDS MMRP SI Project Number C02NY071301			
DQO Statement Number: **3 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect, or develop, additional data, as appropriate, in support of potential Hazard Ranking System (HRS) scoring by United States Environmental Protection Agency (USEPA)	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk - MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	Data for HRS worksheet parameters will be compiled by gathering basic identifying information, general site description, site type, waste description, demographics, water use, sensitive environments, and response actions.	Yes ☑ No ☐	
Media of Interest	Surface soil, subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	Areas where MEC has been historically found, used, or disposed as documented in interviews or existing documentation.	Yes ☑ No ☐	
Number of Samples Required	Refer to DQOs 1and 2.		
Reference Concentration of Interest or Other Performance Criteria	The HRS levels of contamination are Level I (concentrations that meet the criteria for actual contamination and are at or above media-specific benchmark levels), Level II (concentrations that either meet the criteria for actual contamination but are less than media-specific benchmarks, or meet the criteria for actual contamination based on direct observation), and Potential (no observed release is required but targets must be within the target distance limit). These levels are weighted for each target by USEPA (Level I carries the greatest weight) and scores of 28.5 or above are then eligible for listing on the National Priorities List (NPL).	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Methods associated with historic data field reconnaissance and sampling (see DQOs 1 and 2). Refer to NPL Characteristics Data Collection Form, Version 3.0 (USEPA 2001).	Yes ☑ No ☐	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

Data Quality Objective Verification Worksheet			
Site: Suffolk County AAF Bombing and Gunnery Range			
Project: FUDS MMRP SI Project Number C02NY071301			
DQO Statement Number: **4 of 4**			
DQO Element Description	**Site-Specific DQO Statement**	**Attained?**	**Required Corrective Action**
Intended Data Use(s):			
Project Objective(s) Satisfied	Collect the additional data necessary to the complete the Munitions Response Site Prioritization Protocol (MRSPP).	Yes ☑ No ☐	
Data Needs Requirements:			
Data User Perspective(s)	Risk - MEC and MC, Compliance	Yes ☑ No ☐	
Contaminant or Characteristic of Interest	Explosive Hazard Evaluation (EHE), Chemical Warfare Materiel Hazard Evaluation (CHE), and Health Hazard Evaluation (HHE). For the EHE and CHE modules, factors evaluated include the details of the hazard, accessibility to the Munitions Response Site (MRS), and receptor information. HHE factors include an evaluation of MC and any non-munitions-related incidental contaminants present, receptor information, and details pertaining to environmental migration pathways. Typical information compiled includes details pertaining to historical use, current/future use and ownership, cultural/ecological resources, and structures.	Yes ☑ No ☐	
Media of Interest	Surface/subsurface soil and groundwater	Yes ☑ No ☐	
Required Sampling Locations or Areas	Areas where MEC has been identified historically and where sampling is recommended.	Yes ☑ No ☐	
Number of Samples Required	Refer to DQOs 1 and 2 for related sampling required.		
Reference Concentration of Interest or Other Performance Criteria	An MRS priority is determined by USACE based on integrating the ratings from the EHE, CHE, and HHE modules. Refer to Federal Register/Vol. 70, No. 192/Wednesday, October 5, 2005/Rules and Regulations.	Yes ☑ No ☐	
Appropriate Sampling and Analysis Methods:			
Sampling Method and Depths	Data gathering prior to field activities as well as additional data gathered during field reconnaissance and sampling (DoD 2005).	Yes ☑ No ☐	
Analytical Method	Refer to DQOs 1and 2 for associated methods.		

APPENDIX C – INTERVIEW DOCUMENTATION

Appendix not used.

APPENDIX D – FIELD NOTES AND FIELD FORMS

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

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	04-27-09-01	Date: April 27, 2009	
Project Name:	C02NY071301	Contract Number:	W912DY-04-D-0017
Location of Work:	Suffolk County, NY		
Description of Work: Conduct meandering path geophysics throughout the site with a focus around the former bombing and strafing range targets. Collect surface and subsurface soil samples from target areas.			
Weather: Clear	Rainfall: None	Temperature: Min. 52 f	Max. 88 f

1. Work performed today by Alion:

The Alion field team conducted qualitative reconnaissance on approximately 7,800 square feet (0.18 acres) within MRS-1 at Suffolk AAF. The Alion field team collected two surface soil samples and two background soil samples for select explosives and metals analysis.

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

SCA-RC-SS-01-20

SCA-RC-SS-01-21

SCA-BG-SS-01-01

SCA-BG-SS-01-05

Note: No field evidence of target areas or MD was observed. The area in proximity to samples SCA-RC-SS-01-20 and SCA-RC-SS-01-21 contained a significant amount of cultural debris (tires, bottles, can, etc.).

Reconnaissance Acreage / Discussion:

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

2. Work performed today by Subcontractors.

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)

Preparatory phase inspections for the field were completed prior to mobilization to the Suffolk AAF. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

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

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

Benchmark coordinates: Northing 4532718.153 m, Easting 692559.981 m (UTM, Zone 19N, Conus 1983)

Initial GPS reading: Northing 4532718.167 meters (m), Easting 92559.974 m (UTM, Zone 19N, Conus 1983)

Post event GPS reading: Northing 4532718.159 meters (m), Easting 92559.993 m (UTM, Zone 19N, Conus 1983)

5. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.
None
6. Off-site surveillance activities, including action taken.
None
7. Job Safety. (Report safety violations observed and actions taken)
No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.
8. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Initial site reconnaissance was undertaken to investigate viable access roads for the Suffolk AAF FUDS. Paved and/or public access roads were determined to be limited, however, some jeep trails were located which will provide walking access. Two background soil samples were collected in the northeastern portion of the FUDS, outside of MRS 1. Qualitative Reconnaissance (QR) was performed within the former strafing subrange (MRS 1) in the western portion of MRS 1. The field team collected two surface soil samples in proximity to the noted area in the SSWP. Property and site restrictions prevented sample SCA-RC-SS-01-21 from being collected as noted in the SSWP. No subsurface anomalies were detected; however, numerous items of cultural debris were located in the area, some of which were metallic and were detected by the Schonstedt. No munitions presenting a potential explosive hazard (MPPEH) [inclusive of or munitions debris (MD), munitions, explosives of concern (MEC), range related debris] were identified at the MRS.

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

Curtis W Mitchell

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	04-28-09-01	Date: April 28, 2009	
Project Name:	C02NY071301	Contract Number:	W912DY-04-D-0017
Location of Work:	Suffolk County, NY		
Description of Work: Conduct meandering path geophysics throughout the site with a focus around the former bombing and strafing range targets. Collect surface and subsurface soil samples from target areas.			
Weather: Clear	Rainfall: None	Temperature: Min. 59 f	Max. 78 f

1. Work performed today by Alion:

The Alion field team conducted qualitative reconnaissance on approximately 41,952 square feet (0.96 acres) within MRS-1 at Suffolk AAF. The Alion field team collected eleven surface soil samples and five subsurface soil samples for select explosives and metals analysis.

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

SCA-RC-SS-01-08	SCA-RC-SS-01-16	SCA-RC-SS-01-03	SCA-RC-SS-01-04P
SCA-RC-SB-02-08	SCA-RC-SS-01-17	SCA-RC-SB-02-03	
SCA-RC-SS-01-09	SCA-RC-SS-01-06	SCA-RC-SS-01-18	
SCA-RC-SS-01-07	SCA-RC-SB-02-06	SCA-RC-SS-01-04	
SCA-RC-SB-02-07	SCA-RC-SS-01-10	SCA-RC-SB-02-04	

Note: Duplicate soil sample was collected at SCA-RC-SS-01-04. Field evidence of target areas and MD was observed in the eastern portion of the site (within the strafing and rocket targets). The area (Ground Gunnery/Skip Bombing Sub-range A target/impact area) in proximity to samples SCA-RC-SS-01-03, SCA-RC-SB-02-03, SCA-RC-SS-01-18, SCA-RC-SB-02-04, SCA-RC-SS-01-04, and SCA-RC-SS-01-04P contained a significant amount of MD (spent copper jackets and .50 cal bullets.). Additionally, in the area of these samples there is evidence for recent, non-DoD use of small arms including spent shotgun, 9mm, .30 and .22 caliber shells and broken clay pigeons.

Reconnaissance Acreage / Discussion:

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

2. Work performed today by Subcontractors.

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)

Preparatory phase inspections for the field were completed prior to mobilization to the Suffolk AAF. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

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

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

Benchmark coordinates: Northing 4532718.153 m, Easting 692559.981 m (UTM, Zone 19N, Conus 1983)

Initial GPS reading: Northing 4532718.171 meters (m), Easting 92559.973 m (UTM, Zone 19N, Conus 1983)

Post event GPS reading: Northing 4532718.161 meters (m), Easting 92559.978 m (UTM, Zone 19N, Conus 1983)

Benchmark was located near the Hilton Garden Inn property.

5. List material and equipment received.

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

6. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.

None

7. Off-site surveillance activities, including action taken.

None

8. Job Safety. (Report safety violations observed and actions taken)

No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.

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

Qualitative Reconnaissance (QR) was performed within the former bombing sub-range, ground gunnery / rocket sub-range "B", and ground gunnery / skip bombing sub-range "A" within MRS 1.

The field team collected two surface soil samples and one subsurface soil sample in proximity to the former targets within the bombing sub-range. A broken clay pigeon was found adjacent to soil sample SCA-RC-SS-01-09. All samples were collected in the area noted in the SSWP. One spent .50 caliber casing was found within the bombing sub-range in the vicinity of a former target area. One subsurface anomaly was detected.

The field team proceeded to the northeast to collect two surface soil samples and one subsurface soil sample just south of Rt. 27, southeast of the Ground Gunnery / Rocket Sub-range B boundary. Both surface and subsurface samples were collected in proximity to a spent .50 caliber casing. Three subsurface anomalies were detected by the Schonstedt. A pile of weathered wood was observed and may be associated with targets located in this range.

Three surface soil samples and one subsurface soil sample were collected at the target area for the Ground Gunnery / Skip Bombing Sub-range A. Significant evidence for past DoD use was observed in the target area. The ground surface was littered with spent copper jackets and .50 caliber projectiles. Several 2.25" practice rocket nose cones were observed in addition to several practice rocket bodies and motors. Considerable evidence was also found to indicate that this area is currently used as a target and skeet shooting range unrelated to past DoD actions. Numerous quantities of spent shotgun shells, in addition to lesser amounts of 9mm, .22 and .30 caliber shells, were found littering the former target area. Additionally, large quantities of cultural debris were observed (broken bottles, cans, old appliances, car parts). Soil samples were collected in the areas that exhibited copious amounts of MD related to past DoD use and less amount of recent cultural debris. Collection of soil samples was feasible in the areas noted in the SSWP.

Numerous items of cultural debris were located in the area, some of which were metallic and were detected by the Schonstedt. All MD examined was not determined to be MEC nor MPPEH.

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

Curtis W Mitchell

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	04-29-09-01	Date: April 29, 2009	
Project Name:	C02NY071301	Contract Number:	W912DY-04-D-0017
Location of Work:	Suffolk County, NY		
Description of Work: Conduct meandering path geophysics throughout the site with a focus around the former bombing and strafing range targets. Collect surface and subsurface soil samples from target areas and site direct push groundwater samples.			
Weather:	Clear	Rainfall: None	Temperature: Min. 62 f Max. 73 f

1. Work performed today by Alion:

The Alion field team conducted qualitative reconnaissance on approximately 122,202 square feet (2.81 acres) within MRS-1 at Suffolk AAF. The Alion field team collected six surface soil samples, three subsurface soil samples and two groundwater samples for select explosives and metals analysis. Two background groundwater samples were also collected and analyzed for metals only.

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

SCA-RC-SS-01-02	SCA-RC-SS-01-11	SCA-RC-GW-00-02
SCA-RC-SB-02-02	SCA-RC-SS-01-14	SCA-RC-GW-00-03
SCA-RC-SS-01-19	SCA-RC-SS-01-05	SCA-RC-GW-00-03P
SCA-RC-SS-01-01	SCA-RC-SS-01-05P	SCA-BG-GW-00-01
SCA-RC-SB-02-01	SCA-RC-SB-02-05	SCA-BG-GW-00-02

Note: Duplicate samples were collected at sample locations SCA-RC-SS-01-05 and SCA-RC-GW-00-03. A direct push groundwater sample could not be collected from sample location SCA-RC-GW-00-01 because the groundwater table was not encountered. Three direct push bore holes were advance to approximately 48 ft below ground surface (bgs) and groundwater was not reached. However, two groundwater samples within MRS 1 were successfully collected in the northern and southern portion of the site therefore meeting the representativeness component of the Data Quality Objectives (DQOs).

Reconnaissance Acreage / Discussion:

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

2. Work performed today by Subcontractors.

The direct push subcontractor (ADT Inc.) advanced a total of eight soil borings ranging in depth from 25 to 48 ft bgs. As previously mentioned three of the borings (all at sample location SCA-RC-GW-00-01) failed to reach groundwater. Two of the direct push groundwater samples were background samples and were located outside of MRS 1. The subcontractor performed the direct push services in compliance with programmatic and contractual guidelines.

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

Preparatory phase inspections for the field were completed prior to mobilization to the Suffolk AAF. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

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

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

Benchmark coordinates: Northing 4532718.153 m, Easting 692559.981 m (UTM, Zone 19N, Conus 1983)
Initial GPS reading: Northing 4532718.167 meters (m), Easting 92559.969 m (UTM, Zone 19N, Conus 1983)
Post event GPS reading: Northing 4532718.159 meters (m), Easting 92559.994 m (UTM, Zone 19N, Conus 1983)
Benchmark was located on the Hilton Garden Inn property.
5. List material and equipment received.
All equipment (GPS unit, geophysical instrument) supplied by Alion.
6. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.
None
7. Off-site surveillance activities, including action taken.
None
8. Job Safety. (Report safety violations observed and actions taken)
No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.
9. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Qualitative Reconnaissance (QR) was performed in the central and southern portions of MRS 1. All groundwater sample locations were clear of metallic debris as certified by the UXO technician to a depth of 8 ft bgs. A single expended, corroded .50 caliber small arms bullet was observed on the ground surface adjacent to sample location SCA-RC-SS/SB-01-02. Cultural debris was observed throughout the MRS 1 in the woods in the northern portion of the site and near the southern rocket and strafing target area. The southern rocket and strafing target area exhibited similar form and structure as the northern rocket and strafing target area (six cleared circular areas spaced approximately 100 ft apart). With the exception of the previously mentioned direct push groundwater sample SCA-RC-GW-00-01 all environmental samples were collected successfully. No munitions presenting a potential explosive hazard (MPPEH) [inclusive of or munitions debris (MD), munitions, explosives of concern (MEC), range related debris, or cultural debris] were identified at the MRS with the exception of a single, corroded .50 cal bullet near sample location SCA-RC-SS/SB-01-02.

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

Curtis W Mitchell

Alion Science and Technology, Inc.

DAILY QUALITY CONTROL REPORT

Report Number:	04-30-09-01	Date: April 30, 2009	
Project Name:	C02NY071301	Contract Number:	W912DY-04-D-0017
Location of Work:	Suffolk County, NY		
Description of Work: Conduct meandering path geophysics throughout the site with a focus around the former bombing and strafing range targets. Collect surface and subsurface soil samples from target areas.			
Weather:	Partly Cloudy	Rainfall: None	Temperature: Min. 60 f Max. 71 f

1. Work performed today by Alion:

The Alion field team conducted qualitative reconnaissance on approximately 67,224 square feet (1.54 acres) within MRS-1 at Suffolk AAF. The Alion field team collected five surface soil samples for select explosives and metals analysis. Additionally, three background surface soil samples were collected outside MRS 1 and analyzed for metals only.

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

SCA-RC-SS-01-13	SCA-RC-SS-01-13P
SCA-RC-SS-01-12	
SCA-BG-SS-01-02	
SCA-BG-SS-01-03	
SCA-BG-SS-01-04	

Note: A duplicate soil sample was also collected at SCA-RC-SS-01-13.

Reconnaissance Acreage / Discussion:

Reconnaissance was conducted in the meandering path fashion. Travel paths varied slightly from the geophysical site reconnaissance on figures in the SS-WP due to natural terrain and accessibility. The project site is heavily forested and preexisting paths were used to access the majority of the site.

2. Work performed today by 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)

Preparatory phase inspections for the field were completed prior to mobilization to the Suffolk AAF. Initial phase of inspections were completed upon arrival at the site. No follow-up inspections were completed. Satisfactory work completed.

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

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

Benchmark coordinates: Northing 4532718.153 m, Easting 692559.981 m (UTM, Zone 19N, Conus 1983)

Initial GPS reading: Northing 4532718.161 meters (m), Easting 92559.993 m (UTM, Zone 19N, Conus 1983)

Post event GPS reading: Northing 4532718.169 meters (m), Easting 92559.990 m (UTM, Zone 19N, Conus 1983)

Benchmark was located near the Hilton Garden Inn property.

5. List material and equipment received.

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

6. Submittals reviewed. (Include Transmittal No., Item No., Spec/Plan Reference, by whom, and any action.
None
7. Off-site surveillance activities, including action taken.
None
8. Job Safety. (Report safety violations observed and actions taken)
No health and safety violations occurred during the sampling event. All work was performed in a safe and efficient manner.
9. Remarks. (Instructions received or given. Conflicts in Plans or Specifications)
Qualitative Reconnaissance (QR) was performed in the northern portion of MRS 1. The field team was attempting to locate a submarine and aircraft carrier targets identified previously in aerial photographs. The field team found both targets. The targets (two ships) were constructed of crushed white gravel and were located in the northern portion of MRS 1. While conducting QR near the aircraft carrier target a 100-lbs or 300-lbs tail fin assembly was identified partially buried in the sand. The UXO technician determined that the item was a practice (sand filed) 100 – 300 lbs bomb. The exact size of the practice bomb could not be determined because the item was severely crushed and partially buried. Numerous pictures were taken of the item and the GPS coordinates were recorded. A surface soil sample was collected adjacent to this MD (Sample ID SCA-RC-SS-01-13). The field team also located the suspected submarine target and conducted extensive QR around the target. A surface soil sample was collected within the foot print of the submarine target. No other munitions presenting a potential explosive hazard (MPPEH) [munitions, explosives of concern (MEC), range related debris] were identified at the MRS.

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

Curtis W Mitchell

ACCIDENT PREVENTION PLAN REVIEW RECORD

SITE: Suffolk County AAF Bombing and Gunnery Range

Project No. C02NY071301

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
TODD BLANCK		HFA/ALION	4/27/09
Ben Claus		HFA/Alion	4/27/09
TODD BLANCK		"	4/28/09
Ben Claus		"	4/28/09
TODD BLANCK		"	4/29/09
Ben Claus		"	4/29/09
ANDREA BABEL		ADT	4/29/09
JOE MCGILL		ADT	4/29/09
TODD BLANCK		Alion	4/30/09
Ben Claus		Alion	4/30/09

SITE ENTRY AND EXIT LOG

Project/Site : Suffolk County AAF Birthday and Bowling Range
Project No.: C82N407130 1

Date	Name	Representing	Time In	Time Out
4/27/09	DELON LEE	HFA/ALION	1400	1730
4/27/09	Ben Claus	HFA/Alion	1400	1730
4/27/09	TODD BRANGER	HFA/Alion	1400	1730
4/28/09	DELON LEE	HFA/ALION	0800	1700
4/28/09	Ben Claus	HFA/Alion	0800	1700
4/28/09	TODD BRANGER	HFA/Alion	0800	1740
4/29/09	DELON LEE	HFA/ALION	0800	1930
4/29/09	Ben Claus	HFA/Alion	0800	1930
4/29/09	TODD BRANGER	HFA/Alion	0800	1930
4/29/09	JOE MCGILL	ADT	0800	1930
4/29/09	ANDREA BABEL	ADT	0800	1930
4/30/09	DELON LEE	HFA/ALION	0800	1200
4/30/09	TODD BRANGER	Alion	0800	1200
4/30/09	Ben Claus	Alion	0800	1200

Daily Quality Control Journal

DATE: 4/27/09	**PROJECT:** Suffolk County AAF Gunnery Range
SUXOS: Drew Lee	**PM:**
SSO: Drew Lee	**QCO:**
MAG TYPE USED: N/A	**MAG SETTING USED:**

AREA / ITEMS QC'ed	TEAM	SAT	UNSAT
Proper work attire (PPE)		✓	
Morning Schonstedt check		✓	
Vehicle condition		✓	
Equipment condition		✓	
Emergency equipment, first aid kit, burn kit, fire ext.		✓	
Proper grid layout			
Proper search techniques			
Proper use of grubbing equipment			
Compliance with demolition procedures			
Proper tamping techniques, demo shot			
Team leaders daily paperwork			
Office paperwork			
Mapping and UXO data			
Field office, inside			
Field office grounds			

QCO SIGNATURE: Drew Lee

DAILY SITE SAFETY JOURNAL

DATE: 4/27/09	PROJECT: Suffolk County AAF Bombing & Gunnery Range
SUXOS: Delon Lee	PM:
SSO: Delon Lee	QCO:

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

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

Comments:

SSO SIGNATURE:

DAILY SITE SAFETY JOURNAL
MEETING ATTENDEES
DATE: 4/27/09

	Name	Affiliation
1	Ben Clark	Alion
2	Todd Bumgarner	Alion
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Daily Quality Control Journal

DATE: 4/25/09	**PROJECT:** Suffolk County AAF Gunnery Range
SUXOS: Deion Lee	**PM:**
SSO: Deion Lee	**QCO:**
MAG TYPE USED:	**MAG SETTING USED:**

AREA / ITEMS QC'ed	TEAM	SAT	UNSAT
Proper work attire (PPE)		✓	
Morning Schonstedt check		✓	
Vehicle condition		✓	
Equipment condition		✓	
Emergency equipment, first aid kit, burn kit, fire ext.		✓	
Proper grid layout			
Proper search techniques			
Proper use of grubbing equipment			
Compliance with demolition procedures			
Proper tamping techniques, demo shot			
Team leaders daily paperwork			
Office paperwork			
Mapping and UXO data			
Field office, inside			
Field office grounds			

QCO SIGNATURE: DLC

DAILY SITE SAFETY JOURNAL

DATE: 4/28/09	PROJECT: Suffolk County AAF Combat Gunnery Range
SUXOS: Delon Lee	PM:
SSO: Delon Lee	QCO:

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

[ ] Last Work Days Events
[X] Site Description
[ ] Work Area Description
[ ] Work Area Hazards
[ ] On-Site Emergency
[X] Site Evacuation Procedures
[ ] Emergency Response Personnel
[ ] Emergency Telephone Numbers
[X] Directions to Hospital
[X] First Aid
[X] Heat / Cold Stress
[ ] Asbestos Awareness & ID
[X] Ticks

[X] Safety Concerns
[X] Personnel Protective Equipment
[X] Safe Work Practices
[ ] Emergency Response Plan
[ ] Chemical Hazards
[X] Emergency Equipment, Location
[ ] Emergency Equipment, by Type
[ ] Emergency Decontamination
[ ] Safe Work Practices - General
[ ] Site specific OE Safety Precautions
[ ] Site specific OE Identification Features
[ ] Liquid Contaminates / Landfill Material
[ ] Other _____

Comments:

SSO SIGNATURE:

DAILY SITE SAFETY JOURNAL
MEETING ATTENDEES
DATE: 4/28/09
Page 2 of 2

	Name	Affiliation
1	Ben Clews	Alion
2	Todd Burnett	Alion
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Daily Quality Control Journal

DATE: 4/29/09	PROJECT: Suffolk County ANF Bridge Survey
SUXOS:	PM:
SSO: Dewey Lee	QCO:
MAG TYPE USED: n/a	MAG SETTING USED:

AREA / ITEMS QC'ed	TEAM	SAT	UNSAT
Proper work attire (PPE)		✓	
Morning Schonstedt check		✓	
Vehicle condition		✓	
Equipment condition		✓	
Emergency equipment, first aid kit, burn kit, fire ext.		✓	
Proper grid layout			
Proper search techniques			
Proper use of grubbing equipment			
Compliance with demolition procedures			
Proper tamping techniques, demo shot			
Team leaders daily paperwork			
Office paperwork			
Mapping and UXO data			
Field office, inside			
Field office grounds			

QCO SIGNATURE:

DAILY SITE SAFETY JOURNAL

DATE: 4/29/09	PROJECT: Suffolk County AAF Bombing and Gunnery Range
SUXOS: Dewn Lee	PM:
SSO: Dewn Lee	QCO:

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

- [ ] Last Work Days Events
- [X] Site Description
- [ ] Work Area Description
- [ ] Work Area Hazards
- [ ] On-Site Emergency
- [X] Site Evacuation Procedures
- [ ] Emergency Response Personnel
- [X] Emergency Telephone Numbers
- [X] Directions to Hospital
- [X] First Aid
- [X] Heat / Cold Stress
- [ ] Asbestos Awareness & ID
- [X] Ticks
- [X] Safety Concerns
- [X] Personnel Protective Equipment
- [X] Safe Work Practices
- [ ] Emergency Response Plan
- [ ] Chemical Hazards
- [X] 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: DWL

DAILY SITE SAFETY JOURNAL
MEETING ATTENDEES
DATE: 4/29/09
Page 2 of 2

	Name	Affiliation
1	Ben Claus	Alion/IHFA
2	TODD BOANS	ALION/IHFA
3	JOE MCGILL	ADT
4	ANDREW BABEL	ADT
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Daily Quality Control Journal

DATE: 4/30/09	**PROJECT:** Sudbrink County AAF Boundary & Runway Lagl
SUXOS: Drew Lee	**PM:**
SSO: Drew Lee	**QCO:**
MAG TYPE USED: NA	**MAG SETTING USED:**

AREA / ITEMS QC'ed	TEAM	SAT	UNSAT
Proper work attire (PPE)		✓	
Morning Schonstedt check		✓	
Vehicle condition		✓	
Equipment condition		✓	
Emergency equipment, first aid kit, burn kit, fire ext.		✓	
Proper grid layout			
Proper search techniques			
Proper use of grubbing equipment			
Compliance with demolition procedures			
Proper tamping techniques, demo shot			
Team leaders daily paperwork			
Office paperwork			
Mapping and UXO data			
Field office, inside			
Field office grounds			

QCO SIGNATURE: [signature]

DAILY SITE SAFETY JOURNAL

Page 1 of 2

DATE: 4/30/09	PROJECT: Suffolk County BBF Boundary & Survey Range
SUXOS:	PM:
SSO: DeLon Lee	QCO:

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

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

Comments:

SSO SIGNATURE: DeLon Lee

DAILY SITE SAFETY JOURNAL
MEETING ATTENDEES
DATE: 4/30/09

	Name	Affiliation
1	TODD [illegible]	AFA/[illegible]
2	Ken Claus	Alion/HFA
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ELAN

Field Book
E 64-8x4 S

Suffolk County
AAF
FUDS #C02NY071301

April 2009

(2) 4/27/09

Suffolk County AAF

0930: Meet with DeLon Lee/HFA UXO Tech at Hotel. Discuss general field objectives and determine best approach to collect samples.

1000: DeLon gives HS briefing. Topics; Slips/trips/falls, UEC/MD hazards, biological hazards.

1030: weather 70-75°F, clear, 0-10 mph.

1045: Drive around, North, south, east, west of site to identify viable access roads. Site has few access roads, & and no public, paved roads. Will need to do a good deal of walking. Will collect background samples in northern portion site near roads.

1600: Mob to collect back ground soil Sample.

Sample ID: ~~Sample~~ SCA-BG-SS-01-05

Time: 1600

Analyzed for metals only.

1630: Continue to do general windshield recon of the site

4/27/09 (3)

Suffolk County AAF

looking for access roads.

1650: Stop to collect background location in northwest of site

Sample: SCA-BG-SS-01-01

Time: 1650

Metals only.

1715: Mob to western portion of site and conduct QR to collect Sample locations SCA-RC-SS-01-21 and RCA-RC-SS-01-20. good trail to area, a lot of Cultural debris, garbage, building supplies.

1530: collect surface soil sample SCA-RC-SS-01-20

Time: 1530

Metals and explosives.

1545: continue to sample location SCA-RC-SS-01-21

T: 1550

Metals & explosive

1700: Arrive back at vehicle

1730: Arrive back at Hotel.

End of Day.

4128109

Suffolk County AAF

0730: Meet w/ Delon, and Todd B. to mob to site.

0745: Drive to site.

0750: weather: clear, 65°-25°, 0-10mph.

800: Field personnell:

B. Claus / Alion - FTL

Todd. B / Alion

Delon Lee / AFA - UXO Tech.

815: Delon gives H&S briefing

Topics: TICKS and other biological hazards, MECMD, proper hydration.

820: objectives for 4128109

- continue to conduct QR
- collect SS/SB samples
- identify access roads to gain entry to the site.

830: Go down Rt 27, and get ready to collect samples near SCA-RC-SS-01-10 and SCA-RC-SS/SD-08.

0900: off Rt 27, near above samples above, team identifies a spent .50 caliber shell casing, on side of road. GPS & photo taken.

B.C. Dr

Suffolk County AAF

0930: Sample collected, surface

Sample ID: SCA-RC-SS-01-08

Time: 930

940: Subsurface sample at same location

Sample ID: SCA-RC-SB-01-08

T: 940

Metals & explosives.

950: collect surface soil sample SCA-RC-SS-01-09

Time: 950, Metals & explosives.

Note: some scattered old/New skeet around area.

1000: Extensive QR in N: central portion south of Rt 27. two more .50 cal shell casings found, as well as possible wooden target.

1200: collect sample.

ID: SCA-RC-SS-01-16

T: 1200, Metals/explosives

1215: Move slightly South collect sample

Sample ID: SCA-RC-SS-01-07

T: 1215, Metals & explosives surface soil

Doc Dr

/28/09

Suffolk County AAF

2: collect subsurface sample

le ID: SCA-RC-SB-02-07

T: 1220, metals & explosives.

): collect surface soil sample

SCA-RC-SS-01-17

T: 1230, metals & explosives.

0: Head back to near car where .50 cal shells were found to collect samples.

5: collect surface soil sample

D: SCA-RC-SS-01-06

T: 1250,

0: collect subsurface sample

ID: SCA-RC-SB-02-06

T: 13000

Both for Metals & Explosives.

5: Move west along Rt 27

o collect sample, again near rea where .50 cal. casing were found.

0: Surface soil sample

D: SCA-RC-SS-01-10

Time: 1320, metals & explosives

.C.

DL

Suffolk county AAF.

1400: Mob to strafing/rocket range in North East of site.

1430: Arrive a the 6, round Strafing/rocket target areas. Ground in target are is littered with hundreds of .50 cal. copper jacket debris and lead-antimony rounds. GPS'd and Pictures.

1440: All target areas are littered w/ degraded small arms rounds (.50 cal). There is also evidence of heavy shotgun and 9mm pistol fire. Non-DoD activity.

1457: will not sample most southern target hundreds of shot gun shells not related to DoD use.

1500: collect surface soil sample

SCA-RC-SS-01-03

T: 1500, Metals and Explosives

1510: collect subsurface sample

SCA-RC-SB-02-03

T: 1510, Metals and Explo.

1520: collect Surface soil

SCA-RC-SS-01-18

T: 1520

DL

B.C.

4/28/09

Suffolk.

: collect surface soil from most
orthern target, most .50 ca /
bullets.
SCA-RC-SS-01-04
T: 1530, Metals / explosives
0: collect subsurface
SCA-RC-SB-02-04
T: 1540., Metals / explosives.
MS/MSD collected.
Duplicate collected.
SCA-RC-SS-01-04P
T: 1535, Metals Explosives.
0: on way back to car
roximately 400 ft North of
ample SCA-RC-SS-01-04
merous 2.25-2.75-Inch rocket
otors and practice rocket
r heads were observed on
rface and partially embedded
n sand. All were photographed,
SPS'd an certified to be
pended, practice and MD.
Warhead had "Rocket Body
actice" stamped on it.

C

4/29/09

Suffolk county AAF. (9)

1620: Field team goes to western portion of site to look for acces roads to the western portion of site in preparation for geoprobe.

1730: There is a small access road to collect GW samples north of Rt 27. Team mobs back to Hotel.

1800: Arrive back at hotel and plan to meet tomorrow morning

End of Day.

RC.

4/29/09

Suffolk county AAF

0: Meet with field team
Hotel parking lot. Go over
days objectives.
0: AOT drilling company
rives.
0: Team has HES briefing
sonell present:
bus: Alion/FTL
anger: Alion
Lee: HFA/UXO Tech.
a Babble: AOT drilling
McGill: AOT drilling.
HES briefing topics:
s/trips/falls, UXO/MEC avoidance
d safety, biological hazards,
rking around Geoprobe.
0: take access road south
Rt 27, dolc to access
strictions. GW sample
A-RC-GW-00-01 has been
ved 400-500ft East, but
ill near target area.
her: 60-70°F, P-cloudy, 0-10mph.

4/29/09 (11)

Suffolk county AAF

1015: Arrive at GW sample
SCA-RC-GW-00-01. Sample location
moved East due to site access
w/ geoprobe rig (track mounted
model 6620DT). We expect to hit
surficial groundwater at 25-35 ft
bgs. Delon Lee, clears surface
0-2, 2-4, 4-6 Ft for UXO clearance.
1040: Geoprobe rig reaches 45-ft bgs,
bottom of hole appears dry. Field
team will allow ~~poten~~ time for possible
recharge into perforated rod screen. If
no groundwater is detected field team
will attempt another hole.
1110: Attempted to collect GW samples
at three ~~hole~~ locations near
SCA-RC-GW-00-01, Each attempt
went to 45-ft bgs. At all locations
no groundwater was encountered.
NO GW sample collected.
1115: Mob to Southeast targets to
collect, GW, SS and SB samples.
1240: Arrive in SE portion of site
near strafing/rocket targets.

4/29/09

Suffolk County AAF

: Set up geoprobe on location
-RC-GW-00-03, UXO tech
rs first 6-ft bgs. Rest of
ld team will do QR and
ollect SS and SB samples.
: Sample locations near a
50 cal bullet.
): SCA-RC-SS-01-02
Time 1,330
Metals & Explosive

SCA-RC-SB-02-02
TIME 1340
METALS + EXP
1 foot, tan SAND, SOS.
0: Groundwater encountered
(+ 40'ft bgs. at location
SCA-RC-GW-00-03, & GW
Sample collected
ple ID: SCA-RC-GW-00-03
Time: 1350
MS/MSD collected.
uplicate also taken, due to
good recharge.

B.C

4/29/09 (13)

Suffolk County AAF

1355: Duplicate collected
Sample ID: SCA-RC-GW-00-03P
Time: 1355

1410: Team members goes to QR + soil samp.

1420: Samp. col in area of suspected target.

ID: SCA-RC-SS-01-19
TIME: 1420
METALS + EXP

1440: collect surface soil sample
ID: SCA-RC-SS-01-01
T: 1440

1445: collect subsurface sample
ID: SCA-RC-SB-02-01
T: 1445
Metals & Explosive

1500: Mob to samples in Northwest portion of site to collect GW, SS and SB samples.

1520: Geoprobe sets up on GW sample SCA-RC-GW-00-02. Delon clears sample location. Location moved ~ 500 Ft to west due to access issues.

B.C.

) 4/29/09

Suffolk county AAF

50: Field team conducts QR to central northern portion.

: collect surface sample

ID: SCA-RC-SS-01-11

Time: 1610, Metals & explosives.

0: continue to QR towards targets.

0 SCA-RC-SS-01-014
MS+MSD
METALS+EXP

50 ~~SCA-RC-SS-01-010~~

0 SCA-RC-SS-01-05

5 SCA-RC-SS-01-05P
METALS+EXP

SCA-RC-SB-02-05
METALS+EXP

): Ground water encountered t approximately 35-ft bgs. probe rod pushed to approxi 0 ft bgs to collect GW ample.

ound water Sample collected.

le ID: RCA-RC-GW-00-02

Time: 1710

C.

4/29/09

(45)

Suffolk County AAF

1720: Mob to collect background ~~Samples~~ groundwater Samples.

1730: collect background GW sample
SCA-BG-GW-00-02

Time: 1730, Metals only.

1800: Mob to other background location to collect geoprobe GW Sample.
SCA-BG-GW-00-01

Time: 1800, Metals

Note: groundwater encountered at approximately 25 ft bgs at both background groundwater Samples.

1820: Arrive back at hotel, organize samples and ensure all samples are accounted for.

1900: End of Day.

P.C.

(16) 4/30/09

Suffolk County AAF

0745: Meet field crew

800: Delon Lee/UXO Tech gives a H&S briefing: Slips/trips/falls proper hydration, MEC/UXO avoidance

weather: 60-70° F, Partly cloud, 0-10 mph breeze.

830: Field team mobs to Eastern portion of site to do QR and collect samples near submarine and ship targets. Also team will collect background soil samples.

730

900: Conduct QR into site looking for large aircraft carrier or submarine target.

1000: white granite-like angular gravel ~~ear~~located, this is the target outline. Identify partially buried 100-300 lb, GP type tail fins, and possible spotting charge cap.

PL

4/30/09

(17)

Suffolk County AAF

1015: will collect SS sample near bomb fins.

Sample ID: SCA-RC-SS-01-13

Time: 1015

Collect duplicate sample

Sample ID: SCA-RC-SS-01-13P

Time: 1020

Metals and explosives.

1030: Locate old submarine targ Same crushed gravel outline.

1100: collect surface soil samp ID: SCA-RC-SS-01-12

T: ~~1000~~ 1100, Metals & Expl

1130: Mob to background Soil Sample

Sample ID: SCA-BG-SS-01-02

T: 1130

Metals only

1145: collect background ID: SCA-BG-SS-01-03

T: 1145, Metals only.

1200: collect background soil ID: SCA-BG-SS-01-04

T: 1200, metals only

PL

Suffolk County AAF,
0: Head back to hotel
to pack up samples.
30: FedEx arrives at
otel picks up samples.
ield heads to airport.

End of Day.

Suffolk County AAF
List of samples, anomalies and
~~obers~~ observations: 4/28/09

sample/item	Northing	Easting	coment
50cal casing	77089.31	410189.96	
"	77327.06	410926.03	
POSSIBLE TARGET BLEED	77089.68	410887.27	
.50 cal SHELL	77277.79	410800.69	
ROCKET BODY AND NOSE	77868.64	412886.69	
ROCKET MOTOR	77841.08	412885.13	
"	77880.29	412919.67	
MANY SUB ANOM	77867.41	412887.37	
SCA-RC-SS/SB 0108	76833.2	410068.16	
SCA.RC.SS.01.09	76829.56	410292.39	NEAR BROKEN PIGEON
SCA.RC,SS,01:16	76801.58	411308.4	
SCA.RC.SS/SB-01-07	76708.8	411310.49	
SCA.RC.SS-01-17	76805.88	411260.35	
SCA.RC.SS/SB 01-06	77329.38	410992.81	NEAR .50 CAL
SCA.RC.SS.01.10	77291.4	410845.5	" "
SCA.RC.SS/SB 01-03	77464.59	412954.76	
SCA-RC-SS-01-18	77498.15	412931.23	
SCA-RC-SS/SB-01-04	77579.3	412879.98	LOTS OF 50 CAL FRAG
SUB-SURF ANOMS	76954.73	410188.02	
	77331.33	410933.8	
	77293.13	410828.5	
	77479.82	411279.6	

4130109

Suffolk County AAF.

mple/Anomaly coordinates cont.

ID/Item	Northing	Easting	Comment
SB-01-01	76172.220	412655.452	
SB-01-02	760 16.616	412593.065	
SB-01-04	77586.794	412861.784	
SB-01-05	77699.960	411150.150	
SB-01-07	76752.195	411291.602	
-01-11	77987.774	410923.811	
S-01-12	784 77.975	411051.129	
S-01-13	78223.352	410513.591	
S-01-14	77643.827	411178.441	
SS-0145	77924.413	411379.421	
S-01-19	76101.491	412593.065	
-01-20	75606.320	409792.158	
S-01-21	75648.827	409882.281	
W-01-02	77219.004	410145.892	
W00-03	75861.013	412649.578	
W-00-01	81505.051	410973,682	
W-00-02	82078.186	411666.613	
S-04-01	79100.588	409947.762	
SS-01-02	81165.646	411164.285	
SS-01-03	80458.379	411956.457	
SS-01-04	78835.967	413017.928	
SS-01-05	78393.101	413781.257	

DC

(21)

Blank.

DC

GPL LABORATORIES, LLC

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

Contract #/Billing Reference

1 of 3 Pgs.

Project: Suffolk County AAF
Client: Alion Science & Tech
Send Results To: Corinne Shia
Address: 3975 Fairridge Dr.
Fairfax, VA 22033
Phone: 703-259-5147

Turnaround Time: Standard
# of Containers: 2
Container Type: 8-oz
Preservative Used: NA
Type of Analysis: Antimony, Aluminum, Barium, Iron, Copper, Lead, Nickel | DNT-DNT Breakdown | TNT-TNT Breakdown | RDX | Tetryl | Nitroglycerin | Lab Cooler No. | CLIENT COMMENTS

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Antimony, Aluminum, Barium, Iron, Copper, Lead, Nickel	DNT-DNT Breakdown	TNT-TNT Breakdown	RDX	Tetryl	Nitroglycerin	Lab Cooler No.	CLIENT COMMENTS
SCA-BG-SS-01-05	4/27/09	1600	soil	BC	X							
SCA-BG-SS-01-01	4/27/09	1650	"	"	X							
SCA-RC-SS-01-20	4/27/09	1530	"	"	X	X	X	X	X	X		
SCA-RC-SS-01-21	4/27/09	1550	"	"	X	X	X	X	X	X		
SCA-RC-SS-01-08	4/28/09	0930	"	"	X	X	X	X	X	X		
SCA-RC-SB-02-08	4/28/09	0940	"	"	X	X	X	X	X	X		
SCA-RC-SS-01-16	4/28/09	1200	"	"	X	X	X	X	X	X		
SCA-RC-SS-01-07	4/28/09	1215	"	"	X	X	X	X	X	X		
SCA-RC-SB-02-07	4/28/09	1220	"	"	X	X	X	X	X	X		
SCA-RC-SS-01-17	4/28/09	1230	"	"	X	X	X	X	X	X		
SCA-RC-SS-01-06	4/28/09	1250	"	"	X	X	X	X	X	X		
SCA-RC-SB-02-06	4/28/09	1300	"	"	X	X	X	X	X	X		

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	4/30/09 1700				
Relinquished By:	Date/Time	Received By:	Date/Time / Shipper:		Airbill No.:
Relinquished By:	Date/Time	Received By:	Lab Comments:		Temp:

G.P. W.O. _____

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

Contract #/Billing Reference

2 of 3 Pgs.

Project: Suffolk County AAF
Client: Alion Science & Tech
Send Results To: Corinne Shea
Address: 3975 Fairridge Rd.
Fair Fax, VA 22033
Phone: 703-259-5147

Turnaround Time: Standard
# of Containers: 2
Container Type: 8-oz
Preservative Used: NA
Type of Analysis: Antimony, Aluminum, Barium, Iron, Lead, Nickel, Selenium; DNT-ONT Breakdown*; TNT-TNT Breakdown*; RDX; Tetryl; Nitroglycerin

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Lab Cooler No.	CLIENT COMMENTS
SCA-RC-SS-01-10	4/28/09	1320	Soil	BC		
SCA-RC-SS-01-03	4/28/09	1500				
SCA-RC-SB-02-03	4/28/09	1510				
SCA-RC-SS-01-08	4/28/09	1520				
SCA-RC-SS-01-04	4/28/09	1530				
SCA-RC-SS-01-04P	4/28/09	1535				
SCA-RC-SB-02-04	4/28/09	1540				MS/MSD
~~SCA-RC-SS-01-04A~~	~~4/28/09~~	~~1535~~			BC	added twice. Mistake
SCA-RC-SS-01-02	4/29/09	1330				
SCA-RC-SB-02-02	4/29/09	1346				
SCA-RC-SS-01-19	4/29/09	1420				
SCA-RC-SB-02-01	4/29/09	1445				

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	4/29/09 1700				
Relinquished By:	Date/Time	Received By:	Date/Time / Shipper:	Airbill No.:	
Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:	

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Frederick, MD 21703
(301) 694-5310
Fax (301) 620-0731

Contract #/Billing Reference

Project: Suffolk County AAF
Client: Alion Science & Tech
Send Results To: Corinne Shia
Address: 3975 Fairidge Dr
Fairfax, VA 22033
Phone: 703-259-5147

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Aluminum, Barium, Iron, Lead, Nickel	DNT - DNT Breakdown *	TNT - TNT Breakdown *	RDX	Tetryl	Nitroglycerin					Lab Cooler No. / CLIENT COMMENTS
Turnaround Time															Standard
# of Containers															2
Container Type															8oz
Preservative Used															NA
SCA-RC-SS-01-01	4/29/09	1440	soil	RC	X	X	X	X	X	X					
SCA-RC-SS-01-11	4/29/09	1610			X	X	X	X	X	X					
SCA-RC-SS-01-11	4/29/09	1610			X	X	X	X	X	X					MS/MSD
SCA-RC-SS-01-05	4/29/09	1650			X	X	X	X	X	X					
SCA-RC-SS-01-05P	4/29/09	1655			X	X	X	X	X	X					
SCA-RC-SB-02-05	4/29/09	1700			X	X	X	X	X	X					
SCA-RC-SS-01-13	4/30/09	1015			X	X	X	X	X	X					
SCA-RC-SS-01-13P	4/30/09	1020			X	X	X	X	X	X					
SCA-RC-SS-01-12	4/30/09	1100			X	X	X	X	X	X					
SCA-RC-SS-01-02	4/30/09	1130			X										
SCA-RC-SS-01-03	4/30/09	1145			X										
SCA-RC-SS-01-05	4/30/09	1200			X										

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	4/30/09 1700				
Relinquished By:	Date/Time	Received By:	Date/Time	Shipper:	Airbill No.:
Relinquished By:	Date/Time	Received By:	Lab Comments:		Temp:

G.P. W.O. _____

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

Contract #/Billing Reference

1 of 1 Pgs.

Project: Suffolk County AAF
Client: Alion Science & Tech
Send Results To: Corinne Shea
Address: 3975 Fair Lidge Dr
Fairfax, VA 22033
Phone: 703-259-5147

Turnaround Time: Standard
# of Containers: 3
Container Type: 2-Ambers 1-1L Poly
Preservative Used: HNO3
Type of Analysis: Aluminum, Barium, Iron, Manganese, Nickel, Copper; DNT - DNT Breakdown; TNT - TNT Breakdown; RDX; Tetryl; Nitroglycerin

Sample ID#	Date Sampled	Time Sampled	Sample Matrix	Sampler's Initials	Aluminum, Barium, Iron, Manganese, Nickel, Copper	DNT - DNT Breakdown	TNT - TNT Breakdown	RDX	Tetryl	Nitroglycerin	Lab Cooler No.	CLIENT COMMENTS
SCA-RC-GW-00-03	4/29/09	1350	H_2O	BC	X	X	X	X	X	X		MS/MSD
SCA-RC-GW-00-03D	4/29/09	1355	H_2O	BC	X	X	X	X	X	X		
SCA-RC-GW-00-02	4/29/09	1710	H_2O	BC	X	X	X	X	X	X		
SCA-BG-GW-00-01	4/29/09	1800	H_2O	BC	X							
SCA-BG-GW-00-02	4/29/09	1730	H_2O	BC	X							

Relinquished By:	Date/Time	Received By:	Relinquished By:	Received for Laboratory By:	Date/Time
	4/29/09 1760				
Relinquished By:	Date/Time	Received By:	Date/Time / Shipper:	Airbill No.:	
Relinquished By:	Date/Time	Received By:	Lab Comments:	Temp:	

G.P. W.O. _____

APPENDIX E – PHOTO DOCUMENTATION LOG

APPENDIX E – PHOTOGRAPHIC LOG

Project/Site: Suffolk AAF
Project No.: C02NY0713

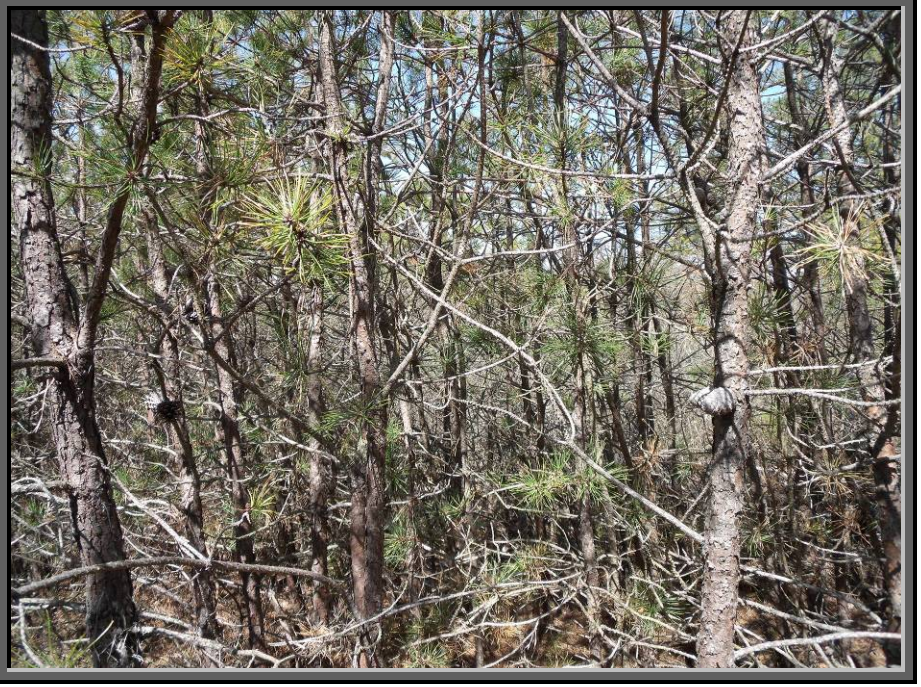
Date	Photo ID	Description
4/28/2009	E.1	.50 caliber shell casing (MD) found within MRS 1 – Strafing sub-range.
4/28/2009	E.2	Very thick vegetation exists over most of the site.
4/28/2009	E.3	.50 caliber shell casing (MD) found within MRS 1 – Strafing sub-range.
4/28/2009	E.4	QR within the Bombing sub-range.
4/28/2009	E.5	Terrain in the Bombing sub-range.
4/28/2009	E.6	Sample SCA-RC-SS-01-07.
4/28/2009	E.7	.50 caliber (cores, jackets, and complete bullets) MD is abundant in the target areas of the strafing sub-range. Cultural debris is present (broken clay pigeons, various small arms calibers).
4/28/2009	E.8	Cultural debris was abundant in the area. Small arms shells (.22, .38, .45, shotgun) [MD] were littered across the former strafing targets.
4/28/2009	E.9	Sample SCA-RC-SS-01-04 and .50 caliber shells (MD).
4/28/2009	E.10	Cultural debris (appliances, auto parts) was abundant in the area. Small arms shells (MD) also present. UXO Tech and strafing target in the background.
4/28/2009	E.11	Former strafing target.

4/28/2009	E.12	Nose cone (MD) from a 2.25-inch practice rocket.
4/28/2009 (E.12).	E.13	2.25-inch practice rocket bodies (MD) found near nose cone
4/29/2009	E.14	Groundwater sample SCA-RC-GW-00-03.
4/29/2009	E.15	.50 caliber projectile (MD) in strafing target.
4/29/2009	E.16	Groundwater sample RCA-RC-GW-00-02.
4/29/2009	E.17	QR within the bombing sub-range.
4/30/2009	E.18	White gravel used to identify the outline of an aircraft carrier target within the bombing sub-range.

Suffolk AAF – Field Photographs

Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	MRS 1 – Strafing sub-range
GPS Coordinates: (UTM Zone 18N)	N 4525052.5 E 694445.7
Direction of Photo:	Down
Comments:	.50 caliber shell casing found within MRS 1 – Strafing sub-range.
Photograph No.:	E.1 Date: 04/28/09 Time: 0900 AM

Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	
GPS Coordinates: (UTM Zone 18N)	N 4525075.9 E 695505.7
Direction of Photo:	West
Comments:	Very thick vegetation exists over most of the site.
Photograph No.:	E.2 Date: 04/28/09 Time: 1350 PM



Suffolk AAF – Field Photographs

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph:
GPS Coordinates: N 4525248 E 695054.3
(UTM Zone 18N)
Direction of Photo: Down

Comments: .50 caliber shell casing found within MRS 1 – Strafing sub-range.

Photograph No.: E.3 Date: 04/28/09 Time: 1415 PM

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph:
GPS Coordinates: N 4525258.9 E 695489.1
(UTM Zone 18N)
Direction of Photo: East

Comments: QR within the Bombing sub-range.

Photograph No.: E.4 Date: 04/28/09 Time: 1445 PM

Suffolk AAF – Field Photographs

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph:
GPS Coordinates: N 4525201.9 E 695349.2
(UTM Zone 18N)
Direction of Photo: North
Comments: Terrain in the Bombing sub-range.
Photograph No.: E.5 Date: 04/28/09 Time: 1500 PM

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph: MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: N 4524684.8 E 695570.6
(UTM Zone 18N)
Direction of Photo: Down
Comments: Sample SCA-RC-SS-01-07.
Photograph No.: E.6 Date: 04/28/09 Time: 1515 PM

Suffolk AAF – Field Photographs

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph: MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: N 4525494.7 E 697182.9
(UTM Zone 18N)
Direction of Photo: Down

Comments: .50 caliber (cores, jackets, and complete bullets) MD is abundant in the target areas of the strafing sub-range. Other cultural debris is present (broken clay pigeons, various small arms calibers).

Photograph No.: E.7 Date: 04/28/09 Time: 1430 PM

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph: MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: N 4525457.3 E 697217.6
(UTM Zone 18N)
Direction of Photo: Down

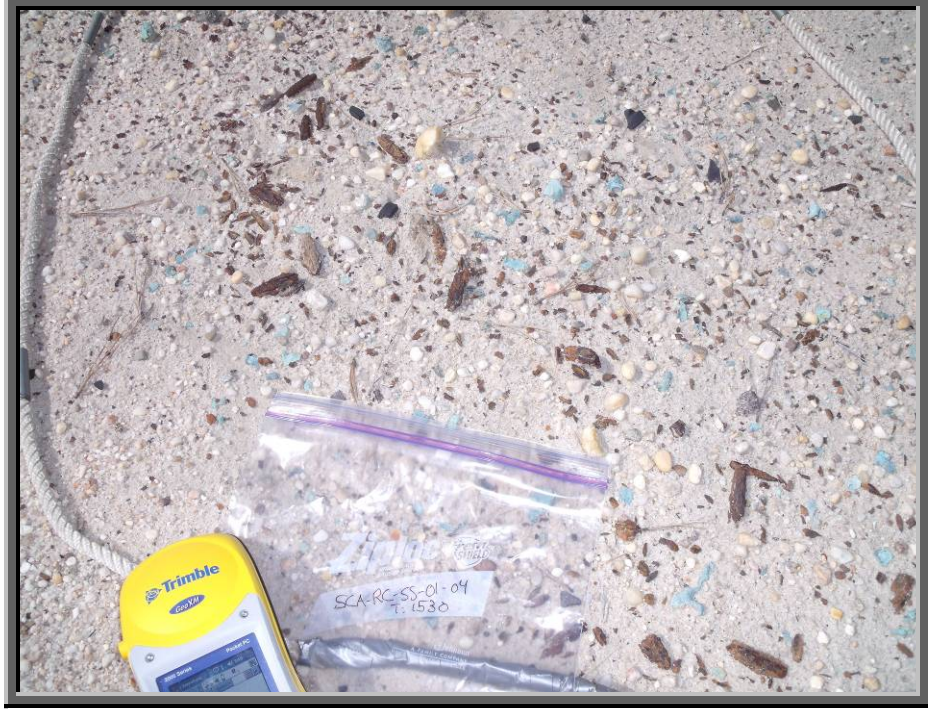
Comments: Cultural debris was abundant in the area. Small arms shells (.22, .38, .45, shotgun) and broken clay pigeons were littered across the former strafing targets.

Photograph No.: E.8 Date: 04/28/09 Time: 1515 PM

Suffolk AAF – Field Photographs

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph: MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: N 4525573.3 E 697130.2
(UTM Zone 18N)
Direction of Photo: Down
Comments: Sample SCA-RC-SS-01-04 and .50 caliber MD.

Photograph No.: E.9 Date: 04/28/09 Time: 1530 PM



Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph: MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: N 4525388 E 697276.6
(UTM Zone 18N)
Direction of Photo: North
Comments: Cultural debris (small arms shells, appliances, auto parts) were abundant in the area. UXO Tech and strafing target in the background.

Photograph No.: E.10 Date: 04/28/09 Time: 1510 PM

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph: MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: N 4525573.2 E 697139.1
(UTM Zone 18N)
Direction of Photo: Southwest

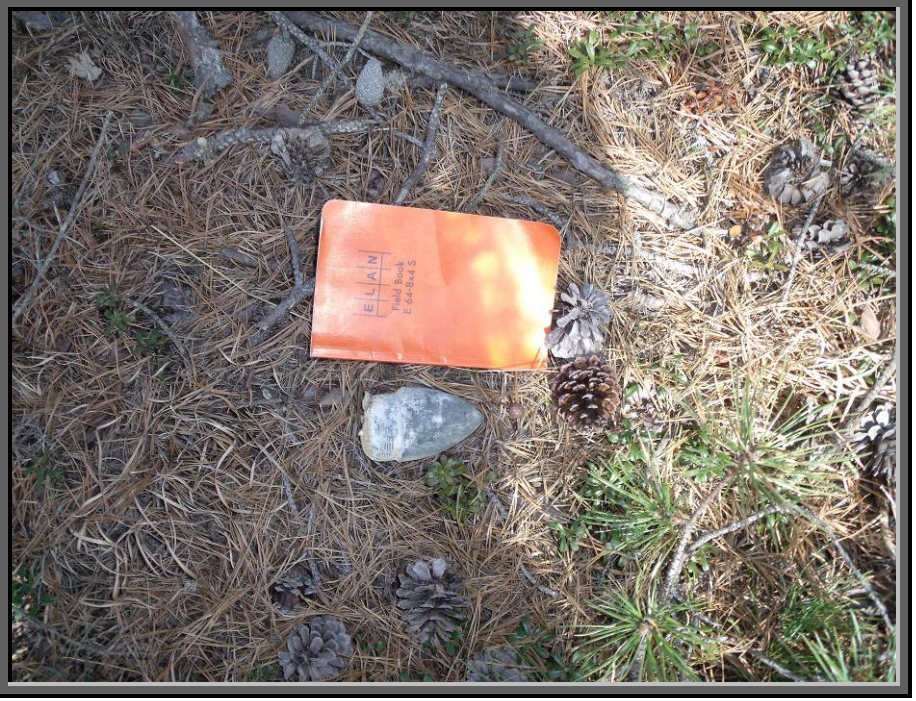
Comments: Former strafing target.

Photograph No.: E.11 Date: 04/28/09 Time: 1500 PM

Site: Suffolk AAF
Photographer: T. Belanger
Location of Photograph: MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: N 4525862.7 E 697133.6
(UTM Zone 18N)
Direction of Photo: Down

Comments: Nose cone (MD) from a 2.25-inch practice rocket. Located north of the strafing targets.

Photograph No.: E.12 Date: 04/28/09 Time: 1550 PM



Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	MRS 1 – Ground Gunnery/Skip Bomb Subrange A
GPS Coordinates: (UTM Zone 18N)	N 4525862.7 E 697133.6
Direction of Photo:	Down
Comments:	2.25-inch practice rocket bodies found near nose cone (E.12).
Photograph No.:	E.13 Date: 04/28/09 Time: 12:57 PM

Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	MRS 1 Ground Gunnery/Rocket Sub Range B
GPS Coordinates: (UTM Zone 18N)	N 4523839.2 E 696944.8
Direction of Photo:	South
Comments:	Groundwater sample SCA-RC-GW-00-03
Photograph No.:	E.14 Date: 04/29/09 Time: 1245 PM

Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	MRS 1 Ground Gunnery/Rocket Sub Range B
GPS Coordinates: (UTM Zone 18N)	N 4523968.4 E 696866.7
Direction of Photo:	Down.
Comments:	.50 caliber projectile in strafing target.
Photograph No.:	E.15 Date: 04/29/09 Time: 1330 PM

Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	MRS 1 – Bombing Sub-range
GPS Coordinates: (UTM Zone 18N)	N 4525131.4 E 694408.2
Direction of Photo:	West
Comments:	Groundwater sample RCA-RC-GW-00-02.
Photograph No.:	E.16 Date: 04/29/09 Time: 1520 PM

Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	MRS 1 – Bombing sub-range
GPS Coordinates: (UTM Zone 18N)	N 4525590.6 E 695481
Direction of Photo:	North
Comments:	QR within the bombing sub-range.
Photograph No.:	E.17 Date: 04/29/09 Time: 1600 PM

Site:	Suffolk AAF
Photographer:	T. Belanger
Location of Photograph:	
GPS Coordinates: (UTM Zone 18N)	N 4526144.1 E 694712.3
Direction of Photo:	North
Comments:	White gravel used to identify the outline of an aircraft carrier target within the bombing sub-range.
Photograph No.:	E.18 Date: 04/30/09 Time: 1000 AM

APPENDIX F – ANALYTICAL DATA

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

Located on CD.

APPENDIX G – ANALYTICAL DATA QUALITY ASSURANCE/ QUALITY CONTROL REPORT

- Validated Data from EDS
- USACE Memorandum for Record-CQAR of Quality Assurance Split Samples. (Split Samples not collected in accordance to CENAB direction.)
- USACE- NAB will provide the Chemical Quality Data Assessment Report (CDQAR) prior to issuance of the Final SI report

Located on CD.

APPENDIX H – GEOGRAPHIC INFORMATION SYSTEMS DATA

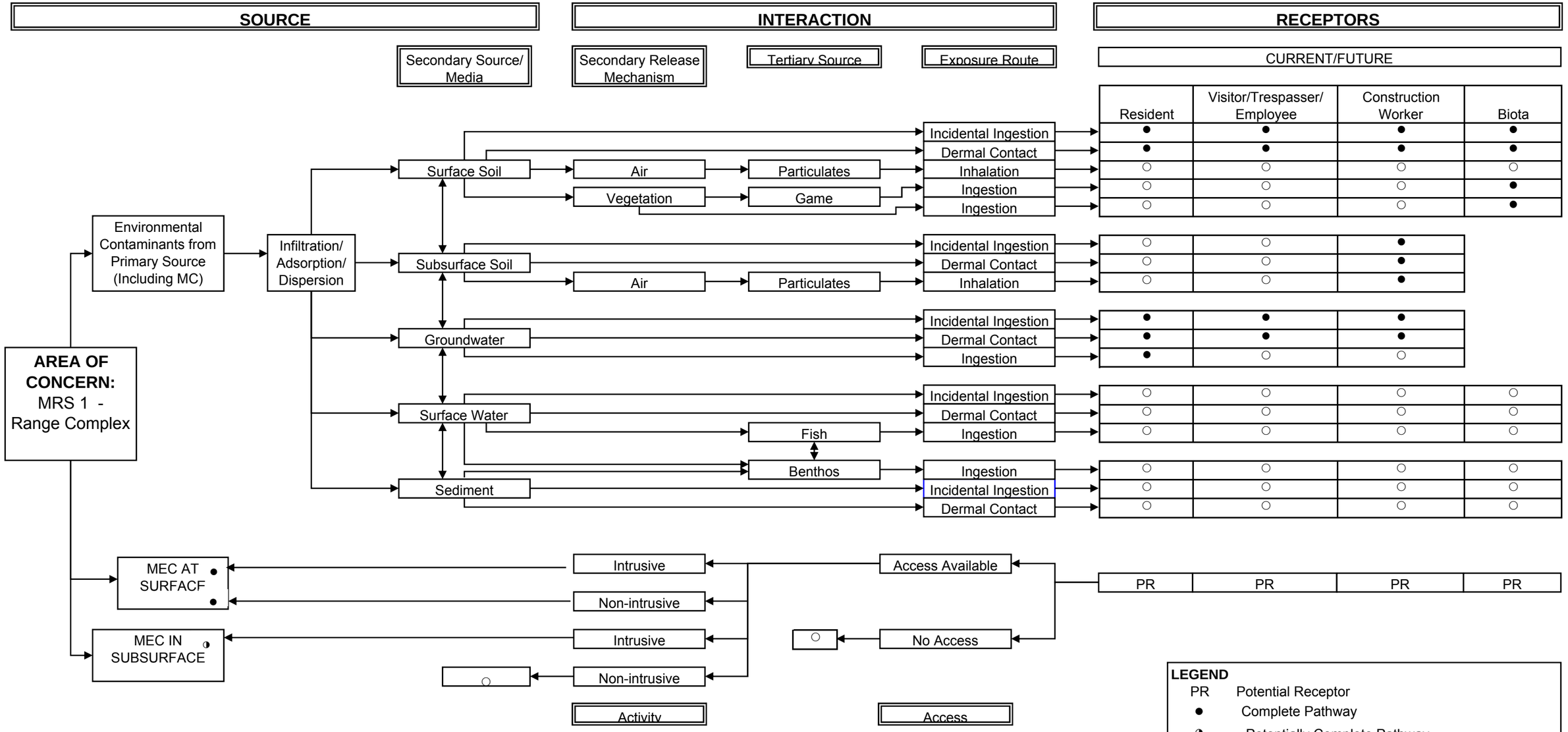
Provided on CD

APPENDIX I – GEOPHYSICAL DATA

Appendix not used.

APPENDIX J – CONCEPTUAL SITE MODEL

- MRS 1 (Range Complex)



NOTES:

1. For the MMRP SI at Suffolk County AAF Bombing and Gunnery Range, this CSM summarizes the potential risk exposure scenarios for MRS 1– Range Complex. For a pathway to be complete, it must include a source, an exposure medium, an exposure route, and a receptor. A complete pathway may also include a release mechanism and a transport medium. Interaction between a potential receptor and MEC has two components: access and activity.

2. Primary sources will vary but will include the MRS 1 range area where historical MEC activities occurred. Munitions have been found historically at Suffolk County AAF Bombing and Gunnery Range; therefore, the pathway for MEC at the surface is complete. During the 2009 Alion SI, MD (practice bombs, rockets, and small arms) was observed on all three islets; therefore, the pathway for MEC is complete for surface and potentially complete in subsurface. No permanent surface water bodies or associated sediments are present within the MRS; therefore, surface water and sediment are not media of concern.

3. Explosives were not detected in any of the surface soil samples analyzed in this SI. Metals were detected above background in surface and subsurface soil and groundwater, therefore these media have complete pathways.

DIAGRAM OF THE INTEGRATED CONCEPTUAL SITE MODEL FOR

Suffolk County AAF Bombing and Gunnery Range **1. 2 and 3**

MRS 1 - Range Complex No. 1

(WORKING DRAFT)

Revised September 2009 **J-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.* EM 1110-1-1200.

APPENDIX K – MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL RESULTS

- MRS 1 (Range Complex)

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: Range Complex

Component: U.S. Army

Installation/Property Name: Suffolk County AAF Bombing and Gunnery Range (FFID: NY29799F122300)

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

Site Name (RMIS ID)/Project Name (Project No.): Suffolk County AAF Bombing and Gunnery Range (RMIS ID C02NY071301R01) / (Project No. C02NY071301)

Date Information Entered/Updated: 11/9/2009

Point of Contact (Name/Phone): Helen Edge / 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):

The former Suffolk County AAF FUDS occupies approximately 9,224 acres. The Suffolk County AAF FUDS was activated in 1943 for bombing, strafing, and rocket fire training exercises during World War II. Military use of the Suffolk County AAF site ceased in 1946 (USACE 2003b). Currently, the majority of the project site is owned by New York State and Suffolk County. The northern portion of the FUDS is located within the Long Island Central Pine Barrens Groundwater Conservation area and is under the stewardship of the Central Pine Barrens Joint Planning and Policy Commission (Alion 2008b). With the exception of a two target silhouettes constructed of painted boulders, a destroyer and an aircraft carrier, no military structures remain at the FUDS (USACE 1997).

Description of Pathways for Human and Ecological Receptors:

Surface soil, subsurface soil, and groundwater were identified as potentially complete pathways for human and ecological receptors. Refer to the CSM (Appendix J) and Sections 5.2.0.1 and 5.2.0.2.

Description of Receptors (Human and Ecological):
Visitor, Trespasser, Employee, Biota.

Table 1

EHE Module: Munitions Type Data Element Table

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

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

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

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

Historical documents indicate that possible munitions used included: .50 caliber small arms, general purpose HE bombs (100 and 500lbs), incendiary photoflash bombs, 4.5-inch HE barrage rockets, and 100-lb practice bombs. A Bomb and Shell Disposal Team report of decontamination, dated 11 June 1946, showed the following items were discovered and removed during the course of clearing the Suffolk County AAF ranges: two un-fuzed 6-lb M69 oil incendiary bombs, eleven 4-lb M54 incendiary bombs, five 4-lb M50Al incendiary bombs, several sand-filled practice rockets and 100-lb practice bomb remnants as well as three unexpended M1 black powder spotting charges. Suffolk County Police Department Emergency Service Section Incident Report, dated 1 July 1996, documenting the recovery and destruction of a suspected 4.5-inch M8 HE rocket on the former Suffolk County AAF Bombing and Gunnery Range lands. However, an Air Force Explosive Ordnance Disposal (EOD) response to the same incident identified this item to be a M9 4.5-inch practice rocket. During the 1997 ASR site inspection of the Suffolk County AAF Bombing and Gunnery Range FUDS, the inspection team discovered an AN-M20 or AN-M18 100-lb bomb burster tube with an intact point-detonating fuze. The ASR inspection team found M38A2 100-lb practice bomb and M1 spotting charge debris as well as several .50 caliber shell casings (USACE 1997). During the 2009 Alion SI, several .50 caliber shell casings and many .50 caliber projectiles and jackets were found in addition to a suspected 100-lb sand-filled practice bomb and several, expended, 2.25-inch practice rockets were discovered. All of the MD items found during the 2009 Alion SI were small arms or practice muntions. Refer to Sections ES.8, 2.4.2.2, 2.4.2.3, 2.4.2.4, 2.4.2.5, 2.4.3.2, 2.5.1, 3.3.1.2, 4.2.1.1, and Tables 2-1, 2-2, and 4-2 of the Alion SI report for more information concerning the types of munitions used and found at the FUDS.

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).	*10*

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

According to the ASR and ASR Supplement, the Suffolk AAF Bombing and Gunnery Range FUDS was used as a bombing, rocket, and strafing range (USACE 1997 and 2004a). Practice munitions without sensitive fuzes, incendiary bombs, HE bombs and rockets, and small arms were used at MRS 1. Historically, incendiary bombs, suspected HE bombs, practice munitions, and small arms have been found within the MRS. Refer to Sections 2.4.2.2, 2.4.2.3, 2.4.2.4, 2.4.2.5, 2.5.1, 4.2.1.1 and Tables 2-1, 2-2, and 4-2 of the Alion SI report for more information concerning the types of munitions used at the FUDS.

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).	*25*

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

Historical reports indicate that incendiary bombs and suspected HE bombs and rockets have been found on the surface. During the ASR site visit surface MD was observed (USACE 1997). During the Alion SI site visit in 2009, MD (100-lb practice bomb, 2.25-inch practice aerial rockets, and .50 caliber projectiles) was observed on the surface within the MRS. Refer to Sections 2.4.2.2, 2.4.2.3, 2.4.2.4, 2.4.2.5, 2.5.1, 4.2.1.1, Tables 2-1, 2-2, 4-2, Figure 3-2 and Appendix E - Photo Log.

Table 4

EHE Module: Ease of Access Data Element Table

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

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

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

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

Suffolk AAF Bombing and Gunnery Range is approximately two miles north of Westhampton Beach, New York and occupies approximately 9,224 acres. The site is situated in a relatively flat area just to the south and partially within the Central Pine Barrens in Suffolk County. Much of the FUDS area is uninhabited. There is no fence surrounding MRS 1, however, the thick local vegatation prevents easy access to much of the FUDS. Refer to Sections 2.3.4.1, 4.2.1.1, and Table 4-2 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*** classifications in the space provided.

The majority of the Suffolk County AAF Bombing and Gunnery Range FUDS is owned by New York State and Suffolk County. A small tract in the southeastern portion of the FUDS is used for residential housing. Other portions of the southern FUDS are used for light industrial purposes and by the State Police (Alion 2008b, USACE 1997). The FUDS is no longer under DoD control. Refer to Sections 2.3.4.1, 4.2.1.1, and Table 4-2 of the SI Report for more information.

Table 6

EHE Module: Population Density Data Element Table

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

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

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

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

The population density of Suffolk County, NY is 1593 persons per square mile (US Census 2008). Refer to Section 2.3.3.1 and Table 4-2 of the SI report for more information.

Table 7

EHE Module: Population Near Hazard Data Element Table

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

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

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

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

There are more than 26 inhabited structures within MRS 1 and within 2 miles of MRS 1. A small subdivision located in the southeastern portion of the FUDS is located within several of the sub-ranges (Google Earth 2009; NYGIS 2004; USACE 1997). Refer to Sections 2.3.3.1, 2.3.4.1, Table 4-2 and Figures 2-2 and 2-4.

Table 8

EHE Module: Types of Activities/Structures Data Element Table

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

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

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

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

Residential structures are located within the MRS in the southeastern portion of the FUDS. A golf course is located north of the FUDS, within two miles. Adjacent to the southern FUDS boundary is a suburban area that is highly developed. Light industry is located in the southern portion of the FUDS. Refer to Section 2.3.4.1, Table 4-2 and Figures 2-2 and 2-4 in 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).	*0*

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

Based on the MRSPP guidance (p. 57 and Table 7.14) for ecological receptors that are considered in this table, no ecological receptors are present on this MRS (DoD 2007). The NYSDEC were contacted and responded that several state-listed rare species may be present within the FUDS. No federally listed threatened or endangered species are listed (USFWS 2008). USACE and Alion consulted with the New York State Historical Commission which concluded that the FUDS is not archaeologically sensitive and does not contain significant archaeological resources (DoD 2007 p. 57). Refer to the SI Report, Sections 2.3.8.1.1, 2.3.8.2.1, 2.3.8.3.1, 3.2.1.1, 3.2.2.1 and Appendix L - T&E and SHPO Response Letters.

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	25	35
Source of Hazard	Table 2	10	
Accessibility Factor Data Elements			
Location of Munitions	Table 3	25	40
Ease of Access	Table 4	10	
Status of Property	Table 5	5	
Receptor Factor Data Elements			
Population Density	Table 6	5	15
Population Near Hazard	Table 7	5	
Types of Activities/ Structures	Table 8	5	
Ecological and /or Cultural Resources	Table 9	0	
EHE MODULE TOTAL			(90)

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	(*B*)

Table 11

CHE Module: CWM Configuration Data Element Table

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

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

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

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

Based on the ASR and ASR Supplement, there are no known or suspected CWM hazards used, stored, or disposed of at Suffolk AAF Bombing and Gunnery Range (USACE 1997, 2004a). Refer to Sections 2.4.0.1 and 2.4.2.5 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	0	0
Sources of CWM	Table 12		
Accessibility Factor Data Elements			
Location of CWM	Table 13		0
Ease of Access	Table 14		
Status of Property	Table 15		
Receptor Factor Data Elements			
Population Density	Table 16		0
Population Near Hazard	Table 17		
Types of Activities/ Structures	Table 18		
Ecological and /or Cultural Resources	Table 19		
CHE MODULE TOTAL			(0)

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

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

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

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

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios
Iron	39100	11000	ug/L	3.6
Barium	209	7300	ug/L	0.029
Copper	88.5	1500	ug/L	0.059
Nickel	71.1	730	ug/L	0.097
Lead	26	15	ug/L	1.7

CHF Scale	CHF Value	Sum The Ratios	5.5
CHF > 100	H (High)	*CHF* =	[Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

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

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).	(M)

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).	(L)
	No Known or Suspected Groundwater MC Hazard	☐

Table 21 Comments: Analytes and their associated sample that exceed site maximum background concentrations include: SCA-RC-GW-00-02 (barium, copper, lead, and nickel). No explosives were detected. Refer to Tables 5-2, 5-3, 5-6, and 6-1 in the SI Report.

Table 22

HHE Module: Surface Water – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

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

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

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

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

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

Table 22 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008a and 2008b). Refer to Section 5.2.0.2, Figure 2-4, and Appendix J1 - CSM of the SI report for further information.

Table 23

HHE Module: Sediment – Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

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

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

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

Table 23 Comments: Sediment is not a medium of concern; therefore sediment was not sampled (Alion 2008a and 2008b). Refer to Section 5.2.0.2 and Appendix J1-CSM of the SI report for further information.

Table 24

HHE Module: Surface Water – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

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

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

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

Table 24 Comments: Surface water is not a medium of concern; therefore surface water was not sampled (Alion 2008a and 2008b). Refer to Section 5.2.0.2, Figure 2-4, and Appendix J1 - CSM of the SI report for further information.

Table 25

HHE Module: Sediment – Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios

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

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

Migratory Pathway Factor

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

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

Receptor Factor

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

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

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

Table 25 Comments: Sediment is not a medium of concern; therefore sediment was not sampled (Alion 2008a and 2008b). Refer to Section 5.2.0.2 and Appendix J1 - CSM of the SI report for further information.

Table 26
HHE Module: Surface Soil Data Element Table

Contaminant Hazard Factor (CHF)

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

Contaminant	Maximum Concentration	Comparison Value	Unit	Ratios
Lead	587	400	mg/Kg	1.5
Copper	215	3100	mg/Kg	0.069
Antimony	16.2	31	mg/Kg	0.52

CHF Scale	CHF Value	Sum The Ratios	2.1
CHF > 100	H (High)	*CHF* = [Maximum Concentration of Contaminant] / [Comparison Value for Contaminant]	
100 > CHF > 2	M (Medium)		
2 > CHF	L (Low)		

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

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).	M

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).	M

No Known or Suspected Surface Soil MC Hazard ☐

Table 26 Comments: Analytes and their associated sample that exceeded site maxiumum background concentrations include: SCA-RC-SS-01-04 (Antimony); SCA-RC-SS-01-18 (Copper); SCA-RC-SS-01-04 (Lead). No explosives were detected. Refer to Tables 5-1, 5-3, 5-4, 5-5 and 6-1 in the SI Report.

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

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

Note: Remember not to add ratios from different media.

Media	Contaminant	Maximum Concentration	Comparison Value	Ratio

Table 28
Determining the HHE Module Rating

DIRECTIONS:

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

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

DIRECTIONS (cont.):

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

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

HHE MODULE RATING	**D**

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				*3*	

APPENDIX L – REFERENCE COPIES

Located on CD.

FINAL

Response to Comments: Site Inspection Report for Suffolk AAF Bombing and Gunnery Range, Suffolk County, NY

DERP FUDS Project No. **C02NY071301**

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

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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.

December 2009

PROJECT: Draft Final Site Inspection Report for Suffolk County AAF Bomb & Gunnery Range (C02NY071301)			
DESIGN REVIEW COMENTS			
		REVIEW:	Draft Final Site Inspection Report for SI of Suffolk County AAF Bomb & Gunnery Range (Nov. 2009)
		DATE:	18 December 2009
		NAME:	Anthony Ceglio (Gabreski Airport)
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	No comments	A-ACCEPT/CONCUR: No action required.

PROJECT: Draft Final Site Inspection Report for Suffolk County AAF Bomb & Gunnery Range (C02NY071301)			
DESIGN REVIEW COMENTS			
		REVIEW:	Draft Final Site Inspection Report for SI of Suffolk County AAF Bomb & Gunnery Range (Nov. 2009)
		DATE:	22 December 2009
		NAME:	Anthony Vasell (U.S. ANG)
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	No comments.	A-ACCEPT/CONCUR: No action required.

PROJECT: Draft Final Site Inspection Report for Suffolk County AAF Bomb & Gunnery Range (C02NY071301)			
DESIGN REVIEW COMENTS			
		REVIEW:	Draft Final Site Inspection Report for SI of Suffolk County AAF Bomb & Gunnery Range (Nov. 2009)
		DATE:	21 December 2009
		NAME:	NYSDEC (State Regulator)
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	General	Agree with recommendation for RI/FS.	A-ACCEPT/CONCUR: No action required.

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

PROJECT: Draft Final Site Inspection Report for Suffolk County AAF Bomb & Gunnery Range (C02NY071301)			
DESIGN REVIEW COMENTS			
		REVIEW: Draft Final Site Inspection Report for SI of Suffolk County AAF Bomb & Gunnery Range (Nov. 2009) DATE: 21 December 2009 NAME: Suffolk County Department of Environment and Energy	
ITEM	DRAWING NO OR REFERENCE	COMMENT	ACTION
1	On page 5-7, Section 5.1.4.2	a) The methodology employed for determining the adequacy of the reporting limit for nitroglycerine is questionable. The risk to human health from the twenty munitions constituents potentially on site should be calculated quantitatively, using Hazard Quotients, to adequately determine if there is a need for concern. b) Additionally, with regard to the potential presence of nitroglycerine in groundwater on site, the reporting limit was 20 ug/L which was significantly higher that the 3.7 ug/L indicated as the "EPA regional tap water concentration" (There was no citation for this reference). The high reporting limit is rationalized by the fact that nitroglycerine was not found above the reporting limit in soils. The SCDEE does not consider this a valid argument because whether the groundwater criterion is exceeded will depend upon the leaching ability of nitroglycerine in soil not the reporting limit in soil. In addition, it does not consider other potential pathways for groundwater contamination, such as direct discharge from buried munitions.	A-ACCEPT/CONCUR: a) Comment noted, during the RI/FS phase additional investigation and evaluation of explosives in groundwater may be warranted. Additionally, with the exception of the uncertainty associated with the reporting limit for NG no other explosives were detected in groundwater. No changes were made to the document. b) During the RI/FS phase for Suffolk County AAF the state, county and other stakeholders will have the opportunity to request additional sampling and risk screening of potential contaminants in groundwater. No changes were made to the document.

2	page 5-18	a) There is also no citation for or explanation of the "EPA regional tap water concentration" referenced for iron. The actual concentration used for comparison should be indicated numerically in the discussion. There is also no mention of what the site's maximum concentration was. The paragraph merely compares the level of iron at the site to the EPA regional tap water concentration, without providing the actual numerical values. While these values are available in the tables, their exclusion from the narrative discussion only severs to make the document and its conclusions more difficult to evaluate. b) We would like to point out that the 15 ug/L comparison value referenced for lead is actually an action level used for drinking water distribution samples. There is a New York State Department of Environmental Conservation (NYSDEC) ambient water quality standard for groundwater (Part 703) of 25 ug/L, which was exceeded in one out of the two groundwater sample locations (SCA-RC-GW-00-02). The conclusion of the weight-of-evidence evaluation for lead detected in groundwater on site is that "…site groundwater is not considered to represent unacceptable risk to human receptors." This conclusion was based on the action level for tap water, and the fact that the concentrations detected on site are from raw groundwater rather than finished tap water. However, given that lead was detected in excess of the NYSDECs ambient groundwater quality standard, that 90% of the site lies within the Long Island Central Pine Barrens Ground Water Conservation Area, that there are potential receptors for contaminants in groundwater and the majority of potable water in the West Hampton area is obtained from the upper glacial and the Magothy aquifers, the SCDEE does not agree that it is appropriate to make this statement at this time, until more data is obtained from the Remedial Investigation.	A-ACCEPT/CONCUR: a) The site maximum iron concentration in groundwater and the comparison value were added to the narrative in the Final SI Report. b) Text was added to the groundwater discussion stating that although this report determined there was no unacceptable risk posed by lead groundwater during the RI/FS phase groundwater should be further investigated. Per USACE guidance during the SI phase of the investigation of Suffolk County AAF only Federal regional screening values were used in the risk screening evaluation. During the RI/FS phase additional lines of evidence, such as state screening criteria, may be used to evaluate MC risk at Suffolk County AAF.