FINAL
Historical Records Review/Work Plan
New York
Army National Guard Directorate
Military Munitions Response Program
Munitions Response Site Inspections
Eastern Region

Contract #: W912DR-09-D-0002
Task Order: DM02

Submitted by: PARSONS
July 2011

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Parsons Infrastructure and Technology Group (Parsons) has completed the Final Historical Records Review/Work Plan for New York. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. 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; alternatives evaluated; 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 the law and existing Corps policy.

State Lead / Regional Lead

All concerns resulting from independent technical review of the project have been considered.

Parsons Program Manager

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LIST OF ACRONYMS AND ABBREVIATIONS

AEC	Army Environmental Center
AEDB-R	Army Environmental Database-Restoration Module
AHA	Activity Hazard Analysis
APP	Accident Prevention Plan
ARNG	Army National Guard
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CHE	Chemical Hazard Evaluation
COR	Contracting Officer's Representative
CRREL	Cold Regions Research and Engineering Laboratory
CSEM	Conceptual Site Exposure Model
CSM	Conceptual Site Model
CTC	Cost-to-Complete
CTT	Closed, Transferring, and Transferred
CWA	Clean Water Act
CWM	Chemical Warfare Material
DERP	Defense Environmental Restoration Program
DHEC	Department of Health and Environmental Control
DMM	Discarded Military Munitions
DNR	Department of Natural Resources
DoD	Department of Defense
DP	Deck Piercing
DQO	Data Quality Objective
EcoSSL	Ecological Soil Screening Levels
EHE	Explosive Hazard Evaluation
EM	Engineering Manual
EPA	Environmental Protection Agency
EPP	Environmental Protection Plan
ESA	Endangered Species Act
FS	Feasibility Study
FSP	Field Sampling Plan
FTL	Field Team Leader
FUDS	Formerly Used Defense Sites
GPS	Global Positioning System
HHE	Health Hazard Evaluation
HRR	Historical Records Review
HRS	Hazard Ranking System
HTRW	Hazardous, Toxic, and Radioactive Waste
IR	Inventory Report

LIST OF ACRONYMS AND ABBREVIATIONS

ITRC	Interstate Technology and Regulatory Council
MC	Munitions Constituents
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MIDAS	Munitions Items Disposition Action System
MMRP	Military Munitions Response Program
mph	miles per hour
MR	Munitions REsponse
MRS	Munitions Response Site
MRSPP	Munitions Response Site Prioritization Protocol
NCP	National Contingency Plan
NDNODS	Non DoD-owned, Non-Operational Defense Site
NFA	No Further Action
NGB	National Guard Bureau
NYSDEC	New York State Department of Environmental Conservation
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
OE	Ordnance and Explosives
PA	Preliminary Assessment
PgM	Program Manager
PM	Project Manager
POC	Point of Contact
PSV	Preliminary Screening Values
PWP	Programmatic Work Plan
PWS	Performance Work Statement
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROE	Right-of-Entry
RSL	Regional Screening Level
RSR	Remediation Standard Regulations
SAP	Sampling and Analysis Plan
SARA	Superfund Amendments and Reauthorization Act
SDZ	Safety Danger Zone
SI	Site Inspection
SLRA	Screening Level Risk Assessment
SOP	Standard Operating Procedure
SOSO	State-Owned/State-Operated
SSHO	Site Safety and Health Officer
SVT	Site Visit Team

LIST OF ACRONYMS AND ABBREVIATIONS

T&E	Threatened and Endangered
TBD	To Be Determined
TD	Transferred
TLI	TechLaw Holdings, Inc.
TPP	Technical Project Planning
U.S.	United States
UFP	Uniform Federal Policy
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
UXOSO	UXO Safety Officer
VS	Visual Survey
WP	Work Plan

GLOSSARY

Anomaly Avoidance – Techniques employed on property known or suspected to contain UXO, other munitions that may have experienced abnormal environments (e.g. DMM), munitions constituents in high enough concentrations to pose an explosive hazard, or chemical agent (CA) regardless of configuration, to avoid contact with potential surface or subsurface explosive or CA hazards, to allow entry to the area for the performance of required operations.

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

Defense Site – All locations that are or were owned by, leased to, or otherwise possessed or used by the DoD. The term does not include any operational range, operating storage, or manufacturing facility, or facility that is used or was permitted for the treatment or disposal of military munitions.

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 UXO, 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.

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

Formerly Used Defense Site (FUDS) – A DoD program that focuses on compliance and cleanup efforts at sites that were formerly used by the DoD. A FUDS property is eligible for the Military Munitions Response Program if the release occurred prior to October 17, 1986; the property was transferred from DoD control prior to October 17, 1986; and the property or project meets other FUDS eligibility criteria.

Military Munitions (MM) – All ammunition products and components produced for or used by the armed forces for national defense and security, including ammunition products or components under the control of the Department of Defense (DoD), United States Coast Guard, Department of Energy (DOE), and 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 than nonnuclear components of nuclear devices that are managed under the nuclear weapons program of the DOE after all required sanitization operations under the Atomic Energy Act of 1954 (42 United States Code [U.S.C.] 2011 et seq.) have been completed. (10 U.S.C. 101(e) (4) (A) through (C))

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 U.S.C. 2710(e) (3))

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

Munitions and Explosives of Concern (MEC) – This term, which distinguishes specific categories of military munitions that may pose unique explosives safety risks means: (A) UXO, as defined in 10 U.S.C. 101(e)(5); (B) DMM, as defined in 10 U.S.C. 2710(e)(2); or (C) munitions constitutes (MC) (e.g., Trinitrotoluene (TNT), Cyclotrimethylenetrinitramine (RDX), as defined in 10 U.S.C. 2710(e) (3), present in high enough concentrations to pose an explosive hazard.

Munitions Response – Response actions, including investigation, removal actions, and remedial actions to address the explosives safety, human health, or environmental risks presented by UXO, DMM, or munitions constituents (MC), or to support a determination that no removal or remedial action is required.

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 compromised of one or more munitions response sites.

Munitions Response Site (MRS) – A discrete location within an MRA that is known to require munitions response.

Range – A designated land or water area 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.

Unexploded Ordnance (UXO) – Military munitions that: (a) have been primed, fused, armed, or otherwise prepared for action; (b) have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installations, personnel, or material; and (c) remain unexploded either by malfunction, design, or any other cause.

UXO Technician – Personnel who are qualified for and filing Department of Labor, Services Contract Act, Directory of Occupations, Contractor positions of UXO Technician I, Technician II, and UXO Technician III.

UXO – Qualified Personnel – Personnel who have performed successfully in military EOD positions, or are qualified to perform in the following Department of Labor, Service Contract Act, Directory of Occupations, Contractor positions: UXO Technician II, UXO Technician III, UXO Safety Officer, UXO Quality Control Specialist, or Senior UXO Supervisor.

CHAPTER 1
INTRODUCTION AND PROJECT BACKGROUND

1.0 INTRODUCTION

1.0.1 This Historical Records Review/Work Plan (HRR/WP) addresses Site Inspection (SI) at 23 eligible Munitions Response Sites (MRS)[1] under the Army National Guard (ARNG) Military Munitions Response Program (MMRP) in New York. The strategy and plans presented in this submittal are consistent with the ARNG's programmatic approach to SIs as defined in the Draft Programmatic Work Plan (PWP) [Weston Solutions (Weston), 2011]. Figure 1-1 shows the locations of the MRSs within New York that are the subject of this SI.

1.0.2 The United States (U.S.) Congress established the MMRP under the Defense Environmental Restoration Program (DERP) to address former defense sites where unexploded ordnance (UXO), discarded military munitions (DMM), and munitions constituents (MC) may be present as a result of past training activities. The Non-Department of Defense (DoD) owned, Non-Operational Defense Sites (NDNODS), defined as those defense sites that were used exclusively by the ARNG and were never owned, leased, or otherwise possessed or used by the Army or other DoD component, are a subcategory of MMRP. An MRS co-used by other DoD components or that fulfills other eligibility criteria, also may be addressed under the ARNG SI program. For the State of New York, four MRSs are classified as NDNODS with the remaining MRSs classified into the latter category.

1.0.3 This HRR/WP supplements the Draft Preliminary Assessment (PA) National Guard Bureau (NGB) NDNODS Inventory Report for New York (Malcolm Pirnie, 2009a) and the Final PA NGB NDNODS Inventory Report for New York (Malcolm Pirnie, 2009b); the Draft Final PWP (Weston, 2011); and presents pertinent site-specific information, plans and protocol not contained in the programmatic documents or Technical Project Planning (TPP) Team agreements. This HRR/WP details the planned tasks necessary to complete this project and ensure conformance to the Performance Work Statement (PWS) dated August 2010.

1.0.4 Any revisions to the Final HRR/WP will be coordinated and resolved with the stakeholder team and documented as a revision to this submittal. This team includes the ARNG Directorate Program Manager (PgM) and Regional Lead, United States Army Corps of Engineers (USACE) – Sacramento Contracting Officer's Representative (COR), the USACE – Sacramento District PgM, New York Army National Guard (NYARNG) and New York State Department of Environmental Conservation (NYSDEC).

[1] The 23 MRSs identified in the Preliminary Assessment (PA) were increased to 28 MRSs in this HRR/WP as the result of subdivision of four of the original MRSs (see Subchapter 1.2.1.3).

Figure 1-1
New York Army National Guard MRSs Eligible for SI

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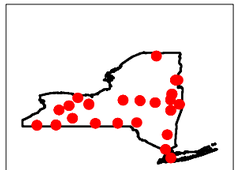

Site Location in New York

0 15 30 60
Kilometers

N

PROJECT NUMBER:
747648.13000
May 2011

1.1 PURPOSE AND SCOPE

1.1.1 This HRR/WP has two objectives, each of which contributes to ensuring the SI approach is complete and in compliance with associated federal guidance and standards. The purpose of the HRR is to: (1) identify data gaps in the current HRR information presented in the PA and (2) collect sufficient information regarding the history, use, and characteristics of the MRSs to support SI plans. The information presented in the HRR facilitates decision-making related to those areas where more information is needed to determine the next steps under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ([CERCLA]; 42 United States Code [USC] 9601 et seq.), Superfund Amendments and Reauthorization Act (SARA) 1986, Executive Orders 12580 and 13016, and the National Oil and Hazardous Substances Pollution Contingency Plan ([NCP] 1984; 40 Code of Federal Regulations [CFR] Part 300). The HRR is consistent with Interstate Technology and Regulatory Council (ITRC) *Munitions Response Historical Records Review Technical/Regulatory Guidance* (ITRC, 2003).

1.1.2 The HRR/WP details the plans and protocol to be implemented to ensure completion of the data quality objectives (DQOs) of the SI. The primary goal of the SI is to collect the appropriate amount of information necessary to make one of the following decisions at each MRS as to whether:

- Further investigation, such as a Remedial Investigation/Feasibility Study (RI/FS), is required;
- An interim removal/remedial action is required; or
- The MRS qualifies for no further action (NFA).

1.1.3 The SI is a limited scope study designed to determine the presence or absence of munitions and explosives of concern (MEC) and/or MC at a given MRS. Therefore, during the SI phase, the nature and extent of potential environmental contamination is not the objective.

1.1.4 At small arms ranges, small arms ammunition is not classified as MEC; therefore, no explosive safety hazards are anticipated. MEC is assumed not to be present at ranges where munitions use was limited to small arms ammunition.

1.2 PROJECT BACKGROUND

1.2.0.1 The National Guard, the oldest component of the Armed Forces of the United States and one of the nation's longest-enduring institutions, first mustered on December 13, 1636. The National Guard provided states with units trained and equipped to protect life and property and provided the nation with units to defend the United States and its interests around the world. The National Guard still remains a dual state-federal force. In support of its dual mission, the ARNG conducted training on DoD installations, Non-DoD Federally Managed Lands, as well as State, Tribal, and privately owned properties. Over 400 ARNG sites were identified in 48 states and two territories. Approximately 65 % of ARNG defense sites are small arms ranges, 21 % are maneuver areas, and 14 % are suspected artillery ranges. As a result, some former ARNG defense sites historically used to accomplish the Defense Mission may contain UXO, DMM, and MC.

1.2.0.2 In 2009, an NDNODS inventory was completed with the goal of identifying all sites in New York where ARNG trained with military munitions with an emphasis on the NDNODS properties. This inventory met the PA requirement under CERCLA. The NDNODS

Inventory for New York consisted of historical research, including an archive search at the national, state, and local levels designed to identify eligible MRSs and their locations, periods of use, and associated types of munitions. The majority of the data was obtained through data collection activities, review of historical records, and interviews with personnel knowledgeable of the specific state training areas, including active and retired Guardsmen. Where an access agreement was granted, a site visit was conducted.

1.2.0.3 As a follow-on to the NDNODS Inventory, the Army contracted with Parsons to perform an SI for each MRS assigned by Army in the Eastern Region. The executing agent for the SI is the USACE - Sacramento District. The USACE - Baltimore and Sacramento Districts and Huntsville Center are providing technical support. The USACE -Omaha District coordinates the effort to collect Rights-of-Entry (ROE) for all relevant property. Omaha District is supported by 15 regional USACE offices. The over 400 MRSs within 46 states and two territories are divided into three regions (Eastern, Central, and Western). The Eastern Region includes 20 states and two territories. Although the scope of the SI may vary for each assigned state, the following inspection activities may be performed: compilation and analysis of existing data and reports; preparation of an HRR/WP; conduct of field work (visual survey [VS], media sampling, and analysis); and analysis of results and preparation of an SI Report, including a Munitions Response Site Prioritization Protocol (MRSPP). The specific data collection elements are determined on a site-by-site basis within a given state. For New York, there are 28 eligible MRSs.

1.2.0.4 Key program drivers developed to date conclude that munitions response actions will be conducted under the process outlined in the NCP (40 CFR Part 300) as authorized by the CERCLA. The key legislative, administrative, and historic precedents include the following:

- **Defense Environmental Restoration Program (DERP) Management Guidance (September 2001)** – The DERP Management Guidance (DoD, 2001) establishes an MMRP element for UXO, DMM, and MC defense sites. The history of DERP dates back to the SARA of 1986. The scope of the DERP is defined in 10 USC §2701(b), which states that the: "Goals of the program shall include the following: (1) The identification, investigation, research and development, and cleanup of contamination from a hazardous substance or pollutant or contaminant and (2) Correction of the environmental damage (such as detection and disposal of unexploded ordnance) which creates an imminent and substantial endangerment to the public health or welfare or to the environment."
- **Army DERP Management Guidance for Active Installations (November 2004)** – The Army DERP Management Guidance (DOA, 2004) provides guidance for active installations and non-base realignment and closure (BRAC) excess properties on the management of the Army Installation Restoration Program (IRP), the MMRP, and the Building Demolition and Debris Removal Program categories that are related to environmental cleanup. The Army DERP Management Guidance does not apply to Army restoration activities overseas, the BRAC Environmental Restoration Program, the Compliance-Related Cleanup Program, or the Formerly Used Defense Sites (FUDS) Restoration Program. The guidance document was provided to implement the Army's DERP in accordance with the DERP Management Guidance (DoD, 2001). The Army DERP Management Guidance supplements the roles,

responsibilities, and procedures contained in Army Regulation 200-1 (AR 200-1) [DOA, 2007] and the Department of Army Pamphlet 200-1 (DA PAM 200-1) [DOA, 2002].

- **National Defense Authorization Act (FY02) (Sections 311-313)** – Sections 311-313 of the National Defense Authorization Act of FY02 reinforced the DoD's 2001 DERP Management Guidance by tasking the DoD to develop and maintain an inventory of defense sites that are known or suspected to contain UXO, DMM, or MC. Section 311 requires the DoD to develop a protocol for prioritizing defense sites for response activities in consultation with the States and Tribes. Section 312 requires the DoD to create a separate program element to ensure that the DoD can identify and track munitions response funding. Section 313 directs the DoD to provide a comprehensive assessment of UXO, DMM, and MC at defense sites in the FY02 DERP Annual Report to Congress.

1.2.0.5 The September 2001 DERP Management Guidance and the National Defense Authorization Act 2002, described above, established the MMRP. The DERP and the MMRP provide guidance and methods for conducting a baseline inventory of defense sites containing, or potentially containing UXO, DMM, and MC. The New York PA Report marked the completion of the PA phase of work under CERCLA. The SI is part of the CERCLA process and will complete the PA/SI requirement for the New York ARNG MMRP. The following sections summarize the results of the New York PA Report and present the primary goals of the SI.

1.2.1 Preliminary Assessment (Inventory Report)

1.2.1.1 The PAs, *Draft State/Territory Inventory Report, National Guard Bureau, Non-Department of Defense (DoD) owned, Non-Operational Defense Sites Inventory for New York* and *Final State/Territory Inventory Report, National Guard Bureau, Non-Department of Defense (DoD) owned, Non-Operational Defense Sites Inventory for New York* (Malcolm Pirnie, 2009a and 2009b), which is the equivalent to a PA in the CERCLA process, was completed in 2009. The PA presents the results of an inventory to establish a comprehensive list and to understand the potential liability associated with the MRSs in the State of New York. The PA included the following information:

- Maps depicting the locations of the eligible MRSs;
- Description of the Site Information, UXO Liability and Future Assessment; and stewardship for the MRSs, presented in both summary and tabular format; and
- A table supporting documentation listing sites determined to be ineligible.

1.2.1.2 The PA identified the following 23 MRSs that qualify for MEC and/or MC evaluation:

- Amsterdam Range, AEDB-R # NYHQ-005-R-01
- Binghamton Rifle Range (new), AEDB-R # NYHQ-006-R-01
- Camp Blauvelt, AEDB-R # NYHQ-007-R-01
- Camp O'Ryan, AEDB-R # NYHQ-008-R-01
- Elmira, AEDB-R # NYHQ-009-R-01
- Geneva Range, AEDB-R # NYHQ-010-R-01
- Glens Falls Range, AEDB-R # NYHQ-011-R-01

- Hoosick Falls Range (new), AEDB-R # NYHQ-012-R-01
- Hornell Rifle Range, AEDB-R # NYHQ-013-R-01
- Jamestown Rifle Range, AEDB-R # NYHQ-014-R-01
- Malone Local Training Area (LTA), AEDB-R # NYHQ-015-R-01
- Mohawk Rifle Range, AEDB-R # NYHQ-016-R-01
- NDNODS Creedmoor Rifle Range, AEDB-R # NYHQ-001-R-01
- NDNODS Geneseo Range (old), AEDB-R # NYHQ-002-R-01
- NDNODS Rensselaer Wyck Target Range, AEDB-R # NYHQ-003-R-01
- NDNODS Rochester Rifle Range, AEDB-R # NYHQ-004-R-01
- Olean Target Range (new), AEDB-R # NYHQ-017-R-01
- Oneida Range, AEDB-R # NYHQ-018-R-01
- Poughkeepsie Rifle Range, AEDB-R # NYHQ-019-R-01
- Saratoga Springs Rifle Range, AEDB-R # NYHQ-020-R-01
- Ticonderoga Range (old), AEDB-R # NYHQ-021-R-01
- Ticonderoga Training Range (new), AEDB-R # NYHQ-022-R-01
- Walton Rifle Range (new), AEDB-R # NYHQ-023-R-01

1.2.1.3 Subsequent to the TPP Meeting 2, the MRS list was expanded to include 27 MRSs as documented in the Final TPP Meeting 2 Minutes (Parsons, 2011). Subsequent to the Final TPP 2 Meeting Minutes, the MRS list was revised to include 28 MRSs. The increase in the number of MRSs from 23 to 28 MRSs is associated with subdivision of four of the original MRSs (Camp O'Ryan, Geneva Range, Glen Falls Range, and Ticonderoga Range [old]) into five additional MRSs. Three of the five MRSs (Geneva Range, Glen Falls Range, and Ticonderoga Range [old]), were subdivided into two MRSs since the surface danger zone (SDZ) is an area of the MRS unlikely to have been impacted by former ARNG range operations and are candidates for NFA. The remaining MRSs either were already truncated during the PA (e.g., Camp Blauvelt) or were subdivided based on other considerations (i.e., Camp O'Ryan has three distinct MRSs). These 28 MRSs will be addressed during the SI:

- Amsterdam Range, AEDB-R # NYHQ-005-R-01
- Binghamton Rifle Range (new), AEDB-R # NYHQ-006-R-01
- Camp Blauvelt, AEDB-R # NYHQ-007-R-01
- Camp O'Ryan MRS 1 Pistol Range, AEDB-R # NYHQ-008-R-01
- Camp O'Ryan MRS 2 Rifle Range, AEDB-R # NYHQ-008-R-02
- Camp O'Ryan MRS 3 Maneuvering Area, AEDB-R # NYHQ-008-R-03
- Elmira, AEDB-R # NYHQ-009-R-01
- Geneva Range, AEDB-R # NYHQ-010-R-01
- Geneva Range SDZ, AEDB-R # NYHQ-010-R02
- Glens Falls Range, AEDB-R # NYHQ-011-R-01
- Glens Falls Range SDZ, AEDB-R # NYHQ-011-R-02
- Hoosick Falls Range (new), AEDB-R # NYHQ-012-R-01
- Hornell Rifle Range, AEDB-R # NYHQ-013-R-01
- Jamestown Rifle Range, AEDB-R # NYHQ-014-R-01
- Malone Local Training Area (LTA), AEDB-R # NYHQ-015-R-01
- Mohawk Rifle Range, AEDB-R # NYHQ-016-R-01
- NDNODS Creedmoor Rifle Range, AEDB-R # NYHQ-001-R-01

- NDNODS Geneseo Range (old), AEDB-R # NYHQ-002-R-01
- NDNODS Rensselaer Wyck Target Range, AEDB-R # NYHQ-003-R-01
- NDNODS Rochester Rifle Range, AEDB-R # NYHQ-004-R-01
- Olean Target Range (new), AEDB-R # NYHQ-017-R-01
- Oneida Range, AEDB-R # NYHQ-018-R-01
- Poughkeepsie Rifle Range, AEDB-R # NYHQ-019-R-01
- Saratoga Springs Rifle Range, AEDB-R # NYHQ-020-R-01
- Ticonderoga Range (old), AEDB-R # NYHQ-021-R-01
- Ticonderoga Range (old) SDZ, AEDB-R # NYHQ-021-R-02
- Ticonderoga Training Range (new), AEDB-R # NYHQ-022-R-01
- Walton Rifle Range (new), AEDB-R # NYHQ-023-R-01

1.2.2 Site Inspection

The March 2009 Draft PA and July 2009 Final PA (Malcolm Pirnie, 2009a and 2009b) marked the completion of the first phase of work under CERCLA. The SI constitutes the second phase of the CERCLA process. The purpose of the ARNG MRS SI is to determine the presence or absence of munitions-related (MEC and MC) contamination at the MRSs identified in the final PA. The SI field activities will be initiated following submittal and approval of the Final HRR/WP. Upon completion of field activities, the data will be analyzed and a report will be developed in which conclusions and recommendations are presented.

1.3 SITE INSPECTION APPROACH

1.3.1 The ARNG Directorate developed a Programmatic Strategy to address all MRSs by site category (Weston, 2011). This approach was developed to ensure consistency across the country as the program is applied. Based on New York requirements, this approach was modified at the state's request as discussed during the TPP Meeting 2 held on March 11, 2011 (Parsons, 2011). Special consideration is made for MRSs anticipated to be recommended for NFA. To gain concurrence for a potential NFA recommendation, the rationale and approach is presented to the stakeholder team and subject to review and negotiation. MRSs confirmed or identified through the PA phase were subsequently categorized into three main range types based on munitions used:

- Small Arms Ranges
- Maneuver Areas
- Artillery Ranges

1.3.2 For New York, all of the eligible MRSs are small arms ranges with the exception of the two maneuver areas (Malone LTA and Camp O'Ryan MRS 3 Maneuvering Area). There are no eligible artillery ranges MRSs in the State of New York.

1.3.3 SI field activities will only be conducted only after Rights-of-Entry (ROE) are executed between the USACE-Omaha District Real Estate Division (or assigned the USACE District) and the landowner.

1.4 PROJECT OBJECTIVES AND PLANNED FIELD ACTIVITIES

1.4.1 The following project objectives were identified for the 28 MRSs in New York. These objectives were discussed with the project stakeholders (TPP Team) during TPP Meeting 2.

1.4.2 Primary Objective – Collect appropriate amount of information necessary to determine whether further evaluation (RI/FS or interim removal/remedial action) is necessary or whether an NFA recommendation is warranted. This objective will consist of the following tasks:

- Determine whether there is sufficient evidence to indicate MEC hazards are present at a given MRS, including UXO, DMM, and MC (in high enough concentrations to pose an explosive hazard). Identification of a single MEC item during field activities (consisting of visual survey transects of the MRS ground surface) may be sufficient to prompt a recommendation for further evaluation of the MRS. For this project, confirmation of all types of MEC present or definition of MEC densities or extent is not necessary to develop a recommendation. As noted in subchapter 1.1.3, small arms ammunition is not classified as MEC and no explosive safety hazards are anticipated.
- Perform the appropriate field activities to determine if MC contamination is present at each MRS. Anomaly avoidance techniques to be used are discussed in Chapter 8 (Anomaly Avoidance) and the Munitions and Explosives of Concern Support Work Plan (Appendix H) of this HRR/WP. At small arms ranges, samples will be collected from the target/impact area(s) and not the SDZ unless there is compelling evidence for MEC or MD in the projected or known SDZ. If MD is observed, samples may also be collected adjacent to the MD location. Samples will be analyzed for antimony, copper, and lead, the indicator metals for small arms munitions. Samples at Camp O'Ryan MRS 3 Maneuvering Area will be analyzed for aluminum, barium, copper, and zinc indicator metals for simulators and shoulder fired practice rockets. If any of these indicator metals are detected at concentrations exceeding the agreed human health screening criteria, further evaluation for MC may be recommended. At Malone LTA, a maneuver area, and NDNODS Creedmoor Rifle Range, no field work is proposed since the MRSs where range activities occurred were redeveloped.
- Parsons will not collect "background" samples but rather "ambient"[2] samples to provide separation from the statistical-based and baseline risk assessment connotation. Two ambient surface soil and/or one to two ambient sediment samples will be will be collected in the least likely MEC or MC-contaminated areas and, therefore, will be expected to provide ambient condition data with regard to metals concentrations at the MRS.
- The media to be sampled at the New York MRSs include soil, and where appropriate, sediment. The maximum detected concentration of each MC metal in the biased surface soil or sediment sample samples will be compared to ambient concentrations. Given that no site-specific statistical evaluation of background metals concentrations was available, the background concentrations for surface soil will be represented by the mean

[2] "Ambient Conditions" are concentrations of metals in soil/sediment in the vicinity of a site but which are unaffected by site-related activities. Ambient conditions are sometimes referred as "local background.

concentration of the two ambient surface soil samples. Part 375 Regulation Soil Cleanup Objectives will be used for evaluation of the soil if no background levels are available, as requested by New York State Department of Environmental Conservation (NYSDEC). Background (ambient) samples will be collected at all MRSs where field sampling is planned; therefore, the application of Part 375 Regulation Soil Cleanup Objectives for evaluation of soil results is not anticipated. Only those analytes detected at the site above the selected background concentrations will be retained for further consideration in the screening level risk assessment (SLRA). The maximum detected concentration of analytes (aluminum, antimony, barium, copper, lead and zinc) in soil retained for further consideration in the SLRA will be compared to the USEPA human health Regional Screening Levels (RSLs) for Chemical Contaminants at Superfund Sites for Residential Soil (November 2010). For sediment, NYSDEC's screening values are applied, i.e., the most conservative of the lowest effect level and severe effect level. The SI is not intended to determine the nature and extent of contamination or to provide sufficient data to perform a baseline risk assessment. However, background data, as available, may be used to assist in evaluation of analytical results. Specific screening values are presented in the Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) [Appendix E].

1.4.3 Secondary Objective – Update the MRSPP and collect data to develop a cost-to-complete (CTC) for each MRS upon completion of the SI, if further action is deemed necessary.

1.4.4 A TPP Summary Table is provided as Table 1-1. This table summarizes the MC and MEC activities and project objectives for the MRS. Sampling and VS details are provided in the FSP within this HRR/WP. Daily field activities will be documented in logbooks or on appropriate forms. The logbooks will document MEC or MD items, site conditions (e.g., vegetation, terrain, hazards, weather conditions, etc.) and modifications to the planned VS path will be discussed. At the completion of the day's field activities, the Field Team Leader (FTL) will submit a Daily Report to the Parsons State Lead, who will distribute the report to USACE, the ARNG Directorate, and the NYARNG Point of Contact (POC).

1.4.5 Table 1-2 presents information on the MRS acreage, boundary, and acreage revisions, and the status of ROEs.

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
Amsterdam Range	Visual survey (VS) will be conducted using a meandering pathway throughout the MRS. VS may be adjusted based on-site conditions.	Visually observe and document presence or absence of small arms ammunition (no MEC)	Eight composite surface soil samples will be collected in areas where vegetation has been least disturbed. Two ambient surface soil samples will be collected from locations not impacted by prior ARNG munitions activities.	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	NFA
Binghamton Rifle Range	Biased VS will be conducted using a meandering pathway and focusing on the suspected locations of the former firing line and target areas. VS may be adjusted based on-site conditions.	Same as above	Five discrete surface soil samples will be collected using X-ray fluorescence (XRF) screening. Two ambient surface soil samples will be collected from locations not impacted by prior ARNG munitions activities.	Same as above	Results will be used to determine if RI/FS or NFA is warranted.
Camp Blauvelt	Biased VS will be conducted using a meandering pathway and focusing on the locations of the former firing line and target areas. VS may be adjusted based on-site conditions.	Same as above	Eight discrete surface soil samples will be collected using XRF screening. Two ambient surface soil samples will be collected from locations not impacted by prior ARNG munitions activities.	Same as above	Same as above
Camp O'Ryan MRS 1 Pistol Range	Biased VS will be conducted using a meandering pathway and focusing on the	Same as above	Four discrete surface soil samples will be collected using XRF screening. Two ambient surface soil	Same as above	Same as above

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
	locations of the former firing line and target areas. VS may be adjusted based on-site conditions.		samples will be collected from locations not impacted by prior ARNG munitions activities. These ambient samples will be used as ambient samples for Camp O'Ryan MRS 3.		
Camp O'Ryan MRS 2 Rifle Range	Both NYSDEC and USACE investigated this MRS; therefore, no field work is planned during this SI.	Not Applicable (N/A)	N/A	N/A	RI/FS likely pending USACE's formal determination of FUDS eligibility/ineligibility
Camp O'Ryan MRS 3 Maneuvering Area	Biased VS will be conducted using a meandering pathway and focusing on the locations of the tank maneuvering area. VS may be adjusted based on-site conditions.	Visually observe and document presence or absence MEC	Four composite surface soil samples will be collected, two in the tank maneuvering area and two at burial sites, if found. Ambient samples from Camp O'Ryan MRS 1 will be used for ambient samples at MRS 3.	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	Results will be used to determine if RI/FS or NFA is warranted.
Elmira	Biased VS will be conducted using a meandering pathway and focusing on the location of the former target berm and firing lines. VS may be adjusted based on the site conditions.	Visually observe and document presence or absence of small arms ammunition (no MEC)	Eight discrete surface soil samples will be collected using XRF screening, if a berm is found. Two ambient surface soil samples will be collected from locations not impacted by prior ARNG munitions activities.	Same as above	Same as above
Geneva Range	Biased VS will be conducted using a meandering pathway and focusing on the	Same as above	Five discrete surfaces soil samples will be collected using XRF screening. Two ambient surface soil	Same as above	Same as above

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
	locations of the former firing line and target area. VS may be adjusted based on-site conditions.		samples will be collected from locations not impacted by prior ARNG munitions activities.		
Geneva Range SDZ	No field work is planned since impacts to the SDZ are unlikely.	N/A	No field work is planned since impacts to the SDZ are unlikely.	N/A	NFA
Glens Falls Range	Biased VS will be conducted using a meandering pathway and focusing on the locations of the former firing line and target area. VS may be adjusted based on-site conditions.	Visually observe and document presence or absence of small arms ammunition (no MEC) recommendations	Five discrete surfaces soil samples will be collected using XRF screening. Two ambient surface soil samples will be collected from locations not impacted by prior ARNG munitions activities.	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	Results will be used to determine if RI/FS or NFA is warranted.
Glens Falls Range SDZ	No field work is planned since impacts to the SDZ are unlikely.	N/A	No field work is planned since impacts to the SDZ are unlikely.	N/A	NFA
Hoosick Falls Range (new)	Biased VS will be conducted using a meandering pathway and focusing on the suspected locations of the former firing line and target area. VS may be adjusted based on-site conditions.	Visually observe and document presence or absence of small arms ammunition (no MEC)	Five discrete surface soil samples will be collected using XRF screening. Two ambient surface soil samples will be collected from locations not impacted by prior ARNG munitions activities.	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	Results will be used to determine if RI/FS or NFA is warranted.
Hornell Rifle Range	Biased VS will be conducted using a meandering pathway	Same as above	Five composite surface soil samples will be collected in and around the target area.	Same as above	NFA

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
	and focusing on the locations of the former firing line and target area. VS may be adjusted based on-site conditions.		Two surface soil ambient samples will be collected from locations not impacted by prior ARNG munitions activities.		
Jamestown Rifle Range	VS will be conducted using a meandering pathway throughout the MRS. VS may be adjusted based on-site conditions.	Same as above	Eight composite surface soil samples or eight discrete sediment samples (depending on site conditions) will be collected at multiple possible range feature locations. Two ambient samples (surface soil or sediment dependent on site conditions) will be collected from locations not impacted by prior ARNG munitions activities.	Same as above	Results will be used to determine if RI/FS or NFA is warranted.
Malone LTA	No field work is planned since the site is completely redeveloped. SI recommendations to be based on existing data	N/A	No field work is planned since the site is completely redeveloped. SI recommendations to be based on existing data	N/A	NFA
Mohawk Rifle Range	Biased VS will be conducted using a meandering pathway and focusing on the backstop behind the target berm. The ROE	Visually observe and document presence or absence of small arms ammunition (no MEC).	Three composite surfaces soil and two discrete sediment samples will be collected. Three ambient samples (two surface soil and one	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	Results will be used to determine if RI/FS or NFA is warranted.

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
	to the land parcel with the target berm has been refused. VS may be adjusted based on-site conditions.		sediment) will be collected from locations not impacted by prior ARNG munitions activities.		
NDNODS Creedmoor Rifle Range	No field work is planned since the site is completely redeveloped. SI recommendations to be based on existing data	N/A	No field work is planned since the site is completely redeveloped. SI recommendations to be based on existing data.	N/A	NFA
NDNODS Geneseo Range (old)	Biased VS will be conducted using a meandering pathway and focusing on the suspected locations of the former firing line and target area. VS may be adjusted based on-site conditions.	Visually observe and document presence or absence of small arms ammunition (no MEC)	Four composite surface soil and two discrete sediment samples will be collected in and around the suspected target area. Three ambient samples (two surface soil and one sediment) will be collected from locations not impacted by prior ARNG munitions activities.	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	Results will be used to determine if RI/FS or NFA is warranted.
NDNODS Rensselaer Wyck Target Range	Biased VS will be conducted using a meandering pathway and focusing on the locations of the former firing line and target area. VS may be adjusted based on-site conditions.	Same as above	Four discrete surface soil and two discrete sediment samples will be collected. XRF screening will be used for surface soil samples. Three ambient samples (two surface soil and one sediment) will be collected from locations not impacted by prior ARNG munitions activities.	Same as above	Same as above
NDNODS	Biased VS will be	Same as above	Six discrete surface soil	Same as above	Same as above

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
Rochester Rifle Range	conducted using a meandering pathway and focusing on the locations of the former firing lines and target areas. VS may be adjusted based on-site conditions.		samples will be collected using XRF screening. Two surface soil ambient samples will be collected from locations not impacted by prior ARNG munitions activities.		
Olean Target Range (new)	Biased VS will be conducted using a meandering pathway and focusing on the locations of the former firing line and target area. VS may be adjusted based on-site conditions.	Same as above	Five composite surface soil samples will be collected in and around the target area. Two surface soil ambient samples will be collected from locations not impacted by prior ARNG munitions activities.	Same as above	NFA
Oneida Range	Biased VS will be conducted using a meandering pathway and focusing on the locations of the former firing line and target area. VS may be adjusted based on-site conditions.	Same as above	Four discrete surface soil samples will be collected using XRF screening. Two surface soil ambient samples will be collected from locations not impacted by prior ARNG munitions activities.	Same as above	Results will be used to determine if RI/FS or NFA is warranted.
Poughkeepsie Rifle Range	Biased VS will be conducted using a meandering pathway and focusing on the suspected locations of the former firing line and target area. VS may be adjusted based	Same as above	Five discrete surface soil and two discrete sediment samples will be collected in and around the target area. XRF screening will be used for surface soil samples. Three ambient samples (two surface soil and one	Same as above	Same as above

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
	on-site conditions.		sediment) will be collected from locations not impacted by prior ARNG munitions activities.		
Saratoga Springs Rifle Range	Biased VS will be conducted using a meandering pathway and focusing on the suspected locations of the former firing line and target area. VS may be adjusted based on-site conditions.	Visually observe and document presence or absence of small arms ammunition (no MEC)	Five composite surface soil samples will be collected in and around the target area. Two surface soil ambient samples will be collected from locations not impacted by prior ARNG munitions activities.	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	Results will be used to determine if RI/FS or NFA is warranted.
Ticonderoga Range (old)	Due to an ROE refusal VS will not be conducted at the Ticonderoga Range (old) MRS.	Same as above	Due to an ROE refusal samples will not be collected.	Same as above	Same as above
Ticonderoga Range (old) SDZ	None, the majority of the SDZ is not investigated during the SI. May be adjusted based during fieldwork.	N/A	N/A	N/A	NFA
Ticonderoga Training Range (new)	Biased VS will be conducted using a meandering pathway and focusing on the former firing line and target areas. VS may be adjusted based on-site conditions.	Visually observe and document presence or absence of small arms ammunition (no MEC)	Eight composite surface soil samples will be collected in areas where vegetation has been least disturbed. Two ambient surface soil samples will be collected from locations not impacted by prior ARNG munitions activities.	Determine if MC are detected at concentrations exceeding ambient concentrations and the agreed PSVs	NFA
Walton Rifle Range	Biased VS will be	Same as above	Five composite surface soil	Same as above	NFA

Table 1-1: Summary of Planned SI Approach for New York MRSs

MRS	MEC SI Activities[1]	MEC SI Purpose[1]	MC SI Activities	MC SI Purpose	Likely SI Outcome
(new)	conducted using a meandering pathway and focusing on the former firing line and target areas. VS may be adjusted based on-site conditions.		samples will be collected in and around the target area. Two surface soil ambient samples will be collected from locations not impacted by prior ARNG munitions activities.		

[1] For small arms ranges, small arms ammunition (whether fired or unfired) is not considered to pose a unique explosive safety hazard and is not considered MEC, therefore, evaluation of the potential for MC is the primary driver for former ARNG small arms ranges.

Table 1-2: New York MRS Acreages, Revisions, and ROE Status

SITE NAME/CATEGORY	ORIGINAL AEDB-R #	Acreage in PA	MRS Division	Revised AEDB-R #	Revised Acreages	ROE Concerns[1]
Amsterdam Range/SA-XBRM	NYHQ-005-R-01	25	No	N/A	N/A	Critical landowner unresponsive; negotiations requested[2]
Binghamton Rifle Range (new)/ SA-XBRM	NYHQ-006-R-01	14.4	No	N/A	67	One critical and one secondary landowner unresponsive; negotiations requested
Camp Blauvelt/SA-BRM-HUSE	NYHQ-007-R-01	447	No	N/A	N/A	N/A
Camp O'Ryan/ SA-XBRM	NYHQ-008-R-01	376	Camp O'Ryan – MRS 1 Pistol Range	NYHQ-008-R-01	6.9	Critical landowner unresponsive; negotiations requested[2]
			Camp O'Ryan – MRS 2 Rifle Range	NYHQ-008-R-02	17.5	
			Camp O'Ryan – MRS 3 Maneuvering Area	NYHQ-008-R-03	394.4	
Elmira/ SA-XBRM	NYHQ-009-R-01	132	No	N/A	N/A	N/A
Geneva Range/ SA-BRM-HUSE	NYHQ-010-R-01	939	Geneva Range	NYHQ-010-R-01	92	Critical landowner unresponsive; negotiations requested[2]
			Geneva Range SDZ	NYHQ-010-R-02	846	
Glens Falls Range/ SA-XBRM	NYHQ-011-R-01	876	Glens Falls Range	NYHQ-011-R-01	215.1	N/A
			Glens Falls Range SDZ	NYHQ-011-R-02	661.2	
Hoosick Falls Range (new)/ SA-BRM-HUSE	NYHQ-012-R-01	23	No	N/A	N/A	Critical landowner unresponsive; negotiations requested[2]
Hornell Rifle Range/ SA-XBRM	NYHQ-013-R-01	100	No	N/A	N/A	Critical landowner unresponsive; negotiations requested[2]
Jamestown Rifle Range/ SA-XBRM	NYHQ-014-R-01	10	No	N/A	N/A	Critical landowner unresponsive; negotiations requested[2]
Malone LTA/ MA-XBRM-HUSE	NYHQ-015-R-01	43	No	N/A	N/A	No ROEs requested
Mohawk Rifle Range/ SA-BRM-HUSE	NYHQ-016-R-01	73	No	N/A	N/A	ROE refused (where berm located) and critical landowner unresponsive; negotiations requested[2]
NDNODS Creedmoor Rifle Range/ SA-XBRM	NYHQ-001-R-01	200	No	N/A	431.9	No ROEs requested
NDNODS Geneseo Range (old)/ SA-BRM-LUSE	NYHQ-002-R-01	3.70	No	N/A	N/A	N/A
NDNODS Rensselaer Wyck Target Range/ SA-BRM-HUSE	NYHQ-003-R-01	30	No	N/A	N/A	ROE Refusal – does not impact the SI
NDNODS Rochester Rifle Range	NYHQ-004-R-01	7.5	No	N/A	N/A	N/A
Olean Target Range (new)/ SA-XBRM	NYHQ-017-R-01	4.25	No	N/A	235	N/A
Oneida Range/ SA-BRM-HUSE	NYHQ-018-R-01	7.5	No	N/A	N/A	Critical landowner unresponsive; negotiations requested[2]
Poughkeepsie Rifle Range/ SA-XBRM	NYHQ-019-R-01	5	No	N/A	89	Critical landowner unresponsive; negotiations requested[2]

Table 1-2: New York MRS Acreages, Revisions, and ROE Status

SITE NAME/CATEGORY	ORIGINAL AEDB-R #	Acreage in PA	MRS Division	Revised AEDB-R #	Revised Acreages	ROE Concerns[1]
Saratoga Springs Rifle Range/ SA-XBRM	NYHQ-020-R-01	100	No	N/A	48 – Acreage discrepancy between PA and GIS files	Critical landowner unresponsive; negotiations requested[2]
Ticonderoga Range (old)/ SA-XBRM	NYHQ-021-R-01	406	Ticonderoga Range (old)	NYHQ-021-R-01	15.5	ROE Refusal for the parcels critical for the SI process. The parcels are where the firing points and target berms were located; therefore, fieldwork cannot be conducted.[2]
			Ticonderoga Range (old) SDZ	NYHQ-021-R-02	394	
Ticonderoga Training Range (new)/ SA-XBRM	NYHQ-022-R-01	105	No	N/A	N/A	Critical landowner unresponsive; negotiations requested[2]
Walton Rifle Range (new)/ SA-XBRM	NYHQ-023-R-01	4	No	N/A	N/A	Critical landowner unresponsive; negotiations requested[2]

[1] As of July 26, 2011. Still waiting for ROE approvals at multiple sites.

[2.] Refusal of ROE may result in no fieldwork at the MRS.

Categories:
SA-XBRM: Small arms, berm-like feature not present
SA-BRM-HUSE: Small arms, berm-like feature present, moderate to heavy use
SA-BRM-LUSE Small arms, berm-like feature present, light use
MA-XBRM-HUSE Maneuver area, berm- like feature not present, moderate to heavy use

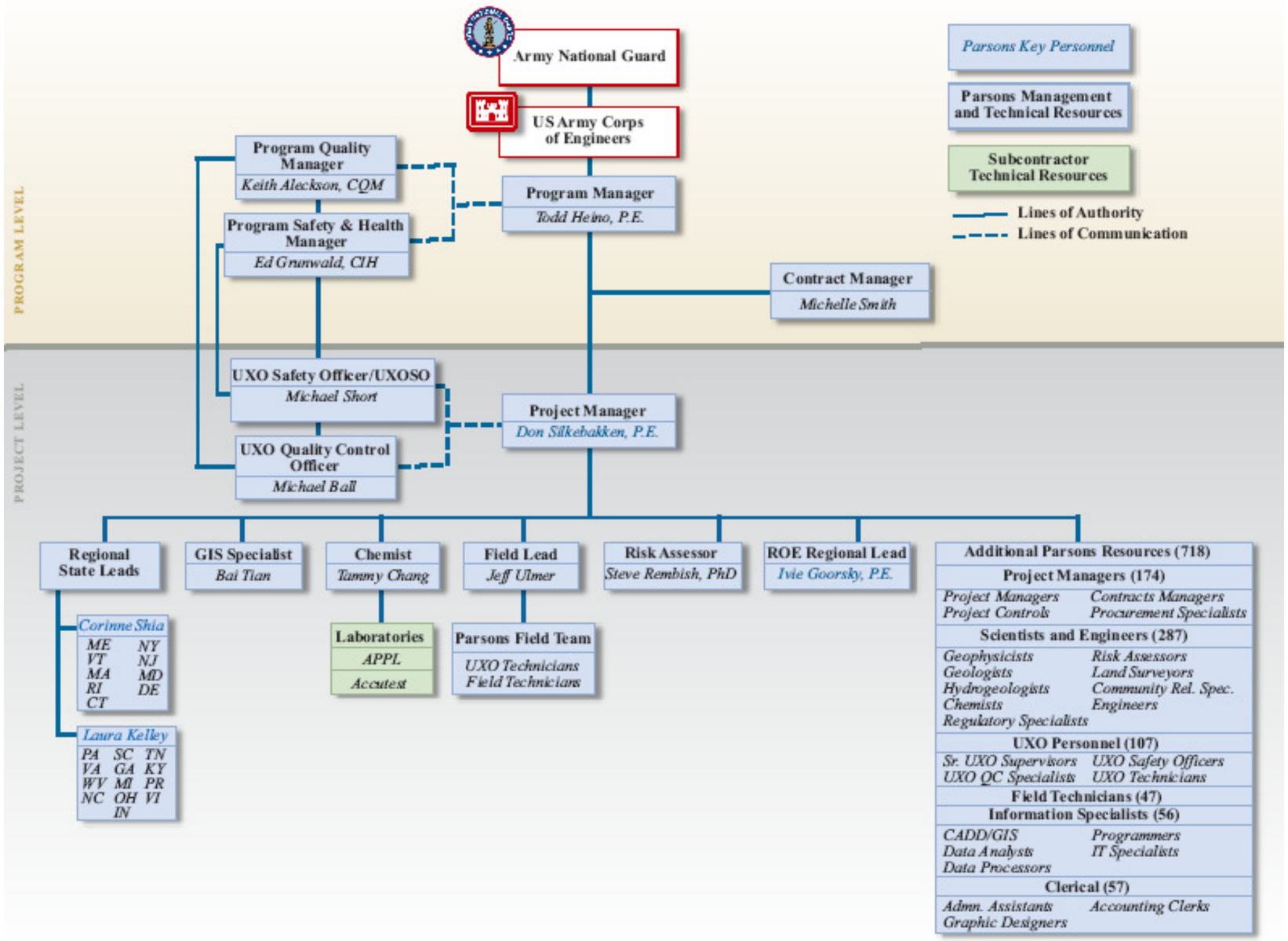
1.5 PROJECT ORGANIZATION

The project organization is presented on Figure 1-2 and illustrates the lines of authority and communication for the project. Key contacts for this project are presented in Table 1-3 below:

Table 1-3: Key Project Contacts

Name	Title	Phone Numbers	Email
Army National Guard Directorate (ARNG)			
Anna Hudson	Program Manager	(703) 601-7785	Anna.Hudson1@us.army.mil
John Haines	Regional Lead	(703) 607-7986	John.B.Haines@us.army.mil
U.S. Army Corps of Engineers (USACE)			
Young Chong	National Program Manager	(916) 557-7212	Young.S.Chong@usace.army.mil
Wayne Davis	Technical Lead	(410) 962-3506	Wayne.F.Davis@usace.army.mil
New York Army National Guard (NYARNG)			
Peter Jensen	Environmental Program Manager	(518) 786-4548	peter.jensen1@usace.army.mil
Brian Rockwell	Cleanup PM	(518) 786-4318	brian.rockwell@ng.army.mil
New York Department of Environmental Conservation (NYSDEC)			
John Swartwout		(518) 402-9620	jbswarto@gw.dec.state.ny.us
New York Department of Health			
Scarlett Messier		(800) 458-1158 ext. 27860	sem10@health.state.ny.us
Parsons			
Don Silkebakken	Project Manager	(678) 969-2384	Don.Silkebakken@parsons.com
Corinne Shia	Regional/State Lead	(202) 775-6033	Corinne.Shia@parsons.com
Maria Borejsza-Wysocka		(202) 469-6556	Maria.Borejsza-Wysock@parsons.com

Figure 1-2: Project Organization



1.6 PROJECT SCHEDULE

The project schedule is shown in Table 1-4:

Table 1-4: Project Schedule

Task	Planned Completion Date
ARNG Draft HRR/WP	May 2011
Stakeholder Draft HRR/WP	June 2011
Final HRR/WP	July 2011
SI Field Work	August - October 2011
ARNG Draft SI Report	December 2012
Stakeholder Draft SI Report	February 2012
TPP Meeting 3	April 2012
Final SI Report	April 2012

1.7 DOCUMENT ORGANIZATION

This HRR/WP covers all activities necessary to complete the SI at the New York ARNG MRSs. The HRR/WP is organized to address each component of the PWS in accordance with the Draft Final PWP and comprises several sub-plans, each discussing a different aspect of the inspection. The chapters and subchapters are summarized below:

- Introduction and Project Background: Chapter 1 details the purpose and background of the project and presents the SI approach and objectives, the project organization and schedule, and organization of the HRR/WP.
- Data Collection and Document Review Process: Chapter 2 details the data collection methods to be implemented during this SI.
- Site Descriptions and History: Chapter 3 details the PA and HRR findings for the MRS.
- Conceptual Site Models (CSM): Chapter 4 details the site conditions for the MRS.
- Data Quality Objectives: Chapter 5 contains the project DQOs for MEC and MC as agreed upon by the TPP Team.
- Sampling and Analysis Plan (SAP): Chapter 6 details the procedures for collecting environmental samples.
- Accident Prevention Plan (APP): Chapter 7 presents the hazards to the field team and the mitigation procedures that will be implemented to prevent harm (see Appendix F).
- Anomaly Avoidance: Chapter 8 details the procedures to be used by the SVT to avoid encountering potential MEC.
- Rights of Entry/Site Access: Chapter 9 presents an overview of the land ownership for the MRS.
- Communication: Chapter 10 details the communication protocol before and during the field effort.
- Environmental Protection: Chapter 11 provides general information and lists applicable requirements for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during field activities.
- Non-Munitions Related Waste: Chapter 12 details procedures the field team will follow if non-munitions related waste or hazardous substances are found during the field effort.

- References: Chapter 13 includes a list of references used in the preparation of this HRR/WP.

Additional information and plans are attached to this HRR/WP as appendices:

A. Sources Contacted: A list of the sources contacted by Parsons for the HRR is included in Appendix A.

B. Record Group Summary and Document Index: A summary of the record groups and an index of the documents collected by Parsons during the HRR are included in Appendix B.

C. Munitions Data Sheets: A detailed description of the munitions associated with the MRS is presented in Appendix C.

D. Field Sampling Plan: The FSP (Appendix D) describes the procedures that will be implemented at the MRS to complete the required field work.

E. Quality Assurance Project Plan: The Uniform Federal Policy Quality Assurance Project Plan (UFP-QAPP) in Appendix E contains a list of the required analytes and the associated sampling procedures.

F. Accident Prevention Plan: The APP is attached as Appendix F. The APP describes the health and safety procedures, personal protection standards, and environmental health hazards applicable to this project.

G. Installation Communication Protocol and Ordnance Contact Form: The protocol to be followed if a munitions item is found during the SI, including the form to be completed, is defined in Appendix G.

H. Munitions and Explosives of Concern Support Work Plan: The work requirements and procedures for UXO support during SI activities are defined in Appendix H.

I. Technical Project Planning Meeting Minutes: Documentation from the first and second TPP meetings is included in Appendix I.

J. Copies of Right-of-Entry Permits: Copies of the Right-of-Entry secured by the USACE-Omaha District to conduct the field effort is included in Appendix J.

K. Electronic Files: Appendix K contains electronic files of supporting documentation and historical reports and figures.

CHAPTER 2
DATA COLLECTION AND DOCUMENT REVIEW PROCESS

2.0 INTRODUCTION

2.0.1 As discussed in Chapter 1, the purpose of the HRR is to collect sufficient information regarding the history, use, and characteristics of the MRSs within New York to determine the presence or absence of MEC and MC hazards that may be present at each MRS. The goals of the HRR are to perform a records search to document historical and other known information for the MRSs, supplement the information developed during the PA, and support the TPP process.

2.0.2 This Chapter details the methods used to collect relevant HRR information and the agencies contacted. The MRS-specific HRR results are further detailed in the HRR findings subchapters in Chapter 3.

2.0.3 For New York, multiple data sources were accessed during the Malcolm Pirnie PA (Malcolm Pirnie, 2009a and 2009b) and Parsons HRR. (Note: Agencies contacted and locations visited during the PA are not listed unless they were re-engaged):

- NYARNG
- Historical Societies, Museums, and Libraries
- Interviews
- NDNODS Inventory
- Aerial Photographs
- Internet Research

2.1 DATA COLLECTION METHODS

2.1.0.1 The following subchapters describe the data collection methods for the primary sources identified above. Detailed lists of sources contacted by Parsons for the HRR are listed in Appendix A and the record groups and documents collected are listed in Appendix B.

2.1.0.2 Potential HRR data sources include DoD and other federal agencies, state and local government, private data sources, internet, and interviews. The type of data collected typically supports understanding of the range configuration and layout, munitions used, years of use, and other design and operational aspects of the range. The source documents vary in both the type of information available and its quality. Consistent with ITRC guidance Technical/Regulatory Guideline Munitions Response Historical Records Review (ITRC, 2003), Parsons identified and evaluated the information obtained during the HRR and determined its quality based on the following criteria:

- High quality: Verifiable data source such as a document, map, or personal interview with supporting documentation.

- Medium quality: Written records, without the original source, or personal interviews where several interviewees provide similar accounts.
- Low quality: Original data source formerly verifiable but no longer available (for example, recollections of lost documents and maps) or personal interviews, without backup documentation or with contradictory documentation.

2.1.0.3 The quality of the data collected during the PA was taken into consideration during the data gap analysis and subsequent SI data collection effort. Based on the data collected, reviewed, and assessed from the PA and HRR, the information was determined whether it would be relevant and of sufficient quantity and quality to support SI planning and execution. A discussion regarding site-specific data gaps identified during the PA and HRR is presented in each subchapter of Chapter 3. In the subchapters 2.1.1 to 2.1.6, all Parsons HRR related documentations are noted, with the exception of subchapter 2.1.4, which addresses the Malcolm Pirnie PA.

2.1.1 New York Army National Guard

Parsons accessed a website link to Annual Adjutant General Reports for every year from 1857 through 1990 and for 1846 and 1995. These documents provided information on all the ranges. The information included dates of use, number of targets and length of firing lines, issues with the ranges, and additional historical information.

2.1.2 Historical Societies, Museums, and Libraries

Parsons contacted and/or visited a number of local libraries and institutions and obtained newspaper articles, aerial photography (subchapter 2.1.6), historical maps, research reports, and photographs for the following MRSs:

- Amsterdam Range
  - Montgomery County Historical Society, Johnstown Historical Society, and Walter Elwood Museum were contacted; however, no pertinent information was available.
  - Montgomery County Department of History and Archives and Weller Library did not respond to repeated contact attempts.
- Elmira
  - Chemung County Historical Society provided a 1904 map with the U.S. Cut Flowers Co. (lessor) location.
  - Tri-Counties Genealogy & History, Horseheads Historical Society, and Town and Village of Horseheads did not respond to repeated contact attempts.
- Glens Falls Range
  - Chapman Museum did not have any pertinent information.
  - Warren County Historical Society did not respond to repeated contact attempts.

- Jamestown Rifle Range
  - Fenton History Center confirmed range location.
  - Chautauqua County Historian provided the county Geographical Information System (GIS) link which did not provide any pertinent information regarding range layout or orientation.
  - Hazeltine Public Library did not have any pertinent information.
- NDNODS Creedmoor Rifle Range
  - Queens Borough Public Library Long Island Division was visited and multiple articles on Creedmoor Rifle Range were collected. The articles provided range layout information, including the number of men that trained there at certain times, number of targets, and range lengths.
- NDNODS Geneseo Range (old)
  - SUNY Geneseo Milne Library and Wadsworth Library were visited and articles regarding the Geneseo Range were collected. The articles provided background history of the troops and training. Specific range orientation and layout were not documented.
- Oneida Range
  - Oneida Public Library provided information that indicated the range was located on Drake Farm property.
  - Oneida Historical Society and City of Oneida Assessor's Office did not have pertinent information.
- Poughkeepsie Rifle Range
  - Dutchess County Real Property Tax Services Agency and County Clerk Office were visited. The County Clerk Office provided a 1855 map of the area with the location of Cornell Farm, the lessor. The Dutchess County Real Property Tax Services Agency provided a GIS link for land parcel information, including aerial images. A 1936 aerial image of the range was obtained and the target pit location was located.
  - Dutchess County Historical Society did not reply to repeated contact attempts.
- Saratoga Springs Rifle Range
  - Saratoga Springs Public Library was visited and an article noted training at the Saratoga Rifle Club.
  - Saratoga Springs Historian, MaryAnn Fitzgerald, and Saratoga County Historian, Lauren Roberts, did not have any pertinent information.
- Ticonderoga Training Range (new)
  - Black Watch Memorial Library did not reply to repeated contact attempts.

- Walton Rifle Range (new)
    - Walton Historical Society provided a 1933 map of the area where the range was located. David Carroll, Treasurer, provided information regarding the range location, range configuration, and layout.

2.1.3 Interviews

Parsons interviewed the following individuals during the SI, the documentation for the interviews are included in Appendix B:

- Mr. Goepfert, USACE NY District regarding Camp O'Ryan
- Mr. Strong, Former ARNG member at Jamestown Rifle Range
- Mr. Warn, resident of Jamestown NY
- Mr. Erlandson, son of a former ARNG member who trained at Jamestown Rifle Range
- Mr. Glassanos, NYS Department of Correctional Services regarding Malone LTA
- Mr. Femia, property owner within the Oneida Range MRS
- Mr. Alvard, Town/Village of Geneseo historian
- Mr. Carroll, Treasurer at Walton Historical Society
- Lt. Col Charles F. Gregory (ret) whose parents owned part of the land where Walton Rifle Range (new) MRS was located

2.1.4 Preliminary Assessment (NDNODS Inventory Report)

The purpose of the PA was to develop an inventory of military ranges and defense sites known or suspected to contain MEC (including UXO), DMM, and MC. The report findings were compiled primarily through an archive search (national, state, and local level), general internet search, review of NYARNG files, interviews of present and former NYARNG personnel, and state-wide field site visits. Information collected during the PA was reviewed, and applicable information was used to support the preparation of this HRR/WP.

2.1.5 Aerial Photographs

U.S. Geological Survey (USGS) aerial photographs were obtained for multiple MRS and are included in Appendix B:

- Amsterdam Range: 1957
- Binghamton Rifle Range (new): 1937 and 1948
- Camp Blauvelt: 1953
- Elmira: 1938, 1944 and 1948
- Glens Falls Range: 1942 and 1947
- Hornell Rifle Range: 1963

- Jamestown Rifle Range: 1938 and 1953
- Malone LTA: 1963
- NDNODS Geneseo Range (old): 1938 and 1959
- Olean Target Range (new): 1956
- Oneida Range: 1941 and 1956
- Saratoga Springs Rifle Range: 1960
- Ticonderoga Range (old): 1970 and 1971
- Ticonderoga Training Range (new): 1986, 1992 and 1994
- Walton Rifle Range (new): 1960

Additional sources accessed to obtain aerial photographs for two MRSs are noted below:

- Poughkeepsie Rifle Range: 1936 aerial photograph from Dutchess County Parcel Access database
- Walton Rifle Range (new): 1930 from Lt. Col. Charles Gregory (Ret)

2.1.6 Internet Research

In addition to the data sources listed above, Parsons conducted internet research to supplement the archival data and information received from the various agencies and sources. The following website was researched:

- Historic Maps for NDNODS Creedmoor Rifle Range

  (http://www.historicmapworks.com/Map/US/3430/Plate+029/Queens+County+1891+Long+Island/New+York)
- Adjutant General Reports for all NYARNG sites

  (http://dmna.state.ny.us/historic/research/AG_Reports/AGreportsIndex.htm)
- Parcel Access for Poughkeepsie Rifle Range

  (http://geoaccess.co.dutchess.ny.us/parcelaccess/parcelaccess_map.htm)

CHAPTER 3
SITE DESCRIPTIONS AND HISTORY

3.0 INTRODUCTION

The following subchapters provide the MRS descriptions, characteristics, history, previous investigations, results of HRR, and potential munitions associated with each of the 28 NYARNG MRSs included in the SI.

3.1 AMSTERDAM RANGE (NYHQ-005-R-01)

3.1.0.1 Amsterdam Range is a former small arms range located in Johnstown, Montgomery County, New York. The NYARNG operated and Company G 105th Infantry used range, which was operational between approximately 1904 and 1957. The exact dates of operation are not specified in historical documents (Malcolm Pirnie, 2009a).

3.1.0.2 Current land use categories include agricultural and residential land use. There are three single family residences within the MRS boundary. Some undeveloped forested areas also are present at Amsterdam Range (Google Earth, 2011). Amsterdam Range does not have a specific physical address; it is located on Switzer Hill Road. The MRS location is shown on Figure 3-1.

3.1.1 Preliminary Assessment Findings

3.1.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included an interview with the property owner, tax assessor's office, a site visit and county archives.

3.1.1.2 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Adjutant General of New York, Renewal of Lease 1941 (NY0024):** The approximate location of the range; Company G 105th Infantry size and composition (three officers and 80 enlisted men); munitions approved for use; and range features are identified in this document. The munitions approved for use at Amsterdam Range were .30-caliber ammunitions. The range included four double-steel frame targets and concrete butts.
- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding the approximate range location, troop use, and range information, including the number of targets (four) at the range.

Figure 3-1
Amsterdam Range (Aerial)
AEDB-R # NYHQ-005-R-01
Johnstown, Montgomery County, New York

PARSONS

Site Location in New York

Legend

MRS Boundary

40 20 0 40
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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- **Interview with a Property Owner.** The property owner owned the property for 10 years and was not aware of the presence of a former rifle range on the property. The property owner did not find any evidence of the former range. The physical features of the range changed and became swampy due to a presence of a stream that was dammed by beavers.

3.1.1. 3 No evidence of former range or MEC or MD was observed during the 16 October 2008 PA site visit. Photographs taken during the site visit were included in the PA.

3.1.1.4 The data gaps identified include the exact range location, configuration (including berm location, firing direction, range boundary) and the exact dates of use.

3.1.2 Historical Records Review Findings

3.1.2.1 During the Parsons HRR, the following data sources were accessed: USGS aerial images. Online research and communications with local historians and librarians also was conducted. The discussion below summarizes the findings from the Parsons HRR.

3.1.2.2 Mr. Scott Heafner, Montgomery County Historical Society, was contacted and did not have any pertinent information regarding range layout and orientation.

3.1.2.3 Mr. Noel Levee and Ms. Nancy MacVean, Johnstown Historical Society, were contacted. Neither Mr. Levee nor Ms. MacVean had any pertinent range information.

3.1.2.4 Ms. Ann Peconie, Museum Director, Walter Elwood Museum, was contacted and did not have any information pertaining to the range.

3.1.2.5 Range features were not observed on the 1957 and 1959 USGS historical aerial images of the area.

3.1.2.6 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. However, certain gaps are still present. The remaining gaps include the exact range location, range configuration, range boundary, and exact dates the range was used. The technical approach will include sampling throughout the MRS since the range layout is unknown. All supporting documentation is provided in Appendices A-C of this report.

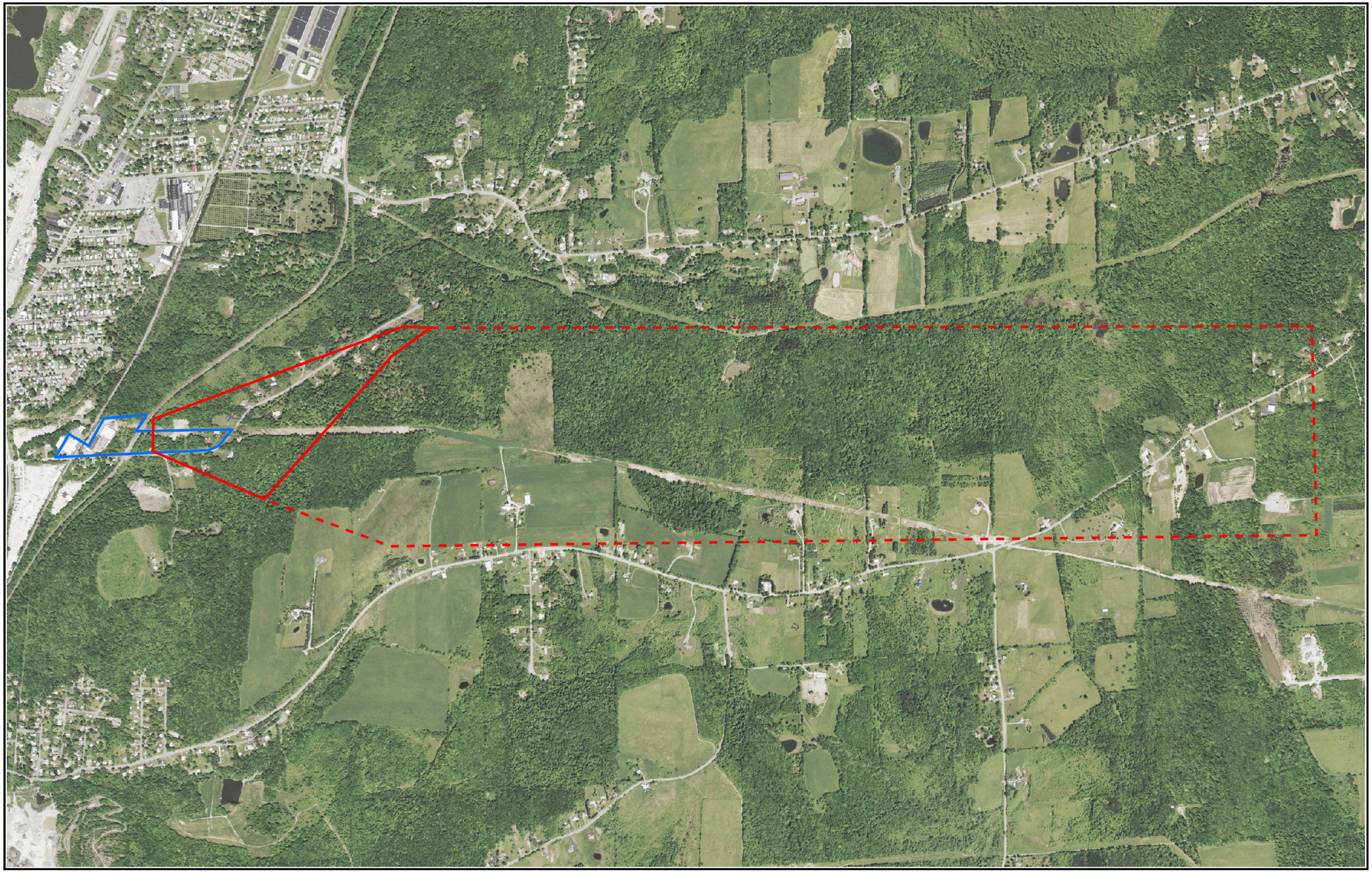
3.2 BINGHAMTON RIFLE RANGE (NEW) (NYHQ-006-R-01)

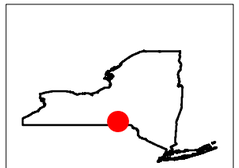
3.2.0.1 The NYARNG used the Binghamton Rifle Range (new) for small arms training. The former range is located in the Town of Port Dickinson, Broome County. Binghamton Rifle Range (new) was operational between 1926 and 1955, though the exact dates or operation are not specified in historical documents (Malcolm Pirnie, 2009a).

3.2.0.2 Currently the land is privately owned residential properties and the eastern portion of the MRS is undeveloped forested land. Binghamton Rifle Range (new) does not have a physical address. The former and current MRS boundaries and location are shown on Figure 3-2a.

Figure 3-2a
Binghamton Rifle Range (new) (Aerial)
AEDB-R # NYHQ-006-R-01
Broome County, New York

PARSONS





Site Location in New York

Legend

- Proposed Revised MRS Boundary
- Proposed Revised SDZ Boundary
- Current MRS Boundary

200 100 0 200
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
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3.2.1 Preliminary Assessment Findings

3.2.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, a site visit, and NYARNG memoranda.

3.2.1.2 Binghamton Rifle Range (new) was used as a small arms rifle range from approximately 1926 through 1955. The munitions used included .30 caliber M1 ammunition as well as other small arms munition.

3.2.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding approximate range locations, troop use, and range information, including the number of targets at the range. The 10th Infantry, 104th Field Artillery, and civilian clubs used the range. The document also noted that there were four targets at Binghamton Rifle Range (new) (Malcolm Pirnie, 2009).
- **New York National Guard Headquarters, Safety of National Guard Home Station Small Arms Range. 21 May 1934 (NY0042):** This document provided information regarding munitions, .30 caliber M1, which were approved to be safely fired on the range (Malcolm Pirnie, 2009).
- **Maps and Directory of Binghamton, NY, Johnson City. 21 September 1925 (NY0229).** This document is a copy of 1925 map of Binghamton, NY. The range is not shown on the map (Malcolm Pirnie, 2009).
- **Interview with Robert Blakeslee, village historian, 29 July, 2008.** Mr. Blakeslee indicated the location of the range, on Rogers Mountain Way, Port Dickinson. Mr. Blakeslee also indicated that virtually there are no remnants of the range.
- **Interview with Pete Matwey, Binghamton Rifle Club Member.** Mr. Matwey indicated that there were no remnants of the former range present. Mr. Matwey mentioned that the range was located off Phelps Street north of the Delaware and Hudson Rail Line.
- **Interview with Mike Giordani, Erie Materials employee.** Erie Materials currently leases the property where the range presumably was located when the PA was conducted. Mr. Giordani found no evidence of the former range.

3.2.1.4 No evidence of the former small arms range or MEC or MD was observed during 3 December 2008 PA site visit. Photographs taken during this site visit were included in the Draft PA.

3.2.1.5 The data gaps identified include the exact range location, range configuration (including berm location and range boundary), and the exact dates of use.

3.2.2 Historical Records Review Findings

3.2.2.1 During the Parsons HRR, the following data source was accessed: USGS aerial images. The discussion below summarizes the findings from the Parsons HRR.

3.2.2.2 A 1948 USGS aerial image depicted range layout for Binghamton Rifle Range (new). Range features, including target berms and firing line, were visible in the historical aerial image (see Figure 3-2b).

3.2.2.3 The aerial image shows that range features were located east of the Draft PA MRS boundary. The Draft PA MRS boundary indicated that the range was 14.40 acres; however, based on the analysis of the USGS aerial image, the range boundary was shifted and expanded to 67 acres.

3.2.2.4 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain. All supporting documentation is provided in Appendices A-C of this report.

3.3 CAMP BLAUVELT (NYHQ-007-R-01)

3.3.0.1 Camp Blauvelt, also known as Camp Bluefields, is a former training camp. The NYARNG former range is located in Orangetown, Rockland County. Camp Blauvelt was operational between 1910 and 1913, though the exact dates or operation are not specified in historical documents (Malcolm Pirnie, 2009a).

3.3.0.2 The MRS is located in a state park. The Palisades Interstate Park Commission (PIPC) owns the property. The majority of Camp Blauvelt is undeveloped, forested land. There also are a few residential properties within the southwestern portion of the MRS and there is a water tower on the southern border of the MRS (Google Earth, 2011). Camp Blauvelt does not have a physical address. The MRS location is shown on Figure 3-3a.

3.3.1 Preliminary Assessment Findings

3.3.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included articles, websites, and a site visit.

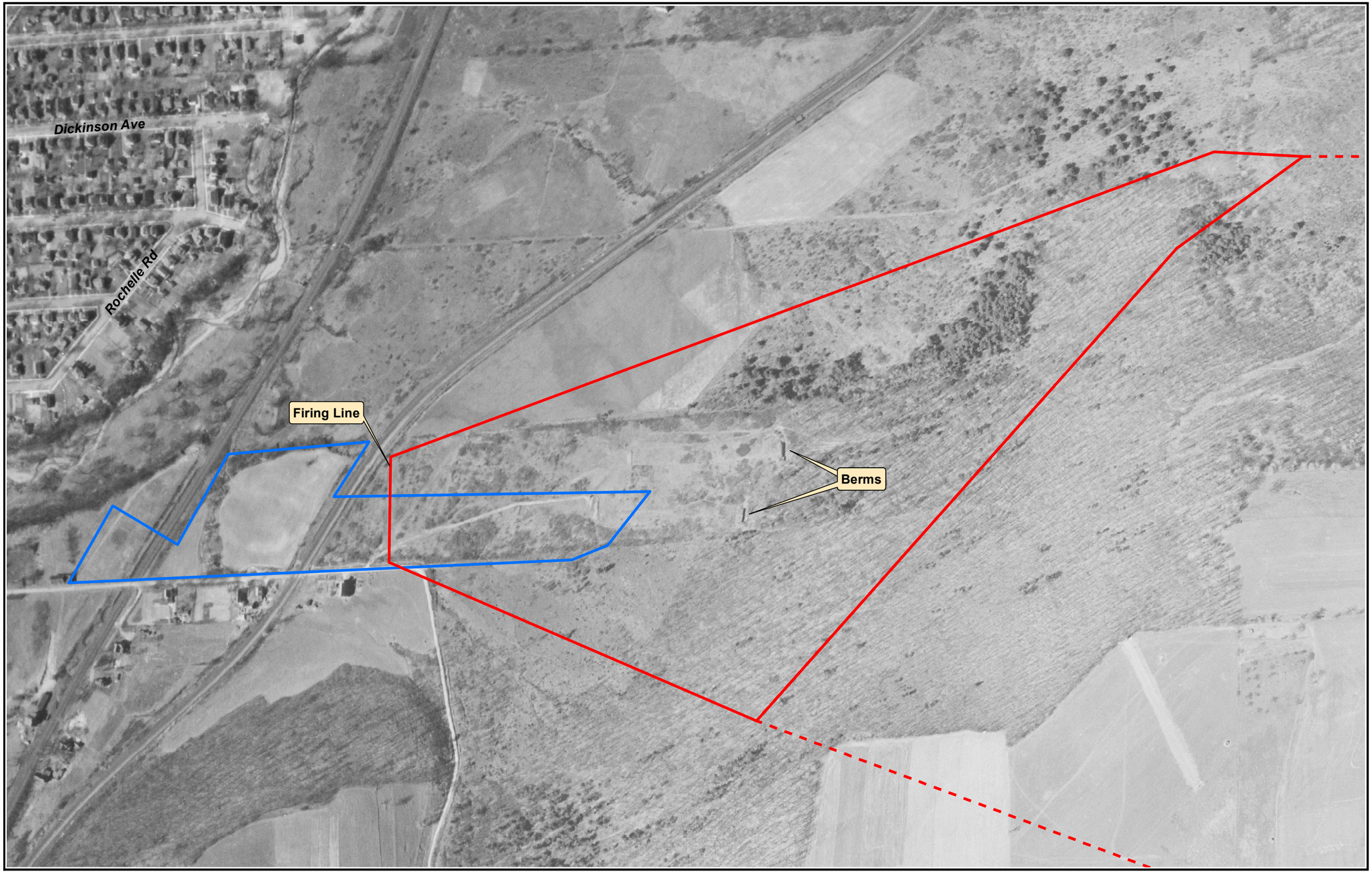
3.3.1.2 Camp Blauvelt was used as a training camp from approximately 1910 through 1913. The munitions most likely used included .22-caliber, .30 caliber, and .45-caliber.

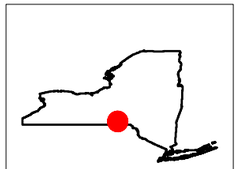
3.3.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Forest and Stream, New York's New Rifle Range. 8 January 1910 (NY0108):** This document provides background information regarding approximate range location, range size, and land features. The article mentioned land differences between Camp Blauvelt and the pre-existing Creedmoor Rifle Range (Malcolm Pirnie, 2009a).
- **Rockland Audubon Society, Blauvelt State Park and Tackamack Town Park, 4 August, 2008 (NY0214):** This document provided the history of the Blauvelt State Park and Tackamack Town Park from 1909 to the present. The document indicated the dates of operation were from 1910 to 1913. The historic information included range information and residential complaints of stray bullets impacting residential structures (Malcolm Pirnie, 2009).

Figure 3-2b
Binghamton Rifle Range (new) (1948 Historical Aerial)
AEDB-R # NYHQ-006-R-01
Broome County, New York

PARSONS





Site Location in New York

Legend

- Proposed Revised MRS Boundary
- Proposed Revised SDZ Boundary
- Current MRS Boundary

50 25 0 50
Meters

N

Image Source: USGS
1948 Aerial Photo
Projection: UTM Zone 18, WGS84, Meters

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Figure 3-3a
Camp Blauvelt (Aerial)
AEDB-R # NYHQ-007-R-01
Rockland County, New York

PARSONS

Site Location in New York

Legend

MRS Boundary

100 50 0 100
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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3.3.1.4 During the 9 October 2008 PA site visit, evidence of the former rifle range was observed. No MEC or MD was observed. Photographs taken during the site visit were included in the PA. The following range features were observed:

- A berm, approximately 200 feet long by 50 feet wide and 15 feet tall, with small concrete monuments. The concrete monuments, approximately 6 inches by 12 inches with two, 1-inch diameter fitting, were on top of the berm. The berm orientation was north to south and likely was used as an observation platform.
- A large concrete bunker, 50 feet long by 15 feet wide, and 25 feet tall, probably was used for ammunition storage.
- A series of partially underground tunnels running from east and west of the bunker were observed. Historical documentation noted that the tunnels were installed to connect targets to the firing lines and to one another.
- Several earthen and concrete target berms in a row with steel mounts for targets. Based on the location of the target berms, the firing occurred from west to east.

3.3.1.5 The data gap identified based on the PA findings includes the exact dates of use.

3.3.2 Historical Records Review Findings

3.3.2.1 Parsons reviewed and validated the information in the PA; however, no additional research in support of the HRR was necessary other than obtaining data on site characteristics.

3.3.2.2 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. The exact dates of use are still unknown; however, this unknown is not considered a significant data gap since the range layout, orientation, and location are known. An appropriate technical approach was developed based on the data available. All supporting documentation is provided in Appendices A-C of this report.

3.3.2.3 A 1953 aerial image was investigated to determine whether current residential properties located at the southern MRS boundary were present (Figure 3-3b). The residential properties were built post-1953; therefore, they were not present during range use.

3.4 CAMP O'RYAN (NYHQ-008-R-01)

3.4.0.1 The NYARNG used Camp O'Ryan as a small arms training range. The former range is located in the Town of Wethersfield, Wyoming County. Camp O'Ryan was operational between 1949 and 1974 and again from 1989 through 1994. No documentation was located to indicate if the pistol and rifle ranges were reactivated in 1989. In 1989, Camp O'Ryan was reactivated for infantry training (Malcolm Pirnie, 2009a).

Figure 3-3b
Camp Blauvelt (1953 Historical Aerial)
AEDB-R # NYHQ-007-R-01
Rockland County, New York

PARSONS

Site Location in New York

Legend

MRS Boundary

100 50 0 100
Meters

N

Image: USGS
1953 Aerial Photo
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
July 2011

3.4.0.2 Based on the Parsons HRR (see subchapter 3.4.2), Camp O'Ryan was divided into three MRSs: Camp O'Ryan MRS 1 Pistol Range, Camp O'Ryan MRS 2 Rifle Range and Camp O'Ryan MRS 3 Maneuvering Area. Current land use at the MRS 1 Pistol Range consists of undeveloped, forested land (Google Earth, 2011). Land use at the MRS 3 Maneuvering Area includes predominantly undeveloped forest land and one farm structure on the northern border of the MRS (Google Earth, 2011). Both USACE and NYSDEC sampled Camp O'Ryan MRS 2 Rifle Range under previous investigations (Appendix K), MRS 2 will not be a focus of this SI Investigation. The Camp O'Ryan MRSs do not have physical addresses. The MRS locations are shown on Figure 3-4.

3.4.1 Preliminary Assessment Findings

3.4.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, a real estate report, and a site visit.

3.4.1.2 Camp O'Ryan was used as a small arms rifle range, including a tank maneuvering training, from approximately 1949 through 1974.

3.4.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

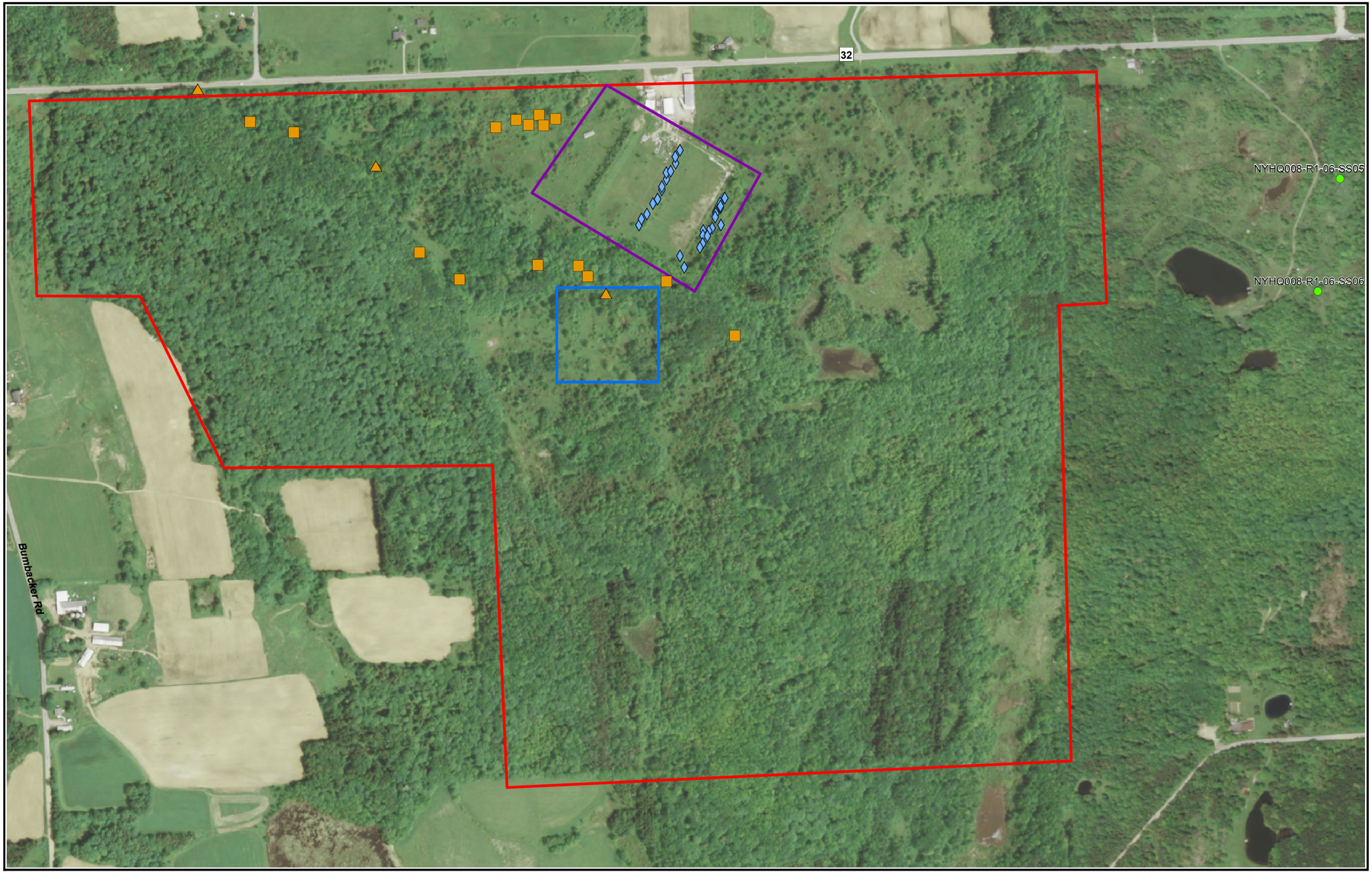
- **Warren Gordon, Chief, Real Estate Division, Camp O'Ryan Wethersfield, NY 22 December 1986 (NY0186):** This set of documents included leases, maps, photographs, memorandums and correspondence letters. These documents provided information on range location, range orientation and size, soil survey data, and a letter of NYSDEC investigation at Camp O'Ryan. A memorandum indicated the dates of range operation were from 1949 to 1974. A map illustrated range layout. The rifle range was located north of the pistol range and the tank driving training area was located in the western portion of Camp O'Ryan. A NGB memorandum document indicated that the range had 50 targets with 100 and 200 yard firing lines (Malcolm Pirnie, 2009a).
- **Telephone call to Wyoming Historical Society 19 June 2008:** No pertinent information was obtained (Malcolm Pirnie, 2009a).
- **Telephone call to Wethersfield Tax Assessor's Office 19 June 2008 and 20 June 2008:** This office provided information on the site location, ownership, and current land use (Malcolm Pirnie, 2009a).

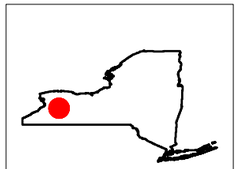
3.4.1.4 The 13 October 2008 PA site visit was conducted from the road and the site was snow covered on the day of the site visit. The site team; therefore, could not confirm the presence or absence of range features or MEC or MD. Photographs taken during the site visit were included in the PA.

3.4.1.5 No data gaps regarding the range were identified.

Figure 3-4
Camp O'Ryan (Aerial)
AEDB-R # NYHQ-008-R-01
Wyoming County, New York

PARSONS





Site Location in New York

Legend

- MRS 1 - Pistol Range
- MRS 2 - Rifle Range
- MRS 3 - Maneuvering Area
- Ambient Soil Sample Location
- TCPL Pb
- WHG Porewater
- WHG Surface Water
- Berm
- Firing Line

May 2009 TCLP samples taken by NYSDEC

October 2010 samples collected by Woods Hole Group for a contract with CENAE

80 40 0 80
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 17, WGS84, Meters

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June 2011

3.4.2 Historical Records Review Findings

3.4.2.1 During the Parsons HRR, the following data sources were accessed: USGS aerial images, NYSDEC and USACE. Communication with NYSDEC and USACE personnel also was conducted. The MRS was divided into three MRSs based on the Parsons HRR Findings; Camp O'Ryan MRS 1 Pistol Range, Camp O'Ryan MRS 2 Rifle Range, Camp O'Ryan MRS 3 Maneuvering Area. The discussion below summarizes the findings from the HRR.

3.4.2.2 A newspaper article indicated that tear gas was used during a training demonstration. The demonstration backfired and the wind shifted and the gas was carried into a crowd of spectators. The article provided information on training practices at Camp O'Ryan. Based on the DOA "Interim Guidance for Chemical Warfare Material (CWM) Responses" (April 2009) tear gas is not a chemical agent or chemical warfare materiel (DOA, 2009).

3.4.2.3 A 1968 Courier Express newspaper article included photographs of National Guardsmen during a parade, pistol maintenance, and range practice. The article provided information on training practices at Camp O'Ryan.

3.4.2.4 A historical aerial photograph, 1954, was obtained from NYSDEC. The aerial image illustrated range features and their locations. Range features included the rifle range berms possible burial areas, and burn pits.

3.4.2.5 The NYSDEC Site Investigation Report Camp O'Ryan Rifle Range Gainesville, NY summarized the 5 November 2008 investigation at Camp O'Ryan. The investigation focused on the rifle range portion of Camp O'Ryan. NYSDEC collected surface soil samples from the firing berm area and from the berm behind where the targets were located. The samples were analyzed for total metal lead analyses. A total of 15 samples had elevated levels of Total Metals Lead, the highest concentrations were at the impact area. The report provided figures with the sample location and range features of the rifle range (See Appendix B, NYHQ00082).

3.4.2.6 Woods Hole Group produced a report, October 2010 Preliminary Site Investigation Report Former Camp O'Ryan (FUDS Property No. C0NY1132) Wethersfield, New York, for USACE New England District. Part of the Preliminary Site Investigation (See Appendix B, NYHQ00219) included surface and shallow groundwater sampling at Camp O'Ryan. The surface water and pore water samples were analyzed for explosives, perchlorate, VOC, SVOC, and lead (total and dissolved). The sampling event focused on the northern portion of MRS 3. The surface water samples collected from the stream and the shallow groundwater samples were nondetect for the compounds that were being analyzed. The only detectable result was for a total lead (0.018 mg/L) in a duplicate field sample for shallow groundwater samples. The associated parent field sample was nondetect. The level of detection was below NYSDEC Technical and Operational Guideline Series. The report also provided site background information, figures including sample locations, and lab results for all samples.

3.4.2.7 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain. A map depicting the NYSDEC and USACE investigations completed is included on Figure 3-4. All supporting documentation is provided in Appendices A-C of this report.

3.5 ELMIRA (NYHQ-009-R-01)

3.5.0.1 The former Elmira range is located in the Town of Horseheads, Chemung County. Elmira was operational between 1877 and 1952, the exact dates of operation are not specified in historical documents (Malcolm Pirnie, 2009a).

3.5.0.2 The MRS is located on private property. Current land use includes agriculture land (Google Earth, 2011). Some undeveloped, forested areas also are present on the eastern portion of the Elmira MRS. Interstate 86 traverses from north to south through the MRS (Google Earth, 2011). The MRS location is shown on Figure 3-5a.

3.5.1 Preliminary Assessment Findings

3.5.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, articles, leases, a site visit and NYARNG memoranda.

3.5.1.2 Elmira was used as a rifle range from approximately 1877 through 1952.

3.5.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type).

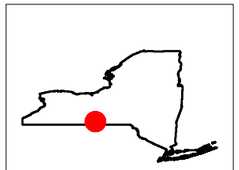
- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding approximate range locations, troop use, and range information, including the number of targets (four) at the range. Company L of the 108th Infantry used the range for training (Malcolm Pirnie, 2009a).
- **Forest and Stream, Rifle Practice of the National Guard, 1877, 3 January 1878 (NY0086):** This document indicated the range opened in 1877 (Malcolm Pirnie, 2009a).
- **Lease agreement between United States Cut Flower Company in Elmira City and Colonel J. Weston Meyers, 31 December 1923 (NY0194):** The document indicated that the NYARNG leased property from the U.S. Cut Flower Company. Company L of the 108th Infantry was documented to have trained at Elmira. The range was a small arms area and .30 caliber M1 and .30 caliber M1906 ammunitions could be fired safely. The range included a target butts at the base of a 500 foot high hill (Malcolm Pirnie, 2009a).
- **Chemung County Atlas, 1904 (NY0205):** The map depicted the location of the U.S. Cut Flower Company, This is the property that the NYARNG leased for the small arms range at Elmira (Malcolm Pirnie, 2009a).

3.5.1.4 No evidence of former training or MEC or MD was observed during the 3 December 2008 PA site visit. Photographs taken during the site visit were included in the PA.

3.5.1.5 The data gaps identified include the range configuration, berm location and exact dates the range was used.

Figure 3-5a
Elmira (Aerial)
AEDB-R # NYHQ-009-R-01
Chemung County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

60 30 0 60
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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3.5.2 Historical Records Review Findings

3.5.2.1 During the Parsons HRR, the following data source was accessed: USGS aerial images. Online research and communications with local historians and librarians also was conducted. The discussion below summarizes the findings from the HRR.

3.5.2.2 The Chemung County Historical Society provided a 1904 map of the area with the location of US Cut Flower Co. The archivist, Rachel Dworkin, did not have any additional information regarding the range at Elmira.

3.5.2.3 The Tri-Counties Genealogy & History, Horseheads Historical Society, and the Town and Village of Horseheads were contacted and none of these organizations had any pertinent information.

3.5.2.4 Parsons obtained multiple USGS historical aerial photographs, 1938, 1944 and 1947, which document dates of use and range features. The 1938 aerial image shows the firing lines and target berm, the firing direction was from west to east (Figure 3-5b). The berm is visible in the 1944 and 1948 aerials images.

3.5.2.4 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. However, certain gaps are still present. The only remaining gap is the exact dates of range use; however this is not considered a significant data gap. All supporting documentation is provided in Appendices A-C of this report.

3.6 GENEVA RANGE (NYHQ-010-R-01)

3.6.0.1 The former Geneva Range is located in Geneva, Ontario County. Geneva Range was operational between 1890 and 1951. The exact dates of operation are not specified in historical documents (Malcolm Pirnie, 2009a).

3.6.0.2 Geneva Range MRS was split into Geneva Range and Geneva Range SDZ. The MRS was divided approximately 200 yards behind the target berm. Geneva Range MRS includes the suspected firing point, target berm and some land behind the target berm for any bullets that may have missed the targets. Geneva Range SDZ MRS includes the remainder of the land from the MRS. The probability that munitions are present in this MRS is very small since it is a fair distance behind the target area location.

3.6.0.4 At the Geneva Range, land use consists of agriculture and undeveloped, forest. Current land uses at the Geneva Range SDZ include agriculture and residential uses as well as undeveloped forest (Google Earth, 2011).The location of the MRSs is shown on Figure 3-6.

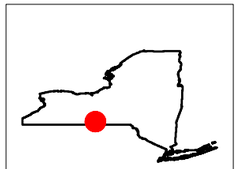
3.6.0.4 The PA Findings and the HRR for Geneva Range and Geneva Range SDZ were completed in tandem.

3.6.1 Preliminary Assessment Findings

3.6.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, leases, a site visit, and NYARNG memoranda.

Figure 3-5b
Elmira (1938 Historical Aerial)
AEDB-R # NYHQ-009-R-01
Chemung County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

60 30 0 60
Meters

N

Image: USDA
1938 Aerial Photo
Obtained at: Syracuse University
Projection: UTM Zone 18,
WGS84, Meters

PROJECT NUMBER:
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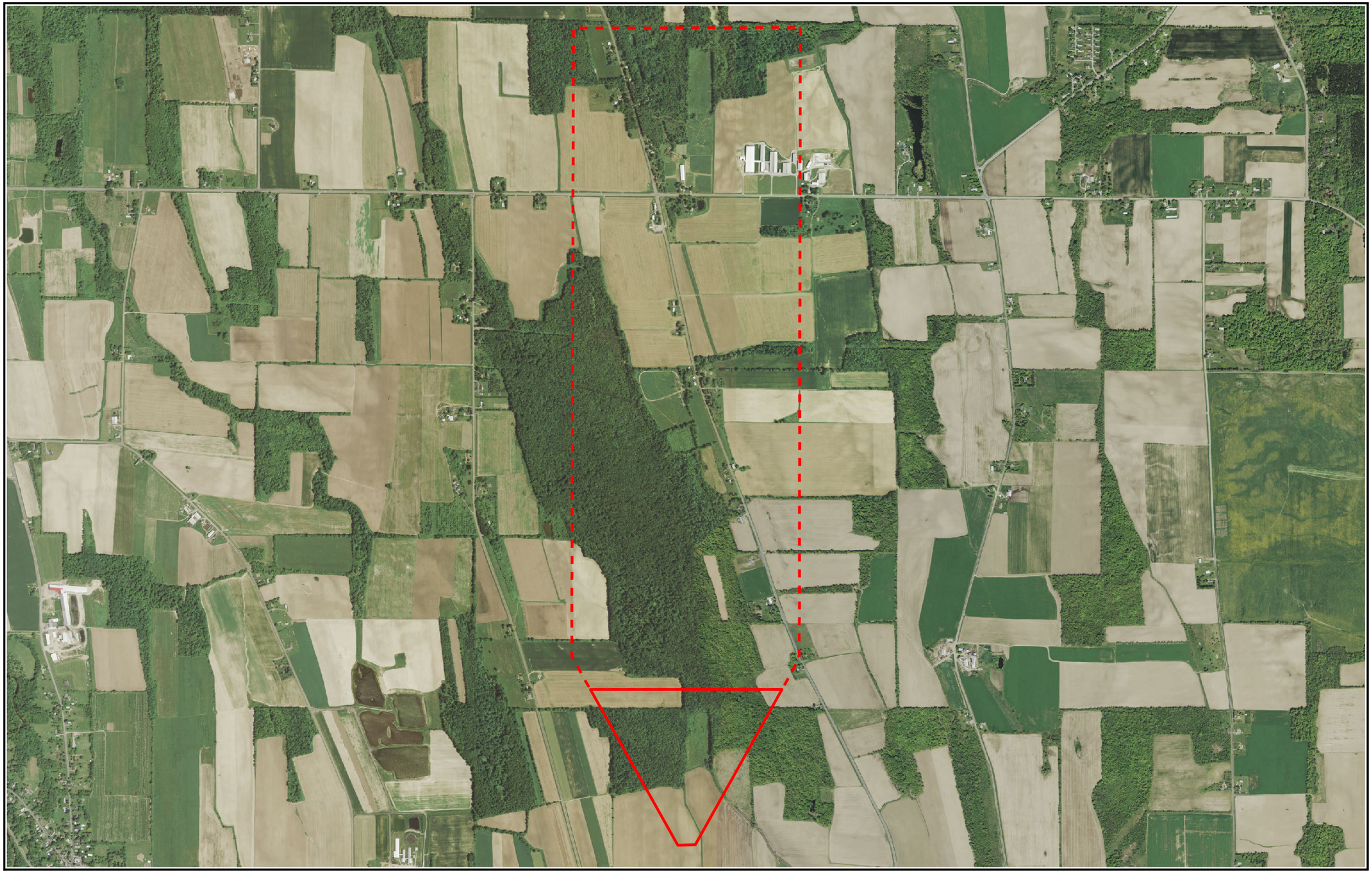
July 2011

Figure 3-6
Geneva Range (Aerial)
AEDB-R # NYHQ-010-R-01
Ontario County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

MRS (SDZ)

250 125 0 250
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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3.6.1.2 Geneva Range was used as a rifle range from approximately 1890 through 1951.

3.6.1.3 The following critical sources were used to determine range specific information (i.e., history, range location, range layout, and munitions type) (Malcolm Pirnie, 2009a):

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding the approximate range location, troop use, and range characteristics, including the number of targets, four, at the range (Malcolm Pirnie, 2009a).
- **O.C. Hammond, Assistant to the Chief, Militia Bureau, Lease Agreement between Rice Brothers Company and the State of New York, 6 September 1924 (NY0030):** This document indicated the range location. Company B of the 108th Infantry and any units in Rochester, NY used the range for training. There were three targets at Geneva Range (Malcolm Pirnie, 2009a).
- **Annual Report of the Adjutant-General of the State of New York, 24 January 1891 (NY0173):** This document indicated the year the range was constructed in 1890 (Malcolm Pirnie, 2009a).
- **Telephone call to Town Residents, 30 July, 2008 and 8 August 2008:** The site location and property owner were identified (Malcolm Pirnie, 2009a).

3.6.1.4 Evidence of the former rifle range was observed during the 2 December 2008 PA site visit. No MEC or MD was observed. Photographs taken during the site visit were included in the PA. The following range features were observed:

- A concrete target berm, approximately 9 inches thick and 40 feet long, was located in a wooded area at Geneva Range. Two metal tripods behind the berm were observed, and were most likely part of a target pulley system.
- A backstop, an earthen hill was found approximately 50 feet north of the berm. The backstop appeared to be man-made and approximately 10 feet high and 80 feet long.

3.6.1.5 The data gap identified includes the exact dates of use.

3.6.2 Historical Records Review Findings

3.6.2.1 Parsons reviewed and validated the information in the Draft PA; however, no additional research was deemed necessary other than collection of site characteristic data.

3.6.2.2 The information data collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. The exact dates of use are still unknown; however, that is not considered a significant data gap since the range layout, orientation and location are known. An appropriate technical approach was developed.

3.7 GLENS FALLS RANGE (NYHQ-011-R-01)

3.7.0.1 The former Glens Falls Range is located in Glens Falls, Warren County. Glens Falls Range was operational between 1878 and 1955. The exact dates of operation are not specified in historical documents (Malcolm Pirnie, 2009a).

3.7.0.2 Glens Falls Range MRS was split into Glens Falls Range and Glens Falls Range SDZ. The MRS was divided approximately 300 yards behind the target berm. Glens Falls Range MRS includes the suspected firing line, target berm and some land behind the target berm for any bullets that may have missed the targets. Glens Falls Range SDZ MRS includes the remainder of the land from the MRS. The probability that munitions are present in this MRS is very small since it is a fair distance behind the target area location.

3.7.0.3 The Glens Falls Range MRS and Glens Falls Range SDZ MRS are located on city-owned and privately owned property. Current land use in both MRSs includes residential and recreational land as well as undeveloped, forested land. The majority of the western portion of Glens Falls Range MRS consists of undeveloped, forested land (Google Earth, 2011). The location of the MRSs is shown on Figure 3-7.

3.7.0.4 The Draft PA Findings and the HRR for Glens Falls Range and Glens Falls Range SDZ were completed in tandem.

3.7.1 Preliminary Assessment Findings

3.7.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, leases, a site visit and NYARNG memorandums.

3.7.1.2 Glens Falls Range was used as a rifle range from approximately 1878 through 1955.

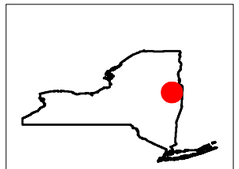
3.7.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding approximate range locations, troop use, and range characteristics, including the number of targets (four) at the range (Malcolm Pirnie, 2009a).
- **Compliance with Inspection of Rifle Range at Queensbury, 5 June 1924 (NY0031):** This document indicated that Company K of the 105th Infantry, comprising 76 men in 1924, used the Glens Falls Range. Local civilian rifle clubs used the range when the NYARNG was not training. There were four targets installed in a concrete pit and could be used at all ranges up to and including 1,000 yards (Malcolm Pirnie, 2009a).
- **Telephone call to Queensbury Tax Assessor's Office, 18 June, 2008:** Information obtained included site location and property owner (Malcolm Pirnie, 2009a).

3.7.1.4 Evidence of the former rifle range was observed during the 15 October 2008 PA site visit. No MEC or MD was observed. Photographs taken during the site visit were included in the PA. The following range features were observed:

Figure 3-7
Glens Falls Range (Aerial)
AEDB-R # NYHQ-011-R-01
Warren County, New York

PARSONS



Site Location in New York

Legend

- MRS Boundary
- SDZ Boundary

150 75 0 150
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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- Concrete target butts that were filled with soil. Based on the orientation of the butts, the firing direction was from west to east. Four iron I-beams, rising approximately 4 feet above the ground, were observed; however, the function of these is not clear.

3.7.1.5 The data gap identified based includes the exact dates of use.

3.7.2 Historical Records Review Findings

3.7.2.1 Parsons obtained two USGS historical aerial photographs, 1942 and 1947, which document dates of use and range features.

3.7.2.2 The data collected, reviewed, and assessed were determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. The exact dates of use remain unknown; however, this information is not considered a significant data. An appropriate technical approach was developed. All supporting documentation is provided in Appendices A-C of this report.

3.8 HOOSICK FALLS RANGE (NEW) (NYHQ-012-R-01)

3.8.0.1 The former Hoosick Falls Range (new) is located in Hoosick Falls, Rensselaer County. Hoosick Falls Range (new) was operational between 1933 and 1955. The exact dates of operation are not specified in historical documents. Hoosick Falls Range (new) was located just south of 621 Clay Hill Road (Malcolm Pirnie, 2009a).

3.8.0.2 The MRS is located on privately owned property. Currently, the land is used as a farm; however, the southern portion of the MRS consists of undeveloped forested land (Google Earth, 2011). The MRS location is shown on Figure 3-8.

3.8.1 Preliminary Assessment Findings

3.8.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, articles, letters and a site visit.

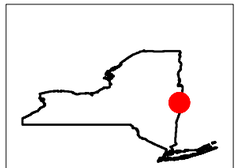
3.8.1.2 Hoosick Falls Range (new) was used as a small arms range from approximately 1933 through 1955

3.8.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Lease agreement between Dr. C. Howard Travell and Colonel J. Weston Myers, Property and Disbursing Officer for the United States for the State of New York, 1 January 1926 (NY0136):** This lease provided information on Hoosick Falls Range (old) and Hoosick Falls Range (new). Hoosick Falls Range (new) is the only range being investigated during this SI process. The documents indicate that Hoosick Falls Range (new) had four targets with a maximum firing distance of 300 yards. There was a natural backstop behind the target berm and there were two firing mounds at 200 and 300 yards. The 1st Battalion Headquarters Company 105th Infantry used the range for training. A range map is included that details the range orientation and layout. There also are pictures of the range features (firing point and the range house). A NYARNG Memorandum indicated that .30 caliber M1 ammunitions could be used safely at Hoosick Falls Range (new) (Malcolm Pirnie, 2009a).

Figure 3-8
Hoosick Falls Range (New) (Aerial)
AEDB-R # NYHQ-012-R-01
Rensselaer County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

40 20 0 40
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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- **Telephone call to Hoosick Township Historical Society, 24 June, 2008:** Mr. Charles Filkins, a Historian identified the range location and property owners. Mr. Filkins mentioned that the range was located off of Hill Road on the Case Fairview Farm. The range was located on the south side of the farm, which is located near the intersection of Clay Hill Road and Tate Road (Malcolm Pirnie, 2009a).
- **Interview with a Landowner 16 October 2008:** The landowner was aware of the range, and during an unknown period, he allowed people to use it. Currently, the range is not used (Malcolm Pirnie, 2009a).
- **Email to Hoosick Falls Tax Assessor, Anthony Rice, 9 July, 2008:** Information obtained included site acreage and property owner (Malcolm Pirnie, 2009a).

3.8.1.4 Evidence of the former rifle range was observed 16 October 2008 PA site visit. No MEC or MD was observed. Photographs taken during the site visit were included in the PA. The following range features were observed:

- A concrete target butt with four target rising mechanisms was observed.
- A small concrete reservoir was found behind the target berm, it was unclear if the structure was range related. The firing direction was noted to be from northwest to southeast (Malcolm Pirnie, 2009).

3.8.1.5 The data gaps identified include clarifying the orientation of the target berm and obtaining the exact dates the range was used.

3.8.2 Historical Records Review Findings

3.8.2.1 During the Parsons HRR, the following data sources were accessed: USGS aerial images. The discussion below summarizes the findings from the HRR.

3.8.2.2 A 1951 USGS historical aerial image from the time the range was used was investigated. The aerial image showed a berm feature at Hoosick Falls Range (new). The berm location was approximately in the same location as it was depicted in the PA; however the orientation of the range indicated that the firing direction was from the northeast to the southwest. This contradicts the PA site visit observation write up, but confirms the hand drawing of the range from the reference documents, NY0136. The difference in the berm orientation between the PA and the Parsons HRR findings does not provide a significant data gap, since in both cases the berm is located in the same area and the berm is still present.

3.8.2.3 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. The exact dates of use are remain unknown; however, this information not considered a significant data gap since the range layout, orientation, and location are known. An appropriate technical approach was developed. All supporting documentation is provided in Appendices A-C of this report.

3.9 HORNELL RIFLE RANGE (NYHQ-013-R-01)

3.9.0.1 The former Hornell Rifle Range is located in Hornellsville, Steuben County. Hornell Rifle Range was operational between 1930 and 1972. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

3.9.0.2 The MRS is located on federal and county-owned property. Current land use includes public uses (federal flood control, recreation, including a parking lot for the Finger Lakes Hiking Trail, and a portion of Kanakadea Park). There also is undeveloped, forested land within the MRS. The MRS location is shown on Figure 3-9.

3.9.1 Preliminary Assessment Findings

3.9.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews and a Range Condition Assessment Report. A site visit also was conducted.

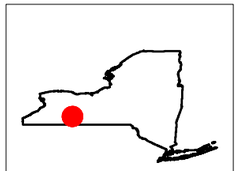
3.9.1.2 Hornell Rifle Range was used as a small arms range from approximately 1930 through 1972.

3.9.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Wayne A. Fox, Program Manager, Ground Water and Solid Waste. Range Condition Assessment, 3 November 2004 (NY0127):** This document provided the environmental conditions of Hornell Rifle Range. Information provided in this document included possible pathways for release of MC to environmental media, site characteristics, operational history, and waste properties, pathways and targets, and conclusions. The figures indicated range orientation and layout information. The range was oriented from southeast to northwest. The original range was located near Canacadea Creek but had to be moved once a dam was constructed to just west of County Road 66. The target butts were located northwest of the firing line. The document also provided site characteristic information, including climate, demographic, hydrology, soil, geology, and sensitive environment information for Hornell Rifle Range. The operation history section of the document indicated that the land was purchased on 7 February 1930 and was used by Company K, 108th Infantry as a rifle range. The range comprised a target house, five frames, concrete and earthen butt (backstop), and firing points at 100, 200, 300, 400, and 500 yards. In 1946, the Almond Dam and was constructed and the 300-, 400- and 500- yard firing lines could no longer be used. There were two building on the range, a pit house and a range house. The final license to train at the range was terminated on 30 May 1972 and the units moved all weapon and training activities to Fort Drum, Watertown, NY. Approximately 200 personnel used the range annually and the weapons fired at the range included pistols, rifles and possibly .30 and .50 caliber machine guns. The document also provided photographs of the range from the site visit (Malcolm Pirnie, 2009a).
- **Email to City of Hornell Tax Assessor, 9 July, 2008:** Information was provided on the range location and property owner (Malcolm Pirnie, 2009a).

Figure 3-9
Hornell Rifle Range (Aerial)
AEDB-R # NYHQ-013-R-01
Steuben County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

50 25 0 50
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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3.9.1.4 During the 13 October 2008 PA site visit, no evidence of MEC or MD was observed. Photographs taken during the site visit were included in the PA.

3.9.2 Historical Records Review Findings

3.9.2.1 During the Parsons HRR, the following data source was accessed: USGS aerial images. The discussion below summarizes the findings from the Parsons HRR.

3.9.2.2 Parsons obtained two USGS historical aerial photographs (1952 and 1963) which document dates of use and range features. The aerial images showed the range after the berm was built. The images show range features, target berm, in the same location as in the PA reference documents. The firing direction was from east to west.

3.9.2.3 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. All supporting documentation is provided in Appendices A-C of this report.

3.10 JAMESTOWN RIFLE RANGE (NYHQ-014-R-01)

3.10.0.1 The former Jamestown Rifle Range is located in Frewsburg, Chautauqua County. Jamestown Rifle Range was operational between 1878 and 1949, though the exact dates of operation are not specified in historical documents. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

3.10.0.2 The MRS is located on private property. Currently, the land use consists of undeveloped, swampy land, some of which is forested. The MRS location is shown on Figure 3-10.

3.10.1 Preliminary Assessment Findings

3.10.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, leases, and NYARNG memoranda. A site visit also was conducted.

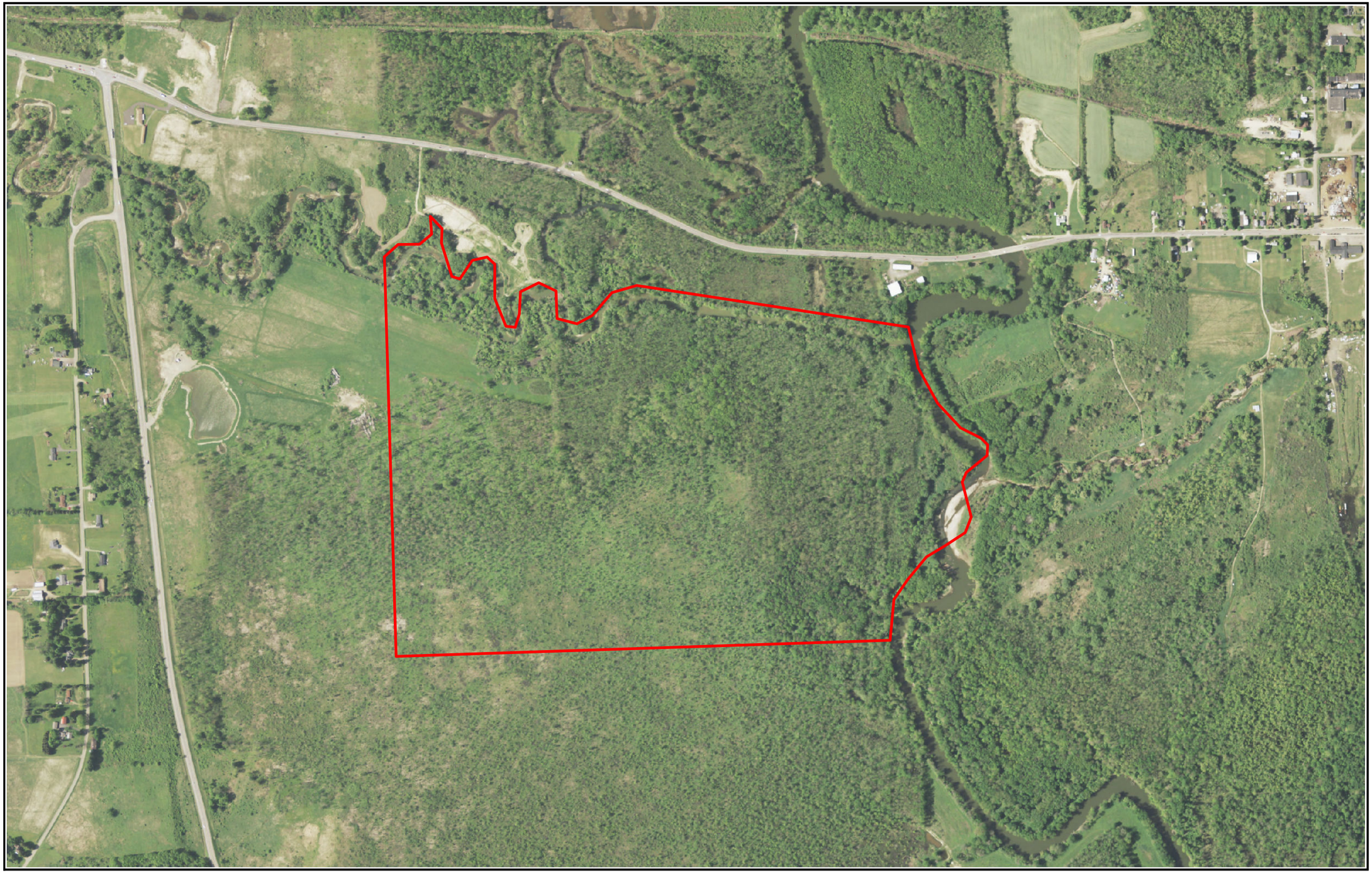
3.10.1.2 Jamestown Rifle Range was used as a small arms range from approximately 1878 through 1949.

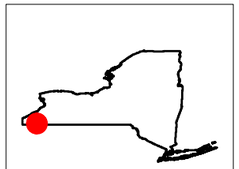
3.10.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding range location, troop use, and range characteristics. The range area was located on swampy land prevented shooting training until after June 1st, when the water level decreased. The range was used by Company E of the 174th Infantry and by Buffalo units of this regime. There were four targets at Jamestown Rifle Range (Malcolm Pirnie, 2009a).

Figure 3-10
Jamestown Rifle Range (Aerial)
AEDB-R # NYHQ-014-R-01
Chautauqua County, New York

PARSONS





Site Location in New York

Legend

MRS Boundary

120 60 0 120
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 17, WGS84, Meters

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- **J. McI. Carter, Brigadier General, U.S. Army, Lease of Rifle Range, 3 January 1921 (NY0022):** This document provided range size, a strip of land 50 feet wide for 500 yards from the 1,000 yard firing point to 500 yard firing point and 200 feet wide from five hundred yard firing point to the butt and bullet catcher. The Company E of the 74th Infantry used the range. Three range officers and 50 men used the range in 1921 Malcolm Pirnie, 2009a).
- **Telephone call to Fenton Museum, 26 June, 2008 and 30 June, 2008:** Mr. Norman Carlson, Historian, indicated that the range was located S.T. Thomas Farms. The range was located south of the rendering works (Malcolm Pirnie, 2009a).

3.10.1.4 The 13 October 2008 PA site visit was conducted from the road. The remains of a concrete bridge abutment were found but the bridge no longer exists and the site could not be accessed. The site team, therefore, could not confirm the presence or absence of range features or MEC/MD. Photographs taken during the site visit were included in the PA.

3.10.1.5 The data gaps identified based include the range configuration, berm location, and direction of fire.

3.10.2 Historical Records Review Findings

3.10.2.1 During the Parsons HRR, the following data sources were accessed: USGS aerial images, local libraries, and historical societies. Interviews with local residents, in person and over the telephone, also were conducted. The discussion below summarizes the HRR findings.

3.10.2.2 The Fenton History Center and Frewsburg/Carroll Town Hall were visited. All the information that was collected from these visits is provided in this subchapter.

3.10.2.3 The "Local Soldiers to Participate in Maneuvers" newspaper article indicated that the 174th Infantry trained at Jamestown Rifle Range.

3.10.2.4 "The Fenton Guard Was Made Up Of Swedish Volunteers" article documented the history of the Fenton Guard spanning from 1875-1916. The troops used Civil War rifles and .50 caliber Remington rifles.

3.10.2.5 The Jamestown Evening Journal from April 29, 1935 provided multiple articles on the Fenton Guard veterans. The articles focused on Company E of the 174th Infantry history. There were a variety of individuals that joined Company E of the 174th Infantry and trained at Jamestown Rifle Range, these included immigrants, Americans, and American Indians.

3.10.2.6 The excerpt from the *Saga from the Hills* included information on the units that were the Fenton Guard and how the designation changed throughout the years. While the troops trained at Jamestown Rifle Range, the group was referred to as: Company E 65th NY Volunteers; Company N of the 1st Battalion; Company G, 3rd Infantry; Company E, 65th Infantry; Company E 74th Infantry; Company E, 108th Infantry; and Company E, 174th Infantry. In 1875, the troops used .50 caliber Remington and for Federal service in the Spanish-American War, .45 caliber Springfields were issued.

3.10.2.7 The Chautauqua County soil survey from 1987 and 1988 provided information on the types of soil located at Jamestown Rifle Range.

3.10.2.8 The 1942 newspaper articles, "Relic From Old State Armory To Be Presented Company E By Mayor for New Armory" indicated that the troops that trained at Jamestown Rifle Range had multiple designations, including Company E in the 65th and in the 74th Infantry.

3.10.2.9 The June 14, 1894 "Jamestown Pride" article provides information regarding the history of Company E and the Armory. The armory had a range, 30 yards in length. The open-air range at Jamestown Rifle Range was 600 yards in length with sliding targets and a range house.

3.10.2.10 The 1990 Post Journal article, "Jamestown's Company E Went off to War 50 Years Ago" confirms the Infantry that trained at Jamestown Rifle Range.

3.10.2.11 Parsons obtained two USGS historical aerial photographs, 1938 and 1953, aerial image of the area where Jamestown Rifle Range were located and investigated. No range features were observed.

3.10.2.12 On 20 December 2010, Ms. Lauren Bell, Parsons, interviewed Mr. Tom Erlandson, son of a former ARNG member. Mr. Erlandson provided aerial photographs from 1958 and 1960 of the area. The photographs show the 'rendering works' complex location as well as a bridge over Conewango Creek. During the interview, Mr. Erlandson indicated that Mr. Jim Strong joined the NYARNG in December 1954. In January 1955, the designation of the units that trained at Jamestown Rifle Range changed from Company E, 127th Division to Company C 27th Armored Division when tanks were introduced. He remembers that his father would go to the range on Sundays once a month and sometimes Mr. Erlandson would go with his father. Mr. Erlandson could not remember exactly the munitions that were used, but recalled using .45-caliber, M-1s and M-2s, which he referred to as "car beans." Earthen mounds were used to stop the bullets and targets on pulley systems were in 6-foot deep pits.

3.10.2.13 On 7 January 2011, Ms. Maria Borejsza-Wysocka, Parsons, interviewed Mr. Jim Strong on the telephone. Mr. Strong recalls training at Jamestown Rifle Range. In 1955, tanks were introduced for training purposes, they did not fire the tanks but shot .30-caliber and .50 caliber machine guns from the tanks. Mr. Strong remembers the tanks being parked in a line and the ARNG members would shoot from east to west into berms with woods behind the berms. Every fifth shot was a tracer.

3.10.2.14 On 7 January 2011, Ms. Borejsza-Wysocka, Parsons, contacted Mr. Warn. Mr. Warn did not have any aerial photographs of the area indicating the location of Jamestown Rifle Range. He confirmed Jamestown Rifle Range was located where Still Water Creek and Conewango Creek met just south of Rt. 62.

3.10.2.15 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. However, data gaps remain and include the exact range configuration, and berm location. The technical approach will focus on the most likely berm locations based on historic data and site characteristics. Samples will be collected in multiple locations to account for the data gap, unknown berm location. All supporting documentation is provided in Appendices A-C of this report.

3.11 MALONE LTA (NYHQ-015-R-01)

3.11.0.1 The former Malone LTA is located in Malone, Franklin County. Malone LTA was operational between 1895 and 1985. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

3.11.0.2 The MRS is located on New York State-owned property. Currently, the Franklin Correctional Facility, a New York state-owned facility, is located on the property of the former MRS. The land use is public and also included a landfill and undeveloped, forested land. The MRS location is shown on Figure 3-11a.

3.11.1 Preliminary Assessment Findings

3.11.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, lease documents, article, a site visit, and an Annual Report.

3.11.1.2 Malone LTA was used as a maneuvering area from approximately 1895 through 1985.

3.11.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

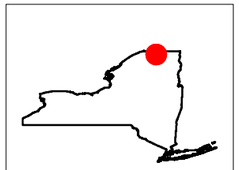
- **Karl F. Hausauer, State of New York Annual Report of the Chief of Staff to the Governor for the Division of Military and Naval Affairs, 31 December 1951 (NY0101):** This document indicated that Malone LTA had three targets with 200 to 600 yard firing lines (Malcolm Pirnie, 2009a).
- **John T. Law, Col, Gs, NYARNG, Director of Logistics. Controlled Firing Area for Malone, New York, 30 April, 1987 (NY0182):** These documents included multiple leases (1956, 1972, and 1982) which noted the location and property owners of the maneuvering area. A document also indicated that there were plans to develop the maneuvering area into a prison (Malcolm Pirnie, 2009a)**.**
- **Malone Newspaper, National Guard Armory Nearly Ready, 28 January 1988 (NY0230):** These newspaper articles indicate the construction and opening of Franklin Correctional Facility. This information indicated that the use of the maneuvering area was discontinued in 1985 (Malcolm Pirnie, 2009a).
- **Telephone to Franklin County Tax Services, 17 September 2008:** Background information regarding range obtained (Malcolm Pirnie, 2009a).

3**.**11.1.4 No evidence of the former rifle range was observed during the 15 October 2008 PA site visit. The site visit was conducted from the road. No MEC or MD was observed. Photographs taken during the site visit were included in the PA.

3.11.1.5 The data gaps identified include the training area configuration and exact location.

Figure 3-11a
Malone LTA (Aerial)
AEDB-R # NYHQ-015-R-01
Franklin County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

70 35 0 70
Meters

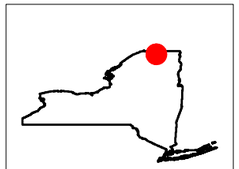
N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
March 2011

Figure 3-11b
Malone LTA (1963 Historical Aerial)
AEDB-R # NYHQ-015-R-01
Franklin County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

80 40 0 80
Meters

N

Image: USGS
1963 Aerial Photo
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
July 2011

3.11.2 Historical Records Review Findings

3.11.2.1 During the Parsons HRR, the following data sources were accessed: USGS aerial images. Local residents were also contacted. The discussion below summarizes the findings from the Parsons HRR.

3.11.2.2 The 1963 USGS historical aerial image reviewed indicates the location of the maneuvering area (see Figure 3-11b). The location of the maneuvering area currently is located under the footprint of the Franklin Correctional Facility.

3.11.2.3 An email exchange between a USACE New York District employee and Mr. George Glassanos in 2011 provided information regarding where Malone LTA was located. Mr. Glassanos indicated that he spoke with an engineer employed by the Department's design and construction consultant, the State Office of General Services, when Franklin was built. He informed Mr. Glassanos that during site preparations for construction, DOCS contractors removed the top 12 inches of topsoil for use elsewhere (unclear if the contractor used the soil elsewhere onsite or off), and then trucked in from 3 to 15 feet of fill material to level the site. Then, the area was compacted.

3.11.2.4 The data collected, reviewed, and assessed were determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS.

3.11.2.5 Based on this information no sampling is planned at Malone LTA since the maneuvering area has been completely redeveloped, (i.e. Franklin Correctional Facility was constructed where the former range was located). All supporting documentation is provided in Appendices A-C of this report.

3.12 MOHAWK RIFLE RANGE (NYHQ-016-R-01)

3.12.0.1 Mohawk Rifle Range, also known as Kast Bridge Range, is a former rifle range. The former range is located in Herkimer, Herkimer County. Mohawk Range was operational between 1907 and 1959. The physical address for the range is State Route 28 and Farber Lane (Malcolm Pirnie, 2009a).

3.12.0.2 The MRS is located on privately owned property. Currently, residential and agricultural (fruit tree farms) land use is present on the property (Google Earth, 2011). There is an area of undeveloped forested land on the eastern part of the MRS. The MRS location is shown on Figure 3-12.

3.12.1 Preliminary Assessment Findings

3.12.1.1 Critical sources for the 2009 PA (Malcolm Pirnie, 2009a) included interviews, leases, a site visit, and ARNG Memoranda and correspondence.

3.12.1.2 Mohawk Rifle Range was used as a rifle range from approximately 1907 through 1959.

3.12.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

Figure 3-12
Mohawk Rifle Range (Aerial)
AEDB-R # NYHQ-016-R-01
Herkimer County, New York

PARSONS

Site Location in New York

Legend

MRS Boundary

60 30 0 60

Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
May 2011

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding approximate range locations, troop use, and range characteristics. Company I of the 10th Infantry used the range. There were four targets at Mohawk Rifle Range (Malcolm Pirnie, 2009a).
- **P.W. Rutledge, Lt. Col. NGB, Assistant, Renewal of Mohawk Lease, 17 July, 1941 (NY0038):** The document included leases for Mohawk Rifle range for 1920, 1924, 1925, 1929, 1940, and 1941. The documents indicate that the range was 600 yards. A hill on Lucius Knight's property, near Kast Bridge, was used as a backstop for the rifle range. The range was used by Company I of the 10th Infantry. There were four targets at the range (Malcolm Pirnie, 2009a).
- **John V. Gallagher, Lt. Colonel, AGC, NYARNG, Assistant Adjutant General, Lease of Mohawk Rifle Range, 5 August 1959 (NY0139):** The document indicated that Ilion Fish and Game Club constructed an eight point 200 yard range in the Mohawk/Ilion area. It is unclear if this range was the Mohawk Rifle Range (Malcolm Pirnie, 2009a).
- **Utica Daily Press, Mohawk Rifle Range Nellis Property, 9 May 1907 (NY0234):** This document indicates that the State of New York would erect a rifle range near Kast Bridge north of Herkimer for NYARNG use (Malcolm Pirnie, 2009a).
- **Telephone call to Herkimer County Historical Society, 25 June, 2008:** Susan Perkins, Executive Director of the Herkimer County Historical Society, indicated that Company I of the 10th Infantry used the range. Ms. Perkins confirmed that there were four targets, two with 200-yard firing lines and two with 400-yards firing lines (Malcolm Pirnie, 2009a).
- **Telephone call to Elmer Smith, Former Guardsmen, 27 August 2008:** Elmer Smith indicated that he joined the NYARNG in 1939 and served for 42 years. During his years in the NYARNG, he trained at Kast Bridge Range. During training, he fired over the highway and across the creek (Malcolm Pirnie, 2009a).

3.12.1.4 , Evidence of the former rifle range was observed the 9 December 2008 PA site visit. No MEC or MD was discovered. Photographs taken during the site visit were included in the PA. The following range features were observed:

- A target berm, approximately 9 inches thick by 10 feet tall by 30 yards long, was observed 25 yards from the west bank of West Canada Creek. There were four metal rods, which most likely served as target pulleys, attached to the wall.
- A natural backstop, a steep hill, was located across West Canada Creek. The hill is heavily forested (Malcolm Pirnie, 2009).

3.12.1.5 No data gaps were identified.

3.12.2 Historical Records Review Findings

The Draft PA data collected, reviewed, and assessed were determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No data gaps remain for this MRS. All supporting documentation is provided in Appendices A-C of this report.

3.13 NDNODS CREEDMOOR RIFLE RANGE (NYHQ-001-R-01)

3.13.0.1 The former NDNODS Creedmoor Rifle Range is located in Queens Village, Queens County. NDNODS Creedmoor Rifle Range was operational between 1873 and 1907. The physical address for the range is unknown (Malcolm Pirnie, 2009b).

3.13.0.2 Currently, public (Creedmoor Psychiatric Center), recreational, and residential land uses are present on the property (Google Earth, 2011). The MRS location is shown on Figure 3-13.

3.13.1 Preliminary Assessment Findings

3.13.1.1 Critical sources for the 2009 Final PA (Malcolm Pirnie, 2009b) included interviews, articles, hand-drawn sketches, and a site visit.

3.13.1.2 NDNODS Creedmoor Rifle Range was used as a rifle range from approximately 1873 through 1907.

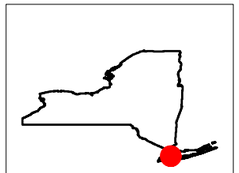
3.13.1.3 The following critical sources were used (Malcolm Pirnie, 2009b) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Forest and Stream Vol. 7, 25 January 1877 (NY0085):** This document indicates that NDNODS Creedmoor Rifle Range had been used since 1873. In 1876, the range was used by 8,000 troops and almost 4,000 other individuals. The document also mentions training statistics for the troops that trained at the range. At the time the article was written, there were 15 targets; however, it was recommended that the number be increased to 20 or 25 targets (Malcolm Pirnie, 2009b).
- **New York Times, Creedmoor Range Miscellaneous Information, 2001 (NY0222):** The documents included: newspaper articles, magazine articles, and an 1892 hand -drawn map. The map showed the range location and boundary. The articles indicated that NDNODS Creedmoor Rifle Range housed a 1,000-yard firing range and it opened in 1873. There were multiple international rifle matches at the range. The description of the rifle matches included the different shooting distances for marksmen (800 to 1,000 yards) and the number of shots (15) each participant received at each firing point. The marksmen used Remington and Sharps breechloaders for training. Numerous gun clubs used the range when the NYARNG was not training or holding a competition. The shape of the range was a long parcel of land that ran from north to south. NDNODS Creedmoor Rifle Range also was referred to as the National Rifle Association (Malcolm Pirnie, 2009b).
- **Telephone call to Creedmoor Psychiatric Center/Queens Co. Farm Museum, 12 September 2008:** The center confirmed the range location, which is where the Creedmoor Psychiatric Center currently is located (Malcolm Pirnie, 2009b).

3.13.1.4 No evidence of the former rifle range or MEC or MD was observed during the 10 October 2008 PA site visit. Photographs taken during the site visit were included in the PA.

Figure 3-13
NDNODS Creedmoor Rifle Range (Aerial)
AEDB-R # NYHQ-001-R-01
Queens County, New York

PARSONS



Site Location in New York

Legend

Revised MRS Boundary

150 75 0 150
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
April 2011

3.13.1.5 The data gaps identified include the exact range location and range configuration (including berm location, firing direction, and range boundary).

3.13.2 Historical Records Review Findings

3.13.2.1 During the Parsons HRR the Long Island Division of the Queens Borough Public Library was visited. All the information collected from the 3 February 2011 visit is presented in subchapters 3.13.2.2 to 3.13.2.8.

3.13.2.2 A historical photograph of men training showed the target berm with more than 15 targets.

3.13.2.3 An excerpt from James McCabe's Book *New York By Sunlight and Gaslight* indicated that NDNODS Creedmoor Rifle Range had ranges with lengths that varied from 50 yards to 1,200 yards. Many different targets ("running deer" target, "a tramp" or "moving man" target and "ringing target") were used at the range.

3.13.2.4 Recollections by Mr. W.H. Brower from 1945 indicated that each regiment had rifle training for two days with 500 to 600 soldiers training each day. Red flags would be raised to notify neighboring farmers that shooting was occurring. Mr. Brower's recollections included salaries and compensation costs issued to farmers who lost livestock to stray bullets. The targets used at NDNODS Creedmoor Rifle Range initially were made of stone, then iron, and finally wood frames with canvas or paper coverings. The NYARNG used 45 caliber Springfield rifles. Additional munitions used at the range included .30 and .50 caliber ammunitions. According to Mr. Brower, there were 45 targets on the 100 to 500 yard range, on the west side of the range, and 75-100 targets for the 100 to 1,000 yard range located on the eastern portion of NDNODS Creedmoor Rifle Range. Mr. W.H. Brower mentioned that the bullets were removed from the berms every year.

3.13.2.5 M.H. Smith's article "Creedmoor Rifle Range" in the *Long Island Forum* indicated that the range was located where the Creedmoor State Hospital is located. The range was similar to the British range at Wimbledon and was used for international and national matches. There were 20 individual ranges up to 1,000 yards were laid out at Creedmoor. The range opened in 1873 with a National Guard match. The international competitions consisted of teams of six men with 15 shots at 800, 900 and 1,000 yards. The article also described scoring practices and other competitions that occurred at NDNODS Creedmoor Rifle Range.

3.13.2.6 The Creedmoor chapter from Vincent F. Seyfried's 1974 book *The Story of Queens Village* described the shape of that range as a 1,200 yard long narrow oblong range that ran north to south. There was no natural backstop at Creedmoor Rifle Range; therefore, a 570 foot backstop was built by the Central Railroad, it was finished in 1873. The first shots were taken in April 1873 and eight regiments participated. The regiments fired Springfield and Remington rifles at 200 and 500 yards. By the summer of 1873, when the range was officially open, the NYARNG units used range almost daily, often as many as 5,000 men at a time. International competition events also occurred at NDNODS Creedmoor Rifle Range. In 1908, NDNODS Creedmoor Rifle Range was released to the Long Island State Hospital.

3.13.2.7 An 1891 map of Queens County notes the location of the National Rifle Range Association, also known as NDNODS Creedmoor Rifle Range.

3.13.2.8 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. Stakeholders confirmed at the TPP 2 meeting sampling would not be conducted at NDNODS Creedmoor Rifle Range since the rifle range was redeveloped. All supporting documentation is provided in Appendices A-C of this report.

3.14 NDNODS GENESEO RANGE (OLD) (NYHQ-002-R-01)

3.14.0.1 NDNODS Geneseo Range (old) is a former small arms range. The former range is located in Piffard, Livingston County. NDNODS Geneseo Range (old) was operational between 1926 and 1935. The physical address for the range is 3528 River Road (Malcolm Pirnie, 2009b).

3.14.0.2 The MRS is located on private property. The Abbey of Genesee is located on the property where the original MRS boundary was demarcated and is not shown on Figure 3-14. The MRS location in the PA was incorrect and was shifted to the location that is shown on Figure 3-14. Based on Figure 3-14, property within the MRS boundary is undeveloped and forested.

3.14.1 Preliminary Assessment Findings

3.14.1.1 Critical sources for the 2009 Final PA (Malcolm Pirnie, 2009b) included interviews, leases, a letter, and a site visit.

3.14.1.2 NDNODS Geneseo Range (old) was used as a rifle range from approximately 1926 through 1935.

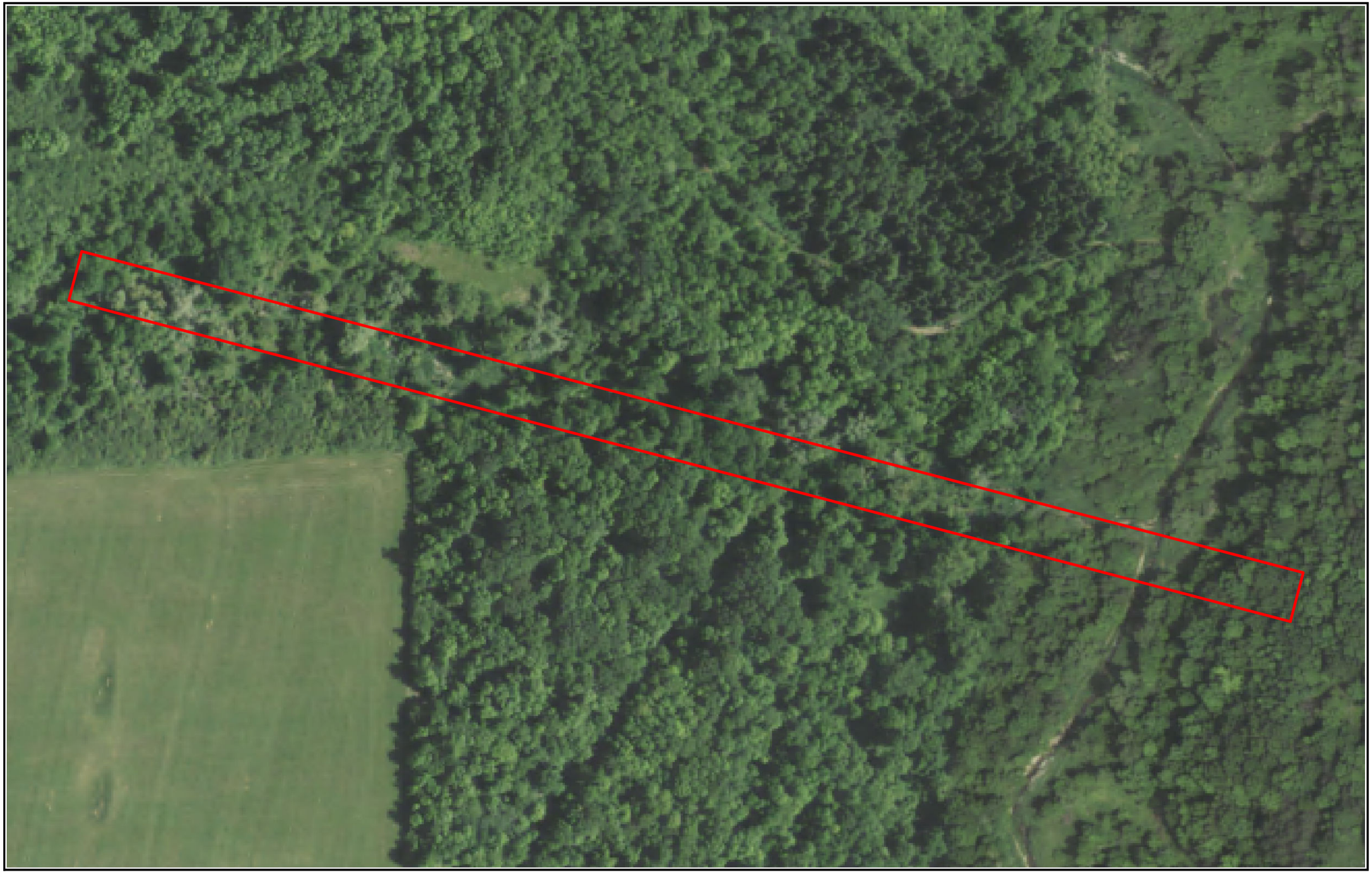
3.14.1.3 The following critical sources were used (Malcolm Pirnie, 2009b) to determine range specific information (i.e., history, range location, range layout, and munitions type):

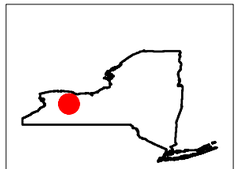
- **Benjamin Linfoot, Captain of 121 Cavalry, Safety of National Guard Home Station Small Arms Ranges, 17 May 1934 (NY0021):** The document indicates that there were two targets with a natural backstop, a hill over 60 feet high behind the targets. Troop "M" 1st Calvary trained at the range. The range was a strip of land 80 feet wide and 2,000 feet long. The hand drawn map shows the location of the range in relation to Piffard and Valentine Farm (Malcolm Pirnie, 2009b).
- **David W. Parish, Historian of Town of Geneseo, Calvary Troops, 2 July 2008:** In the 1930s and very early 1940s, the range was on River Road, Town of York, this property later was developed into the Abbey of Genesee. (Malcolm Pirnie, 2009b).
- **Telephone call to Livingston County Historical Society, 24 June 2008:** The society provided information on the range location (Malcolm Pirnie, 2009b).

3.14.1.4 No evidence of the former rifle range or MEC or MD was observed during the 2 December 2008 PA site visit. Photographs taken during the site visit were included in the PA.

Figure 3-14
NDNODS Geneseo Range (old) (Aerial)
AEDB-R # NYHQ-002-R-01
Livingston County, New York

PARSONS





Site Location in New York

Legend

MRS Boundary

30 15 0 30
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
May 2011

3.14.1.5 The data gaps identified include the exact range location and range configuration (including berm location).

3.14.2 Historical Records Review Findings

3.14.2.1 During the Parsons HRR, Wadsworth Library and State University of New York (SUNY) Geneseo Library – Milne Library were visited. All the information that was collected from the 21 December 2010 visit is presented in subchapters 3.14.2.2 to 3.14.2.5.

3.14.2.2 The newspaper articles indicated that Troop M, 1st New York Cavalry trained at NDNODS Geneseo Range (old). In 1928 Troop M was redesignated as Troop G, 121st Cavalry. A year later, the troop was reorganized and redesignated as Troop I, 121st Cavalry.

3.14.2.3 Mr. David Parish, the Village of Geneseo Historian, indicated that a wooded area east of the Armory was used for training. Mr. Parish has walked the area and mentioned that there are several deep gullies and cast iron forms still present. The cast iron forms might have been used as target mechanisms.

3.14.2.4 Parsons obtained two USGS historical aerial photographs, 1938 and 1959 USGS aerial images of the area where NDNODS Geneseo Range (old) was located. The aerial images did not show any evidence of the range.

3.14.2.5 The data collected, reviewed, and assessed were determined to be relevant and of sufficient quantity and quality to support SI planning and execution. However, certain gaps are still present. The remaining gap includes the exact location of the berm. The technical approach will focus on the most likely berm and backstop location based on the site characteristics and historic data. Samples will be distributed throughout the possible backstop to account for the data gap. All supporting documentation is provided in Appendices A-C of this report.

3.15 NDNODS RENSSELAER WYCK TARGET RANGE (NYHQ-003-R-01)

3.15.0.1 NDNODS Rensselaer Wyck Target Range, also known as Bath-on-Hudson Range, is a former small arms range. The former range is located in Rensselaer, Rensselaer County. NDNODS Rensselaer Wyck Target Range was operational between 1894 and 1938. The physical address for the range is unknown (Malcolm Pirnie, 2009b).

3.15.0.2 The MRS is located on undeveloped, city-owned park (The Hollows) (Google Earth, 2011). The land is used for recreational purposes. The MRS location is shown on Figure 3-15.

3.15.1 Preliminary Assessment Findings

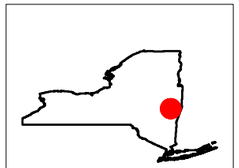
3.15.1.1 Critical sources for the 2009 Final PA (Malcolm Pirnie, 2009b) included interviews, Annual Adjutant General Reports, a site visit, and a historical map.

3.15.1.2 NDNODS Rensselaer Wyck Target Range was used as a small arms range from approximately 1894 through 1938.

3.15.1.3 The following critical sources were used (Malcolm Pirnie, 2009b) to determine range specific information (i.e., history, range location, range layout, and munitions type):

Figure 3-15
NDNODS Rensselaer Wyck Target Range (Aerial)
AEDB-R # NYHQ-003-R-01
Rensselaer County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

50 25 0 50
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
May 2011

- **Annual Report of the Adjutant General of the State Of New York, 1926 (NY0072):** Troops stationed at Albany, Troy, and Cohoes used the range. The approximate are of the range was 11 acres (Malcolm Pirnie, 2009b).
- **Annual Report of the Adjutant General of the State of New York, 1938 (NY0076):** This report documented that training ended at NDNODS Rensselaer Wyck Target Range in 1938 (Malcolm Pirnie, 2009b).
- **Herschel Roberts, Civil Engineer, Map of the Cities of Albany and Rensselaer, NY 1933 (NY0120):** The map shows the location of NDNODS Rensselaer Wyck Target Range location (Malcolm Pirnie, 2009b).
- **Telephone call to Town of Rensselaer Tax Assessors Office/Town of Greenbush Tax Assessors Office, 27 June 2008:** The Tax Assessor provided information on the site location and property owner (Malcolm Pirnie, 2009b).
- **Interview with local resident:** The local resident indicated the rifle range was located on city-owned property, The Hollows. According to the resident, bunkers and a backstop are still present at the site (Malcolm Pirnie, 2009b).

3.15.1.4 Evidence of the former rifle range was observed during the 2 December 2008 PA site visit. No MEC or MD was observed. Photographs taken during the site visit were included in the PA. The following range features were observed:

- A target berm, approximately six feet wide by eight feet deep and 120 feet long, was observed northeast of the entrance to the park. There were 17 T-section iron rods inside the trenches attached to the front wall. Associated with the trenches was a shelter, 300 feet long by 10 feet wide.
- A steep hill backstop, approximately 50-60 feet high, was located behind the back target trench wall.

3.15.1.5 No data gaps were identified.

3.15.2 Historical Records Review Findings

3.1.5.2.1 Parsons reviewed and validated the information in the PA; however, no additional research was necessary other than the collection of site characteristic data.

3.1.5.2.2 The data collected, reviewed, and assessed were determined to be relevant and of sufficient quantity and quality to support SI planning and execution. Based on the Final PA, no data gaps were identified for this MRS. All supporting documentation is provided in Appendices A-C of this report.

3.16 NDNODS ROCHESTER RIFLE RANGE (NYHQ-004-R-01)

3.16.0.1 NDNODS Rochester Rifle Range is a former small arms range. The former range is located in Penfield, Monroe County. NDNODS Rochester Rifle Range was operational between 1942 and 1965. The physical address for the range is unknown (Malcolm Pirnie, 2009b).

3.16.0.2 The MRS is located on county-owned property. Currently, the land is Ellison Park, a county-owned park used for recreational purposes (Malcolm Pirnie, 2009b). The entire MRS is undeveloped, forested land (Google Earth, 2011). According to the PA, the MRS location is shown on Figure 3-16.

3.16.1 Preliminary Assessment Findings

3.16.1.1 Critical sources for the 2009 Final PA (Malcolm Pirnie, 2009b) included newspaper articles, NYARNG Adjutant General Report, a map, and a site visit.

3.16.1.2 NDNODS Rochester Rifle Range was used as a small arms range from approximately 1942 through 1965.

3.16.1.3 The following critical sources were used (Malcolm Pirnie, 2009b) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Ames T. Brown, Colonel, AGD, NYNG, Assistant Adjutant General, Executive Order, Monthly Reports of Target Ranges, 27 July 1937 (NY0159):** This document indicates that NDNODS Rochester Rifle Range was active in 1948 (Malcolm Pirnie, 2009b).
- **Fallensen, Gary. Wishing Happy Trails to You, 1 June 2006 (NY0146):** The article documented that training ended at NDNODS Rochester Rifle Range in 1965 (Malcolm Pirnie, 2009b).
- **Town of Penfield Trail System, Rifle Range Trail, Ellison Park Wetlands Center (NY0226):** The map shows the location of the pistol range and rifle range that were part of NDNODS Rochester Rifle Range location (Malcolm Pirnie, 2009b).

3.16.1.4 Evidence of the former rifle range was observed during the 9 October 2008 PA site visit. Photographs taken during the site visit were included in the PA. The following range features were observed during the PA site visit.

- The original foundation of a range tower currently is under a gazebo and the assumed 300-yard firing line is located where the concrete steps lead up to the foundation.
- In-ground target butts for the 300-yard rifle range with seven iron targets attached to a pulley system are located on the southern portion of the MRS.
- Eight iron pipes used to hold targets were observed at the 25-yard pistol range. The pistol range is located adjacent to the 300-yard rifle range.
- Additional in-ground target butts for a 100, 150 or 200-yard rifle range were partially buried. There were four iron targets with cable pulley system associated with the target butts. Adjacent to the target area, a concrete storage shelter was observed.

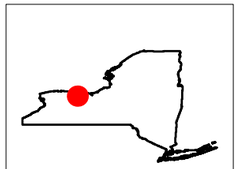
3.16.1.5 No data gaps were identified.

3.16.2 Historical Records Review Findings

3.16.2.1 Parsons reviewed and validated the information in the PA; however, no additional research was necessary other than collection of site characteristic data.

Figure 3-16
NDNODS Rochester Rifle Range (Aerial)
AEDB-R # NYHQ-004-R-01
Monroe County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

30 15 0 30
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
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3.16.2.2 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. All supporting documentation is provided in Appendices A-C of this report

3.17 OLEAN TARGET RANGE (NEW) (NYHQ-017-R-01)

3.17.0.1 Olean Target Range (new) is a former small arms range. The former range is located in Olean, Cattaraugus County. Olean Target Range (new) was operational between 1904 and 1955. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

3.17.0.2 The MRS is located on private property. Currently, the land is used for agricultural and residential purposes. There are a few structures present (residential and agricultural) and the remaining portion of the MRS undeveloped, forested land (Google Earth, 2011). A utility easement is present on the MRS and is somewhat parallel to a portion of the south MRS boundary. Near the central western portion of the MRS is pond. The MRS location is shown on Figure 3-17.

3.17.1 Preliminary Assessment Findings

3.17.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, lease, a site visit, and NYARNG memoranda.

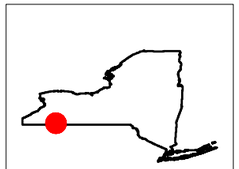
3.17.1.2 Olean Target Range (new) was used as a small arms range from approximately 1904 through 1955.

3.17.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding approximate range locations, troop use, and range characteristics. Company I of the 174th Infantry used the range. There were four targets at Olean Target Range (new) (Malcolm Pirnie, 2009a).
- **Lease Agreement between Max E. Torrey and Carroll O. Torrey and Colonel J. Weston Myers, Property and Disbursing Officer of the United States of New York, 10 March 1925 (NY0138):** The 1925 lease indicated that the range was located on East River Rd. on a farm known as "Barse Farm." The range was a strip of land 100 feet wide and 650 yards long. The strip of land started at the driveway between the house and a horse barn on the farm, running north to south. There was a steep hill behind the targets that served as a backstop. There were firing lines at 200, 300, 500, and 600 yards. Company I of the 174th Infantry used the range. Planned construction of a runway oriented in an east to west direction was noted in several documents. The runway would cut the firing lines at 400 yards. The airport extension runway would have run between 300 and 400 yard firing lines, the 400, 500, and 600 yard firing lines could have been used when the runway was not in use. It is unclear whether the runway extension was ever completed (Malcolm Pirnie, 2009a).

Figure 3-17
Olean Target Range (new) (Aerial)
AEDB-R # NYHQ-017-R-01
Cattaraugus County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

80 40 0 80
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 17, WGS84, Meters

PROJECT NUMBER:
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- **Telephone call to Olean Historical & Preservation Society 25 June 2008:** Mr. David Deckman, the City Historian, indicated that the range was located off East River Road on the Torrey farm (Malcolm Pirnie, 2009a).
- **Telephone call to Jeanne Ahrens, local resident 7 August 2008:** Ms. Jeanne Ahrens mentioned that the range was located on the property that used to be known as Barse Farm. She recalled Company I walking down East River Road on Sunday mornings to train. Ms. Ahrens mentioned that there was a cement wall and racks with targets on the land and as a child she found shells (Malcolm Pirnie, 2009a).
- **Telephone call to Phil Smith, local resident 7 August 2008:** Mr. Phil Smith indicated that the range was located 800 to 1,000 feet from East River Road. He mentioned that bunkers might still be present on the range. He recalled the range used discontinued in 1955 (Malcolm Pirnie, 2009a).

3.17.1.4 No evidence of the former rifle range or MEC or MD was observed during the 3 December 2008 PA site visit. Photographs taken during the site visit were included in the PA.

3.17.1.5 The data gap identified includes the exact location of the range.

3.17.2 Historical Records Review Findings

3.17.2.1 During the Parsons HRR, the following data sources were accessed: USGS aerial images. The discussion below summarizes the findings.

3.17.2.2 A 1956 USGS aerial image from the area where the range was located was assessed. An area of land that was cleared of vegetation that matches the description from the 1925 lease was observed. The direction of fire was from the north to the south.

3.17.2.3 The data collected, reviewed, and assessed were determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. All supporting documentation is provided in Appendices A-C of this report.

3.18 ONEIDA RANGE (NYHQ-018-R-01)

3.18.0.1 Oneida Range is a former small arms range used. The former range is located in Oneida, Madison County. Oneida Range was operational between 1933 and 1965. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

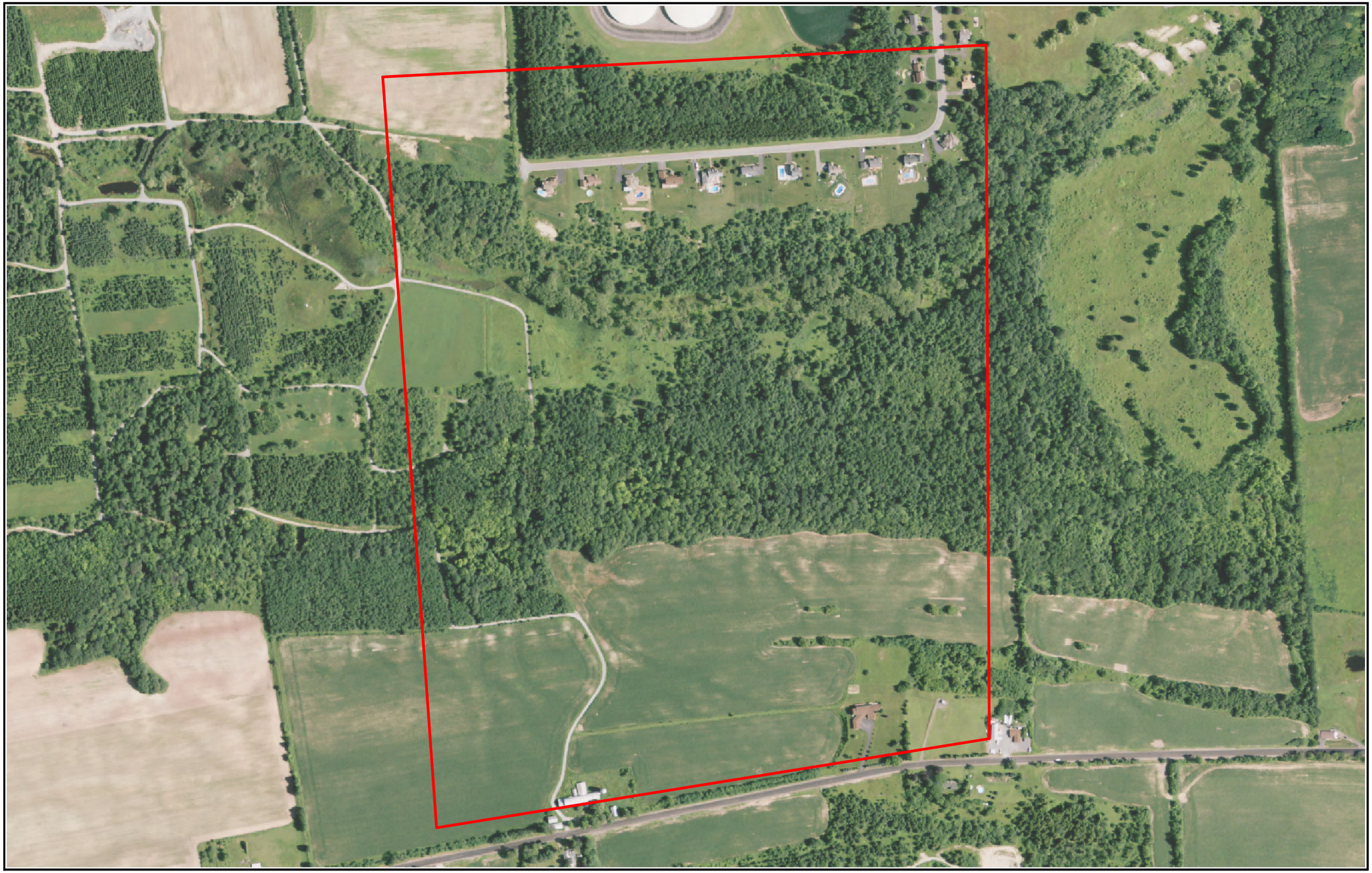
3.18.0.2The MRS is located on city-owned and private property. Currently, the City of Oneida's uses the property for public purposes. Residential, agricultural and undeveloped, forested land uses also are present (Google Earth, 2011). The MRS location is shown on Figure 3-18.

3.18.1 Preliminary Assessment Findings

3.18.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, lease documents, a site visit, and a NYARNG Assistant Adjutant General Report.

Figure 3-18
Oneida Range (Aerial)
AEDB-R # NYHQ-018-R-01
Madison County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

80 40 0 80
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
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3.18.1.2 Oneida Range was used as a small arms range from approximately 1933 through 1965.

3.18.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **George W. Teachout, Major, Infantry, Lease between Alice C. Drake and United States of America, 4November 1936 (NY0107):** The documents indicated that three officers and 62 enlisted men from Company K of the 10th Infantry used the range. A hand drawn range map shows that the direction of fire was from north to south. In 1937 .30 caliber M1 ammunitions could be safely fired at Oneida Range. A 1937 document indicated that Oneida Range was constructed in 1933 was 200 feet wide with two targets. The butts were heavy concrete shelter walls with protecting mound of earth against the sides of the wall. They were located at the foot of a high hill. The mounds were at least four feet thick and the top of the wall on the firing side was covered with a steel angle. The target appliances were mounted on concrete piers. The maximum distance used for firing, in 1937, was 200 yards; however, there was the possibility of firing distances up to 1,000 yards (Malcolm Pirnie, 2009a).
- **Telephone call to Town of Madison Historical Society, 25 June 2008, 27 June 2008 and 14 July 2008:** Information provided included the approximate range location (Malcolm Pirnie, 2009a).
- **Interview with Peter Hedglon, Oneida Mayor:** The interview with Mr. Peter Hedglon provided information regarding location of the range (Malcolm Pirnie, 2009a).
- **Interview with private property owner:** The individual denied that the range was located on his property; however, he noted the range may have been located on an adjacent land parcel (Malcolm Pirnie, 2009a).

3.18.1.4 No evidence of the former rifle range or MEC or MD was observed during the 8 December 2008 PA site visit. Photographs taken during the site visit were included in the PA.

3.18.1.5 The data gaps identified include the exact range location and range configuration (including berm location and range boundary).

3.18.2 Historical Records Review Findings

3.18.2.1 During the Parsons HRR, the following data source was accessed: USGS aerial images. Interviews and written communication with local residents also was conducted. The discussion below summarizes the HRR findings.

3.18.2.2 Parsons obtained two USGS historical aerial photographs which document the dates of range use. The 1941 and 1956 aerial images indicated some ground scarring on the western portion of the MRS.

3.18.2.3 A January 29, 2011 letter from a property owner, Mr. Mark DeMassa, indicated that the range was located on his property and the adjacent property. Mr. DeMassa provided pictures of a presumed target berm. Mr. DeMassa also mentioned that there was a cabin that has collapsed on the adjacent property. The cabin presumably was part of the range.

3.18.2.4 Based on an interview with a property owner, Mr. John Femia, a concrete structure is located on the southern portion of his property and the adjacent property. The structure is about 7.5 feet long and 10 feet high and there is a soil berm behind the structure.

3.18.2.5 The data collected, reviewed, and assessed were determined to be relevant and of sufficient quantity and quality to support SI planning and execution. No significant data gaps remain for this MRS. All supporting documentation is provided in Appendix A-C of this report.

3.19 POUGHKEEPSIE RIFLE RANGE (NYHQ-019-R-01)

3.19.0.1 Poughkeepsie Rifle Range is a former small arms range. The original MRS boundary was based on a review of tax maps. The boundary was revised to eliminate 95 acres based on a review of historical property maps denoting the lessor's property. The property did not cross Titusville Road; therefore, the MRS boundary was truncated at the road. The former range was located in LaGrange, Dutchess County. Poughkeepsie Rifle Range was operational between 1875 and 1935. The physical address for the range is 84 Titusville Road (Malcolm Pirnie, 2009a).

3.19.0.2 The MRS is located on private property (owned by Morgan Manor, LLC) (Malcolm Pirnie, 2009a). Currently, the land use includes agricultural (farmland), a residential and undeveloped, forested land uses (Google Earth, 2011). The MRS location is shown on Figure 3-19.

3.19.1 Preliminary Assessment Findings

3.19.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, lease documents, a site visit, and a NYARNG Assistant Adjutant General Report.

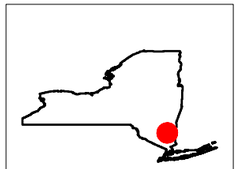
3.19.1.2 Poughkeepsie Rifle Range was used as a small arms range from approximately 1875 through 1935.

3.19.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Annual Report of the Adjutant-General of the State of New York, 5 January 1876 (NY0165) and Annual Report of the Adjutant-General of the State of New York, 8 January 1877 (NY0166):** These documents indicate that there were 637 individuals at Poughkeepsie Rifle Range and aggregate strength of the brigade was 913 individuals. The 21st Regiment included nine companies (Malcolm Pirnie, 2009a).

Figure 3-19
Poughkeepsie Rifle Range (Aerial)
AEDB-R # NYHQ-019-R-01
Dutchess County, New York

PARSONS



Site Location in New York

Legend

MRS (Revised)

MRS (Original)

100 50 0 100
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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- **Notice of Renewal of Contract or Lease for LaGrange, Target Range, 30 June 1934 (NY0053):** These document provided information regarding range location and orientation. The range consisted of a piece of land 25 yards wide situated on the east shore of Wappinger Creek and extending 950 yards in a southern direction. The range was located on Peter C. Cornell's and Augustus B. Gray's properties. The range was used by Battery "c" of the 156th Field Artillery. There was a target pit located at the target area and there were four targets (Malcolm Pirnie, 2009a).
- **Telephone call to the Dutchess County Historical Society/LaGrange Tax Assessors Office:** Information received included the approximate range location and property owner (Malcolm Pirnie, 2009a).

3.19.1.4 The 11 December 2008 PA site visit was conducted from the road. The site team, therefore, could not confirm the presence or absence of range features or MEC/MD. Photographs taken during the site visit were included in the PA.

3.19.1.5 The data gaps identified include the exact range location and range configuration (including berm location, and firing direction).

3.19.2 Historical Records Review Findings

3.19.2.1 During the Parsons HRR, the Dutchess County Clerk's Office and the Real Property Tax Service Agency were visited. Information that collected from the 20 December 2010 visit is presented in subchapters 3.19.2.2 to 3.19.2.5.

3.19.2.2 A 1855 map confirms that Cornell Family owned the land east of Wappinger Creek.

3.19.2.3 An article on Poughkeepsie Rifle Range provided the history of the Poughkeepsie Army National Guard Unit from 1715 through the 1950s. The Poughkeepsie ARNG Unit had many designations. The article followed the unit's assignments during major military events.

3.19.2.4 The Dutchess County GIS website, Parcel Access, provided information on land owners. It was determined that the Cornell Farm was on the western part of Titusville Rd. The website also provided a 1936 aerial image of the area where Poughkeepsie Rifle Range was located. Comparing this aerial to current Google Earth Images, the location of the target pit was determined.

3.19.2.5 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. During the Parsons HRR, the range location and configuration were defined and no data gaps remain. All supporting documentation is provided in Appendix A-C of this report.

3.20 SARATOGA SPRINGS RIFLE RANGE (NYHQ-020-R-01)

3.20.0.1 Saratoga Springs Rifle Range is a former small arms range. The former range was located in Saratoga Springs, Saratoga County. Saratoga Springs Rifle Range was operational between 1878 and 1951. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

3.20.0.2 The MRS is located on city owned and private properties, including residences and the Police Benevolent Association. The current land uses are residential, recreational, and

undeveloped, forested areas (Malcolm Pirnie, 2009a). The MRS location is shown on Figure 3-20.

3.20.0.3 Parsons reviewed and assessed the 100-acre range layout in the PA (Malcolm Pirnie, 2009a) and determined that the acreage was incorrect and revised to be 48 acres. The range layout was modified slightly after examination if a 1960 USGS aerial image, which showed vegetative clearing consistent with the line of fire. For the purpose of this SI, 48 acres is the acreage assigned to this MRS.

3.20.1 Preliminary Assessment Findings

3.20.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interviews, inspection report, a site visit, and NYARNG Assistant Adjutant General Reports.

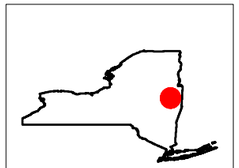
3.20.1.2 Saratoga Springs Rifle Range was used as a small arms range from approximately 1878 through 1951.

3.20.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provided background information regarding approximate range locations, troop use, and range characteristic information. Company L of the 105th Infantry used the range. There were four targets at Saratoga Springs Rifle Range (Malcolm Pirnie, 2009a).
- **Annual Report of the Adjutant-General of the State of New York, 18 January 1811 (NY0067), Annual Report of the Adjutant-General of the State of New York 1879, 28 March 1882 (NY0169), Annual Report of the Adjutant-General of the State of New York, 13 January 1887 (NY0170), and Annual Report of the Adjutant-General of the State of New York, 20 February 1890 (NY0171):** These documents indicated that in 1880 there was concern about the range safety, the range was abandoned during the summer, and a new range location was being sought. The 1887 Adjutant General Report indicated that there were two iron 6x6 targets arranged on pivots (Malcolm Pirnie, 2009a).
- **War Department, Corps of Engineers, Lease of Saratoga Springs, 15 March 1948 (NY0140):** These documents indicated that the firing direction was from the east to the west. The target pit was concrete and approximately 11 feet wide, 48 feet long and 14 feet deep. There was a small target house on the south end. There were four targets at Saratoga Springs Rifle Range. The backstop was a sand mount approximately 25 feet high with a steel plate on top. Company L of the 105th Infantry used the range. The personnel fired .30 caliber rifles at stationary targets. The furthest firing point was at 600 yards (Malcolm Pirnie, 2009a).

Figure 3-20
Saratoga Springs Rifle Range (Aerial)
AEDB-R # NYHQ-020-R-01
Saratoga County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

40 20 0 40
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
May 2011

- **Email to NY State Military Museum/ Courtney Burns, 2 July 2008:** Courtney Burns the Head Curator indicated that the construction of the range began in 1878. In 1879, the range was determined to be unsafe and abandoned until 1880. The range presumably was located on Lake Avenue (Malcolm Pirnie, 2009a).
- **Telephone call to Saratoga Springs Police Department, 29 July 2008:** Investigator Lewis indicated that the range was located adjacent to the PBA property. Evidence of the range was present until about five years ago. Investigator Lewis provided parcel numbers where the range was located, the northern portion of the MRS in the PA (Malcolm Pirnie, 2009a).
- **Interview with a property owner:** The property owner indicated that during the construction of their in-ground pool numerous shell casings were found in the spoil. The property owner described the casings as being approximately 3 inches long and .5 inches in diameter, most likely .50 caliber (Malcolm Pirnie, 2009a).

3.20.1.4 No evidence of the former rifle range or MEC or MD was observed during the 5 December 2008 PA site visit. Photographs taken during the site visit were included in the PA.

3.20.1.5 The data gap identified includes the exact range location.

3.20.2 Historical Records Review Findings

3.20.2.1 During the Parsons HRR, USGS aerial images were collected and the Saratoga Springs Public Library was visited. All the information that was collected from the 21 December 2010 visit is presented in subchapters 3.20.2.2 to 3.20.2.4.

3.20.2.2 A newspaper article indicated that the Saratoga Rifle Club conducted training, which was sometimes associated with Saratoga Springs Rifle Range. This article was from a 1880s Saratoga Springs Newspaper.

3.20.2.3 A 1960 USGS aerial image of the area where Saratoga Springs Rifle Range was located was reviewed. The line of fire was present and oriented in an east to west direction. The image provided the exact location of the range and the target area.

3.20.2.4 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. However, certain gaps remain. The exact location of the berm is unknown; however, the general location of the target area is known and samples will be collected in this general location. The site visit team (SVT) will determine if samples need to be moved if range features are observed. All supporting documentation is provided in Appendix A-C of this report.

3.21 TICONDEROGA RANGE (OLD) (NYHQ-021-R-01)

3.21.0.1 Ticonderoga Range (old) is a former small arms range. The former range was located in Ticonderoga, Essex County. Ticonderoga Range was operational between 1950 and 1973. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

3.21.0.2 The Ticonderoga Range (old) MRS consists of undeveloped, forested land with and one residential property (Google Earth, 2011). Ticonderoga Range (old) SDZ is undeveloped, forested land. Putnam Creek and several marshes and ponds are present within the MRS. The MRS locations are shown on Figure 3-21a.

3.21.0.3 The historic data reviews for Ticonderoga Range (old) and Ticonderoga Range (old) SDZ were done in tandem.

3.21.1 Preliminary Assessment Findings

3.21.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included letters, lease document, a map, and a site visit.

3.21.1.2 Ticonderoga Range (old) was used as a small arms range from approximately 1950 through 1973

3.21.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **LT. T. J. Gallagher, Inspection Report, Small Arms Outdoor Target Range Ticonderoga, NY 21 August 1963 (NY0181):** This document indicated that the range was 250 feet by 900 feet long. There were seven targets at Ticonderoga Range (old). There was a built up mound at the firing point. The target butt consisted of a dug pit, mounded and shored with wood plank. There was no protection against fragments of the mound. The munitions fired at the range included .50, .30 and .45 caliber weapons. The USAR, Special Forces, and Battery C of the 186th Artillery used the range. A hand drawn map illustrated that the firing direction was from west to east into a hill (Malcolm Pirnie, 2009a).
- **Telephone call to Ticonderoga Historical Society, 20 June 2008:** Background information was received on the range (Malcolm Pirnie, 2009a).
- **Telephone call to Ticonderoga Tax Assessors Office/Elizabethtown Tax Assessor, 20 June, 2008:** Information received included site location, property owner, and background information (Malcolm Pirnie, 2009a).

3.21.1.4 The 9 December 2008 PA site visit was conducted from the road. The site team, therefore, could not confirm the presence or absence of range features or MEC/MD. Photographs taken during the site visit were included in the PA.

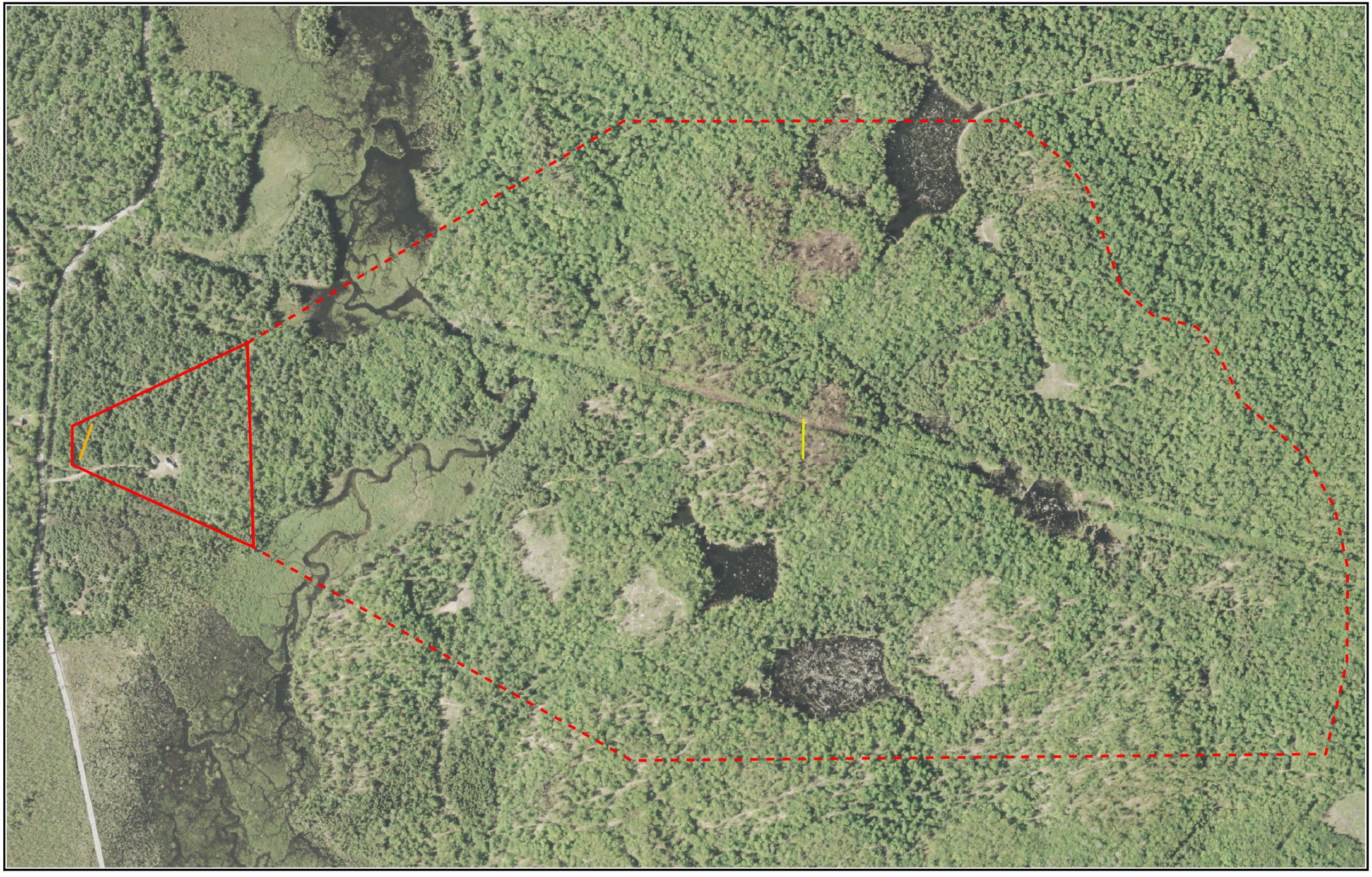
3.21.1.5 The data gaps identified include the exact berm locations, firing distance, and range configuration.

3.21.2 Historical Records Review Findings

3.21.2.1 During the Parsons HRR, the following data sources were accessed: USGS aerial images and Adjutant General Reports. The discussion below summarizes the HRR findings.

Figure 3-21a
Ticonderoga Range (Old) (Orthographic)
AEDB-R # NYHQ-021-R-01
Essex County, New York

PARSONS



Legend

- MRS Boundary
- SDZ Boundary
- Berm
- Firing Line

80 40 0 80
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

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3.21.2.2 Parsons reviewed two USGS historical aerial photographs (1970 and 1971) which document dates of use and range features (See Figure 3-21b). Range features observed included a berm and firing point. Based on these aerial photographs, the range appears to be a 200-yard range.

3.21.2.4 The 1953 and 1955 Annual Adjutant General Reports indicated that the range had 100 and 200-yard firing lines.

3.21.2.5 Based on the Annual Adjutant General Reports and the historic aerial images the MRS was truncated behind the target berm. The target berm drawn in the Draft PA was determined to be incorrectly located.

3.21.2.6 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. Range layout, berm location and range configuration were determined and no gaps remain. All supporting documentation is provided in Appendix A-C of this report.

3.22 TICONDEROGA TRAINING RANGE (NEW) (NYHQ-022-R-01)

3.22.0.1 Ticonderoga Training Range (new) is a former small arms range. The former range was located in Ticonderoga, Essex County. Ticonderoga Training Range (new) was operational between 1986 and 1994. The physical address for the range is unknown (Malcolm Pirnie, 2009a).

3.22.0.2 The MRS is located on private property. Currently, the MRS land use is agricultural (pastureland used for grazing cattle) (Malcolm Pirnie, 2009a). The MRS location is shown on Figure 3-22.

3.22.1 Preliminary Assessment Findings

3.22.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included an interview, a site visit, and State Owned/State Operated Closed, Transferred, Transferring (SOSO CTT) Inventory Report.

3.22.1.2 Ticonderoga Training Range (new) was used as a small arms range from approximately 1986 through 1994.

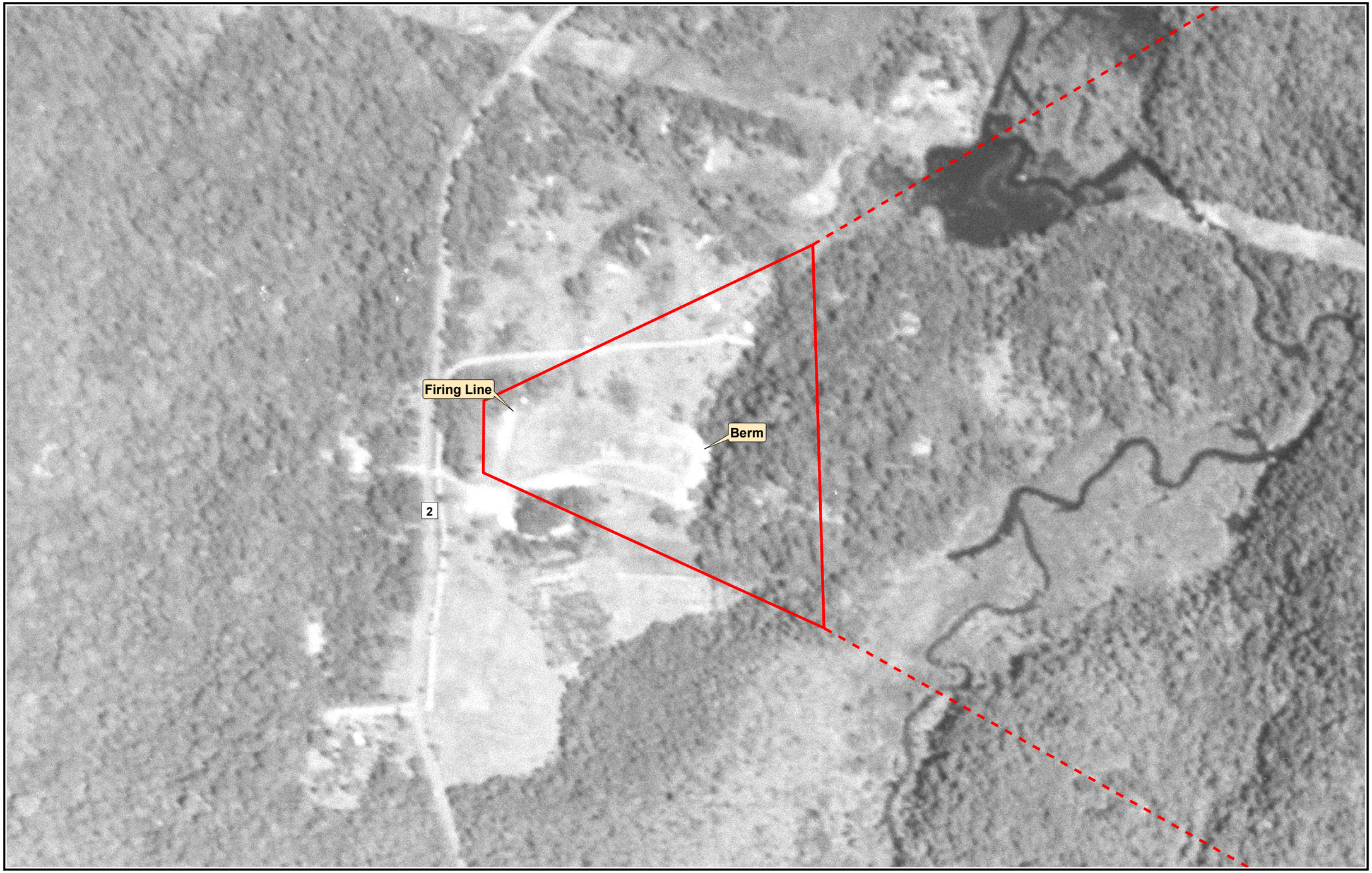
3.22.1.3 The following critical source was used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type).

- **Malcolm Pirnie, Inc. Closed, Transferring, and Transferred Range/MMRP Site Inventory Report, State of New York, State Owned and Operated NGB, 10 July 2003 (NY0242):** The document indicated that the range was approximately 105 acres. The document also provided a figure with the range layout and location (Malcolm Pirnie, 2009a).

3.22.1.4 During the 9 December 2008 PA site visit, the property owner escorted the field team to the former target location. No evidence of the former rifle range or MEC or MD was observed. Photographs taken during the site visit were included in the PA.

Figure 3-21b
Ticonderoga Range (Old) (1970 Historical Aerial)
AEDB-R # NYHQ-021-R-01
Essex County, New York

PARSONS



Site Location in New York

Legend

MRS Boundary

SDZ Boundary

50 25 0 50
Meters

N

Image: USGS
1970 Aerial Photo
Projection: UTM Zone 18,
WGS84, Meters

PROJECT NUMBER:
747648.13000
July 2011

Figure 3-22
Ticonderoga Training (New) (Aerial)
AEDB-R # NYHQ-022-R-01
Essex County, New York

PARSONS

Site Location in New York

Legend

MRS Boundary

50 25 0 50
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
May 2011

3.22.1.5 The data gap identified includes the range configuration (including berm location, firing direction).

3.22.2 Historical Records Review Findings

3.22.2.1 During the Parsons HRR, the following data source was accessed: USGS aerial images. Communications with local historians and librarians also was conducted. The discussion below summarizes the findings from the HRR.

3.22.2.2 The Black Watch Memorial Library did not have any pertinent information.

3.22.2.3 Parsons obtained three aerial photographs from 1986, 1992, and 1994. Range features were not observed on the aerial images.

3.22.2.4 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. However, a data gap remains. The remaining gap includes the exact range configuration. The technical approach will focus on the entire MRS and samples will be collected throughout the MRS, not focused in one area, since the range layout is unknown. All supporting documentation is provided in Appendix A-C of this report.

3.23 WALTON RIFLE RANGE (NEW) (NYHQ-023-R-01)

3.23.0.1 Walton Rifle Range (new) is a former small arms range used. Walton Rifle Range (new) was located in Walton, Delaware County and was operational between 1925 and 1955. Access to the site was obtained for 30-35 William Street (Malcolm Pirnie, 2009a).

3.23.0.2 Currently the MRS is privately owned and used by contains Northeast Fabrication, LLC. residential properties, Walton Central School, Delaware Valley Hospital and Delaware County Mental Health Clinic and other small businesses (Malcolm Pirnie, 2009a). The MRS location is shown on Figure 3-23.

3.23.1 Preliminary Assessment Findings

3.23.1.1 Critical sources for the 2009 Draft PA (Malcolm Pirnie, 2009a) included interview, letters, a site visit, and lease documents.

3.23.1.2 Walton Rifle Range (new) was used as a small arms range from approximately 1925 through 1955.

3.23.1.3 The following critical sources were used (Malcolm Pirnie, 2009a) to determine range specific information (i.e., history, range location, range layout, and munitions type):

- **Adjutant General of New York, Purchase of Rifle Ranges 1926 (NY0019):** This document provides background information regarding approximate range locations, troop use, and range characteristic information. Company F of the 10th Infantry used the range. A mountain served as a natural backstop. In 1942, a memorandum was issued to discontinued use at Walton Rifle Range (new). A 1924 memorandum requests funds for Walton Rifle Range (new) to be built. Walton Rifle Range (new) was to have included a target pit; firing lines at 200, 300, 500 and 600 yards; a roof

Figure 3-23
Walton Rifle Range (new) (Aerial)
AEDB-R # NYHQ-023-R-01
Delaware County, New York

PARSONS

Site Location in New York

Legend

MRS Boundary

60 30 0 60
Meters

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

PROJECT NUMBER:
747648.13000
May 2011

over the target butt, target house, and target frames and carriers based on a development and cost plan (Malcolm Pirnie, 2009a).

- **Benj. L. Jacobson, Major F.D., M.B., Assistant, Lease between Marcus Townsend and Janette Reynold and Alex Townsend and Colonel J. Weston Myers, United States Property and Disbursing Officer of New York, 20 July 1925 (NY0028):** The document indicated range location size, 645 yards long and 5 rods wide (27.5 yards). The range was at the foot of the mountain. Company F of the 10th Infantry used the range for rifle practice. The furthest firing distance was 600-yards and was suitable for pistol, rifle, and automatic rifle or machine gun firing. There were five targets at Walton Rifle Range (new) (Malcolm Pirnie, 2009a).

3.23.1.4 During the 4 December 2008 PA site visit, no evidence of the former rifle range or MEC or MD was observed. Photographs taken during the site visit were included in the PA.

3.23.1.5 The data gap identified based on the PA findings includes the range configuration (including berm location, firing direction, range boundary).

3.23.2 Historical Records Review Findings

3.23.2.1 During the Parsons HRR the Walton Historical Society was visited. Information gathered from the 22 December 2010 visit is presented in subchapters 3.23.2.2 to 3.23.2.5.

3.23.2.2 An interview was conducted with Mr. David J. Carroll, the Walton Historical Society treasurer. Mr. Carroll indicated the location of the range and mentioned that the direction of fire was from north to south. There were multiple mounds that were leveled off in later years and there were bunkers in the side of the hill. Some of the targets were "running deer" targets. Mr. Carroll also provided a 1933 map of Walton and pointed to the area where Walton Rifle Range (new) was located.

3.23.2.3 A 1960 USGS aerial image was located; however, range features were not visible. An area of ground scarring was visible at the foot of the mountain that could be range related

3.23.2.4 Lt. Col. Charles F. Gregory (Ret) sent an email regarding Walton Rifle Range (new). Lt. Col. Gregory (Ret) mentioned that the bunker was located where the school athletic fields are currently located. Lt. Col. Gregory (Ret) also provided a 1930 aerial image of the range and range features were visible. The 200, 300, 500 and 600-yard firing lines, and target berm were visible.

3.23.2.5 The information collected, reviewed, and assessed was determined to be relevant and of sufficient quantity and quality to support SI planning and execution. The range layout and configuration was determined and no data gaps remain. All supporting documentation is provided in Appendix A-C of this report.

CHAPTER 4
CONCEPTUAL SITE MODELS FOR MUNITIONS RESPONSE SITES

4.0 INTRODUCTION

4.0.1 This chapter presents the Conceptual Site Models (CSMs) for the MRSs identified for the State of New York. These CSMs were prepared in accordance with the requirements of USACE EM 1110-1-1200 *Conceptual Site Models for Ordnance and Explosives (OE) and Hazardous, Toxic, and Radioactive Waste (HTRW) Projects* (USACE, 2003) and the Draft Final PWP (Weston, 2011). A CSM expresses an MRS-specific, potential contamination concern through a series of diagrams, figures, and narrative. These diagrams, figures, and narratives are designed to illustrate the potential physical, chemical, and biological processes that transport contaminants from sources to receptors. Overall, a CSM provides a tool to evaluate the potential contamination and to provide the basis for identifying and evaluating the potential risks to human health and the ecosystem (USACE, 2003).

4.0.2 The CSM is a description of a site and its environment. The Project Team integrates this information to illustrate relationships between the potential sources and receptors that may be affected and conducts a pathway analysis to show how site conditions, including the exposure pathways, function as a system. The site-specific CSM describes the sources of potential contamination; actual, potentially complete, or incomplete exposure pathways; current or reasonable proposed use of property; and potential receptors. The source-receptor interaction is a descriptive output of a CSM (USACE, 2003b).

4.0.3 The CSM serves as a planning instrument, a modeling and data interpretation aid, and a communication device. It serves as a tool to aid communication with the general public and also assists with integration of information and decisions. The CSM provides a standard means to summarize and display what is known about the MRS, and to identify what additional information must be known to develop technically sound DQOs (USACE, 2003b).

4.0.4 A preliminary CSM is developed during the first step of the DQO process and continues to evolve throughout the project as historical and recently collected data are evaluated, DQOs are updated, and risk assessments are refined. Typical components of a CSM include:

- Potential sources of contamination.
- Potentially contaminated media and types of contaminants expected.
- Contaminant fate and transport mechanisms and migration pathways.
- Potential exposure pathways and routes of exposure
- Potential human and ecological receptors.

4.0.5 Together, these CSM components and the DQOs present a current understanding of the contamination problem; outline existing data gaps and the sampling necessary to address these gaps; identify potential exposures that may result in existing human and ecological risks; and provide guidance for future project decision-making (USACE, 2003b).

4.0.6 For each MRS within the State of New York, the MRS-specific CSM is presented in a form of a table and a figure. The CSM table summarizes conditions within an MRS that could result in human exposure to MEC and MC. It also describes the types of MEC/MD potentially present at each MRS; facility profile; physical, ecological, land use, and exposure profiles. The CSM diagram summarizes which potential receptor, exposure pathways are (or may be) complete and which are (and are likely to remain) incomplete. An exposure pathway is not considered to be complete unless all four of the following elements are present:

- A source and mechanism for contamination release;
- An environmental transport and/or exposure media;
- A point of exposure at which the contaminant can interact with a receptor; and
- A receptor and a likely route of exposure at the exposure point.

4.0.5 The CSM table and CSM diagram for each New York MRS is provided in the following sections. For small arms ranges, small arms ammunition does not pose a significant explosive safety hazard. The presence of unexpended munitions at these ranges is unlikely; however, a conservative approach to the CSM was applied. At these range types, the potential presence of both MEC and MD were considered when completing the CSM.

4.1 AMSTERDAM RANGE MRS (AEDB-R # NYHQ-005-R-01)

Table 4-1 presents the CSM for Amsterdam Range MRS. Figure 4-1 illustrates the CSM exposure pathways for human and ecological receptors.

Table 4-1
Conceptual Site Model for Amsterdam Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Johnstown, NY, is located in Montgomery County in the east-central part of NY.
	Structures: There are two residential structures located within this MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 70s in summer to the 20s in winter. The average maximum temperature is 80° F in July, and the average minimum temperature is 9° F in January. The annual average precipitation is 44.74 inches with rainfall evenly distributed throughout the year. The wettest month of the year is August with an average rainfall of 4.24 inches (IDcide, 2011a).
	Geology: The Amsterdam Range MRS is within the Appalachian Plateaus physiographic province south of the Adirondack Mountains (Olcott, 1995). The Precambrian metamorphic and igneous rocks exposed in the Adirondack Mountains were deformed and uplifted in a regional mountain building event over 1 billion years ago. By earliest Cambrian time (542 million years ago) these basement rocks were exposed at the surface and shedding sediments into surrounding shallow seas. Discontinuous sandstones of the Potsdam Formation on the northern and western fringe of the Adirondack Mountains grade into sandy carbonate facies. Cambrian and Ordovician sedimentary rocks, primarily limestones, dolomites, sandstones, and shales, surround the Adirondack Mountains and dip gently southward into the Appalachian Basin. Silurian and Devonian carbonates and shales cover the older Paleozoic rocks in south central and southwestern New York (Olcott, 1995). Geologic

Profile Type	MRS Characterization
	maps in Olcott (1995) show that Cambrian and Ordovician rocks are at the surface or subcrop glacial deposits in the vicinity of the Amsterdam Range MRS. Continental-scale glaciers covered most of Canada and the northern United States episodically over the last 1.8 million years. New York has been covered by ice multiple times, including the last advance approximately 22,000 years ago. Glaciers scoured and removed soil and soft weathered surface rocks as they moved, and polished the hard bedrock surface below the ice. A variety of landforms were left behind when the glaciers eventually receded approximately 10,000 years ago (Skehan, 2008). As the ice melted, the sediment load was dropped in place as unsorted till or was redistributed as outwash by the vast amounts of meltwater released by the glacier. Till is a mixture of silt, gravel, and boulders of various sizes in a clay matrix. The glacial outwash sediments, deposited by streams and rivers of meltwater in front of the receding glaciers (glaciofluvial deposits), tend to be graded from coarse to fine with increasing distance from the glacier. Meltwater could also be impounded in lakes that were dammed either by the ice or by glacial sediments. Lake plains, terraces, and beaches were left in place when the dammed water found a lower outlet (Olcott, 1995).
	Topography: The Amsterdam Range MRS is on a flat to gently undulating plain. Elevation within the MRS ranges from approximately 640 to 660 feet above sea level (U.S. Geological Survey [USGS], 1980a).
	Soil: The Natural Resources Conservation Service (NRCS) classifies the soil within the Amsterdam Range MRS as predominantly Churchville silty clay loam on the gentle slopes of a glacial lake or till plain and Madalin silty clay loam in depressions. Churchville soil is derived from clayey glacial lake deposits over loamy till and is somewhat poorly drained. A typical profile is silty clay loam from 0 to 7 inches; clay from 7 to 32 inches; and channery loam to 84 inches. Channery is an accumulation of thin, flat, coarse fragments of sandstone or limestone (AGI, 2011). Madalin soil is poorly drained and is derived from clayey and silty glacial lake deposits. A typical profile is silty clay loam from 0 to 7 inches: clay from 7 to 30 inches; and stratified clay to silt loam from 30 to 60 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, and alluvial deposits form the productive valley-fill aquifers of the Surficial Aquifer system. Yield from valley-fill aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The surficial aquifer has unknown potential in the Amsterdam Range MRS. Within two miles of the MRS, unconfined valley-fill aquifers are capable of producing in excess of 100 gallons per minute (gpm) (Bugliosi et al., 1987a). Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers generally are unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells within the Amsterdam Range MRS. Well number MT 921 is 0.3 miles south. The well depth is 140 feet below land surface and the depth to water is 20 feet. U.S. Geological Survey data for well number MT 81, approximately 0.8 mile south of the MRS, indicates the well depth is 140 feet below land surface; the depth to water is 8 feet; and it was completed in the "Cambrian, Upper" local aquifer (USGS, 2011).
	Hydrology: There are no surface water bodies within the MRS (Google Earth, 2011; USGS 1980a).

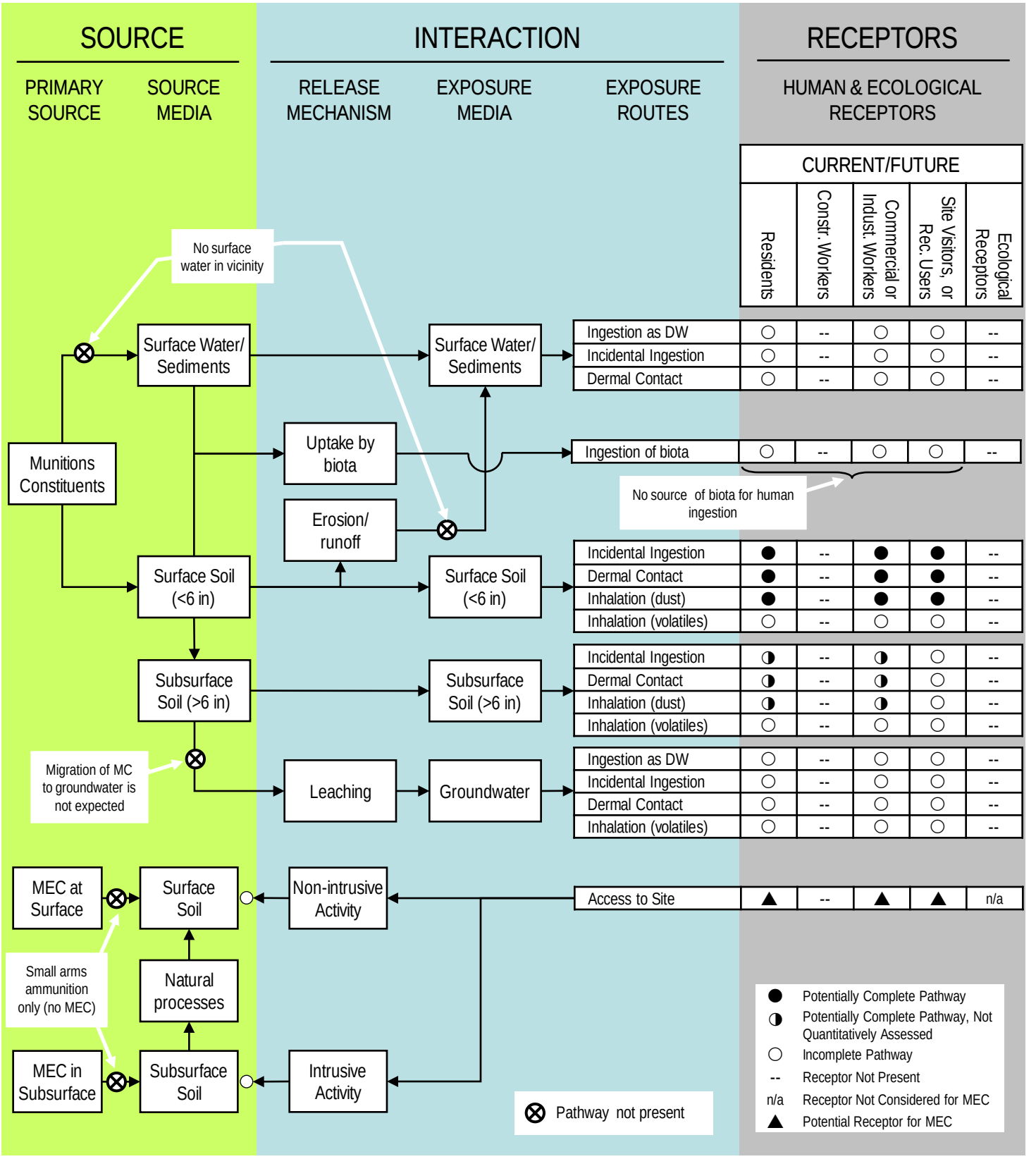
Profile Type	MRS Characterization
	Vegetation: The MRS is landscaped with grasses and shrubs.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at the MRS listed in the National Register of Historic Places.
	Wetlands: U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory mapping indicates that wetlands are not present within the MRS (USFWS, 2011c).
	Demographics: The total population in the town of Johnstown is approximately 8,464 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: There are no critical habitats within this MRS (USFWS, 2011a).
	Ecological Receptors: There are no documented occurrences of threatened and endangered (T&E) species within the MRS (USFWS, 2011b).
	Degree of Disturbance: A portion of the area currently is used for agriculture purposes; therefore, there is medium amount of disturbance to the land.
Land Use and Exposure Profile	Current Land Use: Residential and agricultural purposes by private landowners. Some undeveloped forested areas.
	Current Potential Receptors: Residents, site visitors or recreational users, and commercial or industrial workers represent current potential receptors.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22-caliber, .38-caliber, .30-caliber, .45-caliber and 7.62mm cartridge (Appendix C).
	Release Mechanisms: The locations of the firing point and the target range are unknown. No release is expected within the MRS. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest include antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on

Profile Type	MRS Characterization
	their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening and commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. The surface water exposure pathways are incomplete for all receptors since no surface water is located within this MRS. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway for all receptors at the MRS is incomplete because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-1 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Amsterdam Range (NYHQ-005-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** February 14, 2011



4.2 BINGHAMTON RIFLE RANGE (NEW) RANGE MRS (AEDB-R # NYHQ-006-R-01)

Table 4-2 presents the CSM for Binghamton Rifle Range (new) MRS. Figure 4-2 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-2
Conceptual Site Model Diagram for Binghamton Rifle Range (new) MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Port Dickson, NY; a village that is located in Broom County in the south-central portion of New York.
	Structures: There are approximately five structures within the MRS. There is one residential home within the MRS.
	Security: Access to the MRS is open to the public.
Physical Profile	Climate: Temperature varies from the 60s in summer to the 20s in winter. The average maximum temperature is 78° F in July and the average minimum temperature is 15° F in January. The annual average precipitation is 38.65 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June with an average rainfall of 3.80 inches (IDcide, 2011b).
	Geology: The Binghamton Rifle Range (new) MRS is in the Appalachian Plateaus physiographic province in south central New York (Olcott, 1995). The Appalachian Basin began to form in the Early Cambrian epoch 542 million years ago. In response to regional tectonic forces, the Precambrian igneous and metamorphic basement surface began subsiding south of the Adirondack Mountains. Sediments eroded from the Adirondack Mountains and highlands in New England were deposited into the basin in a continental to nearshore marine environment. Continued basin subsidence resulted in an increasingly marine depositional environment. Consolidated Cambrian and Ordovician sedimentary rocks, primarily limestones, dolomites, sandstones, and shales dip gently southward into the Appalachian Basin. Silurian and Devonian sediments, primarily carbonates with shale and minor sandstone, cover the older Paleozoic rocks in south central and southwestern New York (Olcott, 1995). Beds are flat or gently dipping to the south. Geologic maps in Olcott (1995) show that Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Binghamton Rifle Range (new) MRS. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciation. Continental-scale glaciers covered most of the northern United States episodically over the last 1.8 million years. New York has been covered by ice multiple times, including the last advance approximately 22,000 years ago. Glaciers scoured and removed soil and soft weathered surface rocks as they moved, and polished the hard bedrock surface below the ice. A variety of landforms were left behind when the glaciers eventually receded approximately 10,000 years ago (Skehan, 2008). As the ice melted, the sediment load was dropped in place as unsorted till or was redistributed as outwash by the vast amounts of meltwater released by the glacier. Till is a mixture of silt, gravel, and boulders of various sizes in a clay matrix. The glacial outwash sediments, deposited by streams and rivers of meltwater in front of the receding glaciers (glaciofluvial deposits), tend to be graded from coarse to fine with increasing distance from the glacier. Meltwater could also be impounded in lakes that were dammed either by the ice or by glacial sediments. Lake plains, terraces, and beaches were left in place when the dammed water found a lower outlet. The "Finger Lakes" northwest of the MRS are of glacial origin (Olcott, 1995).

Profile Type	MRS Characterization
	Topography: The Binghamton Rifle Range (new) MRS is on the northwest facing slope of a hill on the east side of the Chenango River. The elevation within the MRS ranges from approximately 950 feet above sea level at the base of the slope to approximately 1200 feet above sea level (USGS, 1976a).
	Soil: The soil within the Binghamton Rifle Range (new) MRS is predominantly Volusia channery silt loam on the slope of a drumlin ridge or hill. The material is loamy glacial till derived from siltstone, sandstone, or shale. A typical soil profile is channery silt loam from 0 to 64 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, and alluvial deposits form the productive valley-fill aquifers of the surficial aquifer system. Yield from valley-fill aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The Binghamton Rifle Range (new) MRS is adjacent to a primary water supply aquifer used by the City of Binghamton. Currently, the City of Binghamton relies primarily on the Susquehanna River for its water supply and uses one groundwater well for backup (Binghamton Water Bureau, 2009). Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers generally are unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells within the MRS. One Domestic water well is within 0.25 miles of the MRS. Well number BM1281 is approximately 0.1 miles south of the MRS; well depth is 185 feet below land surface; and depth to water is 105 feet. USGS data for well number BM 241, approximately 0.2 miles west of the MRS, indicates the well depth to be 192 feet below land surface in the "Bedrock" local aquifer (USGS, 2011).
	Hydrology: No surface water within the MRS (Google Earth, 2011; USGS, 1976a).
	Vegetation: The southeastern portion of the MRS is forested land and the western and northern portion of the MRS are residential properties and are landscaped with grasses, trees and shrubs.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources within the MRS. There are no Notional Historic Landmarks located within the MRS (National Park Service, 2011a-c).
	Wetlands: Wetlands are not present within the MRS (USFWS, 2011c).
	Demographics: The total population in the village of Port Dickson is approximately 1,585 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: There is no critical habitat within this MRS (USFWS, 2011a).
	Ecological Receptors: No T&E species listed in Broome County and there are no documented occurrences of T&E Species within the MRS (USFWS, 2011b).
	Degree of Disturbance: The western portion of the MRS is used for residential purposes; medium disturbance. The southeastern portion of the MRS is forested land that has a low level of disturbance.

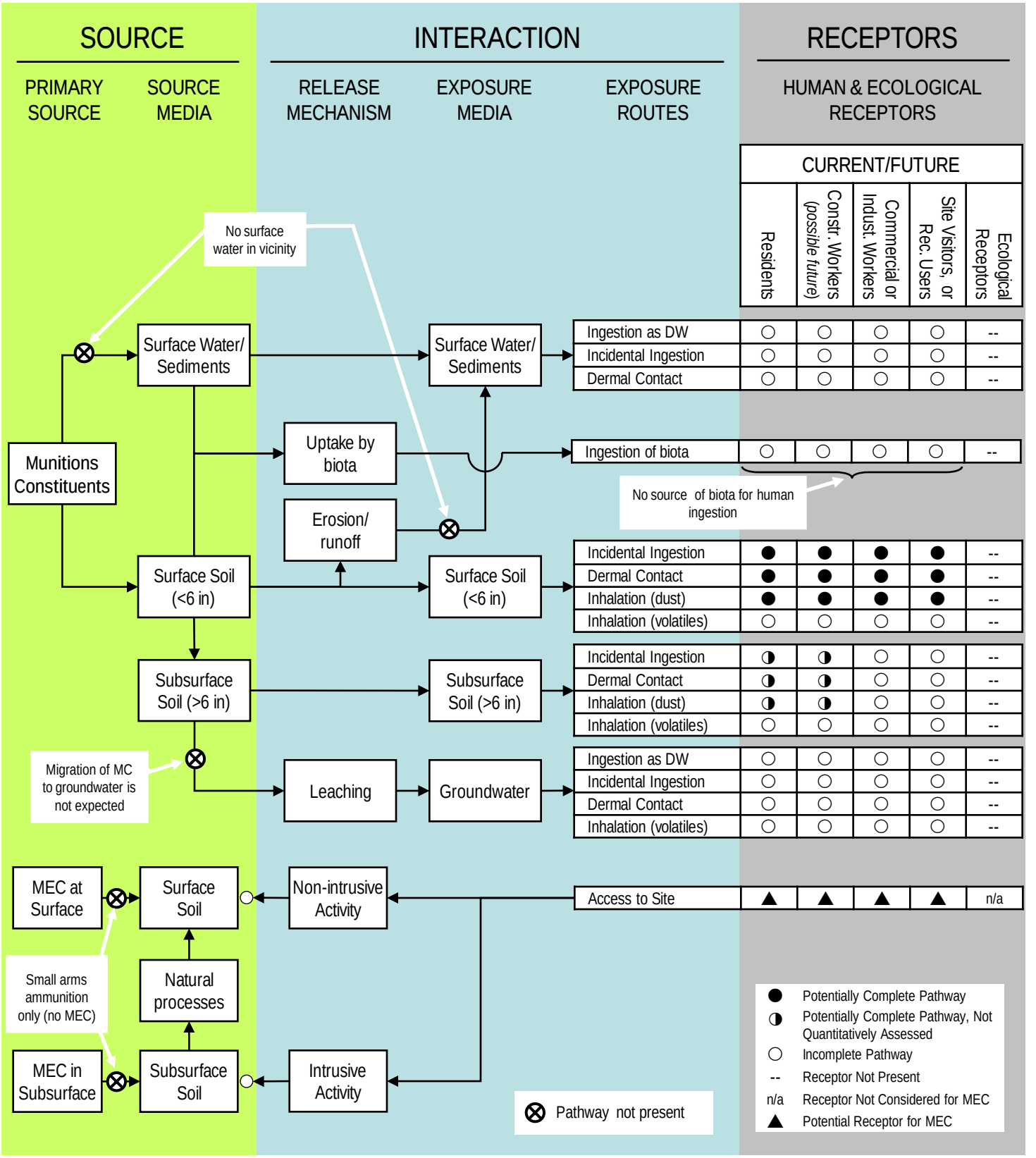
Profile Type	MRS Characterization
Land Use and Exposure Profile	Current Land Use: Residential and undeveloped land (forested) uses are included in this MRS.
	Current Potential Receptors: Residents, site visitors or recreational users, and commercial or industrial workers represent potential receptors.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors with the addition of construction workers.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22-caliber, .30-caliber, .38-caliber, .45-caliber and 7.62 mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, construction workers, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening and construction workers during the intrusive construction activities; however, these pathways are considered to be potentially complete but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these

Profile Type	MRS Characterization
	receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. The surface water exposure pathways are incomplete for all receptors since no surface water is located within this MRS. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway for all receptors is incomplete because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-2 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Binghamton Rifle Range (New) (NYHQ-006-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** February 14, 2011



4.3 CAMP BLAUVELT MRS (AEDB-R # NYHQ-007-R-01)

Table 4-3 presents the CSM for Camp Blauvelt MRS. Figure 4-3 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-3
Conceptual Site Model for Camp Blauvelt MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Orangetown, Rockland County, in southeastern part of NY approximately 20 miles north of New York City.
	Structures: There are a few residential structures located in the southern portion of the MRS.
	Security: No barriers to MRS access are present. Property is a public state park that has numerous hiking trails through undeveloped forest.
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 30s in the winter. The warmest month of the year is July, with an average maximum temperature of 85.4° F. The coldest month of the year is January, with an average minimum temperature of 23° F. The annual average precipitation is 49.7 inches with rainfall evenly distributed throughout the year. The wettest month of the year is September, with an average rainfall of 4.73 inches (IDcide, 2011c).
	Geology: The Camp Blauvelt MRS is in the Newark Basin within the Piedmont physiographic province in southern New York (Yager and Ratcliffe, 2010). The Newark Basin extends approximately 150 mile from Rockland County, New York, through New Jersey and into eastern Pennsylvania. The Basin was formed by faulting during the early rifting stage of the opening of the Atlantic Ocean. The Newark Basin is a half graben that contains a 2.5 to 3 mile thick sequence of westward dipping continental red beds and lake deposits with intrusive sheets of diabase and basalt flows, collectively known as the Newark Supergroup (Yager and Ratcliffe, 2010). The Ramapo Fault bounds the Newark Basin on the west within Rockland County. Sedimentary rocks of the Newark Supergroup range in age from Late Triassic to Early Jurassic (229 to 175 million years ago) and consist of interbedded shale, sandstone, and siltstone that are typically red, reddish brown, or maroon. Locally sediments may be gray or black and may include conglomerate, black mudstone and some coal (Trapp and Horn, 1997). Magmatism in the Early Jurassic (approximately 201 million years ago) produced voluminous basalt lava flows and the intrusion of diabase, including the Palisades Sill (Yager and Ratcliffe, 2010). The Palisades Sill underlies the Camp Blauvelt MRS and outcrops in prominent cliffs along the west bank of the Hudson River (structure map in Yager and Ratcliffe, 2010). Sedimentary formations that outcrop west of the MRS generally dip westward at approximately 10 degrees. The glaciers that covered most of Canada and the northern United States episodically over the last 1.8 million years extended only a few miles south of the Camp Blauvelt MRS during the most recent glacial advance approximately 22,000 years ago (Skehan, 2008). Glaciers scoured and removed soil and soft weathered surface rocks as they moved. As the ice melted, the sediment load was dropped in place as unsorted till or was redistributed as outwash by the vast amounts of meltwater released by the glacier. Till is a mixture of silt, gravel, and boulders of various sizes in a clay matrix. The glacial outwash sediments, deposited by streams and rivers of meltwater in front of the receding glaciers (glaciofluvial deposits), tend to be graded from coarse to fine with increasing distance from the glacier. Meltwater could also be impounded in lakes that were dammed either by the ice or by glacial sediments. Lake plains, terraces, and beaches were left in place when the dammed water found a lower outlet (Olcott, 1995).

Profile Type	MRS Characterization
	Based on surface geology maps in Heisig (2010) unconsolidated deposits of glacial till, lake deposits and alluvium cover bedrock in the vicinity of the Camp Blauvelt MRS. Within the MRS, unconsolidated material is thin or absent on the igneous bedrock of the Palisades Sill.
	Topography: The Camp Blauvelt MRS is on the westward sloping outcrop of the Palisades Sill. The surface of the MRS is undulating with elevations ranging from approximately 250 to 610 feet above sea level with isolated peaks at 350 feet, 410 feet, and 610 feet. East of the MRS, there is steep slope down to the Hudson River at approximately 10 feet above sea level. To the west of the MRS, there is a steep slope down to approximately 150 feet above sea level (USGS, 1979).
	Soil: The eastern half of the Camp Blauvelt MRS is a rock surface without soil cover. The soil in the western portion of the MRS is predominantly Wethersfield gravelly silt loam on undulating to steep slopes. The material is glacial till derived from reddish sandstone, shale and conglomerate with some basalt. A typical soil profile is gravelly silt loam from 0 to 13 inches; gravelly loam from 13 to 22 inches; and gravelly fine sandy loam from 22 to 60 inches (NRCS, 2011).
	Hydrogeology: Although sedimentary rocks are thin or absent over the igneous Palisades Sill within the Camp Blauvelt MRS, Newark Basin sediments outcrop just west of the MRS boundary. The aquifer beds near the MRS consist of sandstone, mudstone, siltstone, and shale. At the western margin of the basin, aquifer beds are coarser consisting of conglomerate, pebbly sandstone, and sandstone. Fractures parallel to the bedding planes are the major water-bearing zones (Heisig, 2010). The Newark Basin aquifer is unconfined where the water table is below the bedrock surface. Where the water table is within the overlying glacial till, the relatively low permeability of till and lake sediments constitute a confining layer (Yager and Ratcliffe, 2010). Approximately 32 percent of the public water supply in Rockland County is obtained from the sedimentary bedrock aquifer identified as the Newark Basin aquifer. Most of the public supply wells are in the coarse-grained sedimentary formations in the Newark Basin lowlands west of the MRS. The Lake DeForest Reservoir, approximately 2.5 miles northwest of the MRS, provides 37 percent of the public water supply (Heisig, 2010). There are no groundwater wells within the Camp Blauvelt MRS.
	Hydrology: Three or four small ponds and an intermittent stream are located within the MRS. The surface water bodies are not in the vicinity of the former range. The ponds are located approximately 300 yards north of the southern MRS boundary. The stream flows from southeast to northwest and is located in the northwest corner of the MRS. The stream discharges into a pond approximately 0.5 mile northwest of the MRS.
	Vegetation: The majority of the MRS is heavily wooded with the exception of the southwestern portion that has some residential properties.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Camp Blauvelt. Additionally, there are no National Historic Landmarks located in Rockland County, NY (National Park Service, 2011a, b).
	Wetlands: There are three types of wetlands within the MRS, these include: PUBHh (Palustrine, Unconsolidated Bottom, Permanently Flooded, Dikes/Impounded), PUBHx (Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated), and PFO1E (Palustrine, Broad-Leaved-Deciduous, Seasonally Flooded/Saturated)

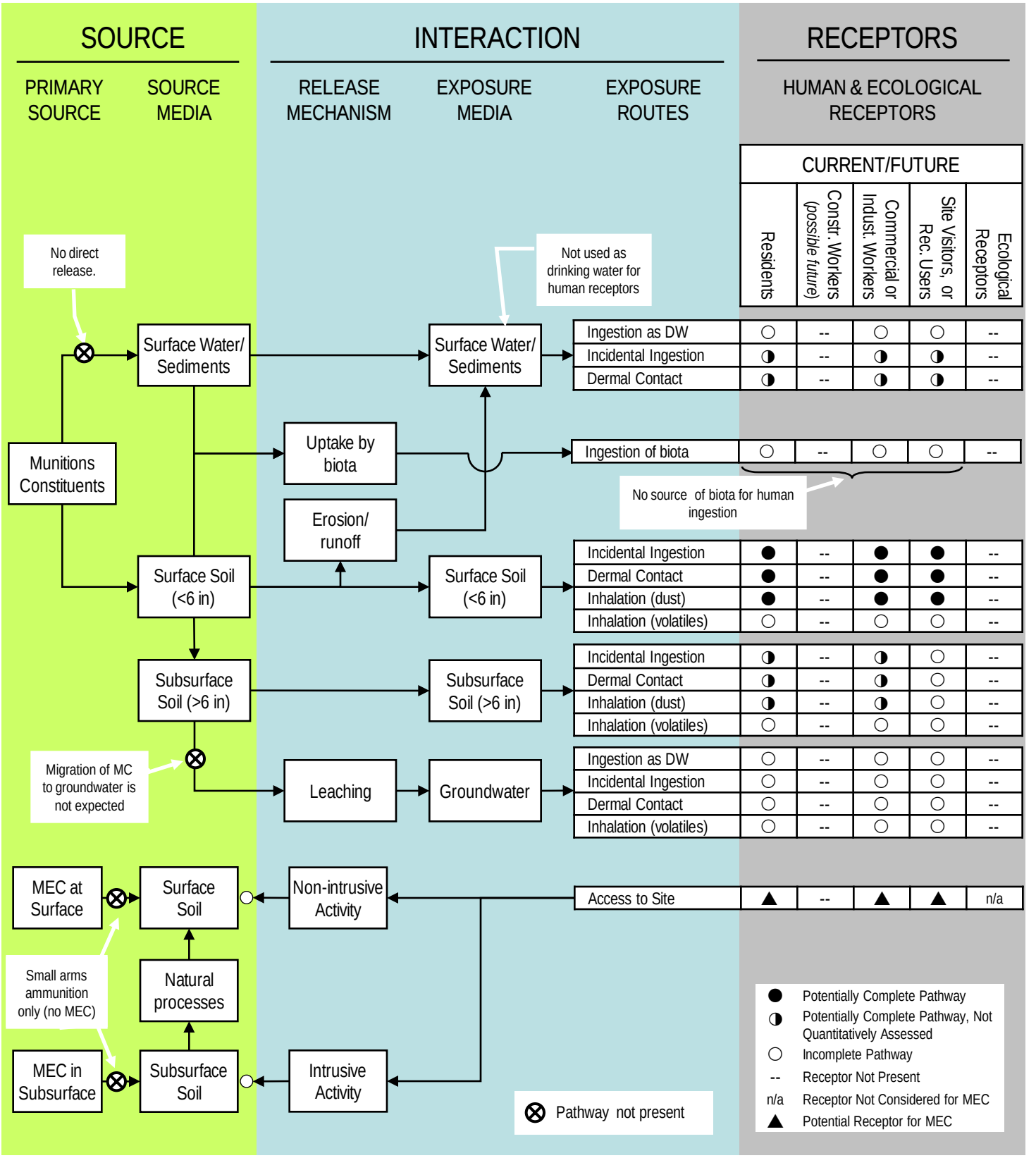
Profile Type	MRS Characterization
	(USFWS, 2011c). The wetlands are not in the vicinity of the former range.
	Demographics: The total population in Orangetown is 48,710 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The area is forested. No critical habitats are present.
	Ecological Receptors: There are two federally listed T&E species that occur in Rockland County; however, no T&E species are listed to occur at Camp Blauvelt MRS (USFWS, 2011b).
	Degree of Disturbance: Low disturbance of the MRS is present. The MRS is a forested state park and there are a couple of residential properties with the only use of the area being for residential and recreational purposes.
Land Use and Exposure Profile	Current Land Use: Undeveloped and residential land uses are present. Portions of the MRS are a state park.
	Current Potential Receptors: Current receptors include residential, site visitors or recreational users, and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, and .45 caliber cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.

Profile Type	MRS Characterization
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening activities; however, these pathways are considered to be potentially complete but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-3 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Camp Blauvelt (NYHQ-007-R-01)

Completed By: Scott Anderson/Maria Borejsza-Wysocka, PARSONS ***Date Completed:*** March 7, 2011



4.4 CAMP O'RYAN MRS 1 PISTOL RANGE (AEDB-R # NYHQ-008-R-01)

Table 4-4 presents the CSM for Camp O'Ryan MRS. Figure 4-4 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-4

Conceptual Site Model for Camp O'Ryan MRS 1 Pistol Range

Profile Type	MRS Characterization
Facility Profile	Location and Area: Wethersfield, Wyoming County, in western part of New York approximately 45 miles east-southeast of Buffalo, NY.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 30s in the winter. The warmest month of the year is July, with an average maximum temperature of 77.2° F. The coldest month of the year is January, with an average minimum temperature of 11.7° F. The annual average precipitation is 43.4 inches with rainfall evenly distributed throughout the year. The wettest month of the year is September, with an average rainfall of 4.6 inches (IDcide, 2011d).
	Geology: The Camp O'Ryan MRS 1 Pistol Range is on the northern margin of the Appalachian Plateaus physiographic province in southwestern New York. Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Camp O'Ryan MRS. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciations (Olcott 1995). For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: The Camp O'Ryan MRS 1 Pistol Range is located in an area that has a downward regional slope from the southeast to northwest on a glacial lake plain that is incised by streams to produce a rolling surface within the MRS. Elevations range from approximately 1745 feet above sea level in the northwest corner of the MRS to 1810 feet above sea level in the southeast corner (USGS, 1995a).
	Soil: The soil in the Camp O'Ryan MRS 1 Pistol Range predominantly is moderately well drained Williamson channery silt loam on a glacial lake plain. The material is derived from glacial lake deposits or eolian (windblown) deposits with a high content of silt and fine sand. A typical soil profile is channery silt loam from 0 to 17 inches; silt loam from 17 to 41 inches; and stratified silt loam to very fine sand to clay from 41 to 60 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact and alluvial deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). Major consolidated bedrock aquifers in the vicinity of the Camp O'Ryan MRS 1 Pistol Range are in Devonian age limestone formations at or near the surface. Little primary porosity or permeability remains in rocks following the lithification process. Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from

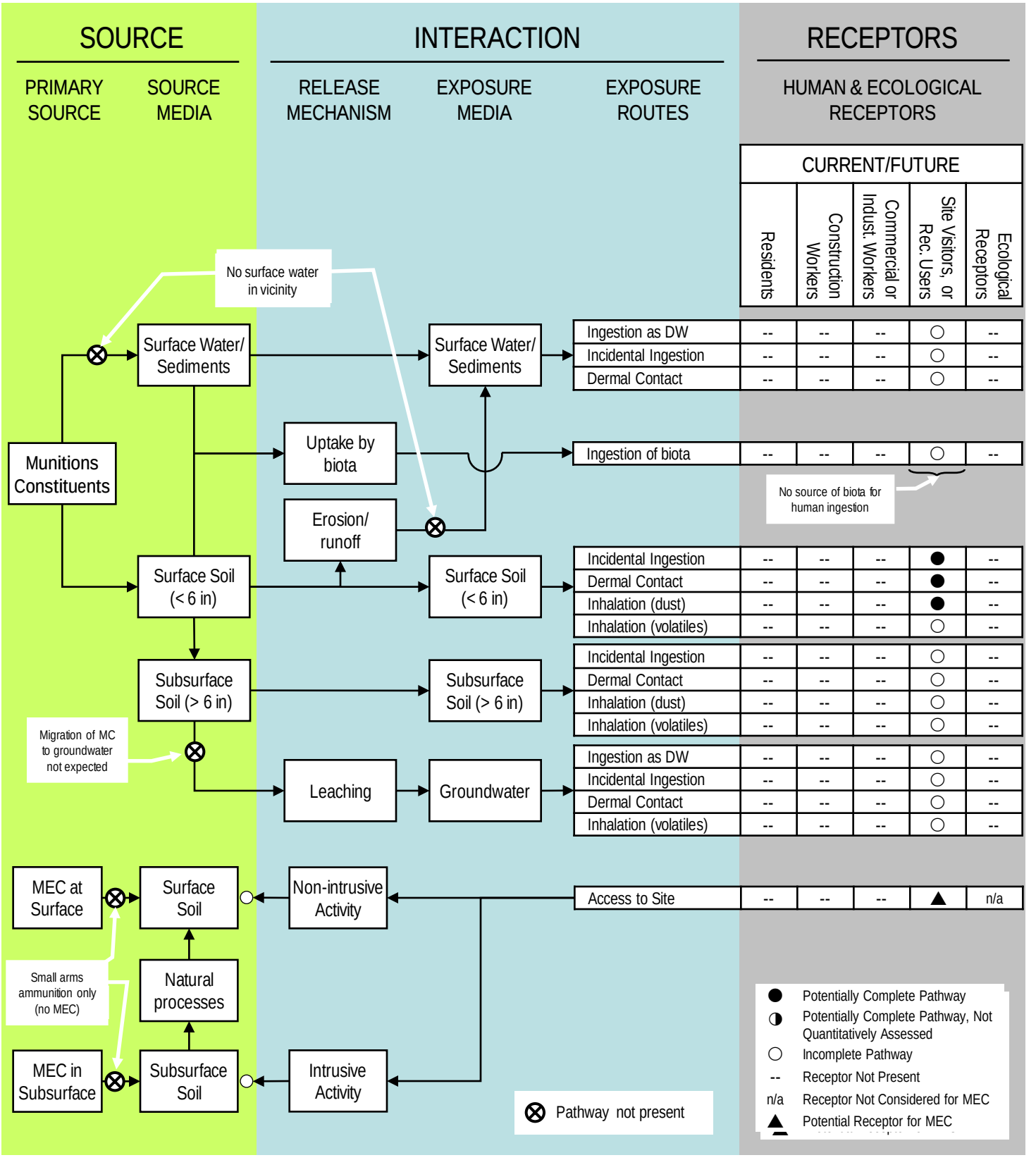
Profile Type	MRS Characterization
	carbonate aquifers in New York. Aquifers generally are unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells within the Camp O'Ryan MRS 1 Pistol Range.
	Hydrology: There are no surface water bodies within MRS 1 – Pistol Range.
	Vegetation: The majority of the MRS is heavily vegetated with trees and shrubs. The central portion of the MRS is less densely vegetated.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Camp O'Ryan MRS 1 Pistol Range. Additionally, there are no National Historic Landmarks located in Wyoming County, NY (National Park Service, 2011a, b).
	Wetlands: No wetlands are within MRS 1 (USFWS, 2011c).
	Demographics: The total population in Wethersfield is 912 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The area is forested. No critical habitats are present.
	Ecological Receptors: There are no federally listed (T&E species that occur in Wyoming County; therefore, no T&E species are listed to occur at Camp O'Ryan MRS (USFWS, 2011b).
	Degree of Disturbance: Low disturbance of the MRS is present. The MRS is undeveloped, forested land.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land.
	Current Potential Receptors: Current receptors include site visitors/recreational users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .38 caliber cartridge, .45 caliber cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or

Profile Type	MRS Characterization
	chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil; however, these subsurface pathways are incomplete for the site visitors because it is unlikely for the receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. The surface water exposure pathways are incomplete for site visitors since no surface water is located within this MRS. The groundwater exposure pathways are incomplete for site visitors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway for site visitors at the MRS is incomplete because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-4 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – Camp O'Ryan MRS 1 Pistol Range

Completed By: Maria Borejsza-Wysocka, PARSONS ***Date Completed:*** May 2, 2011



4.5 CAMP O'RYAN MRS 3 MANEUVERING AREA (AEDB-R # NYHQ-008-R-03)

Table 4-5 presents the CSM for Camp O'Ryan MRS. Figure 4-5 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-5

Conceptual Site Model for Camp O'Ryan MRS 3 Maneuvering Area

Profile Type	MRS Characterization
Facility Profile	Location and Area: Wethersfield, Wyoming County, in western part of New York approximately 45 miles east-southeast of Buffalo, NY.
	Structures: There are less than five structures located in the north-central portion of the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 30s in the winter. The warmest month of the year is July, with an average maximum temperature of 77.2° F. The coldest month of the year is January, with an average minimum temperature of 11.7° F. The annual average precipitation is 43.4 inches with rainfall evenly distributed throughout the year. The wettest month of the year is September, with an average rainfall of 4.6 inches (IDcide, 2011d).
	Geology: The Camp O'Ryan MRS 3 Maneuvering Area is on the northern margin of the Appalachian Plateaus physiographic province in southwestern New York. Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Camp O'Ryan MRS 3 Maneuvering Area. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciations (Olcott 1995). For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: The Camp O'Ryan MRS 3 Maneuvering Area is located in an area that has a downward regional slope from the southeast to northwest on a glacial lake plain that is incised by streams to produce a rolling surface within the MRS. Elevations range from approximately 1620 feet above sea level in the northwest corner of the MRS to 1900 feet above sea level in the southeast corner (USGS, 1995a).
	Soil: The soil in the Camp O'Ryan MRS 3 Maneuvering Area predominantly is moderately well drained Williamson channery silt loam on a glacial lake plain. The material is derived from glacial lake deposits or eolian (windblown) deposits with a high content of silt and fine sand. A typical soil profile is channery silt loam from 0 to 17 inches; silt loam from 17 to 41 inches; and stratified silt loam to very fine sand to clay from 41 to 60 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact and alluvial deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). Major consolidated bedrock aquifers in the vicinity of the Camp O'Ryan MRS 3 Maneuvering Area are in Devonian age limestone formations at or near the surface. Little primary porosity or permeability remains in rocks following the lithification process. Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells

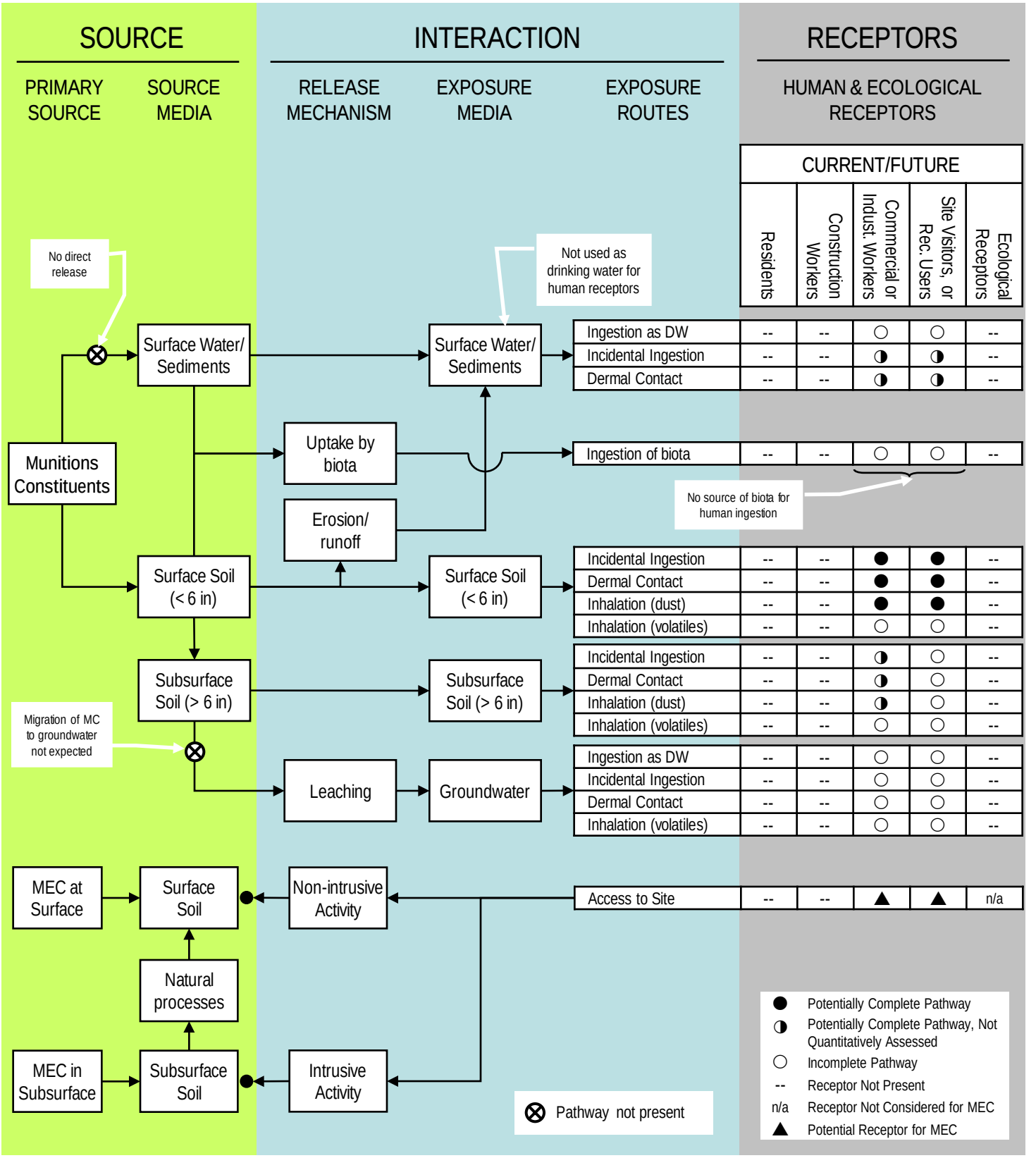
Profile Type	MRS Characterization
	commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers generally are unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells within the Camp O'Ryan MRS 3 Maneuvering Area.
	Hydrology: There are small marshes and ponds within MRS 3 – Maneuvering Area. The surface water is predominantly located in the eastern portion of the MRS.
	Vegetation: The majority of the MRS is heavily vegetated with trees and shrubs. The central portion of the MRS is less densely vegetated.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Camp O'Ryan MRS 3 Maneuvering Area. Additionally, there are no National Historic Landmarks located in Wyoming County, NY (National Park Service, 2011a, b).
	Wetlands: There are eight types of wetlands that occur at Camp O'Ryan. These wetlands include: PFO1/SS1A (Palustrine, Forested, Broad-Leaved Deciduous/Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Temporary Flooded), PFO5/UBFh (Palustrine, Forested, Dead/Palustrine, Unconsolidated Bottom, Semipermanently Flooded, Diked/Impounded), PFO1E (Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated), PUBHx (Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated), PEM1E (Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated), PSS1F (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Semipermanently Flooded), PSS1/EM1Fb (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous/ Palustrine, Emergent, Persistent, Semipermanently Flooded, Beaver), and PEM1Fb (Palustrine, Emergent, Persistent, Semipermanently Flooded, Beaver) (USFWS, 2011c).
	Demographics: The total population in Wethersfield is 912 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The area is forested. No critical habitats are present.
	Ecological Receptors: There are no federally listed (T&E species that occur in Wyoming County; therefore, no T&E species are listed to occur at Camp O'Ryan MRS 3 Maneuvering Area (USFWS, 2011b).
	Degree of Disturbance: Low disturbance of the MRS is present. The MRS is undeveloped, forested land.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land and farming.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, 5.56mm cartridge, and 7.62mm cartridge. Slap flares and practice bazooka rockets (awaiting documentation to verify) (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via

Profile Type	MRS Characterization
	corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms, tank maneuvering, and signals/pyrotechnics; maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: MEC is possible due to simulator and shoulder-fired rocket use. Density is unknown.
	Munitions Debris: Associated with the small arms, slap flares and practice bazookas listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for commercial or industrial workers, and site visitors. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. There are potentially complete exposure pathways for MEC in both surface and subsurface soil at the MRS, should intact items remain at the MRS. Exposure to human receptors could result from both intrusive and non-intrusive activities.

FIGURE 4-5 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – Camp O'Ryan MRS 3 Maneuvering Area

Completed By: Maria Borejsza-Wysocka, PARSONS ***Date Completed:*** May 2, 2011



4.6 ELMIRA MRS (AEDB-R # NYHQ-009-R-01)

Table 4-6 presents the CSM for Elmira MRS. Figure 4-6 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-6

Conceptual Site Model for Elmira MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Horseheads, Chemung County, in southwest part of New York.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 82.3° F. The coldest month of the year is January, with an average minimum temperature of 15° F. The annual average precipitation is 34.95 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 4.01 inches (IDcide, 2011e).
	Geology: The Elmira MRS is in the Appalachian Plateaus physiographic province in south central New York. Beds are flat or gently dipping to the south. Geologic maps in Olcott (1995) show that Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Elmira MRS. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciation. For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: The western third of the Elmira MRS is on the relatively flat floor of Newtown Creek valley. The elevation ranges from approximately 860 feet above sea level at the stream level to just under 870 feet on a stream terrace. The eastern two-thirds of the MRS are on steep slopes and ridges that rise to approximately 1580 feet above sea level (USGS, 1990).
	Soil: The western third of the Elmira MRS is on the valley floor of Newtown Creek. Soil is predominantly Howard gravelly silt loam on the stream terrace. The material is derived from glaciofluvial deposits containing significant amounts of limestone. A typical soil profile is gravelly silt loam from 0 to 9 inches; gravelly fine sandy loam from 9 to 22 inches; very gravelly silt loam from 22 to 52 inches; and stratified gravelly sand to 60 inches. Flood plains flanking the stream terrace include the Papakating silt loam and the Tioga silt loam that are derived from alluvium (NRCS, 2011). The eastern two-thirds of the MRS are on hillslopes rising from the stream valley floor. The soil is predominantly the moderately well drained Mardin channery silt loam and a composite of well drained Lordstown and Arnot very rocky soil. The Mardin channery silt loam is derived from loamy till formed from acidic sedimentary source rocks. A typical soil profile is channery silt loam from 0 to 42 inches and very channery silt loam from 42 to 72 inches. The Lordstown and Arnot very rocky soil is loamy till derived from sandstone and siltstone. A typical profile for the Lordstown soil is channery silt loam from 0 to 26 inches; very channery silt loam from 26 to 30 inches on unweathered bedrock. A typical profile for the Arnot soil is channery silt loam from 0 to 6 inches; very channery silt loam from 6 to 17 inches on bedrock (NRCS, 2011).

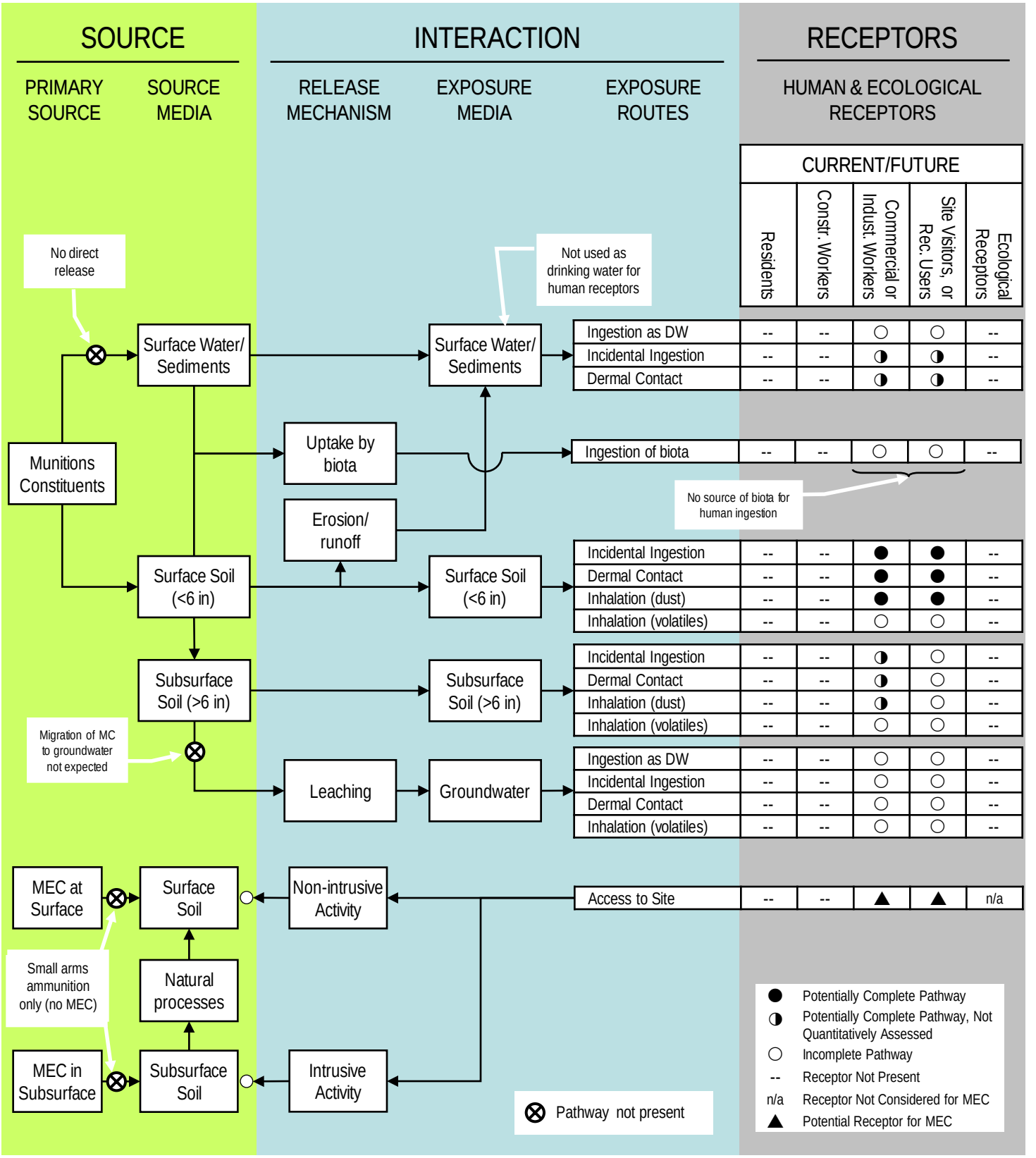
Profile Type	MRS Characterization
	Hydrogeology: Coarse-grained glacial outwash, ice contact and alluvial deposits form the productive sand and gravel aquifers of the surficial aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The western part of the Elmira MRS lies atop a primary water supply aquifer used by the City of Elmira. Currently, the City of Elmira relies on the Chemung River for 57 percent of its water supply and uses two groundwater well fields for 41 percent of its water supply (Elmira Water Board, 2011). There are no groundwater wells within the Elmira MRS. The nearest wells to the MRS are upgradient of the MRS and approximately 1 mile away.
	Hydrology: Newton Creek flows to the south and is located along the western boundary of the MRS. A small tributary of Newton Creek flows northwest and originates near the center of the MRS.
	Vegetation: The majority of the central and eastern portions of the MRS are heavily forested. The western part of the MRS is agricultural land and vegetation varies.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Elmira. Additionally, There are no National Historic Landmarks located in Chemung County, NY (National Park Service, 2011a, b).
	Wetlands: There are two types of wetlands that occur at Elmira: PEM1F (Palustrine, Emergent, Persistent, Semipermanently Flooded) and PSS1E (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated) (USFWS, 2011c).
	Demographics: The total population of Horseheads is 19,144 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The majority of the area is forested with a small portion that is agricultural land. No critical habitats are present.
	Ecological Receptors: There are no federally listed T&E species that occur in Chemung County; therefore, no T&E species are listed to occur at Elmira MRS (USFWS, 2011b).
	Degree of Disturbance: Medium to low disturbance of the MRS is present. The eastern portion of the MRS is undeveloped forested land, low level of disturbance; however the western portion is used for agricultural purposes and a medium level of disturbance is associated with agricultural activities.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land and agricultural purposes. Interstate 86 trends from north to south through the MRS.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and 7.62mm cartridge (Appendix C).

Profile Type	MRS Characterization
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for commercial or industrial workers, and site visitors. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-6 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Elmira (NYHQ-009-R-01)

Completed By: James Salisbury/Scott Anderson, PARSONS ***Date Completed:*** February 24, 2011



4.7 GENEVA RANGE MRS (AEDB-R # NYHQ-010-R-01)

Table 4-7 presents the CSM for Geneva Range MRS (not including SDZ). Figure 4-7 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-7

Conceptual Site Model for Geneva Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Geneva, Ontario County, in west-central part of New York in the Finger Lakes Region of the state.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 80° F. The coldest month of the year is January, with an average minimum temperature of 15.3° F. The annual average precipitation is 33.43 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 3.75 inches (IDcide, 2011f).
	Geology: The Geneva Range MRS is at the northern edge of the Appalachian Plateaus physiographic province southwest of the Adirondack Mountains and south of Lake Ontario. Geologic maps in Olcott (1995) show that Silurian and Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Geneva Range MRS. For more on the geology see Amsterdam Range, Table 4-1.
	Topography: The Geneva Range MRS is on a low relief plain with northwest trending low ridges. The elevation within the MRS is approximately 720 to 730 feet above sea level. There is a marsh between the ridges in the southern part of the Geneva Range safety danger zone (SDZ). The marsh is at an elevation of approximately 710 feet above sea level. The elevation within the Geneva Range SDZ ranges from 630 to 730 feet above sea level (USGS, 1976b).
	Soil: Soil within the Geneva Range MRS is predominantly poorly drained Lakemont silty clay loam in depressions. The material is derived from reddish clayey and silty glacial lake deposits. A typical profile is silty clay loam from 0 to 6 inches; silty clay from 6 to 28 inches; and stratified clay to silt loam from 28 to 40 inches. A significant part of the MRS is Ontario loam on a gently sloping glacial till plain. The material is derived from calcareous till with limestone and sandstone source rocks (NRCS, 2011). A substantial part of the Geneva Range SDZ is a marsh containing acidic organic muck derived from organic materials. The northern end of the SDZ is predominantly moderately well drained Lima silt loam on a very gently sloping plain. The material is loamy till derived from limestone and calcareous shale. A typical profile is silt loam from 0 to 24 inches with gravelly silt loam from 24 to 40 inches. The northern end of the Geneva Range SDZ also includes Ontario loam as described above (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the surficial aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). Major

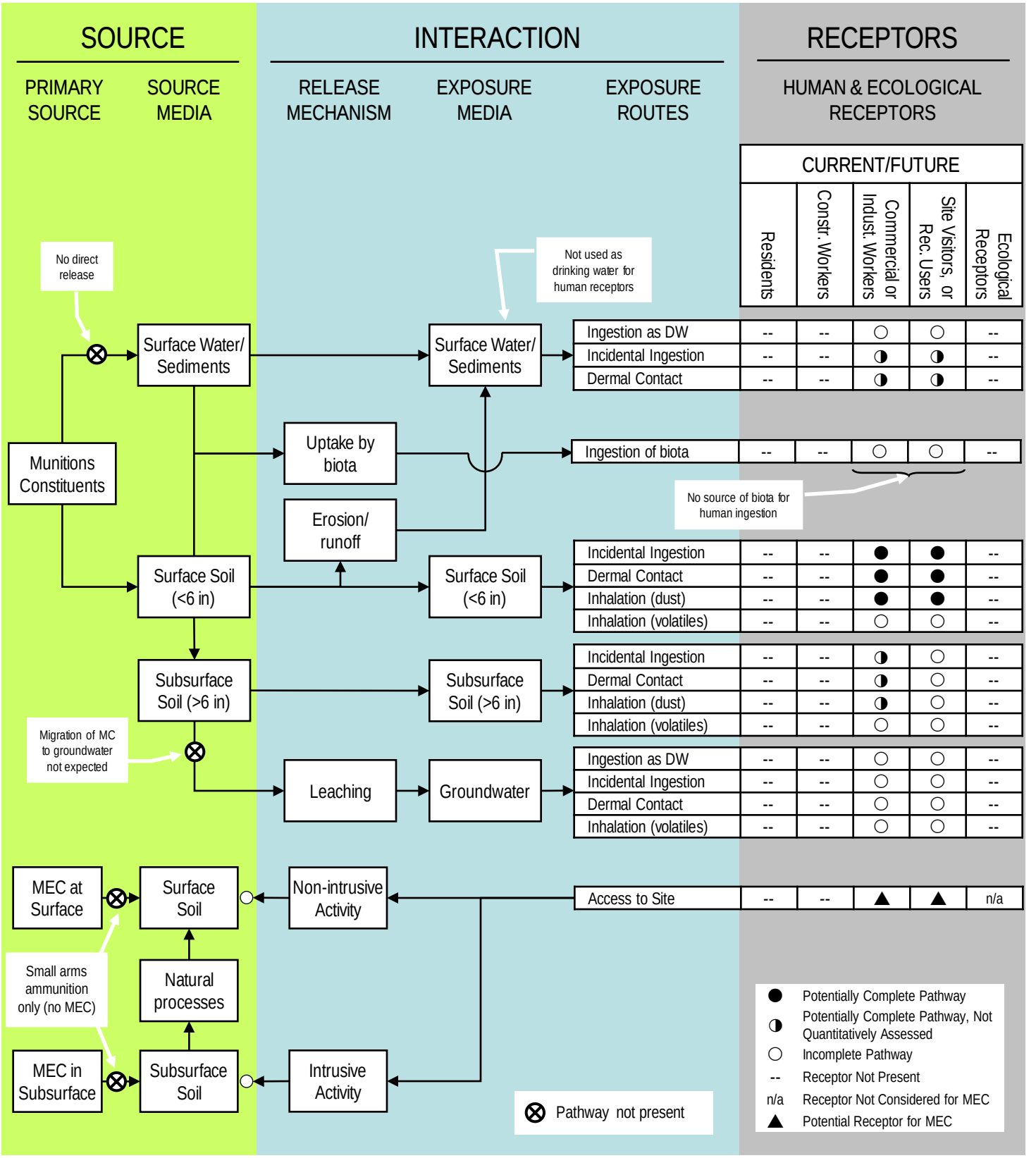
Profile Type	MRS Characterization
	consolidated bedrock aquifers in the vicinity of the Geneva Rifle Range MRS are in Devonian age limestone formations at or near the surface. Major consolidated bedrock aquifers in the vicinity of the Geneva Range MRS are in Devonian age limestone formations at or near the surface. There are no groundwater wells within the MRS.
	Hydrology: A stream is present within the MRS. The stream flows from the southeast corner of the MRS to the north. The stream empties into a swampy area within the SDZ (Google Earth, 2011; USGS, 1976b).
	Vegetation: The majority of the MRS is agricultural land and a small portion in the north part of the MRS is forested.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Geneva Range. Additionally, There are no National Historic Landmarks located in Ontario County, NY (National Park Service, 2011a, b).
	Wetlands: There are five types of wetlands that occur at Geneva Range. These wetlands include: PFO1E (Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated), PUBHh (Palustrine, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded), PEM1E (Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated), PSS1E (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated), and PSS1/EM1E (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous/ Palustrine, Emergent, Seasonally Flooded/Saturated) (USFWS, 2011c).
	Demographics: The total population of Geneva is 13,617 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: A portion of the area is forested and the rest of the MRS is agricultural land. No critical habitats are present.
	Ecological Receptors: There are no federally listed T&E species that occur in Ontario County; therefore, no T&E species are listed to occur at Geneva Range MRS (USFWS, 2011b).
	Degree of Disturbance: Medium to low disturbance of the MRS is present. The northern portion of the MRS is undeveloped forested land, low level of disturbance; however the southern portion is used for agricultural purposes and a medium level of disturbance is associated with agricultural activities.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land and agricultural purposes.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.

Profile Type	MRS Characterization
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for commercial or industrial workers, and site visitors. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-7 PRELIMINARY CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – Geneva Range (NYHQ-010-R-01)

Completed By: James Salisbury, PARSONS ***Date Completed:*** April 25, 2011



4.8 GENEVA RANGE SDZ MRS (AEDB-R # NYHQ-010-R-02)

Table 4-8 presents the CSM for Geneva Range SDZ MRS. Figure 4-8 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-8

Conceptual Site Model for Geneva Range SDZ MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Geneva, Ontario County, in west-central part of New York in the Finger Lakes Region of the state.
	Structures: There are a number of structures located in the MRS (< 30).
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 80° F. The coldest month of the year is January, with an average minimum temperature of 15.3° F. The annual average precipitation is 33.43 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 3.75 inches (IDcide, 2011f).
	Geology: The Geneva Range SDZ MRS is at the northern edge of the Appalachian Plateaus physiographic province southwest of the Adirondack Mountains and south of Lake Ontario. Geologic maps in Olcott (1995) show that Silurian and Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Geneva Range SDZ MRS. For more on the geology see Amsterdam Range, Table 4-1.
	Topography: There is a marsh between the ridges in the southern part of the Geneva Range SDZ. The elevation within the SDZ is approximately 720 to 730 feet above sea level. There is a marsh between the ridges in the southern part of the Geneva Range SDZ. The marsh is at an elevation of approximately 710 feet above sea level. The elevation within the Geneva Range SDZ ranges from 630 to 730 feet above sea level (USGS, 1976b).
	Soil: A substantial part of the Geneva Range SDZ is a marsh containing acidic organic muck derived from organic materials. The northern end of the SDZ is predominantly moderately well drained Lima silt loam on a very gently sloping plain. The material is loamy till derived from limestone and calcareous shale. A typical profile is silt loam from 0 to 24 inches with gravelly silt loam from 24 to 40 inches. The northern end of the Geneva Range SDZ also includes Ontario loam as described above (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). Major consolidated bedrock aquifers in the vicinity of the Geneva Range MRS are in Devonian age limestone formations at or near the surface. There are two groundwater wells within the Geneva Range SDZ. In well number OT2052, the well depth is 83 feet below land surface and the depth to water is 14 feet. USGS well data shows well number OT 163 at the north end of the Geneva Range SDZ completed in "Till" with a well depth of 68 feet below land surface. USGS well

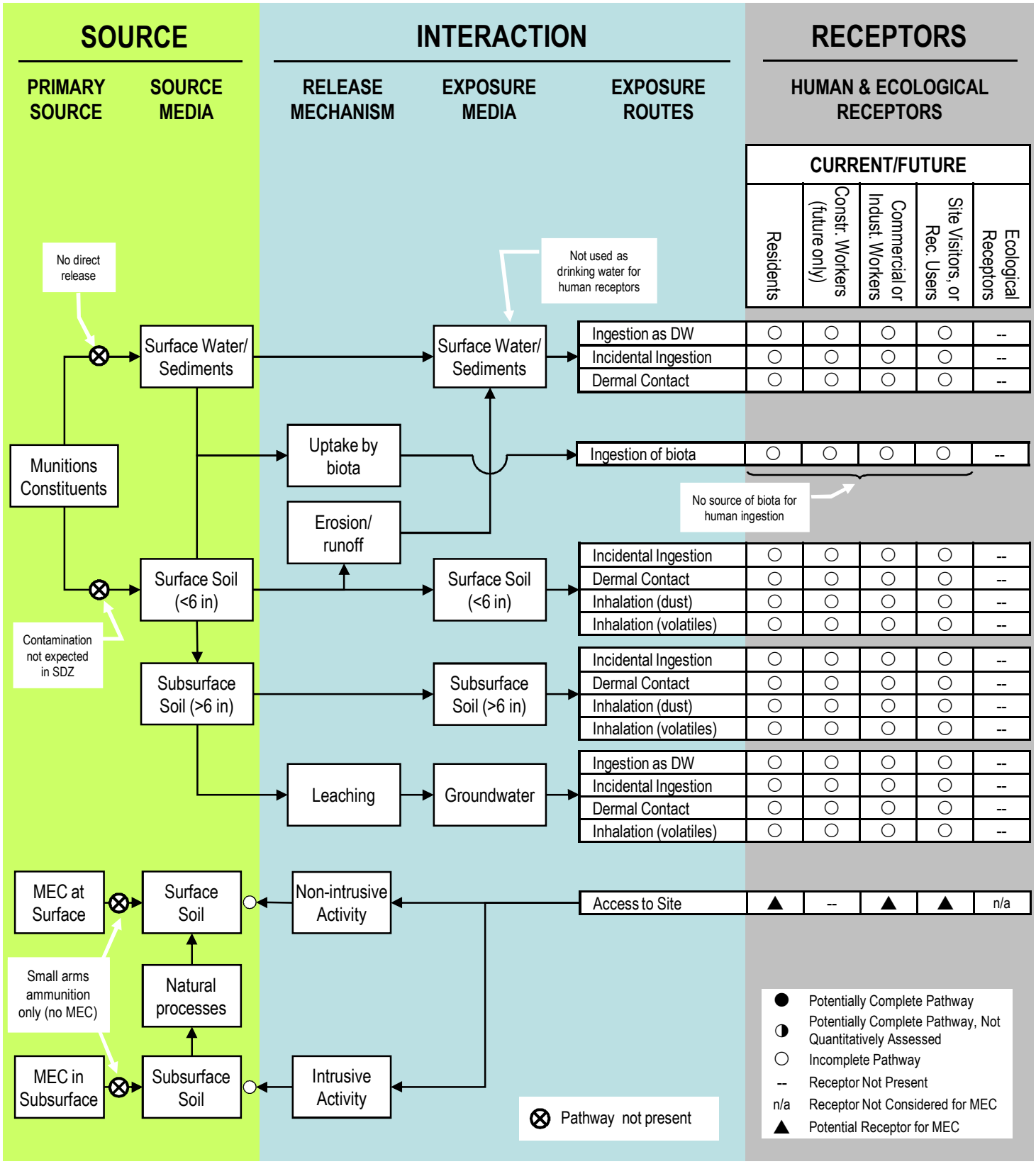
Profile Type	MRS Characterization
	data also shows well number OT 634 east of the north end of the Geneva Rifle Range SDZ that was completed in the "Middle Devonian" local aquifer at a depth of 83 feet below land surface. The depth to water is 3 feet (USGS, 2011).
	Hydrology: A large swamp is located in the southwestern portion of the SDZ. A stream flows out of the eastern edge of the swamp towards the northeast. The stream located within the MRS empties into the southern boundary of the swamp.
	Vegetation: The majority of the MRS is agricultural land and a small portion in the north part of the MRS is forested.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Geneva Range SDZ. Additionally, There are no National Historic Landmarks located in Ontario County, NY (National Park Service, 2011a, b).
	Wetlands: There are five types of wetlands that occur at Geneva Range SDZ. These wetlands include: PFO1E (Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated), PUBHh (Palustrine, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded), PEM1E (Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated), PSS1E (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated), and PSS1/EM1E (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous/ Palustrine, Emergent, Seasonally Flooded/Saturated) (USFWS, 2011c).
	Demographics: The total population of Geneva is 13,617 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: A portion of the area is forested and the rest of the MRS is agricultural land. No critical habitats are present.
	Ecological Receptors: There are no federally listed T&E species that occur in Ontario County; therefore, no T&E species are listed to occur at Geneva Range SDZ MRS (USFWS, 2011b).
	Degree of Disturbance: Medium to low disturbance of the MRS is present. The northern portion of the MRS is undeveloped forested land, low level of disturbance; however the southern portion is used for agricultural purposes and a medium level of disturbance is associated with agricultural activities.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land, residential, and agricultural purposes.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors plus future construction workers.
Munitions/Release Profile	Munitions Type(s): None.
	Release Mechanisms: No release mechanism since no source.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges

Profile Type	MRS Characterization
	where munitions use was limited to small arms ammunition.
	Munitions Debris: No MD anticipated.
	Associated Munitions Constituents: No MC of interest
	Transport Mechanisms/Migration Routes: None, no source present.
	Pathway Analysis: None, of the exposure pathways are complete for all receptors within the MRS because no source present.

FIGURE 4-8 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – Geneva Range (SDZ)

Completed By: James Salisbury, PARSONS ***Date Completed:*** April 25, 2011



4.9 GLENS FALLS RANGE MRS (AEDB-R # NYHQ-011-R-01)

Table 4-9 presents the CSM for Glens Falls Range MRS (not including SDZ). Figure 4-9 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-9

Conceptual Site Model for Glens Falls Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Glens Falls, Warren County, in east-central part of New York eight miles away from Lake George, NY.
	Structures: There are multiple structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 10s in the winter. The warmest month of the year is July, with an average maximum temperature of 81.6° F. The coldest month of the year is January, with an average minimum temperature of 7.90° F. The annual average precipitation is 38.57 inches with rainfall evenly distributed throughout the year. The wettest month of the year is May, with an average rainfall of 3.75 inches (IDcide, 2011g).
	Geology: The Glens Falls Range MRS is at the southeast edge of the Adirondack physiographic province. As shown on a USGS bedrock geology map, little deformed Lower Ordovician and Cambrian carbonates and associated marine clastic rocks are at the surface or subcrop glacial deposits in the vicinity of the Glens Falls Range MRS (Thompson et al., 1990). The fault bounded flank of the Adirondack Mountains is approximately 1.2 miles west of the MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Glens Falls Range MRS is on a gently sloping outwash plain that is incised by Halfway Creek. Elevations within the MRS range from approximately 370 feet above sea level in the creek bed to 460 feet above sea level on the plain above the creek (USGS, 1966).
	Soil: The soil within the Glens Falls Range MRS is predominantly well drained Oakville loamy fine sand on gentle slopes. The material is derived from sandy eolian (windblown) deposits, beach ridges or other glaciofluvial deposits. A typical soil profile is loamy fine from 0 to 6 inches and sand to 60 inches. The flood plain deposits within Halfway Creek are alluvium with a highly variable texture (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the surficial aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Unconsolidated aquifers in the vicinity of the Glens Falls Range MRS are unconfined with potential yields ranging from 10 to 100 gpm in sand and gravel with a saturated zone of 10 feet or less (Bugliosi et al., 1987a). The City of Glens Falls obtains its drinking water supplies from five surface water reservoirs of which four are remote, upland reservoirs on West Mountain (City of Glens Falls, 2011). Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm

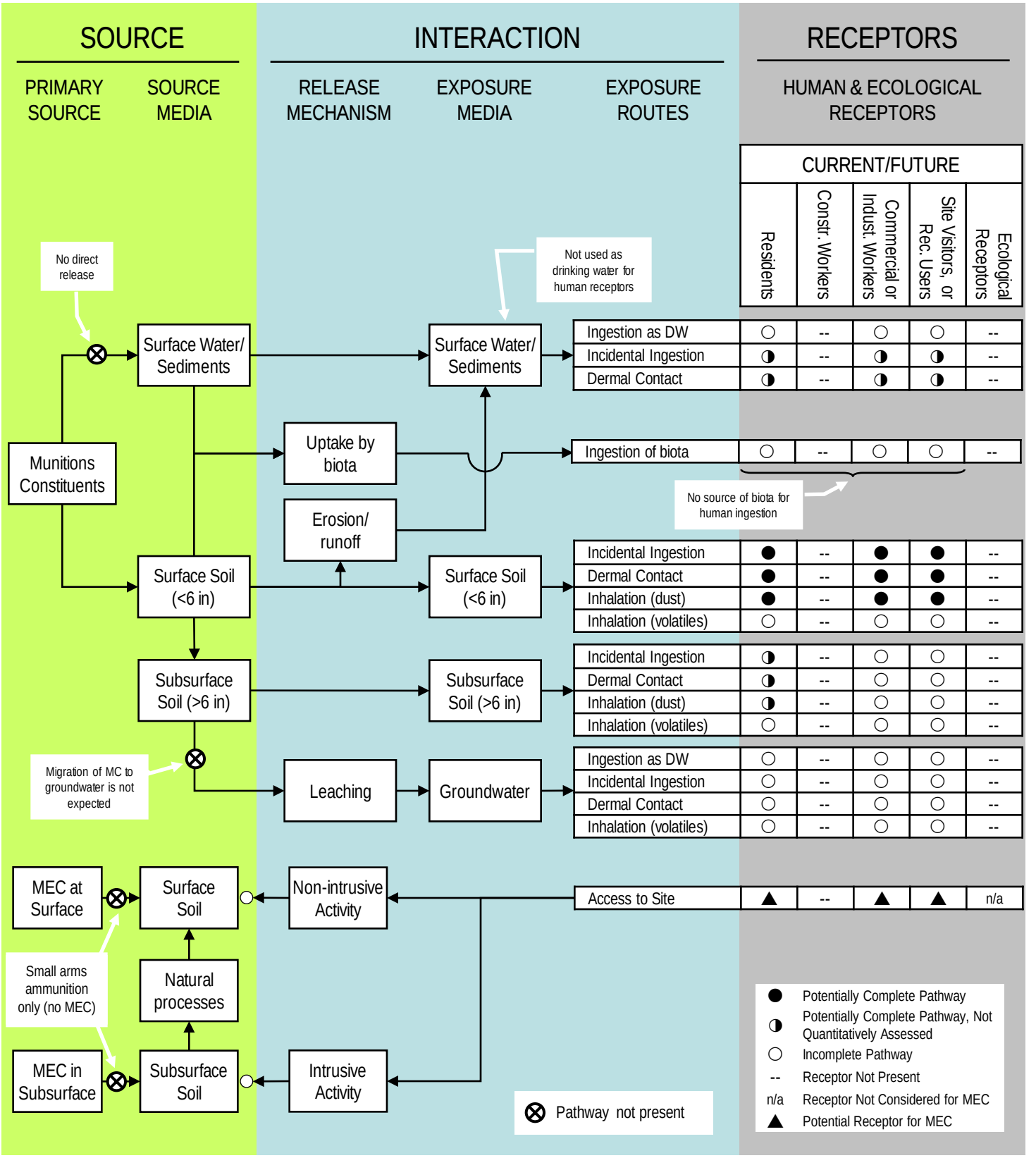
Profile Type	MRS Characterization
	have been reported from carbonate aquifers in New York. Aquifers are generally unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells within the Glens Falls Range MRS.
	Hydrology: Halfway Creek enters the MRS at the range fan firing point and flows to southeast. The creek continues along the south boundary of the MRS and eventually empties into a dammed lake, a portion of which is located in the southeastern corner of the MRS (Google Earth, 2011; USGS, 1966).
	Vegetation: The majority of the MRS forested land.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Glens Falls Range. Additionally, there are no National Historic Landmarks located in Warren County, NY (National Park Service, 2011a, b).
	Wetlands: There are seven types of wetlands that occur at Glens Falls Range. These wetlands include: L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded), PSS1/FO1Ch (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous / Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded, Diked/Impounded), PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded), PSS1C (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded), PFO1C (Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded), PSS1E (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated), and PFO1A (Palustrine, Forested, Broad-Leaved Deciduous, Temporary Flooded) (USFWS, 2011c).
	Demographics: The total population of Glens Falls is 14,354 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: Majority of the area is forested and the northeastern corner of the MRS is residential properties. No critical habitats are present.
	Ecological Receptors: There are two federally listed T&E species that occur in Warren County; however, no T&E species are listed to occur at Glens Falls Range MRS (USFWS, 2011b).
	Degree of Disturbance: High to low disturbance of the MRS is present. Majority of the MRS is undeveloped forested land, low level of disturbance; however the northeastern portion is a residential community where new houses might be built and the disturbance level is high.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land and residential purposes.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.

Profile Type	MRS Characterization
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening activities; however, these pathways are considered to be potentially complete but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-9 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Glens Falls Range (NYHQ-011-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** March 7, 2011



4.10 GLENS FALLS RANGE SDZ MRS (AEDB-R # NYHQ-011-R-02)

Table 4-10 presents the CSM for Glens Falls Range SDZ MRS. Figure 4-10 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-10

Conceptual Site Model for Glens Falls Range SDZ MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Glens Falls, Warren County, in east-central part of New York eight miles away from Lake George, NY.
	Structures: There are multiple structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 10s in the winter. The warmest month of the year is July, with an average maximum temperature of 81.6° F. The coldest month of the year is January, with an average minimum temperature of 7.90° F. The annual average precipitation is 38.57 inches with rainfall evenly distributed throughout the year. The wettest month of the year is May, with an average rainfall of 3.75 inches (IDcide, 2011g).
	Geology: The MRS is at the southeast edge of the Adirondack physiographic province. As shown on a USGS bedrock geology map, little deformed Lower Ordovician and Cambrian carbonates and associated marine clastic rocks are at the surface or subcrop glacial deposits in the vicinity of the MRS (Thompson et al., 1990). The fault bounded flank of the Adirondack Mountains is approximately 1.2 miles west of the MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The MRS is on a gently sloping outwash plain that is incised by Halfway Creek. Elevations within the MRS range from approximately 370 feet above sea level in the creek bed to 460 feet above sea level on the plain above the creek (USGS, 1966).
	Soil: The soil within the MRS is predominantly well-drained Oakville loamy fine sand on gentle slopes. The material is derived from sandy eolian (windblown) deposits, beach ridges or other glaciofluvial deposits. A typical soil profile is loamy fine from 0 to 6 inches and sand to 60 inches. The flood plain deposits within Halfway Creek are alluvium with a highly variable texture (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Unconsolidated aquifers in the vicinity of the MRS are unconfined with potential yields ranging from 10 to 100 gpm in sand and gravel with a saturated zone of 10 feet or less (Bugliosi et al., 1987a). The City of Glens Falls obtains its drinking water supplies from five surface water reservoirs of which four are remote, upland reservoirs on West Mountain (City of Glens Falls, 2011). Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers are generally

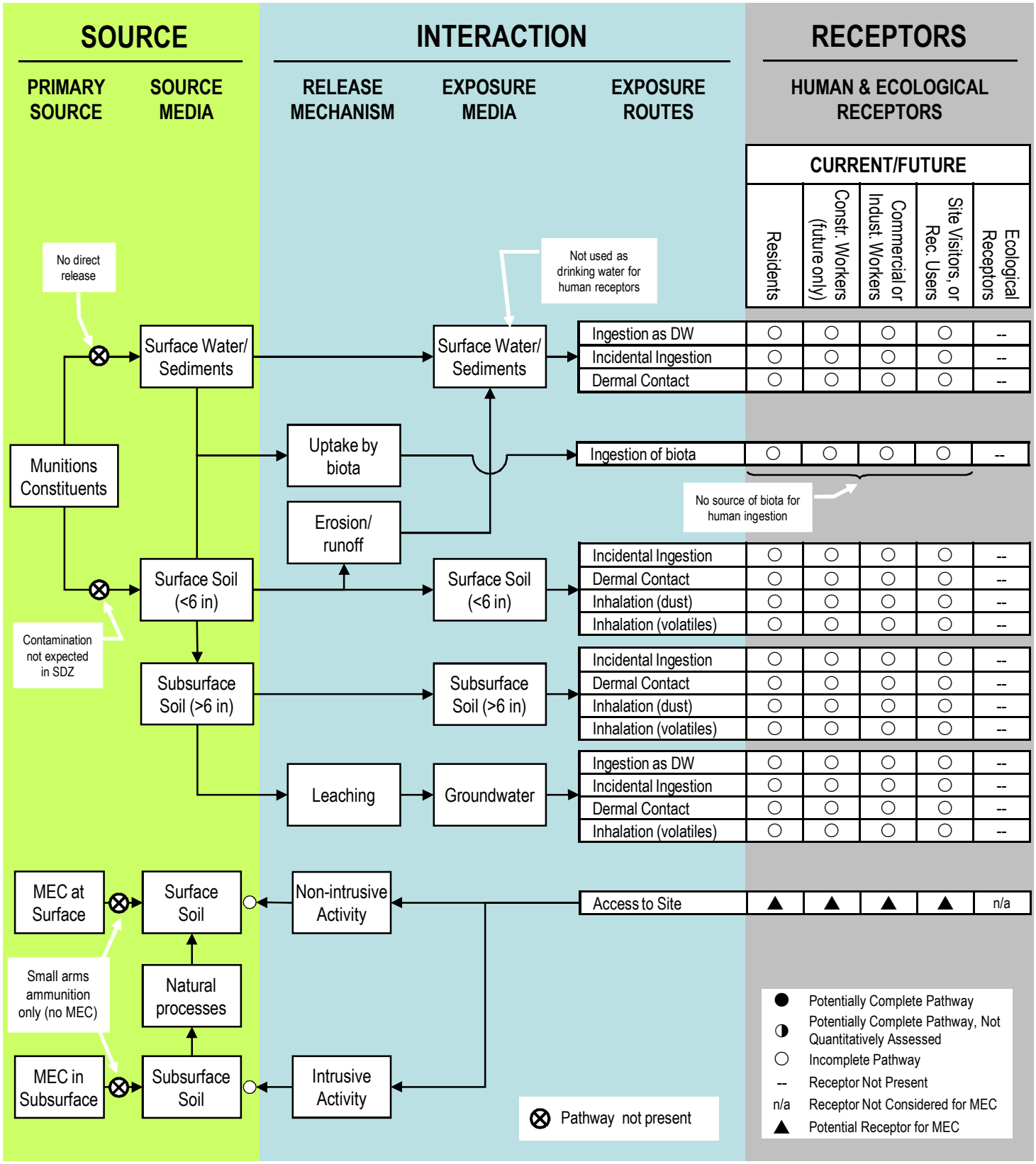
Profile Type	MRS Characterization
	unconfined in the upper 200 feet. (Olcott, 1995). Well number WR1154 is an "Other" use well within 0.25 miles of the Glens Falls Range SDZ. The well depth is 300 feet below land surface. USGS well data shows well number WR 6 approximately 0.35 miles west of the MRS. The well depth is 82 feet and the depth to water is 59 feet (USGS, 2011).
	Hydrology: A small portion of the damned lake is located along the southern border of the SDZ MRS. Discharge from the lake flows to the northeast through the SDZ and exits at the northeastern corner of the SDZ. A second, smaller, lake is located just north of the SDZ boundary (Google Earth, 2011; USGS, 1966).
	Vegetation: The MRS comprises of forested land, primarily trees, and residential properties, landscaped with grasses, shrubs and trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Glens Falls Range SDZ. Additionally, there are no National Historic Landmarks located in Ontario County, NY (National Park Service, 2011a, b).
	Wetlands: There are seven types of wetlands that occur at Glens Falls Range SDZ. These wetlands include; L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded), PSS1/FO1Ch (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous / Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded, Diked/Impounded), PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded), PSS1C (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded), PFO1C (Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded), PSS1E (Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated), and PFO1A (Palustrine, Forested, Broad-Leaved Deciduous, Temporary Flooded) (USFWS, 2011c).
	Demographics: The total population of Glens Falls is 14,354 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: Glens Falls Range SDZ is comprised of forested land and residential properties. No critical habitats are present.
	Ecological Receptors: There are two federally listed T&E species that occur in Warren County; however, no T&E species are listed to occur at Glens Falls Range MRS (USFWS, 2011b).
	Degree of Disturbance: High to Low disturbance of the MRS is present. Majority of the MRS is undeveloped forested land, low level of disturbance; however the southeastern portion is a residential community high level of disturbance.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land and agricultural purposes.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors plus future construction workers.
Munitions/Release Profile	Munitions Type(s): None.
	Release Mechanisms: No release mechanism since no source.
	Maximum Probable Penetration Depth: Training activities included small arms;

Profile Type	MRS Characterization
	maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: No MD anticipated.
	Associated Munitions Constituents: No MC of interest
	Transport Mechanisms/Migration Routes: None, no source present.
	Pathway Analysis: None, no source present.

FIGURE 4-10 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – Glens Falls Range (SDZ)

Completed By: James Salisbury, PARSONS ***Date Completed:*** April 25, 2011



4.11 HOOSICK FALLS RANGE (NEW) MRS (AEDB-R # NYHQ-012-R-01)

Table 4-11 presents the CSM for Hoosick Falls Range MRS. Figure 4-11 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-11

Conceptual Site Model for Hoosick Falls Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Hoosick Falls, Rensselaer County, in eastern part of New York approximately 30 miles northeast of Albany, NY.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 78.2° F. The coldest month of the year is January, with an average minimum temperature of 12.7° F. The annual average precipitation is 37.54 inches with rainfall evenly distributed throughout the year. The wettest month of the year is July, with an average rainfall of 4.04 inches (IDcide, 2011h).
	Geology: The Hoosick Falls Range MRS is within the Appalachian Valley and Ridge physiographic province in the Hudson River Valley. Geologic maps in Olcott (1995) show that Cambrian and Ordovician rocks are at the surface or subcrop glacial deposits in the vicinity of the Hoosick Falls Range MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Hoosick Falls Range MRS is on the north and northwest facing slope of a hill south of Clay Hill Road. Elevation within the MRS ranges from approximately 680 to 820 feet above sea level (USGS 1995b, c).
	Soil: The soil on the lower elevations within the Hoosick Falls Range MRS is Alden silt loam on very gentle slopes. The material is a silty mantle of local deposition overlying loamy glacial till. A typical profile is silt loam from 0 to 6 inches; silty clay loam from 6 to 40 inches; and gravelly silt loam from 40 to 60 inches. The soil on the upper slopes within the MRS is moderately well drained Pittstown gravelly silt loam. The material is derived from loamy glacial till. A typical profile is gravelly silt loam from 0 to 60 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Unconsolidated aquifers in the vicinity of the Glens Falls Range MRS are unconfined with potential yields ranging from 10 to 100 gpm in sand and gravel with a saturated zone of 10 feet or less (Bugliosi et al., 1987a). The surface area of the Hoosick Falls Range MRS is mostly covered by glacial till (generalized surficial geology map in Nystrom, 2010). Groundwater in limestone and other carbonate aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers are generally unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells

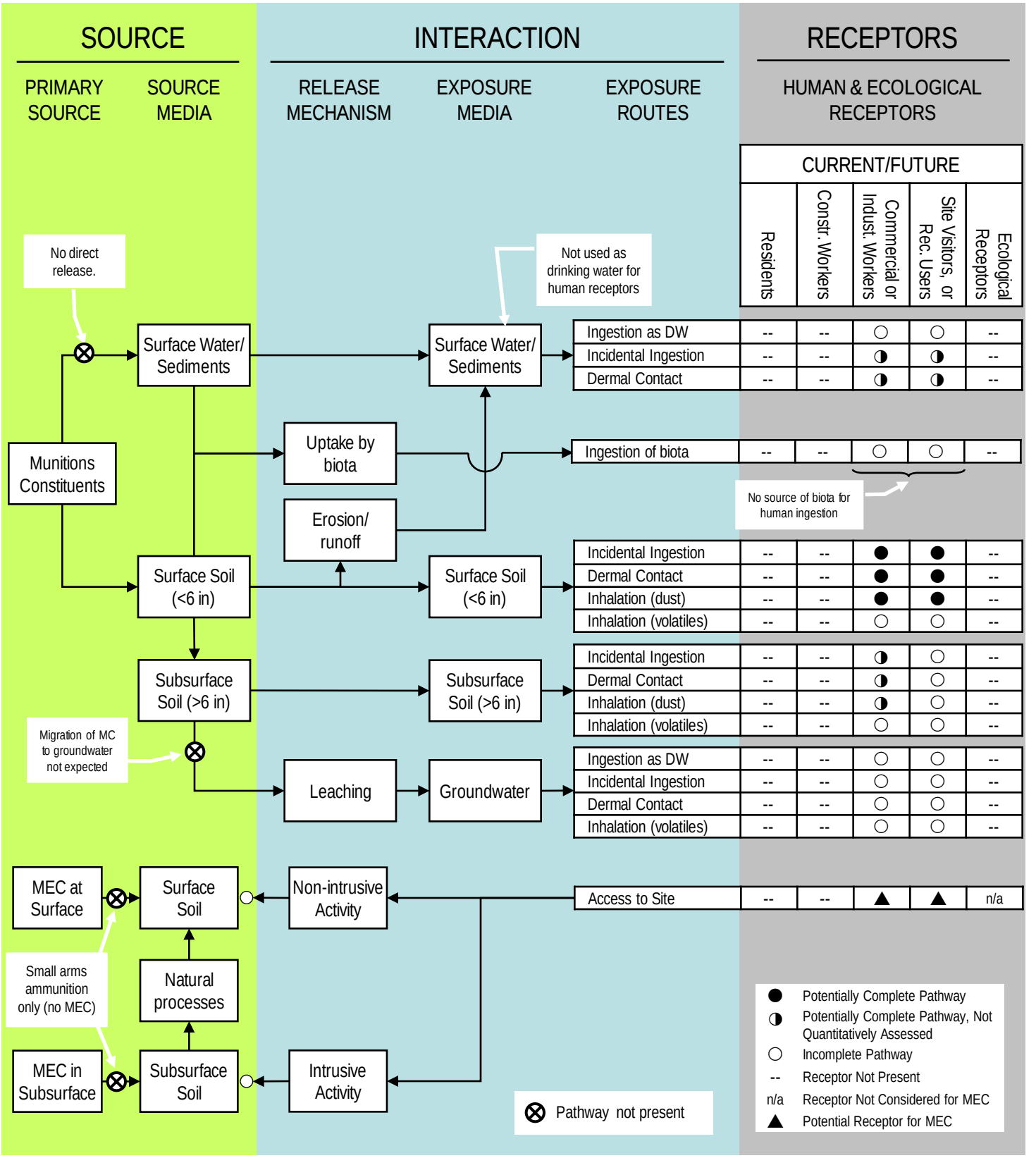
Profile Type	MRS Characterization
	within the Hoosick Falls Range MRS.
	Hydrology: Two palustrine areas are within the MRS. One is located near the northern boundary of the MRS and one is located in the central-eastern portion of the MRS (Google Earth, 2011; USGS 1995b, c).
	Vegetation: The southern portion of the MRS is forested land and the northern portion of the MRS is agricultural land and grassy.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Hoosick Falls Range. Additionally, there are no National Historic Landmarks located in Rensselaer County, NY (National Park Service, 2011a, b).
	Wetlands: There are one wetland type that occurs at Hoosick Falls Range: PEM1b (Palustrine, Emergent, Persistent, Saturated) (USFWS, 2011c).
	Demographics: The total population of Hoosick Falls is 3,268 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is divided into agricultural land and forested areas. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occur in Rensselaer County; however, no T&E species are listed to occur at Hoosick Falls Range MRS (USFWS, 2011b).
	Degree of Disturbance: Medium to low disturbance of the MRS is present. The southern portion of the MRS is undeveloped forested land, low level of disturbance; however the northern portion is used for agricultural purposes and a medium level of disturbance is associated with agricultural activities.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested and agricultural land.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and

Profile Type	MRS Characterization
	lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, the surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for commercial or industrial workers and site visitors. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-11 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Hoosick Falls Range (new) (NYHQ-012-R-01)

Completed By: Scott Anderson, PARSONS ***Date Completed:*** March 7, 2011



4.12 HORNELL RIFLE RANGE MRS (AEDB-R # NYHQ-013-R-01)

Table 4-12 presents the CSM for Hornell Rifle Range MRS. Figure 4-12 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-12

Conceptual Site Model for Hornell Rifle Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Hornellsville, Steuben County, in southwestern part of New York 80 miles away from Rochester, NY.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS. Most of the site is either recreational area or roadways/parking lots.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 80.5° F. The coldest month of the year is January, with an average minimum temperature of 10.3° F. The annual average precipitation is 35.19 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 4.39 inches (IDcide, 2011i).
	Geology: The Hornell Rifle Range MRS is in the Appalachian Plateaus physiographic province in southwestern New York. Geologic maps in Olcott (1995) show that Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Hornell Rifle Range (new) MRS. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciation. For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: The surface within the Hornell Rifle Range MRS is an undulating lower slope of Pennsylvania Hill. The MRS is adjacent to Almond Lake in the Canacadea Creek valley. The lower elevations of the MRS are subject to controlled inundation by Almond Lake (USGS, 1978 b). Elevation within MRS ranges from approximately 1260 to 1440 feet above sea level (USGS, 1978b).
	Soil: The predominant soil within the Hornell Rifle Range MRS is the well-drained composite Howard and Alton gravelly soils in an outwash delta or terrace landform. The material is derived from gravelly loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits containing significant amounts of limestone. A typical soil profile for the Howard soil is gravelly loam from 0 to 9 inches; very gravelly loam from 9 to 45 inches; and very gravelly sand from 45 to 72 inches. A typical profile for the Alton soil is gravelly fine sandy loam from 0 to 6 inches; very gravelly sandy loam from 6 to 36 inches; and extremely gravelly sandy loam from 36 to 60 inches. (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The Hornell Rifle Range MRS covers part of Almond Lake and the Canacadea Creek valley. Valley-fill sand and gravel aquifers within the MRS are unconfined with a

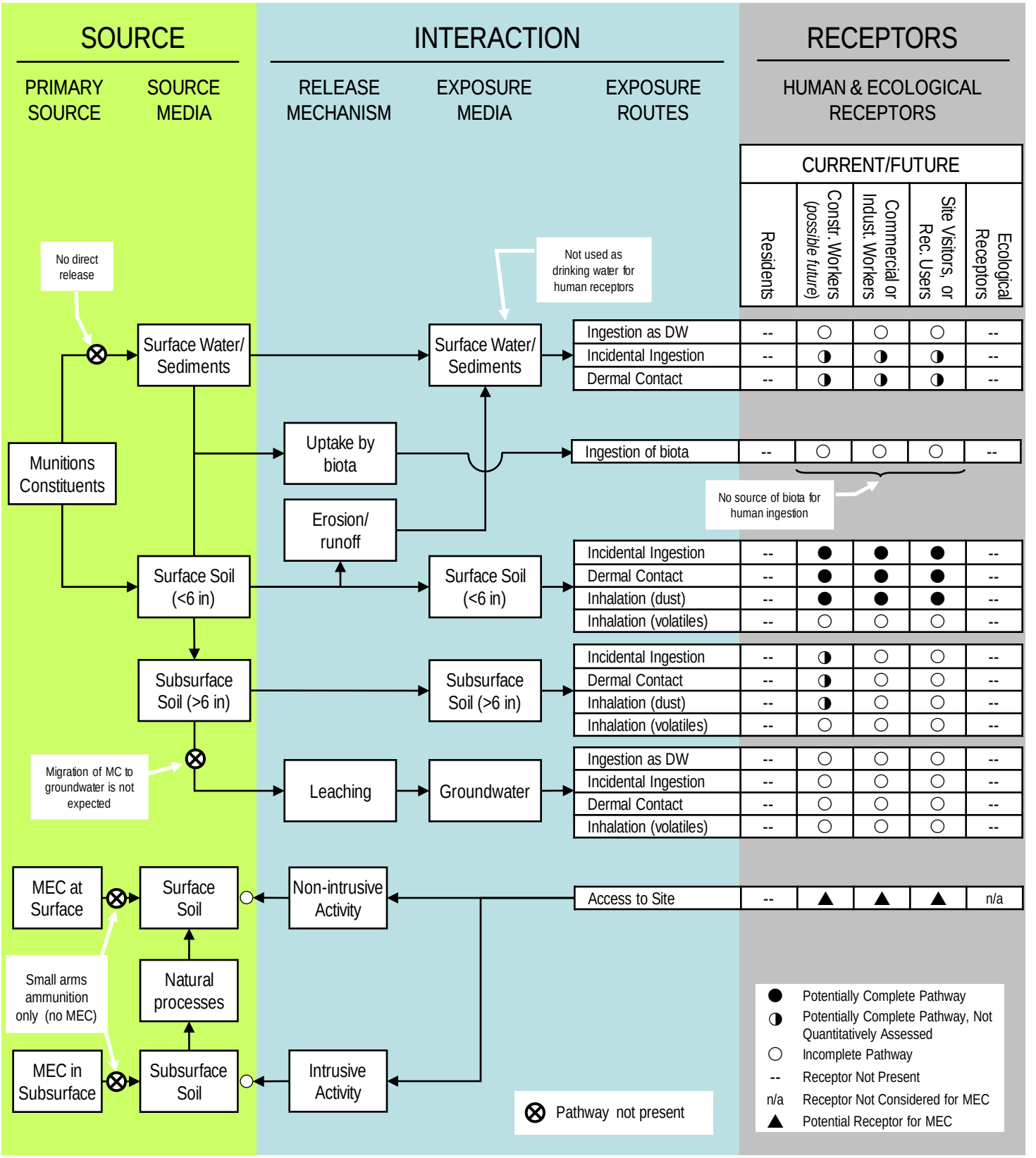
Profile Type	MRS Characterization
	saturated zone less than 10 feet thick and have a potential yield of 10 to 100 gpm (Miller, 1987). There are no groundwater wells within the Hornell Rifle Range (new) MRS.
	Hydrology: No surface water; however, the site is part of a flood control project associated with Almond Lake located approximately 300 yards northeast of the MRS (Google Earth, 2011; Malcolm Pirnie 2009a, USGS 1978b).
	Vegetation: The western portion of the MRS is forested land and the rest of the MRS is landscaped with grasses, shrubs and some trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Hornell Rifle Range. Additionally, there are no National Historic Landmarks located in Steuben County, NY (National Park Service, 2011a, b).
	Wetlands: Wetlands do not occur within Hornell Rifle Range (USFWS, 2011c).
	Demographics: The total population of Hornellsville is 3,806 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The western part of the MRS is forested and the rest of the area is covered by grasses and shrubs. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occurs in Steuben County, Northeastern bulrush (*Scirpus ancistrochaetus*); however, no T&E species are listed to occur at Hornell Rifle Range MRS (USFWS, 2011b).
	Degree of Disturbance: High to Low disturbance level is present at the MRS. The western portion of the MRS is undeveloped, low level of disturbance. The eastern portion of the MRS has been redeveloped into a road, and parking lot, high level of disturbance.
Land Use and Exposure Profile	Current Land Use: Federal flood control project, parking lot for the Finger Lakes Hiking Trail, portion of the Kanakadea Park and roadways.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors with possible construction workers.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50-caliber cartridge, 5.56mm cartridge and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.

Profile Type	MRS Characterization
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for construction workers, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for construction workers during intrusive construction activities; however, these pathways are considered to be potentially complete but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-12 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Hornell Rifle Range (NYHQ-013-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** February 22, 2011



4.13 JAMESTOWN RIFLE RANGE MRS (AEDB-R # NYHQ-014-R-01)

Table 4-13 presents the CSM for Jamestown Rifle Range MRS. Figure 4-13 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-13

Conceptual Site Model for Jamestown Rifle Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Frewsburg, Chautauqua County, in southwestern part of New York.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 80.1° F. The coldest month of the year is January, with an average minimum temperature of 14.1° F. The annual average precipitation is 45.68 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 5.10 inches (IDcide, 2011j).
	Geology: The Jamestown Rifle Range MRS is on the northern margin of the Appalachian Plateaus physiographic province in southwestern New York. Geologic maps in Olcott (1995) show that Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Jamestown Rifle Range MRS. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciation. For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: The Jamestown Rifle Range MRS is in a flat marshy depression on the west side of Conewango Creek. Elevation within the MRS is approximately 1240 feet above sea level (USGS, 1980b).
	Soil: The soil in the Jamestown Rifle Range MRS is predominantly poorly drained Canandaigua silt loam in depressions. The material is derived from silty and clayey glacial lake deposits. A typical soil profile is silt loam from 0 to 72 inches. There is an area of very poorly drained Canandaigua mucky silt loam in the southwest part of the MRS. The soil has a layer of mucky silt loam from 0 to 6 inches overlying silt loam to 72 inches. Ponding in this area is frequent (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The Jamestown Rifle Range MRS is in a lowland adjacent to Conewango Creek. The sand and gravel valley-fill aquifer in the vicinity of the MRS is confined by a layer of till, fine sand, silt or clay overlying sand and gravel and has a potential yield that could range from 5 to 500 gpm (Miller, 1988). There are no groundwater wells within the Jamestown Rifle Range MRS.
	Hydrology: Stillwater Creek flows to the east and parallels the northern MRS

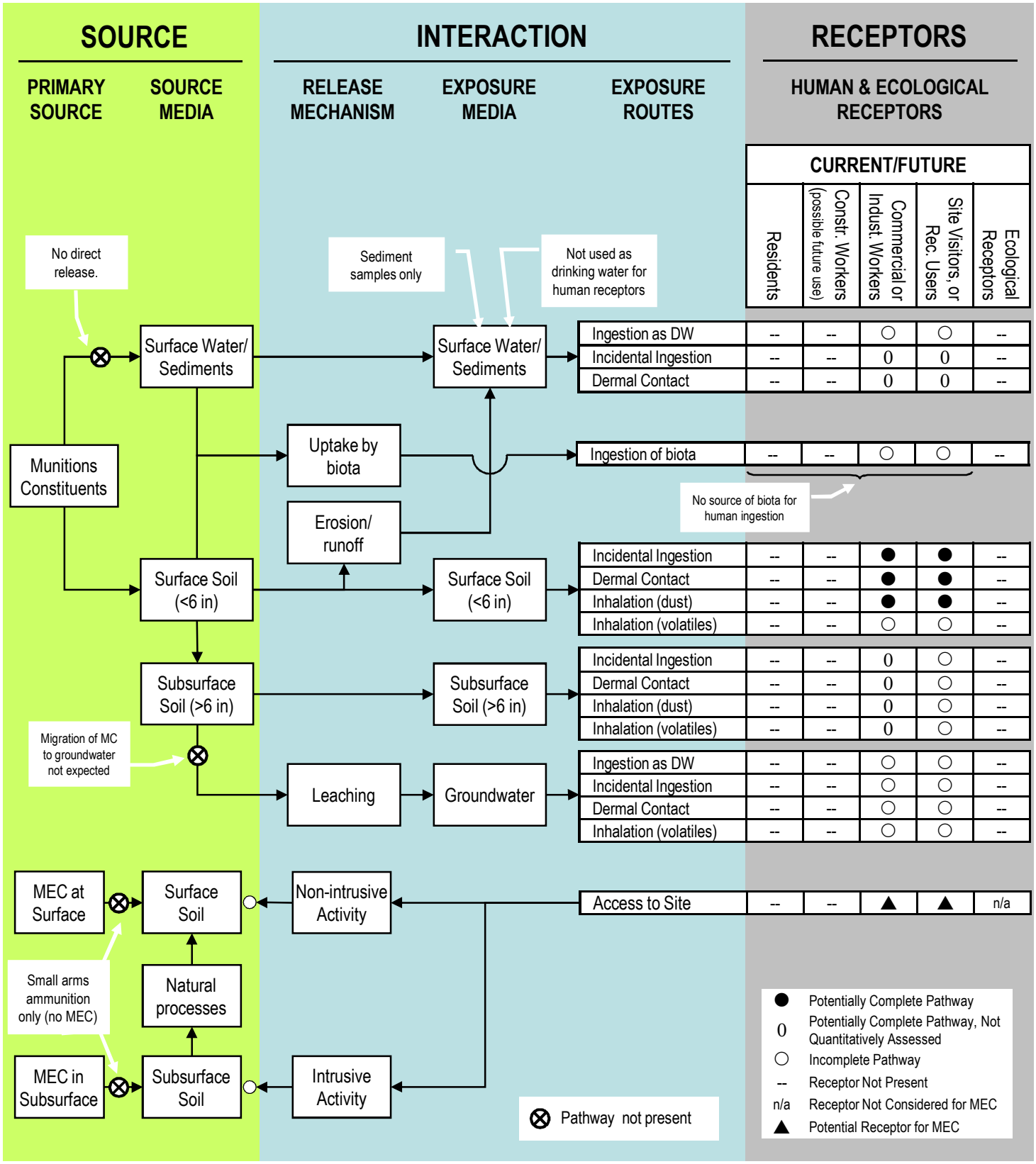
Profile Type	MRS Characterization
	boundary. Stillwater Creek empties into Conewango Creek located outside, but adjacent to the eastern MRS boundary. Conewango Creek flows south. The majority of the MRS is a wetland area.
	Vegetation: The MRS is landscaped with grasses, shrubs and trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Jamestown Rifle Range. Additionally, there are no National Historic Landmarks located in Chautauqua County, NY (National Park Service, 2011a, b).
	Wetlands: There are four types of wetlands that occur within Jamestown Rifle Range: R2UBH (Riverine, Lower Perennial, Unconsoidated Bottom, Permanently Flooded), PFO1A (Palustrine, Forested, Broad-Leaved Deciduous, Temporary Flooded), PFO1C (Palustrine System, Forested, Broad-Leaved Deciduous, Seasonally Flooded), and PFO1/5E (Palustrine, Forested, Broad-Leaved Deciduous / Dead, Seasonally Flooded/Saturated) (USFWS, 2011c).
	Demographics: The total population of Frewsburg is 1,965 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is undeveloped land that is mostly landscaped with grassed, shrubs and trees. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occurs in Chautauqua County, Clubshell (*Pleurobema clava*); however, no T&E species are listed to occur at Jamestown Rifle Range MRS (USFWS, 2011b).
	Degree of Disturbance: Low disturbance level is present at the MRS. The MRS is undeveloped land.
Land Use and Exposure Profile	Current Land Use: Undeveloped swampy land.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and .45-70 caliber cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).

Profile Type	MRS Characterization
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. Based on the site conditions at this MRS, a direct release to sediment may have occurred, therefore, this pathway is potentially complete. Nearby surface water is dynamic and not used for human consumption, therefore the pathway is incomplete. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for site visitors and commercial/industrial workers are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for site visitors. Sediment samples are proposed (dependant on site conditions). However, the surface water exposure pathways will not be quantitatively assessed since surface water samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by human receptors. The groundwater exposure pathways are incomplete for site visitors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for site visitors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-13 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Jamestown Rifle Range (NYHQ-014-R-01)

Completed By: James Salisbury/Scott Anderson, PARSONS ***Date Completed:*** March 7, 2011



4.14 MALONE LTA MRS (AEDB-R # NYHQ-015-R-01)

Table 4-14 presents the CSM for Malone LTA MRS. Figure 4-14 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-14

Conceptual Site Model for Malone LTA MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Malone, Franklin County, in northern part of New York 70 miles south of Montreal, Canada.
	Structures: There are multiple county correctional facility structures (Franklin Correctional Facility) located in the MRS.
	Security: Access to the MRS is restricted; the MRS is a medium-level prison that is fenced and guarded.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 10s in the winter. The warmest month of the year is July, with an average maximum temperature of 76.3° F. The coldest month of the year is January, with an average minimum temperature of 4.3° F. The annual average precipitation is 37.81 inches with rainfall evenly distributed throughout the year. The wettest month of the year is August, with an average rainfall of 4.63 inches (IDcide, 2011k).
	Geology: The Malone LTA MRS is within the St. Lawrence Valley physiographic province north of the Adirondack Mountains. Geologic maps in Olcott (1995) show that Cambrian and Ordovician rocks are at the surface or subcrop glacial deposits in the vicinity of the Malone LTA MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Malone LTA MRS is on a northward sloping glacial outwash terrace with elevations ranging from approximately 630 to 710 feet above sea level. East of the MRS, the terrace drops down to the Salmon River at approximately 570 feet above sea level (USGS 1988, 1995d).
	Soil: NRCS classifies the soil within Malone LTA MRS as predominantly well drained Colton and Constable gravelly loamy sand. The material is derived from sandy and gravelly glaciofluvial deposits having a granitic rock and sandstone source. A typical soil profile is decomposed plant material from 0 to 3 inches; gravelly loamy sand from 3 to 27 inches; and stratified sand to gravel from 27 to 60 inches. The eastern one-third of the MRS is predominantly Adams and Colton soil on gentle to moderate slopes. The Adams soil profile is loamy sand from 0 to 22 inches and sand from 22 to 60 inches (NRCS, 2011).
	Hydrogeology: The Potsdam Sandstone aquifer generally is hydraulically connected to the overlying carbonate rocks and the two aquifers are confined by overlying glacial deposits. Recharge to the sandstone aquifer is by downward percolation through overlying glacial deposits and/or carbonate rocks. The intergranular porosity of the sandstone averages approximately 10 percent because of siliceous or calcareous cementation of constituent sand grains. Movement of groundwater is primarily through secondary openings including bedding planes, joints, and fractures. As reported in Olcott (1995), well data compiled from 12 domestic wells in northern New York indicated yields ranging from 3 to 30 gpm in sandstone intervals averaging 32.5 feet thick (Olcott, 1995). The village of Malone obtains its drinking water from two

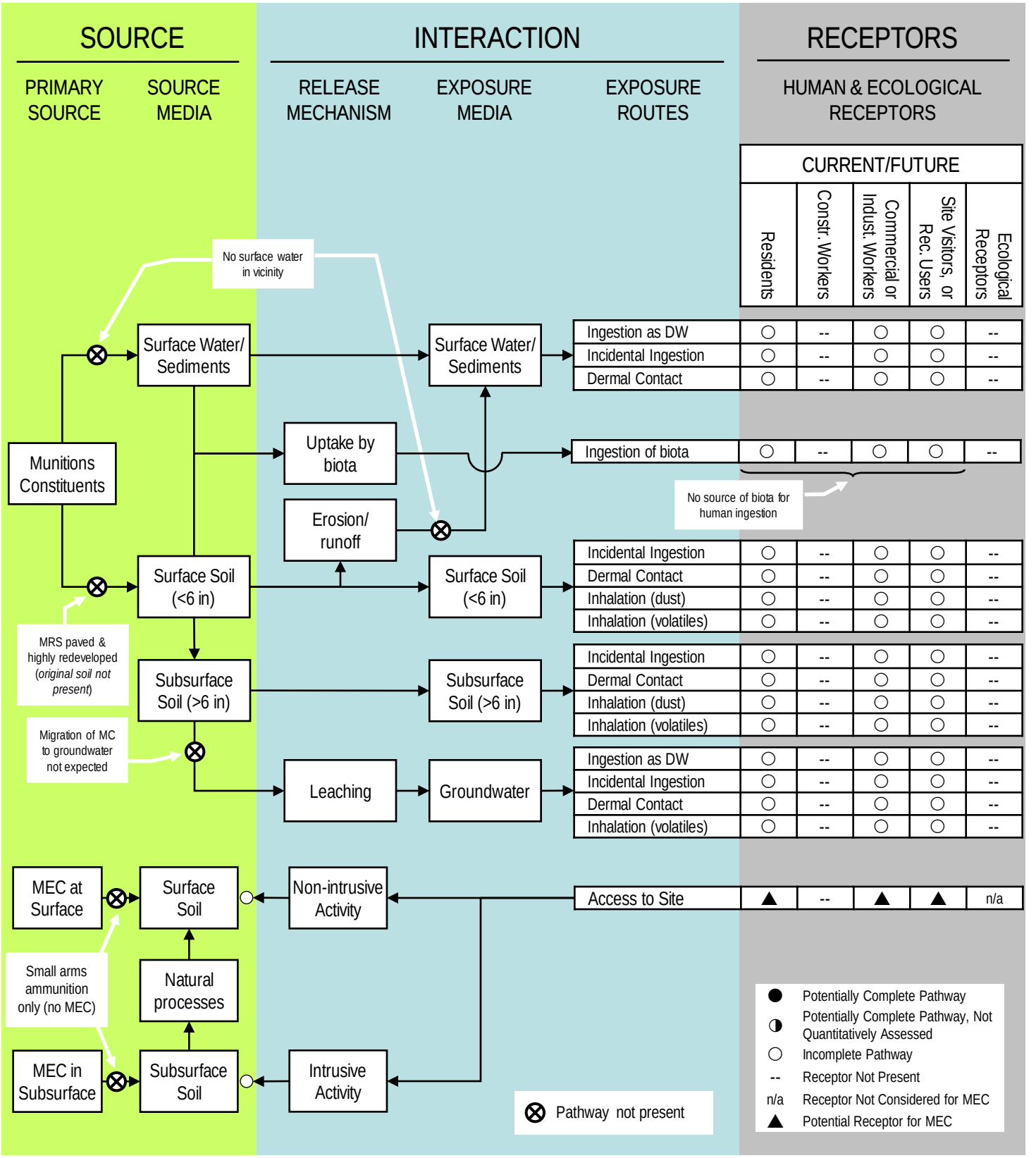
Profile Type	MRS Characterization
	groundwater wells seven miles from the village (Village of Malone, 2011). There are no groundwater wells within the Malone LTA MRS.
	Hydrology: A portion of Lamica Lake is located in the northeast corner of the MRS (Google Earth, 2011; USGS 1988, 1995d).
	Vegetation: Majority of the MRS is the Franklin County Correctional Facility and the vegetation is sparse. The northeastern part of the MRS has some forested land.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Malone LTA. There is one National Historic Landmarks located in Franklin County, NY; however it is not located within the MRS boundaries (National Park Service, 2011a, b).
	Wetlands: There are two types of wetlands that occur within Malone LTA MRS: R3UBH (Riverine upper perennial (characterized by high water velocity) unconsolidated bottom permanently flooded) and PSS1/EM5E (Palustrine Scrub-Shrub broad leaved deciduous) (USFWS, 2011c).
	Demographics: The total population of Malone is 14,691 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The northeastern part of the MRS has some forested land but majority of the MRS is developed. No critical habitats are present.
	Ecological Receptors: There are no federally listed T&E species that occurs in Franklin County. No T&E species are listed to occur at Malone LTA MRS (USFWS, 2011b).
	Degree of Disturbance: High disturbance level is present at the MRS. The MRS is has been significantly developed.
Land Use and Exposure Profile	Current Land Use: Franklin Correctional Facility
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50-caliber cartridge, .45-70 caliber cartridge, 5.56mm cartridge and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: None, the site has been redeveloped.
	Munitions Debris: None, the site has been redeveloped.
	Associated Munitions Constituents: None, the site has been redeveloped.

Profile Type	MRS Characterization
	Transport Mechanisms/Migration Routes: None, the site has been redeveloped.
	Pathway Analysis: None of the exposure pathways were complete for receptors within the MRS because the MRS was paved and the site has been highly redeveloped. The original soil is not present. No surface water is located within the MRS.

FIGURE 4-14 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Malone LTA (NYHQ-015-R-01)

Completed By: M. Borejsza-Wysocka/J. Salisbury, PARSONS ***Date Completed:*** February 18, 2011



4.15 MOHAWK RIFLE RANGE MRS (AEDB-R # NYHQ-016-R-01)

Table 4-15 presents the CSM for Mohawk Rifle Range MRS. Figure 4-15 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-15

Conceptual Site Model for Mohawk Rifle Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Herkimer, Herkimer County, in central of New York.
	Structures: There are two structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 84.3° F. The coldest month of the year is January, with an average minimum temperature of 13.8° F. The annual average precipitation is 42.88 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 4.3 inches (IDcide, 2011l).
	Geology: The Mohawk Rifle Range MRS is within the Appalachian Plateaus physiographic province south of the Adirondack Mountains. Geologic maps in Olcott (1995) show that Cambrian and Ordovician rocks are at the surface or subcrop glacial deposits in the vicinity of the Mohawk Rifle Range MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Mohawk Rifle Range MRS is in the relatively flat flood plain of the West Canada Creek where the elevation ranges from approximately 420 to 440 feet above sea level. On the east side of the creek, the valley wall is approximately 200 feet high and is very steep. Within the MRS on the east side of the creek, elevations range from approximately 420 to 560 feet above sea level (USGS, 1943).
	Soil: The soil within the Mohawk Rifle Range MRS is primarily Hamlin fine sandy loam and Teel fine sandy loam in the flood plain of the West Canada Creek tributary to the Mohawk River. The material is silty alluvium derived from siltstone, shale, and limestone. A typical profile for the Hamlin soil is fine sandy loam from 0 to 9 inches; very fine sandy loam from 9 to 38 inches; and fine sandy loam from 38 to 60 inches. On the east side of the West Canada Creek, the soil is classified as rough broken land consisting of channery loam from 0 to 60 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The Mohawk Rifle Range MRS is in the valley of the West Canada Creek tributary to the Mohawk River. The Surficial Aquifer in the MRS is an unconfined valley-fill aquifer capable of producing in excess of 100 gpm (Bugliosi et al., 1987a). The aquifers are recharged rapidly by water percolating through overlying material. There are no groundwater wells within the Mohawk Rifle Range MRS.

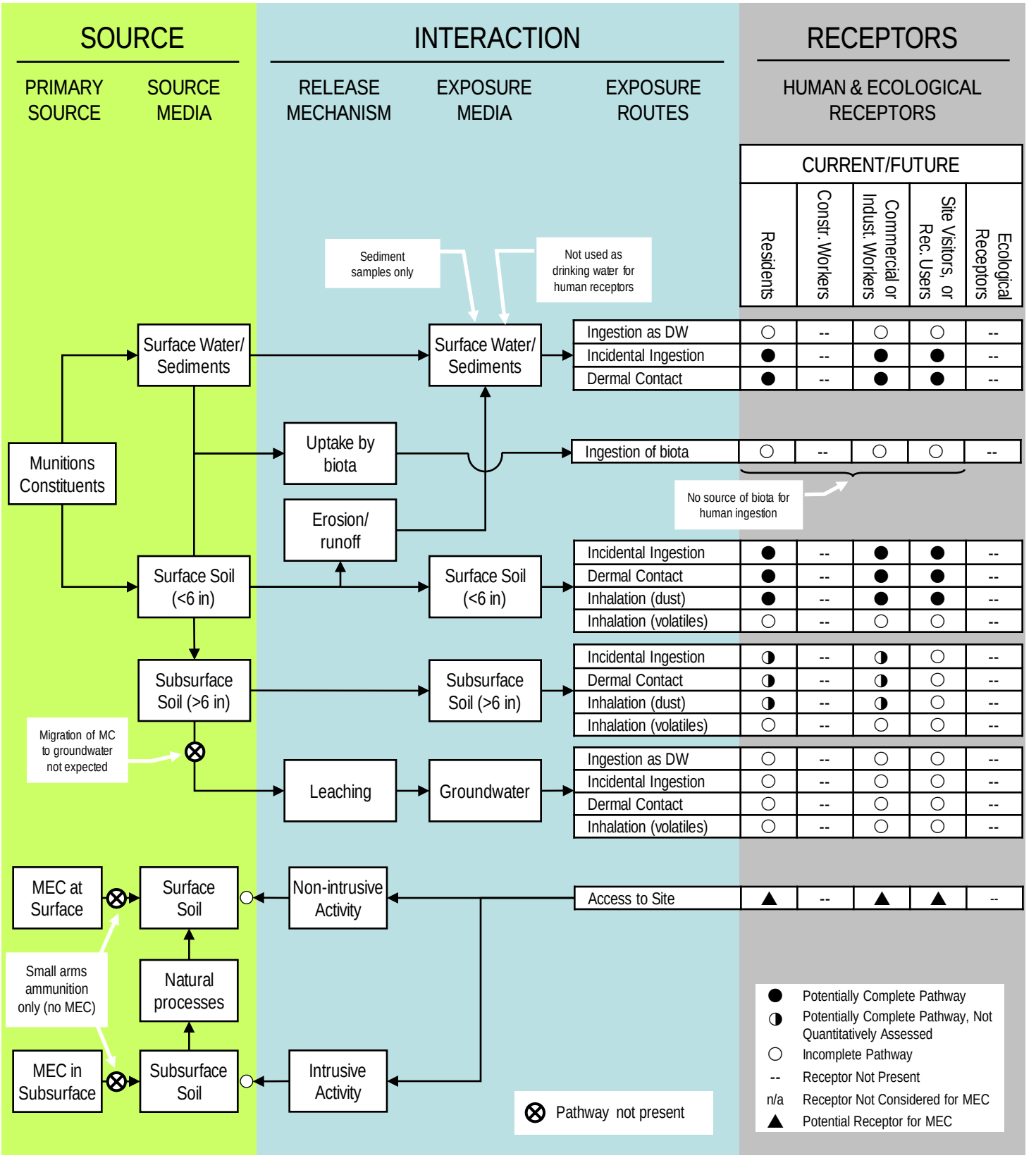
Profile Type	MRS Characterization
	Hydrology: Canada Creek flows to the south through the eastern portion of the MRS (Google Earth, 2011; USGS, 1943).
	Vegetation: Majority of the MRS is agricultural land and the eastern border of the MRS is forested land.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Mohawk Rifle Range. There is one National Historic Landmarks located in Herkimer County, NY; however it does not occur within the MRS (National Park Service, 2011a, b).
	Wetlands: Wetlands do not occur within Mohawk Rifle Range (USFWS, 2011c).
	Demographics: The total population of Herkimer is 9,360 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: Majority of the MRS is agricultural land and the eastern border of the MRS has forested land. No critical habitats are present.
	Ecological Receptors: There are no federally listed T&E species that occurs in Herkimer County, therefore, no T&E species are listed to occur at Mohawk Rifle Range MRS (USFWS, 2011b).
	Degree of Disturbance: Medium level of disturbance is present at the MRS due to agricultural practices.
Land Use and Exposure Profile	Current Land Use: Agricultural purposes, undeveloped forested and residential land.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, and commercial/industrial users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff.

Profile Type	MRS Characterization
	Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. Based on the site conditions at this MRS, the former range is in close proximity to a surface water feature therefore the transport or direct release of MC into sediment may have occurred. The sediment pathway is potentially complete however, nearby surface water is dynamic and not used for human consumption, therefore the surface water pathway is incomplete. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening and commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. Sediment samples are proposed. However, the surface water exposure pathways will not be quantitatively assessed since surface water samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-15 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York –Mohawk Rifle Range (NYHQ-016-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** February 24, 2011



4.16 NDNODS CREEDMOOR RIFLE RANGE MRS (AEDB-R # NYHQ-001-R-01)

Table 4-16 presents the CSM for NDNODS Creedmoor Rifle Range MRS. Figure 4-16 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-16

Conceptual Site Model for NDNODS Creedmoor Rifle Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Queens Village, Queens County, in located on the western portion of Long Island, NY.
	Structures: The MRS is densely populated with residential and commercial structures.
	Security: A portion of this MRS is developed as a psychiatric hospital and is fenced; however, the entrance does not have a gate. Another portion of the MRS is developed as recreational areas and is open to the public.
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 30s in the winter. The warmest month of the year is July, with an average maximum temperature of 82.8° F. The coldest month of the year is January, with an average minimum temperature of 25.4° F. The annual average precipitation is 46.36 inches with rainfall evenly distributed throughout the year. The wettest month of the year is March, with an average rainfall of 4.28 inches (IDcide, 2011m).
	Geology: The NDNODS Creedmoor Rifle Range MRS is within the Coastal Plain physiographic province in Queens County on western Long Island, New York (Olcott, 1995). The crystalline bedrock surface is formed by Paleozoic age igneous and metamorphic rocks that slope southward under Long Island at depths ranging from approximately 200 to 1000 feet below sea level in Queens County. The crystalline bedrock does not outcrop on Long Island but is exposed onshore in Connecticut north of Long Island Sound. Cretaceous age (65 to 145 million years old) coastal plain sediments of the Raritan and Magothy Formations overlie crystalline basement in a southward thickening wedge of primarily unconsolidated to semi-consolidated clay, sand and gravel. The unconsolidated Raritan Formation includes the lower Lloyd Sand Member and an upper unnamed clay member. The Lloyd Sand Member consists of fine to coarse sand and gravel within a clayey matrix and reaches a maximum thickness of approximately 300 feet within Queens County. The Magothy Formation consists of unconsolidated fine to medium quartz sand with layers and lenses of clay, silt, coarse sand and gravel. Both the Raritan and Magothy Formations were eroded from the northwest part of Long Island before glaciation (Olcott, 1995). No Tertiary age sediments are present above the Cretaceous section on Long Island. The basal Pleistocene Jameco Gravel, consisting of fine sand to gravel with lenses of clay and silt, was deposited in western Long Island, including the southern half of Queens County. The Jameco Gravel is overlain by the Gardiners Clay in the southern half of Queens County. Younger sediments are glacial deposits (Olcott, 1995). Continental-scale glaciers covered most of the northern United States episodically over the last 1.8 million years. The latest glacial advance approximately 22,000 years ago advanced as far south as Long Island before beginning to recede. Glaciers scoured and removed soil and soft weathered surface rocks as they moved. A variety of landforms were left behind when the glaciers eventually receded approximately 10,000 years ago (Skehan, 2008). Two terminal moraines were deposited at the front of the glacier on Long Island. The moraines mark the southern limit of glaciation. The moraines are till consisting of unsorted and unstratified clay, silt, sand, gravel, cobbles, and boulders mixed and/or interbedded with glacial outwash consisting of fine to coarse quartz sand

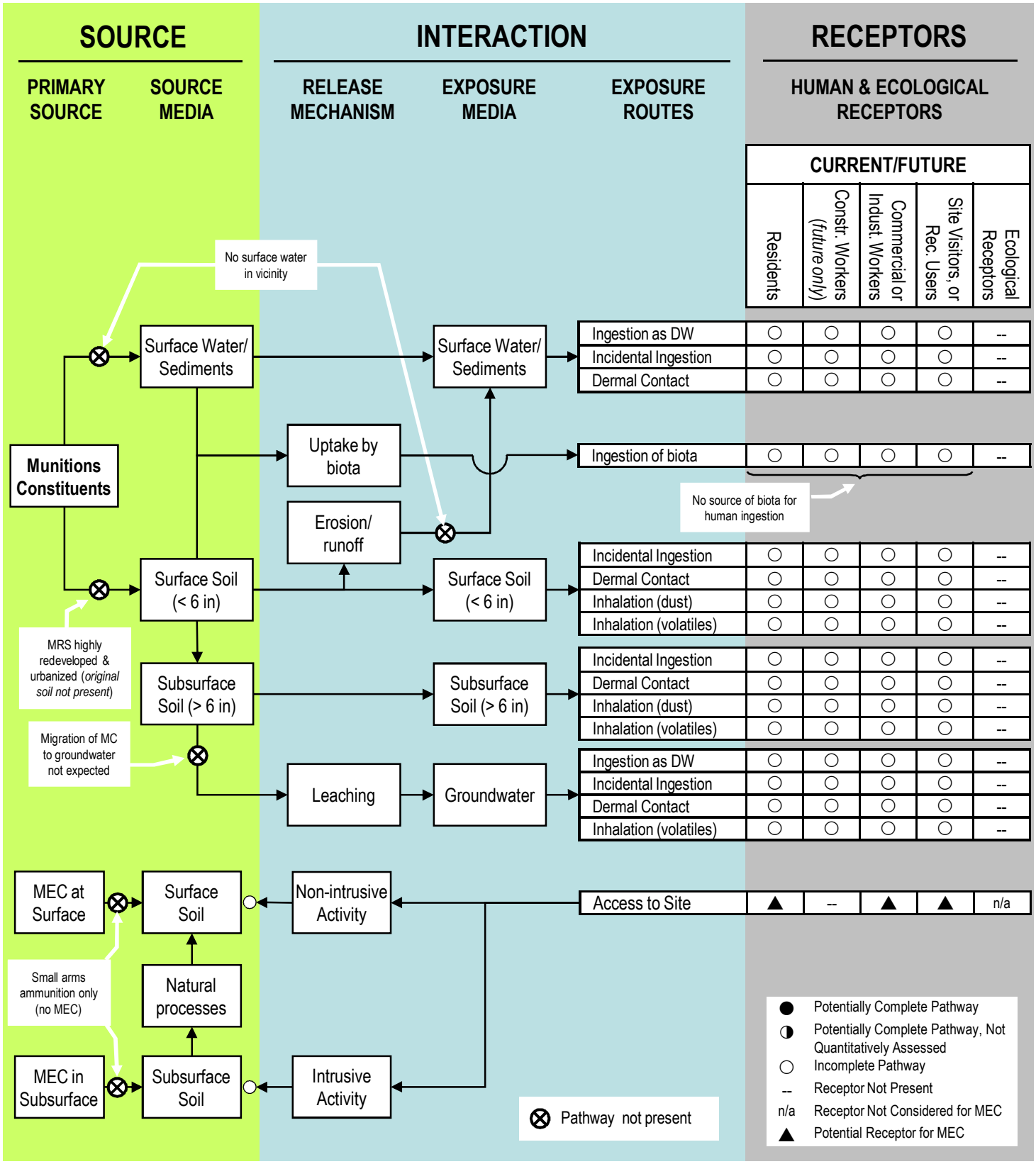
Profile Type	MRS Characterization
	and gravel (Olcott, 1995).
	Topography: The surface within the NDNODS Creedmoor Rifle Range MRS slopes gently toward the south. Elevations range from approximately 115 feet above sea level in the northern part of the MRS to approximately 90 feet above sea level at the southern boundary (USGS 1969).
	Soil: The NDNODS Creedmoor Rifle Range MRS is in an urban community. The NRCS has not classified the soil in that area. The Final State/Territory Inventory Report for New York described the soil as silt/silty clay (Malcolm Pirnie, 2009b).
	Hydrogeology: The Lloyd aquifer is within the Lloyd Sand Member of the Raritan Formation and is the lowermost principal aquifer on Long Island. The aquifer ranges in depth from approximately 200 to 300 feet below sea level in the vicinity of the NDNODS Creedmoor Rifle Range MRS. The aquifer thickness ranges from a featheredge to maximum of 300 feet in southern Queens County. The unnamed clay member of the Raritan Formation consists of clay with lenses of sand and lignite. This clay member has a maximum thickness of 300 feet and forms a leaky confining unit between the Lloyd aquifer and the overlying Magothy aquifer. Water moves downward from the Magothy aquifer to recharge the Lloyd aquifer (Olcott, 1995). Groundwater is the only source of drinking water on Long Island. The Lloyd aquifer and the Magothy aquifer are part of the North Atlantic Coastal Plain Aquifer System. Local aquifers that exist in the Jameco Gravel and in glacial deposits are part of the Surficial Aquifer System (Olcott, 1995). Based on USGS data, there are six groundwater wells within the NDNODS Creedmoor Rifle Range MRS. Parsons obtained data for Well number Q 577.1. This well was completed at 640 feet below land surface in the North Atlantic Coastal Plain aquifer system; the local aquifer was the "Lloyd Aquifer." Depth to water ranged from 101 to 115 feet below land surface during 2006 to 2010 (USGS, 2011).
	Hydrology: There is no surface water within the MRS (Google Earth, 2011; USGS, 1969).
	Vegetation: The MRS heavily developed and has limited vegetation, primarily grasses, and shrubs.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at NDNODS Creedmoor Rifle Range. Additionally, there are no National Historic Landmarks located in Queens County, NY (National Park Service, 2011a, b).
	Wetlands: Wetlands do not present within NDNODS Creedmoor Rifle Range (USFWS, 2011c).
	Demographics: The total population of Queens Village is 71,684 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is heavily developed and there are no critical habitats are present.
	Ecological Receptors: There are five federally listed T&E species listed in Queens County, Piping Plover (*Charadrius melodus*), Hawksbill sea turtle (*Eretmochelys imbricata*), Leatherback sea turtle (*Dermochelys coriacea*), Green sea turtle (*Chelonia mydas*), Loggerhead sea turtle (*Caretta caretta*); however, no T&E species are listed to occur at NDNODS Creedmoor Rifle Range MRS (USFWS, 2011b).

Profile Type	MRS Characterization
	Degree of Disturbance: High disturbance level is present at the MRS. The MRS is has been significantly developed.
Land Use and Exposure Profile	Current Land Use: Residential and recreational properties and the Creedmoor Psychiatric Center.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors plus future construction workers.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and .45-70 caliber cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: None, the site has been redeveloped.
	Munitions Debris: None, the site has been redeveloped.
	Associated Munitions Constituents: None, the site has been redeveloped.
	Transport Mechanisms/Migration Routes: None, the site has been redeveloped.
	Pathway Analysis: None of the exposure pathways were complete for receptors within the MRS because the MRS was paved and the site has been highly redeveloped. The original soil is not present. No surface water is located within the MRS.

FIGURE 4-16 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – NDNODS Creedmoor Rifle Range

Completed By: James Salisbury, PARSONS ***Date Completed:*** Feb. 14, 2011



4.17 NDNODS GENESEO RANGE (OLD) MRS (AEDB-R # NYHQ-002-R-01)

Table 4-17 presents the CSM for NDNODS Geneseo Range (old) MRS. Figure 4-17 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-17

Conceptual Site Model for NDNODS Geneseo Range (old) MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Piffard, Livingston County, in the northwestern portion of New York.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 81.2° F. The coldest month of the year is January, with an average minimum temperature of 15.7° F. The annual average precipitation is 30.44 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 3.68 inches (IDcide, 2011n).
	Geology: The NDNODS Geneseo Range (old) MRS is on the northern margin of the Appalachian Plateaus physiographic province in western New York. Geologic maps in Olcott (1995) show that Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the NDNODS Geneseo Range (old) MRS. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciation. For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: The NDNODS Geneseo Range (old) MRS is adjacent to and within the Bairds Creek stream bed that is incised into a glacial lake terrace. Elevation within the MRS ranges from approximately 650 to 710 feet above sea level (USGS 1978a).
	Soil: The NRCS classifies soil within the NDNODS Geneseo Range (old) MRS as undifferentiated alluvium in flood plains within Salt Creek and Bairds Creek stream beds and moderately well drained Odessa silt loam on gentle slopes. The Odessa silt loam is derived from reddish clayey and silty glacial lake deposits (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The surficial aquifer has unknown potential in the NDNODS Geneseo Range (old) MRS (Miller, 1988). Adjacent to the MRS toward the east, glacial lake deposits or till at the surface may be a confining unit above possible sand and gravel aquifers. Approximately one mile northeast, sand and gravel are overlain by till, very fine sand, silt or clay and wells in the confined aquifer have a potential yield of 5 to 500 gpm (Miller, 1988). Based on USGS data, wells surrounding the MRS are completed in "Sand and Gravel" local aquifers (USGS, 2011). There are no groundwater wells within the MRS.

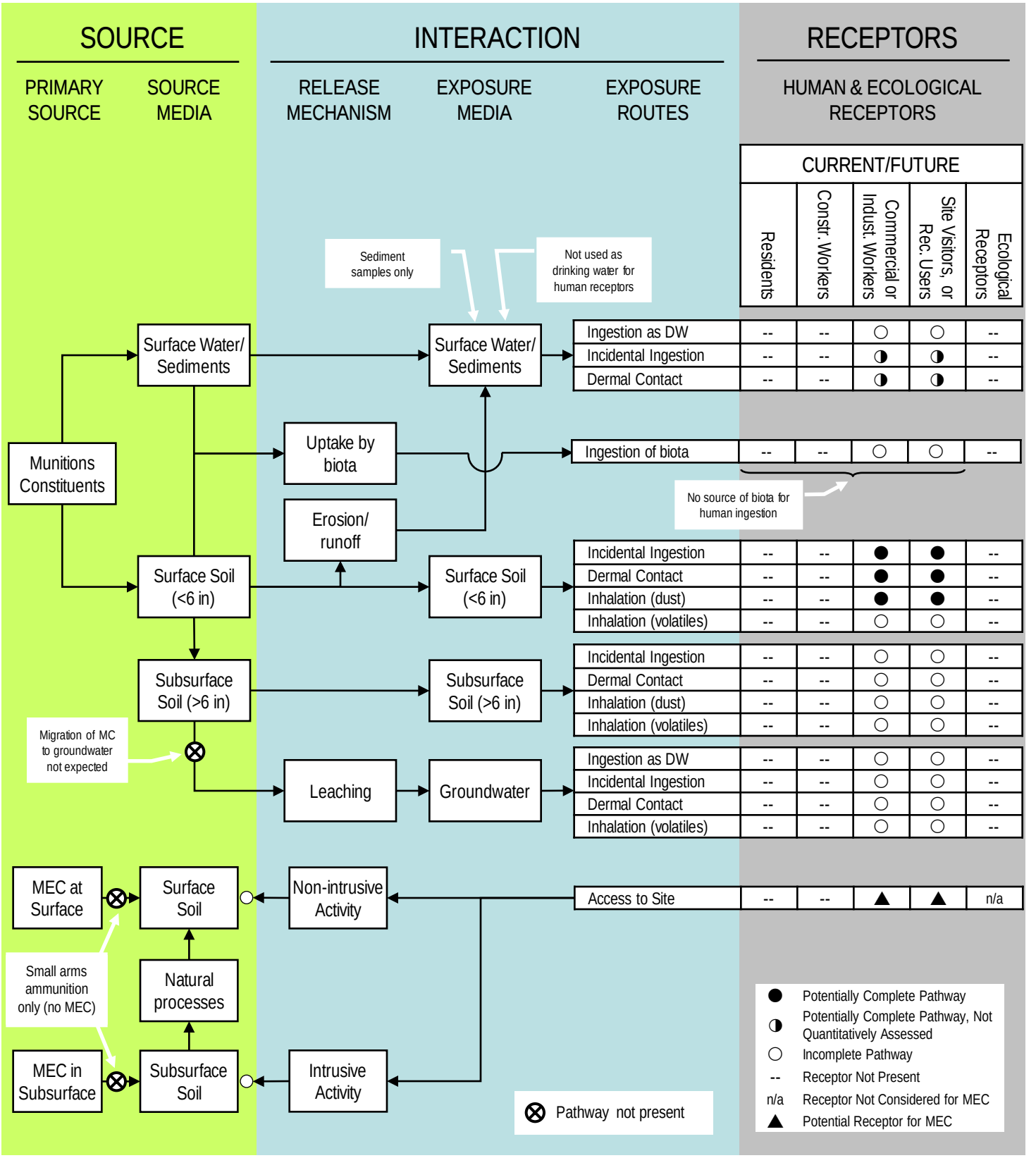
Profile Type	MRS Characterization
	Hydrology: Bairds Creek flows to the east and is located along the northern edge of the MRS. The creek empties into a large north-south oriented wetland located at the eastern end of the MRS (Google Earth, 2011; USGS, 1978a).
	Vegetation: The MRS is heavily wooded.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at NDNODS Geneseo Range (old). Additionally, there are no National Historic Landmarks located in Livingston County, NY (National Park Service, 2011a, b).
	Wetlands: There is one types of wetlands that occurs within NDNODS Geneseo Range (old): PEM1C (Palustrine, Emergent, Persistent, Seasonally Flooded) (USFWS, 2011c).
	Demographics: The total population of Piffard is 2,320 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is undeveloped land that is heavily wooded. No critical habitats are present.
	Ecological Receptors: There are no federally listed T&E species that occurs in Livingston County; therefore, no T&E species are listed to occur at NDNODS Geneseo Range (old) MRS (USFWS, 2011b).
	Degree of Disturbance: Low disturbance level is present at the MRS. The MRS is undeveloped land.
Land Use and Exposure Profile	Current Land Use: Undeveloped forested land.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, and .45 caliber cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these

Profile Type	MRS Characterization
	compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. Based on the site conditions at this MRS, the former range is in close proximity to a surface water feature therefore the transport or direct release of MC into sediment may have occurred. The sediment pathway is potentially complete however, nearby surface water is dynamic and not used for human consumption, therefore the surface water pathway is incomplete. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. Sediment samples are proposed. However, the surface water exposure pathways will not be quantitatively assessed since surface water samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-17 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – NDNODS Geneseo Range (old) (NYHQ-002-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** March 7, 2011



4.18 NDNODS RENSSELAER WYCK TARGET RANGE MRS (AEDB-R # NYHQ-003-R-01)

Table 4-18 presents the CSM for NDNODS Rensselaer Wyck Target Range MRS. Figure 4-18 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-18

Conceptual Site Model for NDNODS Rensselaer Wyck Target Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Rensselaer, Rensselaer County, in east-central New York.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS. The range is a public park.
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 82.2° F. The coldest month of the year is January, with an average minimum temperature of 13.3° F. The annual average precipitation is 42.06 inches with rainfall evenly distributed throughout the year. The wettest month of the year is May, with an average rainfall of 4.13 inches (IDcide, 2011o).
	Geology: The NDNODS Rensselaer Wyck Target Range MRS is within the Appalachian Valley and Ridge physiographic province in the Hudson River Valley. Geologic maps in Olcott (1995) show that Cambrian and Ordovician rocks are at the surface or subcrop glacial deposits in the vicinity of the NDNODS Rensselaer Wyck Target Range MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The NDNODS Rensselaer Wyck Target Range MRS is located in a steep-walled stream valley incised into a probable glacial lake terrace. The valley floor slopes gently southwestward with elevations ranging from approximately 90 feet above sea level at the northeast end of the MRS to 60 feet above sea level at the southwest end. The southeastern valley wall rises abruptly to approximately 150 feet at the boundary of the MRS. The slope above the valley wall continues to rise to a peak of 300 feet southeast of the MRS. The northwestern valley wall rises abruptly to approximately 150 feet above sea level to a relatively flat terrace. The northwestern boundary of the MRS is approximately coincident with the valley wall (USGS, 1995e).
	Soil: The predominant soils within the NDNODS Rensselaer Wyck Target Range MRS are the Limerick silt loam on very gentle slopes and the Hoosic gravelly sandy loam on steep slopes. The poorly drained Limerick silt loam is a flood plain deposit in the stream channel. The material is derived from alluvium that is primarily silt and very fine sand. A typical profile is silt loam from 0 to 80 inches. The Hoosic gravelly sandy loam is derived from sandy and gravelly glaciofluvial deposits. A typical profile is gravelly sandy loam from 0 to 9 inches; very gravelly sandy loam from 9 to 23 inches; and very gravelly sand from 23 to 60 inches. Soil at the northeast end of the MRS is Hudson silt loam derived from clayey and silty glacial lake deposits (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits.

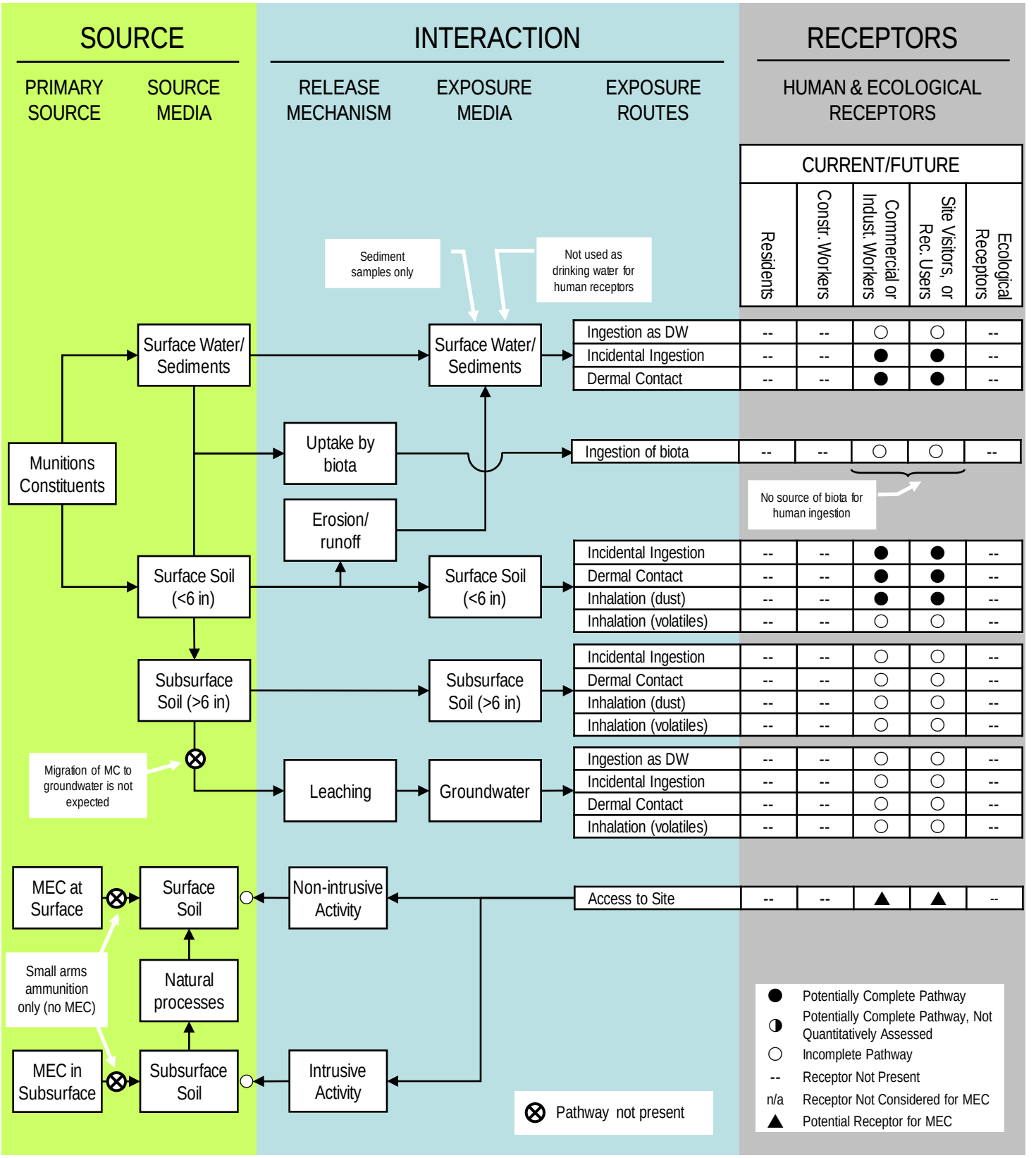
Profile Type	MRS Characterization
	Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The City of Rensselaer obtains its water supply from surface sources through purchases from the City of Troy, New York (City of Rensselaer, 2011). The Surficial Aquifer has unknown potential in the MRS (Bugliosi et al., 1987a). Sand and gravel aquifers in the Hudson River valley 0.5 miles west of the MRS have potential yields in excess of 100 gpm in saturated zones greater than 10 feet (Bugliosi et al., 1987a). There are no groundwater wells within the NDNODS Rensselaer Wyck Target Range MRS.
	Hydrology: A creek flows from the northeast boundary of the MRS to the southeast boundary where it flows through a culvert under a major highway (Google Earth, 2011; USGS, 1995e).
	Vegetation: The MRS is landscaped with grasses, shrubs and trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at NDNODS Rensselaer Wyck Target Range. There are five National Historic Landmarks located in Rensselaer County, NY; however none occur within the MRS (National Park Service, 2011a, b).
	Wetlands: Wetlands are not present within NDNODS Rensselaer Wyck Target Range (USFWS, 2011c).
	Demographics: The total population of Rensselaer is 7,851 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is undeveloped land that is mostly landscaped with grassed, shrubs and trees. No critical habitats are present.
	Ecological Receptors: There are two federally listed T&E species that occurs in Rensselaer County, Indiana bat (*Myotis sodalist*), Shortnose sturgeon (*Acipenser brevirostrum*); however, no T&E species are listed to occur at NDNODS Rensselaer Wyck Target Range MRS (USFWS, 2011b).
	Degree of Disturbance: Low disturbance level is present at the MRS. The MRS is undeveloped land.
Land Use and Exposure Profile	Current Land Use: The Hollow, a city park.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, and .45 caliber cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms;

Profile Type	MRS Characterization
	maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. Based on the site conditions at this MRS, the former range is in close proximity to a surface water feature therefore the transport or direct release of MC into sediment may have occurred. The sediment pathway is potentially complete however, nearby surface water is dynamic and not used for human consumption, therefore the surface water pathway is incomplete. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil; however, the subsurface pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. Sediment samples are proposed. The surface water exposure pathways are potentially complete, but not quantitatively evaluated since surface water samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because no surface water exists that can be used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-18 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – NDNODS Rensselaer Wyck Target Range (NYHQ-003-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** March 7, 2011



4.19 NDNODS ROCHESTER RIFLE RANGE MRS (AEDB-R # NYHQ-004-R-01)

Table 4-19 presents the CSM for NDNODS Rochester Rifle Range MRS. Figure 4-19 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-19

Conceptual Site Model for NDNODS Rochester Rifle Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Penfield, Monroe County in northwestern part of New York, approximately five miles east of Rochester, NY.
	Structures: There is a gazebo structure located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS. The MRS is a county-owned park.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 81.4° F. The coldest month of the year is January, with an average minimum temperature of 16.6° F. The annual average precipitation is 33.98 inches with rainfall evenly distributed throughout the year. The wettest month of the year is August, with an average rainfall of 3.54 inches (IDcide, 2011p).
	Geology: The NDNODS Rochester Rifle Range MRS is within the Central Lowlands physiographic province west of the Adirondack Mountains and south of Lake Ontario. Geologic maps in Olcott (1995) show that Silurian age rocks including the sandstones of the Medina Group are at the surface or subcrop glacial deposits in the vicinity of the NDNODS Rochester Rifle Range MRS. Westward across Irondequoit Creek from the MRS, the Silurian rocks are absent and Cambrian and Ordovician rocks are at the surface or subcrop glacial lake deposits. The broad lowland in the vicinity of the NDNODS Rochester Rifle Range MRS is covered with clay and silt laid down as lake sediments in a much larger predecessor of Lake Ontario. Below the modern Irondequoit Creek, a deep, preglacial bedrock valley was filled with sand and gravel outwash from an earlier glacial stage (Olcott, 1995). For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The NDNODS Rochester Rifle Range MRS is in a ravine eroded into a terrace of probable glacial lake origin. The lowlands of the Irondequoit Creek are west of the MRS. Elevations within the MRS range from approximately 270 to 325 feet above sea level. The relatively flat surface of the terrace east of the MRS is approximately 390 feet above sea level (USGS, 1995f).
	Soil: Soil within the MRS is the Arkport, Dunkirk, Colonie complex of very fine loamy sand and loamy fine sand on moderate to steep slopes. The material is derived from glaciofluvial and deltaic deposits on a glacial lake plain. The soils are well drained to excessively drained (NRCS, 2011).
	Hydrogeology: The Irondogenesee aquifer consists of glacial deposits in a deep, pre-glacial bedrock valley that is approximately 300 feet deep near the MRS and deepens northward toward Lake Ontario. The aquifer is comprised of two thick sand and gravel layers separated by less permeable glacial lake beds. The lower zone of sand and gravel is 60 to 85 feet thick and may extend northward under Lake Ontario. South of the MRS, the aquifer consists only of the lower zone. Water in the lower zone is under artesian (confined) conditions over most of its area. Recharge of the lower zone

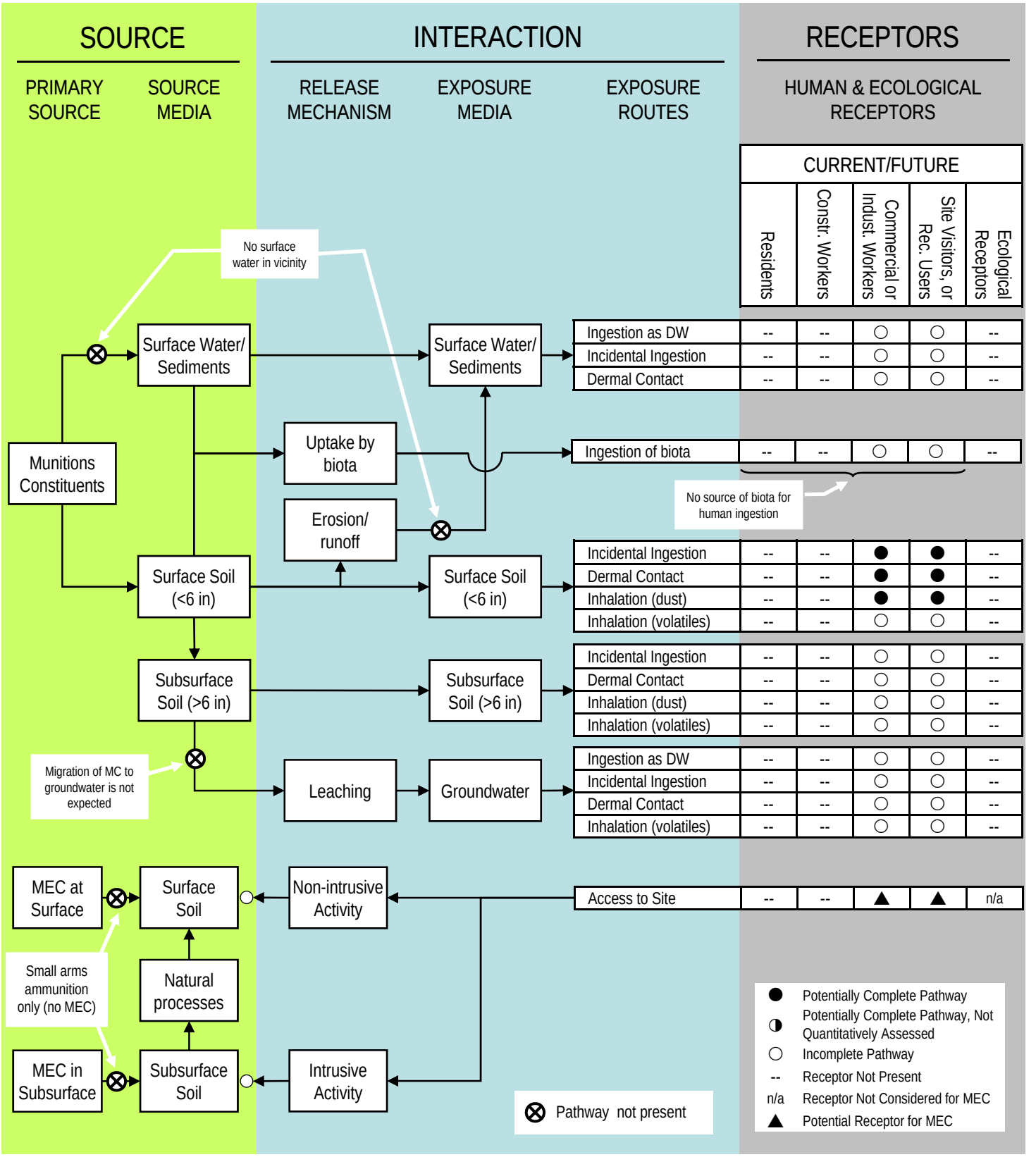
Profile Type	MRS Characterization
	south of the MRS is by leakage from stream beds such as Irondequoit Creek. In the vicinity of the MRS and northward, sources of recharge include flow from the south, inflow from fractured bedrock and percolation through leaky confining units. Water in the upper permeable zone is under unconfined conditions south of the MRS where the sand and gravel is exposed at the surface. Where the upper zone is covered by thick glacial lake deposits, the aquifer is confined. Recharge to the upper zone is by infiltration of precipitation where the sand and gravel are exposed at the surface. Wells completed in the Irondogenesee aquifer generally yield several hundred gpm (Olcott, 1995). The primary aquifer in the vicinity of the NDNODS Rochester Rifle Range MRS is the Irondogenesee aquifer. Groundwater from this aquifer is used by the Village of Webster for its water supply (Village of Webster, 2011). The larger surrounding communities including the City of Rochester use treated water from Lake Ontario. There are no groundwater wells within the NDNODS Rochester Rifle Range MRS.
	Hydrology: No surface water is present within the MRS (Google Earth, 2011; USGS, 1995f).
	Vegetation: The MRS densely wooded, primary vegetation is trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at NDNODS Rochester Rifle Range. There are two National Historic Landmarks located in the City of Rochester, Monroe County, NY; however, these landmarks do not occur within the MRS (National Park Service, 2011a, b).
	Wetlands: Wetlands are not present within NDNODS Rochester Rifle Range (USFWS, 2011c).
	Demographics: The total population of Penfield is 36,084 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is undeveloped forested land. No critical habitats are present.
	Ecological Receptors: There are no federally listed T&E species that occurs in Monroe County; therefore, no T&E species are listed to occur at NDNODS Rochester Rifle Range MRS (USFWS, 2011b).
	Degree of Disturbance: Low disturbance level is present at the MRS. The MRS is undeveloped land.
Land Use and Exposure Profile	Current Land Use: Ellison Park, county park.
	Current Potential Receptors: Current receptors include site visitors/recreational users and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .5.56mm cartridge and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.

Profile Type	MRS Characterization
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil; however, these subsurface pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. The surface water exposure pathways are incomplete for all receptors since no surface water is located within this MRS. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway for all receptors at the MRS is incomplete because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-19 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – NDNODS Rochester Rifle Range (NYHQ-004-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** February 22, 2011



4.20 OLEAN TARGET RANGE (NEW) MRS (AEDB-R # NYHQ-017-R-01)

Table 4-20 presents the CSM for Olean Target Range (new) MRS. Figure 4-20 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-20

Conceptual Site Model for Olean Target Range (new) MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Olean, Cattaraugusa County, in southwestern part of New York, five miles from the Pennsylvanian border.
	Structures: There are less than five structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 79.3° F. The coldest month of the year is January, with an average minimum temperature of 10.7° F. The annual average precipitation is 39.07 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 5.04 inches (IDcide, 2011q).
	Geology: The Olean Target Range (new) MRS is in the Appalachian Plateaus physiographic province in southwestern New York. Geologic maps in Olcott (1995) show that Devonian rocks are at the surface or subcrop glacial outwash deposits in the vicinity of the Olean Target Range (new) MRS. For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: Approximately 90 percent of the Olean Target Range (new) MRS is on the relatively flat to gently sloping floor of the Alleghany River valley. The remaining 10 percent of the MRS is on the slope of a hill near the southern boundary. The elevation on the valley floor is approximately 1420 feet above sea level. The surface gradually rises in the eastern part of the MRS to approximately 1480 feet. The hill on the southern border of the MRS rises to a peak at approximately 1780 feet above sea level. Within the MRS, elevations range from approximately 1420 to 1680 feet above sea level (USACE 1980c).
	Soil: Soil on the floor of the Alleghany River valley within the Olean Target Range (new) MRS is predominantly silt loam of several NRCS classifications. The Unadilla and Scio well drained and moderately well drained silt loams are glacial lake deposits, or eolian (windblown) deposits and reworked alluvium. The Niagara silt loam is derived from silty and clayey glacial lake deposits. The somewhat poorly drained Red Hook silt loam is derived from glaciofluvial deposits. On the hillslope within the MRS, the predominant soil classification is the Valois-Volusia-Mardin soil complex. Components of the complex are derived from loamy till and consist of gravelly silt loam or channery silt loam (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The Olean Target Range (new) MRS is within a primary water supply aquifer used by

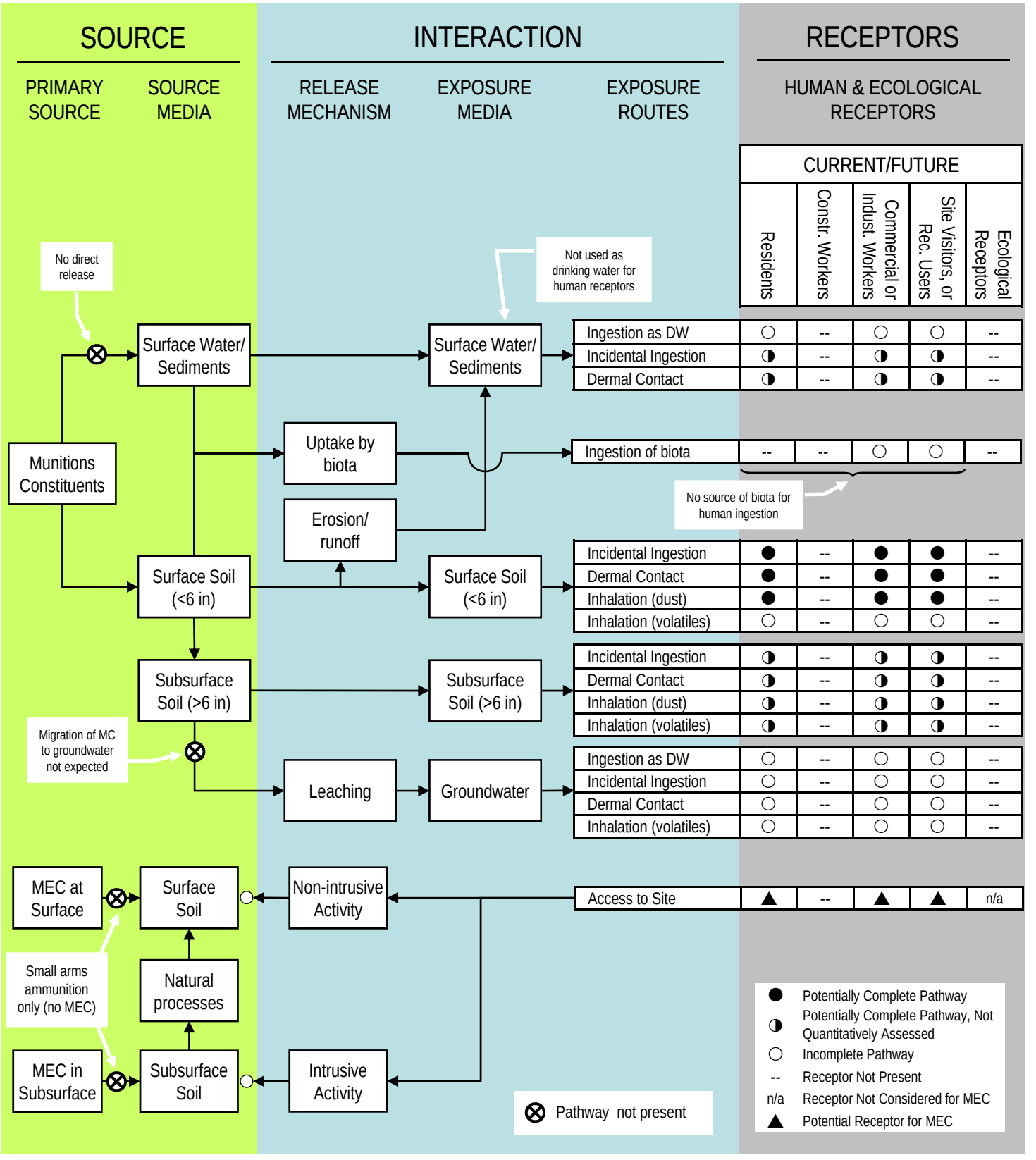
Profile Type	MRS Characterization
	the City of Olean. Currently the City of Olean relies on three groundwater wells and intake from Olean Creek for its water supplies (City of Olean, 2011). The Surficial Aquifer within the MRS is an unconfined valley-fill aquifer capable of producing in excess of 100 gpm from sand and gravel with a saturated thickness greater than 10 feet (Miller, 1988). A deeper confined sand and gravel aquifer is separated from the Surficial Aquifer by a layer of till or lake deposit (Miller, 1988). There are no groundwater wells within the Olean Target Range (new) MRS.
	Hydrology: Two small intermittent streams and one perennial stream flow into the Allegheny River (north of the MRS). A pond is located within the MRS. The intermittent streams flow to the northwest and cross the MRS from east to west. The perennial stream flows north and is located east of the target areas (Google Earth, 2011; USGS, 1980c).
	Vegetation: The MRS is landscaped with agricultural crops, grasses, shrubs and trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Olean Target Range (new). Additionally, there are no National Historic Landmarks located in Cattaraugus County, NY (National Park Service, 2011a, b).
	Wetlands: No wetland information available from the National Wetlands Inventory: Wetlands Mapper; however, according to Google Earth there appears to be impounded water features on site (Google Earth, 2011).
	Demographics: The total population of Olean is 1,931 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is comprised of agricultural land in the northeastern portion of the MRS and forested land in the rest of the MRS. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occurs in Cattaraugus County, Clubshell clam (*Pleurobema clava*); however, no T&E species are listed to occur at Olean Target Range (new) MRS (USFWS, 2011b).
	Degree of Disturbance: Medium to low disturbance of the MRS is present. The western portion of the MRS is undeveloped forested land, low level of disturbance; however the eastern portion is used for agricultural purposes and a medium level of disturbance is associated with agricultural activities.
Land Use and Exposure Profile	Current Land Use: Agricultural land, undeveloped land, and a residential property.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms;

Profile Type	MRS Characterization
	maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers, residents and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening and commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-20 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Olean Target Range (new) (NYHQ-017-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** February 21, 2011



4.21 ONEIDA RANGE MRS (AEDB-R # NYHQ-018-R-01)

Table 4-21 presents the CSM for Oneida Range MRS. Figure 4-21 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-21

Conceptual Site Model for Oneida Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Oneida, Madison County, in central part of New York.
	Structures: There are a number (<20) of residential structures located in the MRS.
	Security: A portion of the MRS consists of property owned by Oneida Water Department, which is fenced in and has an entrance gate. There are no barriers preventing access to any of the residential properties.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 80.4° F. The coldest month of the year is January, with an average minimum temperature of 13.5° F. The annual average precipitation is 39.35 inches with rainfall evenly distributed throughout the year. The wettest month of the year is September, with an average rainfall of 4.36 inches (IDcide, 2011r).
	Geology: The Oneida Range MRS is on the northern edge of the Appalachian Plateaus physiographic province southwest of the Adirondack Mountains. Geologic maps in Olcott (1995) show that Silurian rocks are at the surface or subcrop glacial deposits in the vicinity of the Oneida Range MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Oneida Range MRS is in an east-west trending valley between ridges of probable glacial origin. The peak elevation of the northern ridge is approximately 670 feet above sea level at the MRS boundary. The lowest elevation in the valley is approximately 560 feet. The ridge on the southern border of the MRS has a peak elevation of 820 feet above sea level within the MRS boundary (USGS 1993).
	Soil: The predominant soil type within the Oneida Range MRS is the Lairdsville silty clay loam on moderate to steep slopes. The material is derived from clayey till dominated by reddish calcareous shale and glacial lake deposits. A typical soil profile is silty clay loam from 0 to 27 inches and channery clay loam from 27 to 36 inches on weathered bedrock. On the ridge in the southern part of the MRS, the Honeoye silt loam covers a significant area. The material is derived from loamy till with limestone, dolomite, and calcareous shale source rocks. A typical soil profile is silt loam from 0 to 9 inches and gravelly silt loam from 9 to 62 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). Major consolidated bedrock aquifers in the vicinity of the Oneida Range MRS are in Silurian age limestone formations at or near the surface. Little primary porosity or permeability remains in rocks following the lithification process. Groundwater moves through fractures, joints, and bedding planes in consolidated sandstone, shale and limestone

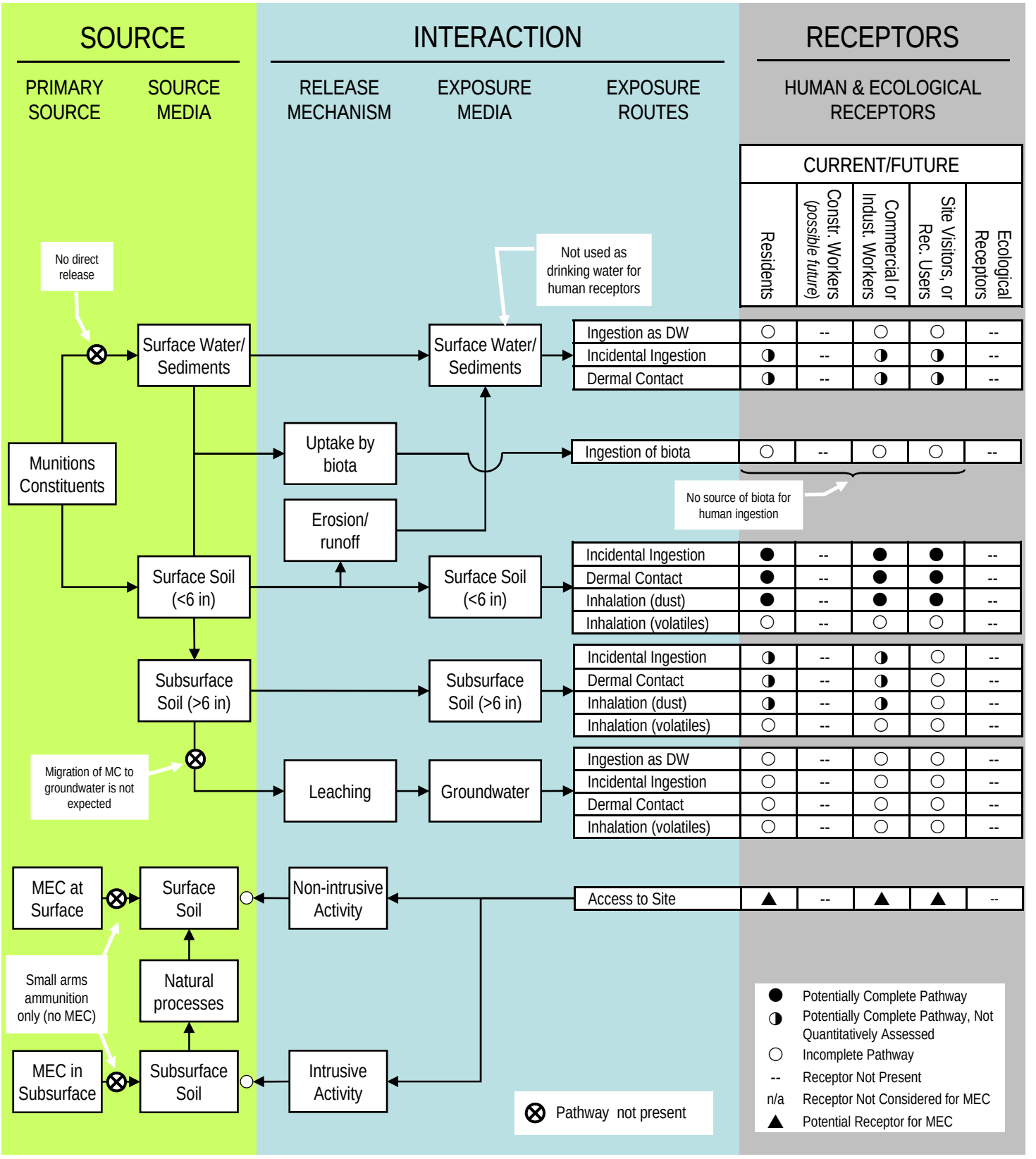
Profile Type	MRS Characterization
	rocks. The fractures, joints, and bedding planes in limestone and other carbonate rocks are enlarged through the dissolution of carbonate by slightly acidic water circulating through the upper 200 to 300 feet of the zone of saturation (Olcott, 1995). Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers are generally unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells within the MRS.
	Hydrology: A swampy area and stream are located in the northern portion of the MRS. The stream flows to the northeast (Google Earth, 2011; USGS 1993).
	Vegetation: The MRS is landscaped with grasses, shrubs and trees, the southern portion of the MRS is forested.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Oneida Range. There is one National Historic Landmarks located in Madison County, NY; however, is does not occur within the MRS (National Park Service, 2011a, b).
	Wetlands: There is one type of wetland within the MRS; PUBHx (Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated) (USFWS 2011c).
	Demographics: The total population of Oneida is 10,987 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS has residential properties and undeveloped land. No critical habitats are present.
	Ecological Receptors: There are three federally listed T&E species that occurs in Madison County, American hart's-tongue fern (*Asplenium scolopendrium* var. *americanum*), Indiana bat (*Myotis sodalis*), Chittenango ovate amber snail (*Succinea chittenangoensis*); however, no T&E species are listed to occur at Oneida Range MRS. (USFWS, 2011b).
	Degree of Disturbance: Low to medium disturbance level is present at the MRS. The MRS is residential properties and undeveloped land.
Land Use and Exposure Profile	Current Land Use: Residential properties and public services. Agriculture.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, 5.56 cartridge, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms;

Profile Type	MRS Characterization
	maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening and commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-21 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Oneida Range (NYHQ-018-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** March 7, 2011



4.22 POUGHKEEPSIE RIFLE RANGE MRS (AEDB-R # NYHQ-019-R-01)

Table 4-22 presents the CSM for Poughkeepsie Rifle Range MRS. Figure 4-22 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-22

Conceptual Site Model for Poughkeepsie Rifle Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: LaGrange, Dutchess County in eastern part of New York.
	Structures: There are some residential and farm-related structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 83.6° F. The coldest month of the year is January, with an average minimum temperature of 14.7° F. The annual average precipitation is 44.12 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 4.73 inches (IDcide, 2011s).
	Geology: The Poughkeepsie Rifle Range MRS is within the Appalachian Valley and Ridge physiographic province in the Hudson River Valley. Geologic maps in Olcott (1995) show that Cambrian and Ordovician rocks are at the surface or subcrop glacial deposits in the vicinity of the Poughkeepsie Rifle Range MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Poughkeepsie Rifle Range MRS is on an undulating outwash terrace east of Wappinger Creek. The terrace within the MRS is relatively flat with elevations ranging from approximately 180 to 190 feet above sea level. There is an abrupt slope down to Wappinger Creek at approximately 150 feet above sea level (USGS 1981a, 1998).
	Soil: The predominant soil within the Poughkeepsie Rifle Range MRS is the Hoosic gravelly loam on nearly flat land. The material is derived from sandy and gravelly glacial outwash deposits. A typical profile is gravelly loam from 0 to 9 inches; very gravelly sandy loam from 9 to 24 inches; and extremely gravelly loamy sand from 27 to 72 inches. There is a significant area of Wappinger loam along the east side of Wappinger Creek within the MRS. The material is loamy alluvium washed from soils derived from shale and slate. A typical profile is loam from 0 to 33 inches; sandy loam from 33 to 37 inches; and extremely gravelly sand from 37 to 60 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The western part of the MRS includes the Wappinger Creek valley that contains an unconfined sand and gravel aquifer with a saturated thickness greater than 10 feet and a potential yield to wells in excess of 100 gpm (Bugliosi and Trudell, 1987). Based on the generalized surficial geology map in Nystrom (2010), the aquifer material is alluvium and glacial outwash.

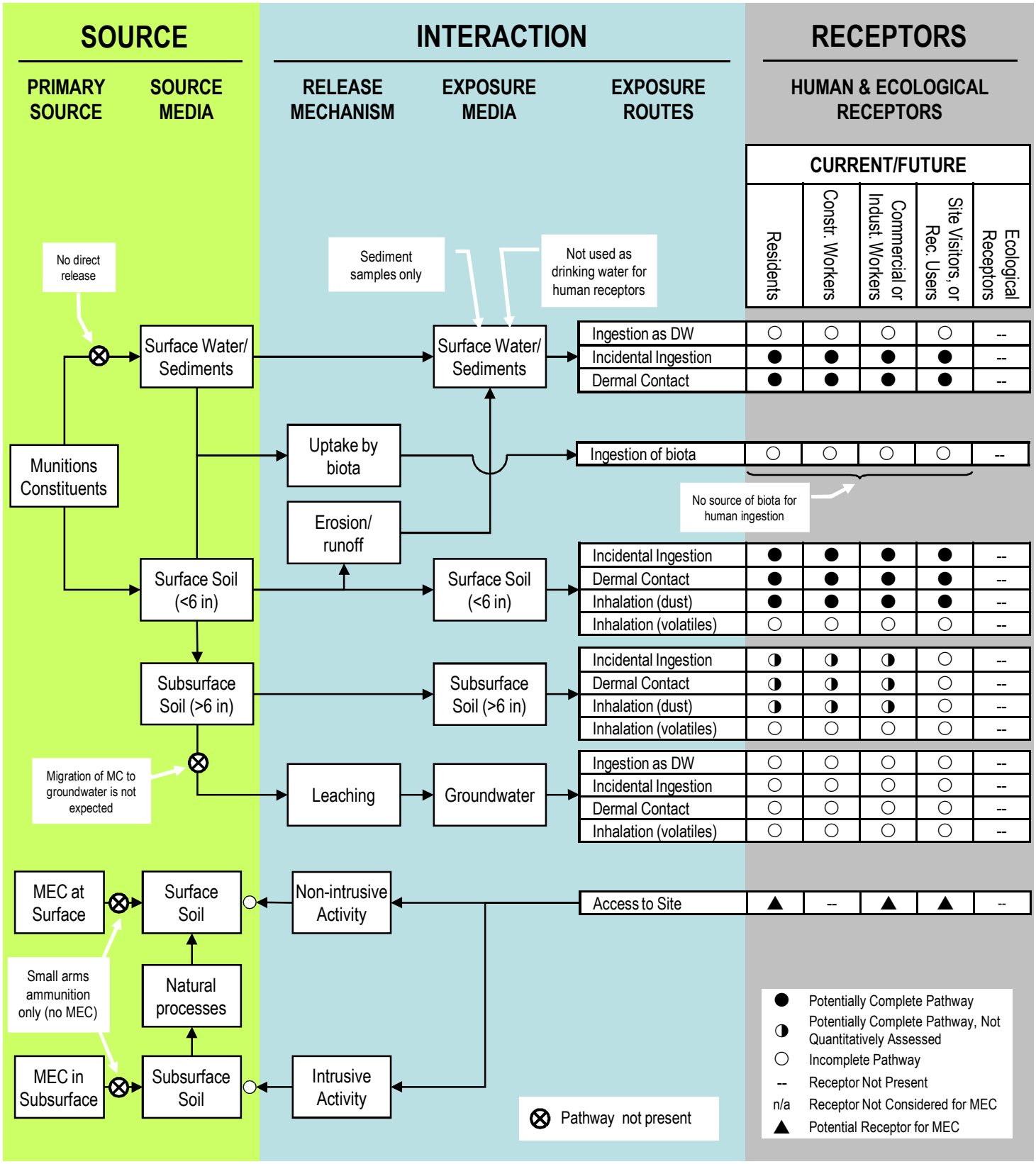
Profile Type	MRS Characterization
	Groundwater in limestone and other carbonate aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers are generally unconfined in the upper 200 feet (Olcott, 1995). There are no groundwater wells within the Poughkeepsie Rifle Range MRS.
	Hydrology: Wappinger Creek is located along the western MRS boundary and flows south (Google Earth, 2011; USGS 1981a, 1998).
	Vegetation: The MRS is primarily landscaped with agricultural crops, and there are some areas with grasses and shrubs. The western and southern border of the MRS is lined with trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Poughkeepsie Rifle Range. There are four National Historic Landmarks located in Dutchess County, NY; however, none occur within the MRS (National Park Service, 2011a, b).
	Wetlands: There are three types of wetlands that occur within Poughkeepsie Rifle Range: R2UBH (Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded/Saturated), PFO1E (Palustrine, Forested, Broad-leaved Deciduous, Seasonally Flooded/Saturated) and PUBH (Palustrine, Unconsolidated Bottom, Permanently Flooded) USFWS 2011c).
	Demographics: The total population of Poughkeepsie is 84,797 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is primarily agricultural land, no critical habitats are present.
	Ecological Receptors: There are three federally listed T&E species that occurs in Dutchess County, Dwarf wedgemussel (*Alasmidonta heterodon*), Bog (Muhlenberg) turtle (*Clemmys muhlenbergii),* Indiana bat (*Myotis sodalis*); however, no T&E species are listed to occur at Poughkeepsie Rifle Range MRS (USFWS, 2011b)
	Degree of Disturbance: Medium disturbance level is present at the MRS. The disturbance level is associated with agricultural practices.
Land Use and Exposure Profile	Current Land Use: Agriculture and associated residence.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and .45-70 caliber cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).

Profile Type	MRS Characterization
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. Based on the site conditions at this MRS, the former range is in close proximity to a surface water feature therefore the transport or direct release of MC into sediment may have occurred. The sediment pathway is potentially complete however, nearby surface water is dynamic and not used for human consumption, therefore the surface water pathway is incomplete. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening and commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to wetlands in the area via erosion/runoff. Therefore, sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. Sediment samples are proposed. The ingestion as drinking water exposure pathway is incomplete because no surface water exists that can be used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-22 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Poughkeepsie Rifle Range (NYHQ-019-R-01)

Completed By: Scott Anderson/James Salisbury, PARSONS ***Date Completed:*** March 7, 2011



4.23 SARATOGA SPRINGS RIFLE RANGE MRS (AEDB-R # NYHQ-020-R-01)

Table 4-23 presents the CSM for Saratoga Springs Rifle Range MRS. Figure 4-23 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-23

Conceptual Site Model for Saratoga Springs Rifle Range MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Saratoga Springs, Saratoga County, in eastern part of New York.
	Structures: There are multiple residential structures located in the MRS.
	Security: There are no barriers preventing access to the residential properties. The city-owned pistol range has a fence surrounding the range. Multiple residences and several other facilities owned by the Police Benevolent Organization (outdoor firing range, soccer field, softball field).
Physical Profile	Climate: Temperature varies from the 70s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 83.0° F. The coldest month of the year is January, with an average minimum temperature of 11.6° F. The annual average precipitation is 43.31 inches with rainfall evenly distributed throughout the year. The wettest month of the year is June, with an average rainfall of 4.06 inches (IDcide, 2011t).
	Geology: The Saratoga Springs Rifle Range MRS is at the northern end of Appalachian Valley and Ridge physiographic province adjacent to the Adirondack physiographic province. As shown on a USGS bedrock geology map, little deformed Ordovician marine mudstone and calcareous mudstone are at the surface or subcrop glacial deposits in the vicinity of the Saratoga Springs Rifle Range MRS (Thompson et al., 1990). The fault bounded flank of the Adirondack Mountains is approximately 2.5 miles west of the MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Saratoga Springs Rifle Range MRS is on gently rolling terrain with elevations ranging from approximately 250 to 280 feet above sea level (USGS, 1967).
	Soil: Soil in the Saratoga Springs Rifle Range MRS is predominantly Windsor loamy sand on rolling terrain. The material is derived from sandy glaciofluvial deposits on a glacial outwash plain. A typical soil profile is moderately decomposed plant material from 0 to 2 inches and loamy sand from 2 to 72 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits. Higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Groundwater well depths generally range from 10 to 120 feet and could exceed 500 feet below land surface (Olcott, 1995). The City of Saratoga Springs obtains most of its drinking water supplies from the Loughberry Lake watershed that is approximately 1.5 miles west of the Saratoga Springs Rifle Range MRS. Groundwater from seven wells at Geyser Crest supply the Geyser Crest subdivision and the southwest part of the city. Four groundwater wells at Interlaken supply the Interlaken subdivision. (City of Saratoga Springs, 2010). There are no groundwater wells within the Saratoga Springs Rifle Range MRS.

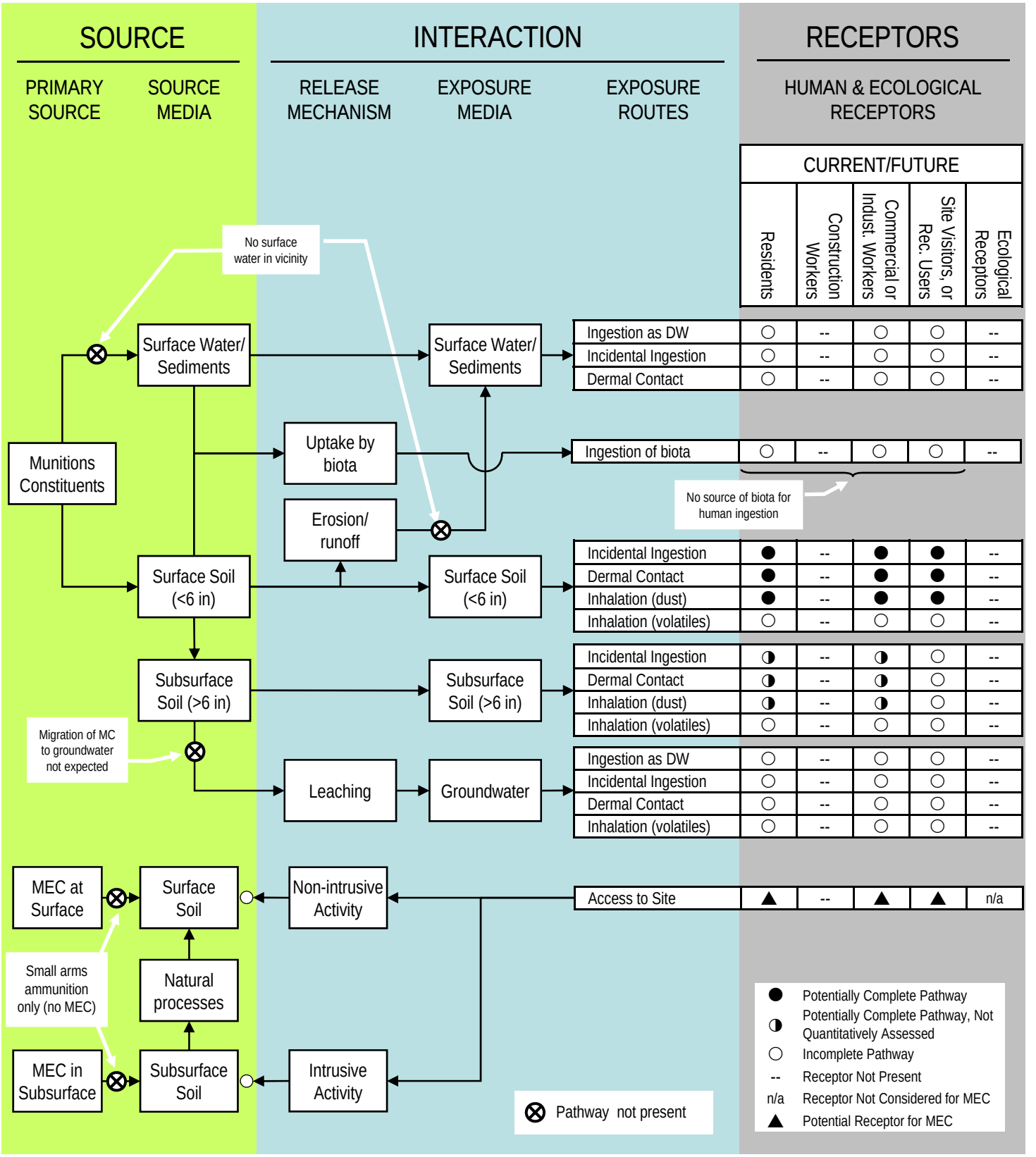
Profile Type	MRS Characterization
	Hydrology: No surface water present within the MRS (Google Earth, 2011; USGS, 1967).
	Vegetation: The MRS is landscaped with grasses, shrubs and trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Saratoga Springs Rifle Range. There are three National Historic Landmarks located in Saratoga County, NY; however none occur within the MRS (National Park Service, 2011 a, b).
	Wetlands: Wetlands are not present within the Saratoga Springs Rifle Range MRS (USFWF 2011c).
	Demographics: The total population of Saratoga Springs is 29,126 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is residential properties with some grassy areas. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occurs in Saratoga County, Karner blue butterfly (*Lycaeides melissa samuelis*); however, no T&E species are listed to occur at Saratoga Springs Rifle Range MRS (USFWS, 2011b).
	Degree of Disturbance: High to medium disturbance level is present at the MRS. A portion of the MRS has been redeveloped into residential properties, high level of disturbance. The rest of the MRS is recreational area that has a medium level of disturbance.
Land Use and Exposure Profile	Current Land Use: Residential properties, city-owned pistol range, and recreational areas.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, construction workers, and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, .45-70 caliber cartridge, and 7.62 mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).

Profile Type	MRS Characterization
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, construction workers, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening, construction workers during current/future development, and commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. The surface water exposure pathways are incomplete for all receptors since no surface water is located within this MRS. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway for all receptors at the MRS is incomplete because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-23 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Saratoga Springs Rifle Range (NYHQ-020-R-01)

Completed By: Maria Borejsza-Wysocka, PARSONS ***Date Completed:*** February 17, 2011



4.24 TICONDEROGA RANGE (OLD) MRS (AEDB-R # NYHQ-021-R-01)

Table 4-24 presents the CSM for Ticonderoga Range (old) MRS (not including SDZ). Figure 4-24 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-24

Conceptual Site Model for Ticonderoga Range (old) MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Ticonderoga, Essex County, in eastern part of New York, couple of miles west of the Vermont Border.
	Structures: There are less than five residential structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 83.9° F. The coldest month of the year is January, with an average minimum temperature of 17.6° F. The annual average precipitation is 51.77 inches with rainfall evenly distributed throughout the year (IDcide, 2011u).
	Geology: The Ticonderoga Range (old) MRS is within the Adirondack physiographic province west of Lake Champlain. Based on a USGS bedrock geology map, the Ticonderoga Range (old) MRS is on the faulted eastern margin of the Adirondack province (Thompson et al., 1990). Precambrian granitic gneiss and metamorphosed sedimentary rocks are exposed at the surface or subcrop glacial deposits in the vicinity of the MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Ticonderoga Range (old) MRS is on a stream terrace within the lowland containing Putnam Creek to the east and Penfield Pond to the north. The MRS includes a small rocky hill at its eastern boundary. The elevation on the terrace portion of the MRS is approximately 950 to 960 feet above sea level. The hill on the eastern border of the MRS rises to approximately 1040 feet above sea level (USGS, 1973).
	Soil: The soil within the Ticonderoga Range (old) MRS is predominantly Champlain loamy sand in a stream terrace landform. The material is derived from sandy glacial lake deposits. A typical soil profile is loamy sand from 0 to 10 inches; sand from 10 to 16 inches; fine sand from 16 to 50 inches; and sand from 50 to 72 inches. The soil on the hill at the eastern border of the MRS is Lyman-Knob Lock complex on a steep, very rocky and bouldery surface. The material is derived from glacial till. The soil profiles for the components of this soil complex include decomposed plant material at the surface, a relatively thin layer of gravelly sandy loam or fine sandy loam on shallow unweathered bedrock. (NRCS, 2011).
	Hydrogeology: USGS well data in the vicinity of the Ticonderoga Range (old) MRS indicate aquifers are found primarily in rocks of the basement complex (USGS, 2011). The basement complex consists of crystalline igneous and metamorphic rocks, primarily granitic gneiss and metamorphosed sedimentary rocks (Thompson et al., 1990). The intergranular porosity of crystalline rocks is insignificant and pore spaces are not interconnected. Therefore, movement of water through crystalline rock aquifers is dependent on fractures and jointing within the rock. The fracture permeability in crystalline rocks is a result of cooling of igneous rocks, deformation of metamorphic rocks, faulting and weathering. Such openings may follow the original

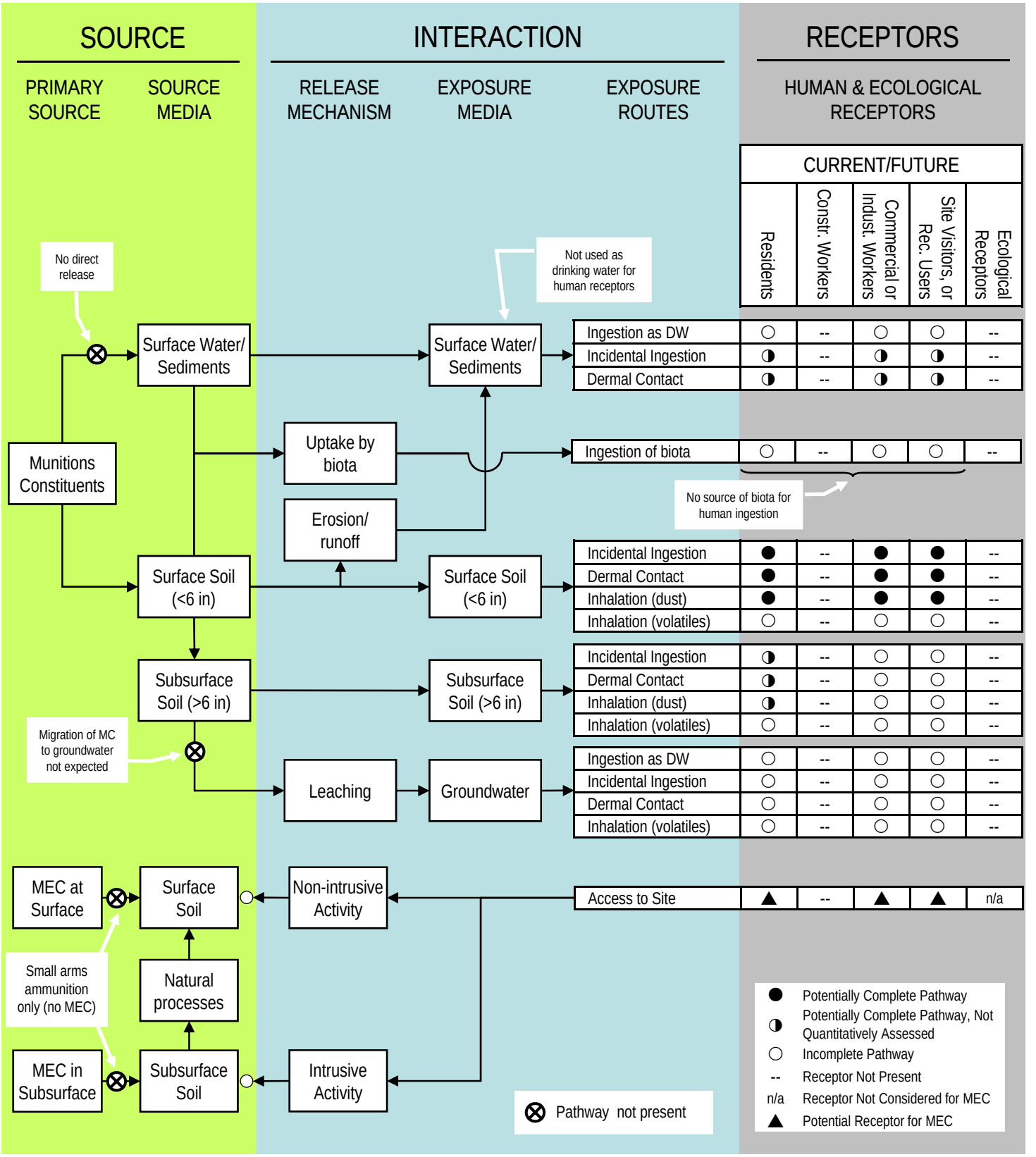
Profile Type	MRS Characterization
	fabric of the rock but are generally very heterogeneous in size, orientation, and degree of interconnectivity. Fracture permeability tends to decrease with increasing depth. Water in these aquifers is generally unconfined. Well yields commonly range from 2 to 10 gpm (Olcott, 1995). There are no groundwater wells within the Ticonderoga Range (old) MRS.
	Hydrology: There is no surface water within the MRS (Google Earth, 2011; USGS, 1973).
	Vegetation: The MRS is very densely forested.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Ticonderoga Range (old). There are six National Historic Landmarks located in Essex County, NY; however, none occur within the MRS (National Park Service, 2011a, b).
	Wetlands: Wetlands are not delineated within the MRS (USFW 2011c).
	Demographics: The total population of Ticonderoga is 4,931 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is undeveloped forested land. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occurs in Essex County, Indiana bat (*Myotis sodalis*)); however, no T&E species are listed to occur at Ticonderoga Range (old) MRS (USFWS, 2011b).
	Degree of Disturbance: Medium to low disturbance level is present at the MRS. Majority of the MRS is undeveloped land, low level of disturbance. There is a residence on the area where a portion of the range was located, medium level of disturbance.
Land Use and Exposure Profile	Current Land Use: Undeveloped land with a residential property.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users, and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge, and 5.56mm cartridge, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.

Profile Type	MRS Characterization
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening activities; however, these pathways are considered to be potentially complete but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used, however, there is potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-24 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Ticonderoga Range (old) (NYHQ-021-R-01)

Completed By: M. Borejsza-Wysocka/J. Salisbury, PARSONS ***Date Completed:*** March 7, 2011



4.25 TICONDEROGA RANGE (OLD) SDZ MRS (AEDB-R # NYHQ-021-R-02)

Table 4-25 presents the CSM for Ticonderoga Range (old) SDZ MRS. Figure 4-25 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-25

Conceptual Site Model for Ticonderoga Range (old) SDZ MRS

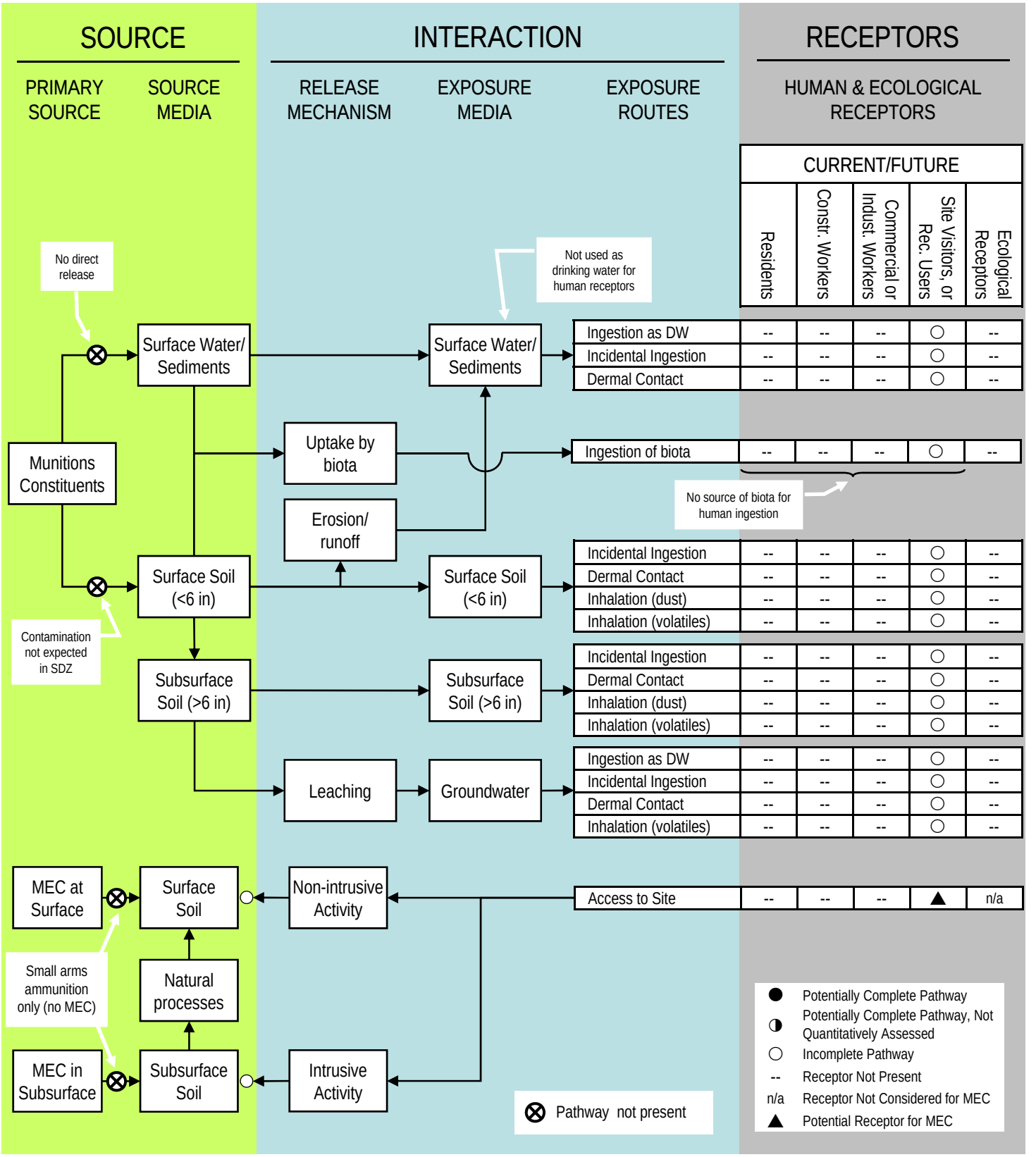
Profile Type	MRS Characterization
Facility Profile	Location and Area: Ticonderoga, Essex County, in eastern part of New York, couple of miles west of the Vermont Border.
	Structures: There are no structures located in the MRS.
	Security: There are no barriers preventing access to any part of the MRS.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 83.9° F. The coldest month of the year is January, with an average minimum temperature of 17.6° F. The annual average precipitation is 51.77 inches with rainfall evenly distributed throughout the year (IDcide, 2011u).
	Geology: The Ticonderoga Range (old) MRS is within the Adirondack physiographic province west of Lake Champlain. Based on a USGS bedrock geology map, the Ticonderoga Range (old) MRS is on the faulted eastern margin of the Adirondack province (Thompson et al., 1990). Precambrian granitic gneiss and metamorphosed sedimentary rocks are exposed at the surface or subcrop glacial deposits in the vicinity of the MRS. For more on the geology of this area see Amsterdam Range, Table 4-1.
	Topography: The Ticonderoga Range (old) MRS is on a stream terrace within the lowland containing Putnam Creek to the east and Penfield Pond to the north. The MRS includes a small rocky hill at its eastern boundary. The elevation on the terrace portion of the MRS is approximately 950 to 960 feet above sea level. The hill on the eastern border of the MRS rises to approximately 1040 feet above sea level (USGS, 1973).
	Soil: The soil within the Ticonderoga Range (old) MRS is predominantly Champlain loamy sand in a stream terrace landform. The material is derived from sandy glacial lake deposits. A typical soil profile is loamy sand from 0 to 10 inches; sand from 10 to 16 inches; fine sand from 16 to 50 inches; and sand from 50 to 72 inches. The soil on the hill at the eastern border of the MRS is Lyman-Knob Lock complex on a steep, very rocky and bouldery surface. The material is derived from glacial till. The soil profiles for the components of this soil complex include decomposed plant material at the surface, a relatively thin layer of gravelly sandy loam or fine sandy loam on shallow unweathered bedrock (NRCS, 2011).
	Hydrogeology: USGS well data in the vicinity of the Ticonderoga Range (old) MRS indicate aquifers are found primarily in rocks of the basement complex (USGS, 2011). The basement complex consists of crystalline igneous and metamorphic rocks, primarily granitic gneiss and metamorphosed sedimentary rocks (Thompson et al., 1990). The intergranular porosity of crystalline rocks is insignificant and pore spaces are not interconnected. Therefore, movement of water through crystalline rock aquifers is dependent on fractures and jointing within the rock. The fracture permeability in crystalline rocks is a result of cooling of igneous rocks, deformation of metamorphic rocks, faulting and weathering. Such openings may follow the original

Profile Type	MRS Characterization
	fabric of the rock but are generally very heterogeneous in size, orientation, and degree of interconnectivity. Fracture permeability tends to decrease with increasing depth. Water in these aquifers is generally unconfined. Well yields commonly range from 2 to 10 gpm (Olcott, 1995). There are no groundwater wells within the Ticonderoga Range (old) MRS.
	Hydrology: Putnam Creek and several ponded/marsh areas are within the SDZ MRS. The creek flows north and discharges into Penfield Pond located north of the SDZ (Google Earth, 2011; USGS, 1973).
	Vegetation: The MRS is very densely forested.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Ticonderoga Range (old). There are six National Historic Landmarks located in Essex County, NY; however none occur within the MRS (National Park Service, 2011a, b).
	Wetlands: Wetlands are not delineated by the USFWS Mapper within the MRS (USFWS 2011c). Ponds are marshes are present (Google Earth, 2011).
	Demographics: The total population of Ticonderoga is 4,931 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is undeveloped forested land. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occurs in Essex County, Indiana bat (*Myotis sodalis*)); however, no T&E species are listed to occur at Ticonderoga Range (old) MRS (USFWS, 2011b).
	Degree of Disturbance: A low disturbance level is present at the MRS. The MRS is undeveloped land.
Land Use and Exposure Profile	Current Land Use: Undeveloped land.
	Current Potential Receptors: Current receptors include site visitors/recreational users.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): None.
	Release Mechanisms: No release mechanism since no source.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: No MD anticipated.
	Associated Munitions Constituents: No MC of interest
	Transport Mechanisms/Migration Routes: None, no source present.
	Pathway Analysis: None of the exposure pathways are potentially complete for all receptors within the MRS since no source is present.

FIGURE 4-25 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: NEW YORK – Ticonderoga Range (old) (SDZ)

Completed By: J. Salisbury, PARSONS ***Date Completed:*** April 25, 2011



4.26 TICONDEROGA TRAINING RANGE (NEW) MRS (AEDB-R # NYHQ-022-R-01)

Table 4-26 presents the CSM for Ticonderoga Training Range (new) MRS. Figure 4-26 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-26

Conceptual Site Model for Ticonderoga Training Range (new) MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Ticonderoga, Essex County, in eastern part of New York, couple of miles west of the Vermont Border.
	Structures: There are no structures located in the MRS.
	Security: The MRS is partially fenced and has a cattle gate.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 83.9° F. The coldest month of the year is January, with an average minimum temperature of 17.6° F. The annual average precipitation is 51.77 inches with rainfall evenly distributed throughout the year (IDcide, 2011u).
	Geology: The Ticonderoga Training Range (new) MRS is within the Adirondack physiographic province west of Lake Champlain (Thompson et al., 1990). The Precambrian metamorphic and igneous rocks exposed in the Adirondack Mountains were deformed and uplifted in a regional mountain building event over 1 billion years ago. By earliest Cambrian time (542 million years ago) these basement rocks were exposed at the surface and rift faulting developed along northeast trends during the opening of an early version of the Atlantic Ocean (Taylor and Fitzgerald, 2011). The Adirondack Mountains shed sediments into the surrounding shallow seas. Discontinuous sandstones of the Potsdam Formation on the northern and western fringe of the Adirondack Mountains grade into sandy carbonate facies. Cambrian and Ordovician sedimentary rocks, primarily limestones, dolomites, sandstones, and shales, surround the Adirondack Mountains and dip gently southward into the Appalachian Basin (Olcott, 1995). Based on a USGS bedrock geology map, the Ticonderoga Training Range (new) MRS is on the faulted eastern margin of the Adirondack province (Thompson et al., 1990). Precambrian granitic gneiss and metamorphosed sedimentary rocks are exposed at the surface or subcrop glacial deposits in the vicinity of the MRS. Continental-scale glaciers covered most of Canada and the northern United States episodically over the last 1.8 million years. New York has been covered by ice multiple times, including the last advance approximately 22,000 years ago. Glaciers scoured and removed soil and soft weathered surface rocks as they moved, and polished the hard bedrock surface below the ice. A variety of landforms were left behind when the glaciers eventually receded approximately 10,000 years ago (Skehan, 2008). As the ice melted, the sediment load was dropped in place as unsorted till or was redistributed as outwash by the vast amounts of meltwater released by the glacier. Till is a mixture of silt, gravel, and boulders of various sizes in a clay matrix. The glacial outwash sediments, deposited by streams and rivers of meltwater in front of the receding glaciers (glaciofluvial deposits), tend to be graded from coarse to fine with increasing distance from the glacier. Meltwater could also be impounded in lakes that were dammed either by the ice or by glacial sediments. Lake plains, terraces and beaches were left in place when the dammed water found a lower outlet. Lake Champlain east of the MRS is a remnant of a once more-extensive glacial lake (Olcott,

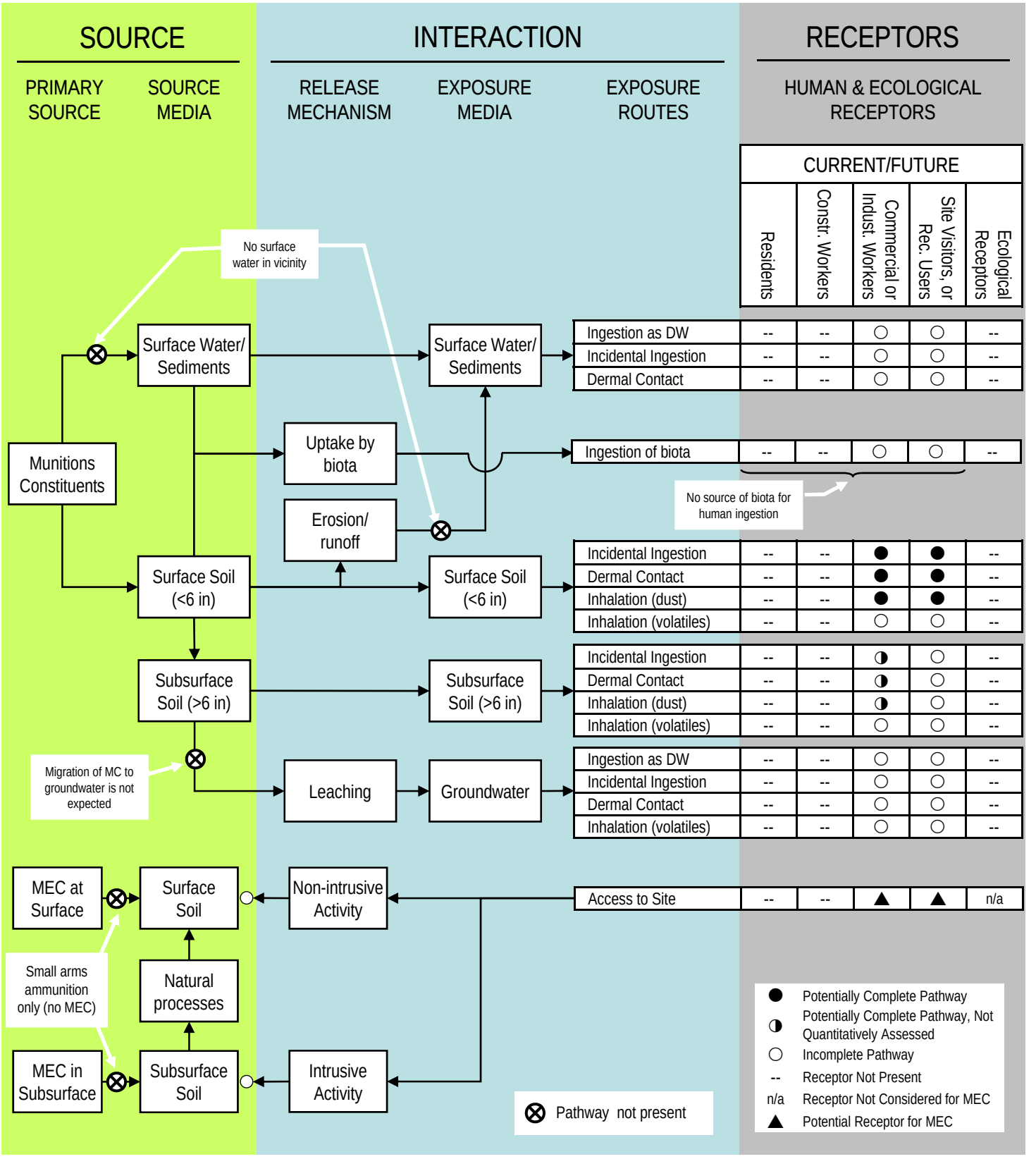
Profile Type	MRS Characterization
	1995).
	Topography: The Ticonderoga Training Range (new) MRS is on a relatively flat terrace at the base of Keeney Mountain. The surface of the terrace is approximately 520 feet above sea level. The MRS includes part of the mountain slope to an elevation of approximately 660 feet above sea level. The overall range of elevations within the MRS is from 480 to 660 feet above sea level (USGS, 1950).
	Soil: The soil within the Ticonderoga Training Range (new) MRS is predominantly Howard gravelly loam in a glacial outwash terrace. The material is derived from gravelly outwash with limestone source rocks. A typical soil profile is moderately decomposed plant material from 0 to 1 inch; very gravelly loam from 1 to 4 inches; gravelly loam from 4 to 11 inches; very gravelly loam from 11 to 22 inches; and extremely gravelly loamy sand from 22 to 72 inches (NRCS, 2011).
	Hydrogeology: Coarse-grained glacial outwash, ice contact, alluvial, and glacial lake deposits form the productive sand and gravel aquifers of the Surficial Aquifer system. Yield from sand and gravel aquifers depends on thickness and grain size of deposits, higher yields may be obtained where deposits are hydraulically connected to an adjacent body of surface water. Unconsolidated aquifers in the vicinity of the Ticonderoga Training Range (new) MRS are probable lake terrace deposits. The aquifers are unconfined with potential yields exceeding 100 gpm in sand and gravel with a saturated zone greater than 10 feet (Bugliosi et al., 1987b). Based on the Bugliosi et al. map (1987b), the unconsolidated aquifer exists within the MRS but is not extensive. Well yields commonly range from 2 to 10 gpm (Olcott, 1995). There are no groundwater wells within the Ticonderoga Training Range (new) MRS.
	Hydrology: No surface water is present within the MRS (USGS, 1950).
	Vegetation: The MRS is primarily vegetated with grasses and the borders are landscaped with trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Ticonderoga Range (old). There are six National Historic Landmarks located in Essex County, NY; however none occur within the MRS (National Park Service, 2011a, b).
	Wetlands: Wetlands are not present within the MRS (USFWS 2011c).
	Demographics: The total population of Ticonderoga is 4,931 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is undeveloped pasture land. No critical habitats are present.
	Ecological Receptors: There is one federally listed T&E species that occurs in Essex County, Indiana bat (*Myotis sodalis*); however, no T&E species are listed to occur at Ticonderoga Training Range (new) MRS (USFWS, 2011b).
	Degree of Disturbance: A low disturbance level is present at the MRS. The MRS is undeveloped land.
Land Use and Exposure Profile	Current Land Use: Undeveloped pasture land.
	Current Potential Receptors: Current receptors include site visitors/recreational users, and commercial/industrial workers.

Profile Type	MRS Characterization
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .38 caliber cartridge, .45 caliber cartridge, 5.56mm cartridge, and 9mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes. If MEC or MD (bullets, casings, or metal fragments) are present, MC could be released to the soil via corrosion, degradation, or weathering of bullets or casings.
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12").
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for commercial or industrial workers and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for commercial/industrial workers during intrusive farming activities; however, these pathways are considered to be potentially complete, but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. The surface water exposure pathways are incomplete for all receptors since no surface water is located within this MRS. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway for all receptors at the MRS is incomplete because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-26 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York –Ticonderoga Training Range (new) (NYHQ-022-R-01)

Completed By: M. Borejsza-Wysocka/J. Salisbury, PARSONS ***Date Completed:*** February 21, 2011



4.27 WALTON RIFLE RANGE (NEW) MRS (AEDB-R # NYHQ-023-R-01)

Table 4-27 presents the CSM for Walton Rifle Range (new) MRS. Figure 4-27 illustrates the CSM; exposure pathways for human and ecological receptors.

Table 4-27

Conceptual Site Model for Walton Rifle Range (new) MRS

Profile Type	MRS Characterization
Facility Profile	Location and Area: Walton, Delaware County, in southeastern part of New York, approximately 25 miles from the Pennsylvania border.
	Structures: There are multiple residential, commercial, and public structures located in the MRS.
	Security: There are no barriers preventing access to the residential properties.
Physical Profile	Climate: Temperature varies from the 60s in the summer to the 20s in the winter. The warmest month of the year is July, with an average maximum temperature of 80.8° F. The coldest month of the year is January, with an average minimum temperature of 12.5° F. The annual average precipitation is 46.69 inches with rainfall evenly distributed throughout the year. The wettest month of the year is May, with an average rainfall of 4.34 inches (IDcide, 2011v).
	Geology: The Walton Rifle Range (new) MRS is in the Catskills Section of the Appalachian Plateaus physiographic province in southeastern New York. Geologic maps in Olcott (1995) show that Devonian rocks are at the surface or subcrop glacial deposits in the vicinity of the Walton Rifle Range MRS. These Paleozoic sediments are deeply eroded, particularly by geologically recent glaciation. For more on the geology of this area see Binghamton Rifle Range, Table 4-2.
	Topography: The Walton Rifle Range (new) MRS is on a relatively flat river terrace on the south side of the West Branch Delaware River. The elevation of the terrace within the MRS is approximately 1340 feet above sea level (USGS, 1981b).
	Soil: The soil within the Walton Rifle Range (new) MRS is predominantly the Tunkhannock gravelly loam on a flat or gently sloping river terrace. The material is derived from glaciofluvial deposits with reddish sandstone, siltstone or shale source rocks. A typical soil profile is gravelly loam from 0 to 8 inches; very gravelly loam from 8 to 18 inches; very gravelly sandy loam from 18 to 25 inches; and very gravelly loamy coarse sand from 25 to 72 inches. There are small areas of Basher and Raypol silt loam in flood plains and two areas classified by NRCS as "Urban land." (NRCS, 2011).
	Hydrogeology: Major consolidated bedrock aquifers in the vicinity of the Walton Rifle Range (new) MRS are in Devonian age limestone formations at or near the surface. Little primary porosity or permeability remains in rocks following the lithification process. Groundwater moves through fractures, joints, and bedding planes in consolidated sandstone, shale and limestone rocks. The fractures, joints, and bedding planes in limestone and other carbonate rocks are enlarged through the dissolution of carbonate by slightly acidic water circulating through the upper 200 to 300 feet of the zone of saturation (Olcott, 1995). The Walton Rifle Range (new) MRS is in the West Branch Delaware River valley. Unconsolidated aquifers in the vicinity of the MRS are unconfined with potential yields ranging from 10 to 100 gpm in sand and gravel with a saturated zone of 10 feet

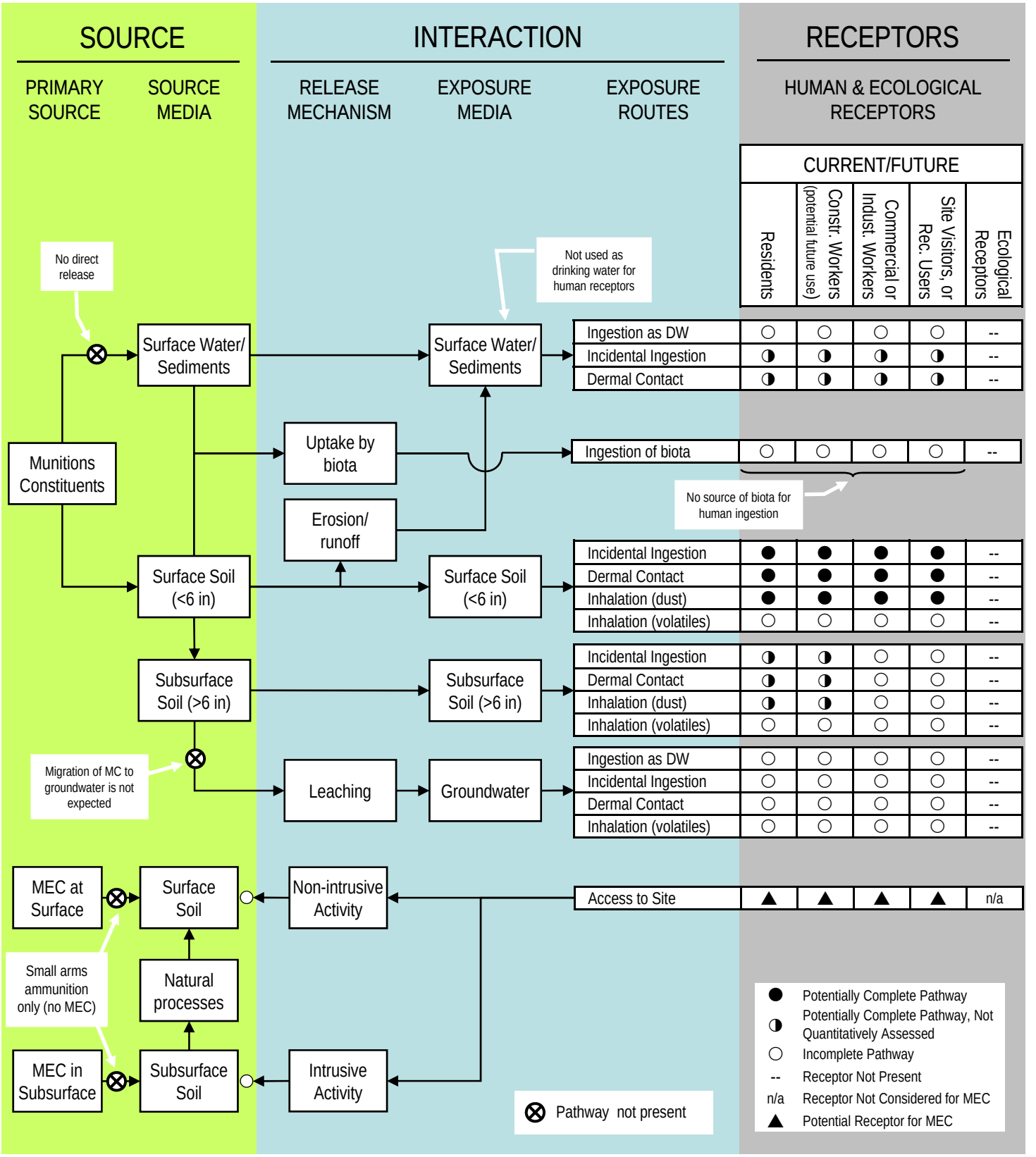
Profile Type	MRS Characterization
	or less (Bugliosi et al., 1987a). Groundwater in limestone aquifers is stored in solution cavities that are interconnected through very complex dissolution channels resulting in highly variable yields. Wells commonly yield 10 to 30 gpm although yields of 1000 gpm have been reported from carbonate aquifers in New York. Aquifers are generally unconfined in the upper 200 feet (Olcott, 1995). Based on USGS data, well number D 260 is within the Walton Rifle Range MRS. The well depth is 60 feet below land surface with no other information available. Well number D 175 is approximately 140 feet south of the MRS. The well was completed in the "Devonian, Upper" local aquifer. The well depth is 140 feet below land surface and the depth to water is 41 feet (USGS, 2011).
	Hydrology: A small area of marshland is within the MRS (Google Earth, 2011; USGS, 1981b).
	Vegetation: The MRS is landscaped with grasses, shrubs and trees.
	Cultural, Archeological, and Historical Resources: There are no historic or cultural resources at Walton Rifle Range (new). There is one National Historic Landmarks located in Delaware County, NY; however, none occur within the MRS (National Park Service, 2011a, b).
	Wetlands: There are two types of wetland: PEM1A (Palustrine, Emergent, Persistent Temporary Flooded) and PSS1E (palustrine, Scrub-Shrub, Leaved Deciduous, Seasonally Flooded/Saturated) within the Walton Rifle Range (new) MRS (USFWS 2011c).
	Demographics: The total population of Walton is 5,231 based on the 2000 to 2009 State and County QuickFacts estimate census data from the U.S. Census Bureau (U.S. Census Bureau, 2011).
Ecological Profile	Habitat Type: The MRS is residential and commercial properties with some grassy areas. No critical habitats are present.
	Ecological Receptors: There are two federally listed T&E species that occurs in Delaware County, Dwarf wedgemussel (*Alasmidonta heterodon*), Northern wild monkshood (*Aconitum noveboracense*), however, no T&E species are listed to occur at Walton Rifle Range (new) MRS (USFWS, 2011b).
	Degree of Disturbance: High and low disturbance levels are present at the MRS. The MRS has been redeveloped into residential and commercial properties, high level of disturbance. Low level of disturbance is associated with the undeveloped mountain, natural backstop area, at the southern portion of the MRS.
Land Use and Exposure Profile	Current Land Use: Residential, commercial properties, and a public school.
	Current Potential Receptors: Current receptors include residents, site visitors/recreational users and commercial/industrial workers.
	Potential Future Land Use: Same as current land use.
	Potential Future Receptors: Same as current receptors with the addition of construction workers.
Munitions/Release Profile	Munitions Type(s): Small arms general: .22 caliber cartridge, .30 caliber (includes carbine) cartridge, .38 caliber cartridge, .45 caliber cartridge, .50 caliber cartridge machine gun, and 7.62mm cartridge (Appendix C).
	Release Mechanisms: Residual munitions released from historical training activities as well as natural processes, such as erosion or frost heave processes.

Profile Type	MRS Characterization
	Maximum Probable Penetration Depth: Training activities included small arms; maximum probable penetration depth is land surface and shallow subsurface (< 12”).
	MEC Density: Small arms ammunition is not classified as MEC and, therefore, no explosive safety hazards are anticipated. MEC are assumed not to be present at ranges where munitions use was limited to small arms ammunition.
	Munitions Debris: Associated with the small arms listed above.
	Associated Munitions Constituents: MC of interest includes antimony, copper, and lead (Appendix C).
	Transport Mechanisms/Migration Routes: MC metals and some explosives can absorb to or fromcomplexes with soil particles or organic matter in soil. This makes these compounds generally less likely to be transported by water via leaching or runoff. Because explosives are organic compounds, they are also subject to biological or chemical degradation over time, which results in these compounds being less persistent in the environment than MC metals. Based on these properties, while MC compounds potentially are present in surface and subsurface soil, the migration of MC metals to groundwater is not expected at this MRS. The same rationale applies with respect to the migration of MC metals to surface water and sediment (where present). MC metals are not anticipated to have migrated to surface water/sediment based on their chemical/physical properties and the distance between the potential source and the surface water in the vicinity of the MRS. Based on the limited amount of contaminated surface soil anticipated, contaminated fugitive dust is not expected to migrate off-site.
	Pathway Analysis: While the presence of MC contamination at this MRS has not been confirmed, the historic use of the site may have resulted in the release of MC to site media. Based on the possible presence of MC in surface soil, the primary potentially complete exposure pathways for residents, construction workers, commercial or industrial workers, and site visitors are through direct contact (i.e., incidental ingestion, dermal contact, and inhalation of suspended particulates). There is also the potential for exposure to these compounds in subsurface soil for residents during intrusive gardening activities and construction workers during intrusive construction activities; however, these pathways are considered to be potentially complete but not quantitatively assessed because no sampling of subsurface soil (i.e., deeper than 6 inches) is proposed. The subsurface exposure pathways are incomplete for the commercial/industrial workers and site visitors because it is unlikely for these receptors to expose themselves to subsurface soil for anticipated non-intrusive activities. There is no surface water in the vicinity of the area where munitions were formerly used; however, there is the potential that MC in soil might have migrated to surface water within the MRS via erosion/runoff. Therefore, surface water and sediment exposure pathways (i.e., incidental ingestion and dermal contact) are potentially complete for all receptors within the MRS. However, these pathways will not be quantitatively assessed since surface water and sediment samples are not proposed. The ingestion as drinking water exposure pathway is incomplete because the surface water is not used as a source of drinking water by the human receptors. The groundwater exposure pathways are incomplete for all receptors because migration of MC to groundwater is not expected. The ingestion of biota exposure pathway is incomplete for all receptors at this MRS because there are no sources of biota for human ingestion. MEC is not anticipated at the MRS since only small arms ammunition was used.

FIGURE 4-27 CONCEPTUAL SITE MODEL DIAGRAM

Site/MRS Name: New York – Walton Rifle Range (new) (NYHQ-023-R-01)

Completed By: M. Borejsza-Wysocka/J. Salisbury, PARSONS ***Date Completed:*** March 7, 2011



CHAPTER 5
DATA QUALITY OBJECTIVES

5.0 INTRODUCTION

5.0.1 Various government agencies and scientific disciplines have established and adopted different variations to systematic planning, each tailoring their specific application areas. Both processes are DQO planning tools that are applied to ensure data are generated of the type, quality, and quantity needed for decision making at an MRS. The DQOs developed for the ARNG MRS SIs for the State of New York were developed using the USEPA Seven-Step DQO Process (USEPA, 2006).

5.0.2 The DQO Process consists of seven iterative steps that define criteria that will be used to establish the final data collection design. The seven steps include:

1. **State the Problem**: The nature of the problem that initiated the study and a conceptual model of the environmental hazard to be investigated.
2. **Identify the Goal of the Study**: State how the data will be used in meeting objectives and solving the problem, identify study questions and the order of priority for resolving them, and define alternative outcomes.
3. **Identify Information Inputs**: Identify the data and information needed to answer study questions.
4. **Define Study Boundaries**: The analytic approach or decision rule that defines the logic for how the data will be used to draw conclusions from the study findings. This step should specify the target population and characteristics of interest, spatial and temporal limits, and scale of influence.
5. **Develop Analytical Approach**: Define parameter of interest, specify the type of influence, and develop the logic for drawing conclusions from the findings.
6. **Specify Performance or Acceptance Criteria**: Specify probability limits for false rejection and false acceptance decision errors; develop performance criteria for new data being collected or acceptable criteria for existing data being considered for use.
7. **Develop the Plan for Obtaining Data**: Select the resource-effective sampling and analysis plan that meets performance criteria.

5.0.3 The first five steps are focused primarily on identifying qualitative criteria, while the sixth step establishes acceptable quantitative criteria on the quality and quantity of the data to be collected relative to the ultimate use of the data. These criteria are known as performance or acceptance criteria (i.e., DQOs). For decision problems, DQOs typically are expressed as tolerable limits on the probability or chance (risk) of the collected data leading the user to making an erroneous decision. For estimation problems, DQOs are expressed in terms of acceptable uncertainty (e.g., width of an uncertainty band or interval) associated with a point estimate at a desired level of statistical confidence. The seventh step of the DQO Process, a data collection design, is developed to generate data meeting the quantitative and qualitative criteria

specified at the end of Step 6. A data collection design specifies the type, number, location, and physical quantity of samples and data, as well as the QA and QC activities that will ensure that sampling design and measurement errors are managed sufficiently to meet the performance or acceptance criteria specified in the DQOs. The outputs of the DQO Process are used to develop a QA Project Plan and for performing Data Quality Assessment (USEPA, 2006).

5.0.4 The objective of the DQO Process for this project is to collect an appropriate amount of data for each MRS to determine if the project objectives defined in Subchapter 1.4 of this HRR/WP have been met. Table 5-1 presents the Summary of the DQOs for the ARNG MRSs located in New York State that are the subject of this SI; subchapters 5.1 and 5.2 reiterate the MEC and MC DQOs, respectively, and Table 5-2 presents the MRS-specific sampling and analysis plan that is the outcome of Step 7.

Table 5-1
Data Quality Objectives Summary

DQO Process Steps	DQO Decision Statements
Step 1. State the Problem	Historical ARNG training activities within and near a given MRS could have resulted in the release of MEC/MD and associated MC contamination of environmental media. Based on information obtained in the PA and HRR, the use of small arms munitions at Amsterdam Range, Binghamton Rifle Range (new), Camp Blauvelt, Camp O'Ryan MRS 1 Pistol Range, Camp O'Ryan MRS 3 Maneuvering Area, Elmira, Geneva Range, Glens Falls Range, Hoosick Falls Range (new), Hornell Rifle Range, Jamestown Rifle Range, Malone LTA, Mohawk Rifle Range, NDNODS Creedmoor Rifle Range, NDNODS Geneseo Range (old), NDNODS Rensselaer Wyck Target Range, NDNODS Rochester Rifle Range, Olean Target Range (new), Oneida Range, Poughkeepsie Rifle Range, Saratoga Springs Rifle Range, Ticonderoga Range (old), Ticonderoga Training Range (new), and Walton Rifle Range (new) MRSs was confirmed. An SI is needed to determine if MEC/MD and MC are present and, if so, to evaluate whether a potential explosive hazard or unacceptable safety risk/hazard (MEC) to human health and the environment (MC) has resulted. ***MEC is assumed not to be present at ranges where munitions use was limited to small arms ammunition only. In New York, all MRSs (except for Camp O'Ryan MRS 3 Maneuvering Range and Malone LTA, which are maneuver areas) are small arms ranges; therefore, MC is the primary source of concern.***
Step 2. Identify Goal of the Study	Do the survey data and investigation observations indicate the presence and/or the potential presence of MEC at the MRS? If MEC and/or MD are present, then evaluate the need for an Interim Removal Action or RI/FS. If MEC (or indicators of MEC such as craters, targets, etc.) is not present, then a recommendation of NFA for MEC is viable. A recommendation for NFA or further action RI/FS or Interim Remedial/Removal Action will be based on a "weight of evidence" approach. Is MC in surface soil or other media present at concentrations exceeding applicable screening levels based on environmental sampling? If MC is present as a result of former NYARNG training activities and is above ambient and/or background levels (as agreed to by the TPP Team), and if

Table 5-1
Data Quality Objectives Summary

DQO Process Steps	DQO Decision Statements
	MEC or MD is present, then MC is potentially MEC- or MD-related, and an RI/FS may be required. If MC exists in surface soil or other media above screening levels, and if MEC or MD is not present, then the MC concentrations will be ***further evaluated*** to determine whether the MC is related to MEC from former ARNG training activities. If MC is not present above screening levels, then a recommendation of NFA for MC is justified since the sampling strategy was implemented with maximum bias. If risk screening levels are not available for an MC analyte, the results will be discussed qualitatively. If MC is present above screening levels and is attributable to MEC or MD, does it pose an ***unacceptable risk***? An RI/FS may be required to determine whether confirmed MC concentrations pose an unacceptable risk to human health and/or the environment.
Step 3. Indentify Information Inputs	The following information is needed to make the decisions specified above: • Historical information for the types of munitions that may have been used at the MRSs; • Locations, types, and depths of MEC and/or MD observed; • Results from the visual survey (VS) conducted for the SI; • Analytical results from MC samples collected during the SI; • Results of the screening level risk assessment (SLRA), if appropriate.
Step 4. Define the Study Boundaries	The study area boundaries include the areas within the MRS boundary. The New York MRSs are generally is accessible, but may include features that result in constraints on the extent of the inspection. These constraints include the presence of buildings, roads, fences, other structures, and vegetation. Therefore, a VS and MC sampling will be limited to areas where these constraints are not present. For a given MRS, decisions regarding MEC/MD and MC will be based on analytical laboratory data and discussions with project stakeholders.
Step 5. Develop Analytical Approach	If MEC is present on the ground surface of the MRS, appropriate notification procedures will occur in accordance with the site-specific safety plan. If MEC is identified, the MRS will likely be recommended for RI/FS. A weight-of-evidence approach will be applied to determine the final recommendation. If MC exists in surface soil or other media above agreed to background values (represented by site-specific ambient data) and screening criteria, and if MEC or MD are present, then an RI/FS will be recommended and a more robust MC analysis in the RI/FS is warranted. If MC exists in surface soil or other media above the agreed to ambient values and screening criteria, and MEC or MD are not present, then MC concentrations will be further evaluated to determine whether the MC is related to the MEC or small arms MD from former NYARNG training

Table 5-1
Data Quality Objectives Summary

DQO Process Steps	DQO Decision Statements
	activities. If the source of the MC is not site-related, an NFA will likely be recommended. If MC is not detected in surface soil or other media above the agreed to ambient values and screening criteria, then NFA will be retained pending assessment of the MEC and or MD findings.
Step 6. Specify Performance or Acceptance Criteria	Data quality evaluation procedures and determination of usability are defined in UFP-QAPP (Appendix E). Results of Quality Assurance/Quality Control (QA/QC) efforts during sample collection and analysis, in combination with professional judgment, will be used to evaluate the usability of chemical data for making decisions. Acceptable limits for the MC sampling include analytical method reporting and/or detection limits that are sufficiently low to meet applicable human and ecological screening criteria. Analytical method detection limits, reporting limits, and QC acceptance criteria are specified in the UFP-QAPP (Appendix E).
Step 7. Develop Plan for Obtaining Data	The overall field data collection plan is presented in Sections 5.1 and 5.2, and the MRS-specific data collection plan is presented in Table 5-2 and is based on the information presented in the preceding six steps, and evaluation of existing data. Initial field observations will be assessed to optimize sample location selection if MEC and/or MD are present at the MRS. The TPP Team will have opportunities to provide input through regular project updates during data collection activities, analysis of data, and preparation of reports.

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
Amsterdam Range MRS	Risk – MEC, Compliance.	Small Arms (.30-caliber MI and .30-caliber M1906)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Visual survey throughout the MRS.	1.9 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey throughout the area. Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not Applicable.
	Risk – MC, Compliance	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Surface soils samples biased to areas with limited vegetative disturbance. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Eight surface soil samples (within MRS) will be collected. Two ambient surface soil samples (outside the MRS) will be collected.	If MC is detected below screening levels, then the MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Binghamton Rifle Range (new) MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target areas and the adjacent area.	2.0 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments, record MC sample locations, and document locations of photographs..	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target areas and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at target areas and adjacent areas. Two ambient surface soil samples collected outside the MRS.	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).

Table 5-2
Summary of Munitions Response Site Data Collection Plan

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	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
Camp Blauvelt MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target areas and the adjacent area.	3.6 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target areas and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Eight surface soil samples collected at target areas and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Camp O'Ryan MRS 1 Pistol Range	Risk – MEC, Compliance	Small arms (.22, .30, .38 and .45-caliber, and 5.56 mm and 7.62 mm)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target areas, the adjacent area.	0.3 mile of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former firing lines, target areas and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target areas and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Four surface soil samples collected at MRS 1 Pistol Range. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Camp O'Ryan MRS 3 Maneuvering Area	Risk – MEC, Compliance	2.36-inch practice rocket; and illumination signals	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus maneuvering training area.	4.9 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (tank training area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (aluminum, barium, copper and zinc) and explosives.	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the maneuvering area and at burial sites, if found. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.)	Four surface soil samples will be collected at MRS 3 Maneuvering Area. The two ambient surface soil samples collected for Camp O'Ryan MRS 1 will be used for ambient samples at MRS 3.	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (aluminum, barium, copper, and zinc) and SW-846 8330A for explosives.
Elmira MRS	Risk – MEC, Compliance	Small arms (.30 caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and adjacent areas.	1.7 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former firing lines, target areas and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample	Not applicable.

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
							locations, and document locations of photographs.	
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Surface soil samples to be collected from the target berm and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Eight surface soil samples collected at the target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Geneva Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and the adjacent area.	2.1 miles of magnetometer-assisted visual survey \.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated..	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target area and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
Geneva Range SDZ MRS	Risk – MEC and MC, Compliance	Small arms (22, .30, and .45-caliber)	Surface Soil (0-6 inches)	Not Applicable (N/A) – Majority of the SDZ is not investigated during the SI.	N/A	Historic and current data will serve as the basis for determining if an RI/FS or NFA will be recommended	N/A	N/A
Glens Falls Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and the adjacent area.	2.9 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target areas and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Glens Falls Range SDZ MRS	Risk – MEC and MC, Compliance	Small arms (22, .30, and .45-caliber)	Surface Soil (0-6 inches)	N/A – Majority of the SDZ is not investigated during the SI	N/A	Historic and current data will serve as the basis for determining if an RI/FS or NFA will be recommended	N/A	N/A

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
Hoosick Falls Range (new) MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and the adjacent area.	1.2 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target area and the adjacent area. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Hornell Rifle Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on the historic target area and the adjacent area.	2.0 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target area and the adjacent area. Locations will be adjusted if conditions exist that warrant additional bias of	Five surface soil samples collected at target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
				locations (stained soil, MD, etc.).				
Jamestown Rifle Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Visual survey transects throughout the MRS.	4.4 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey throughout the MRS. Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Surface soil or sediment samples (depending on site conditions) to be collected in areas that were potentially the target areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Eight surface soil or eight sediment samples collected throughout the possible target area and adjacent areas. Two ambient surface soil or sediment samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead,)
Malone LTA	Risk – MEC and MC, Compliance	Small arm s (22, .30,.38, .45, .50-caliber, .45 to .70-caliber, and 5.56 mm and 7.62 mm)	Surface Soil (0-6 inches)	Not Applicable (N/A) – MRS redeveloped and native soil no longer present.	N/A	Historic and current data will serve as the basis for determining if an RI/FS or NFA will be recommended.	N/A	N/A
Mohawk Rifle Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be	Biased visual survey to focus on the natural backstop, and the adjacent area.	0.8 mile of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended.	Visual survey in biased locations (former natural backstop and adjacent areas). Instrument-assisted survey will include GPS	Not applicable.

Table 5-2
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Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
			biased to consider range-related debris, if detected.			If MEC is discovered, degree of hazard and exposure will be evaluated.	to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil and sediment samples to be collected at backstop, and the adjacent area. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Three surface soil samples at the natural backstop and two sediment samples will be collected. Two ambient surface soil samples and one ambient sediment sample collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
NDNODS Creedmoor Rifle Range	Risk – MEC and MC, Compliance	Small arms (and .45 and .50-caliber)	Surface Soil (0-6 inches)	Not Applicable (N/A) – MRS redeveloped and native soil no longer present.	N/A	Historic and current data will serve as the basis for determining if an RI/FS or NFA will be recommended.	N/A	N/A
NDNODS Geneseo Range (old)	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on potential target area, natural backstop and the adjacent area.	0.5 mile of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area, natural backstop and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil and sediment samples to be collected at the target area, natural backstop, and the adjacent area. Locations will be adjusted if conditions exist that warrant additional bias of	Four surface soil samples collected at potential target area, backstop, and adjacent areas. Two sediment samples collected up and downstream from the target area. Two ambient surface soil samples and one ambient sediment sample collected	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
				locations (stained soil, MD, etc.).	(outside the MRS).			
NDNODS Rensselaer Wyck Target Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and the adjacent area.	1.7 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated..	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target area and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Four surface soil samples collected at target area and adjacent areas. Two sediment samples collected up and downstream from the target area. Two ambient surface soil and one ambient sediment sample collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
NDNODS Rochester Rifle Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and the adjacent area.	1.0 mile of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be	Biased surface soil samples to be collected at the target area and adjacent areas.	Six surface soil samples collected at target area and adjacent areas. Two ambient surface soil	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
			modified to consider range-related debris, if detected.	Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	samples collected (outside the MRS).			lead).
Olean Target Range (new) MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on the suspected target area and the adjacent area.	1.6 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the suspected target area and the adjacent area. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Oneida Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and the adjacent area.	1.5 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the target area and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Four surface soil samples collected at target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Poughkeepsie Rifle Range MRS	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on target area and the adjacent area.	1.0 mile of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (former target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil and sediment samples to be collected at the target area and adjacent areas. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at target area and adjacent areas. Two sediment samples collected up and downstream from the target area. Two ambient surface soil samples and one ambient sediment sample collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Saratoga Springs Rifle Range	Risk – MEC, Compliance	Small arms (22, .30, and .45-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on the suspected target area and the adjacent area.	1.7 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (suspected target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample	Not applicable.

Table 5-2
Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
							locations, and document locations of photographs.	
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil s to be collected at suspected target area and the adjacent area. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at suspected target area, backstop, and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Ticonderoga Range (old) MRS	Risk – MEC, Compliance	Small arms (.30, .45 and .50-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	N/A – Access to the MRS was refused.	N/A – Visual survey cannot be conducted as a result of an ROE refusal.	Historic and current data will serve as the basis for determining if an RI/FS or NFA will be recommended.	N/A	N/A
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches).	N/A – Access to the MRS was refused	N/A – ROE refusal; therefore no samples can be collected.	N/A	N/A	N/A
Ticonderoga Range (old) SDZ MRS	Risk – MEC and MC, Compliance	Small arms (.30, .45 and .50-caliber)	Surface Soil (0-6 inches)	N/A – Majority of the SDZ is not investigated during the SI.	N/A	Historic and current data will serve as the basis for determining if an RI/FS or NFA will be recommended.	N/A	N/A
Ticonderoga Training Range (new) MRS	Risk – MEC, Compliance.	Small arms (.30, .45 and .50-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Visual survey transects throughout the MRS.	2.3 miles of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey throughout the area. Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not Applicable.

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Summary of Munitions Response Site Data Collection Plan

Munitions Response Site	Data Requirements						Sampling and Analysis Methods	
	Data User Perspective(s) [1]	Contaminant or Characteristic of Interest Identified	Media of Interest Identified	Required Visual Surveys, Sampling Areas or Locations and Depths Identified	Visual Survey Lengths, Amount of Sampling/Number of Samples Required	Reference Concentration(a) or Other Performance Criteria	Sampling Method Identified	Analytical Method Identified
	Risk – MC, Compliance	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Surface soils samples will be collected throughout the MRS biased to the areas with limited vegetative disturbance. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Eight surface soil samples collected throughout the MRS. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, then the MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).
Walton Rifle Range (new) MRS	Risk – MEC, Compliance	Small arms (.30, .45 and .50-caliber)	Ground surface based on visual observation. Approach will be modified to consider terrain, vegetation, etc., and will be biased to consider range-related debris, if detected.	Biased visual survey to focus on the suspected target area and the adjacent area.	1.0 mile of magnetometer-assisted visual survey.	If no evidence of munitions other than small arms ammunition is found, MRS has no MEC potential and NFA for MEC will be recommended. If MEC is discovered, degree of hazard and exposure will be evaluated.	Visual survey in biased locations (suspected target area and adjacent areas). Instrument-assisted survey will include GPS to record geospatial findings, confirm pathway alignments record MC sample locations, and document locations of photographs.	Not applicable.
	Risk – MC, Compliance.	MC (antimony, copper, and lead).	Surface soil (0- 6 inches). Approach will be modified to consider range-related debris, if detected.	Biased surface soil samples to be collected at the suspected target area and the adjacent area. Locations will be adjusted if conditions exist that warrant additional bias of locations (stained soil, MD, etc.).	Five surface soil samples collected at target area and adjacent areas. Two ambient surface soil samples collected (outside the MRS).	If MC is detected below screening levels, MRS will be recommended for NFA for MC.	CRREL composite surface soil samples collected.	EPA SW-846 6010C for metals (antimony, copper, and lead).

[1]. MEC is assumed not to be present at ranges where munitions use was limited to small arms ammunition only; therefore, VS associated with this SI is intended to confirm small arms use only.

5.1 DATA QUALITY OBJECTIVES FOR MUNITIONS AND EXPLOSIVES OF CONCERN

5.1.1 The MRSs will be evaluated to determine if use of military munitions resulted in the potential for MEC and/or MC contamination. At small arms ranges, the VS will focus on the known or suspected locations of berms and targets and since small arms (either fired or unfired) are not classified as MEC due to lack of explosive safety hazard, the VS focus will be to refine MC sampling locations. Typically, downrange SDZ will not be examined unless there is evidence (i.e., MEC/MD discoveries) to support field work in the projected or known SDZ.

5.1.2 If MEC is identified within the MRSs, an RI/FS (or interim removal/remedial action) recommendation may be warranted. A weight-of-evidence approach will be applied as noted in Table 5-1 to determine the final recommendation.

5.1.3 The VS distance for each of the MRSs is listed within Attachment 1 and is also depicted in Figures D-1 through D-20 included in Appendix D (Field Sampling Plan).

5.2 DATA QUALITY OBJECTIVES FOR MUNITIONS CONSTITUENTS

5.2.1 The New York MRSs will be evaluated to determine the presence or absence of MC resulting from former military training.

5.2.2 Surface soil and sediment (as appropriate) samples will be collected to evaluate for the presence/absence of MC. Ambient samples also will be collected. The number of samples to be collected is listed in Table 5-1 and Attachment 1 of the FSP. Collection of samples is based on the potential presence of military munitions (MEC or MD) and the location of known areas of interest such as target areas, firing lines, and/or where there is evidence of military activity. Samples will be collected based on the criteria and procedures outlined in Subchapter 4.2 of the FSP. Samples will be analyzed for analytes defined in Table D-1 of the FSP (Appendix D).

5.2.3 Constituent concentrations that exceed the detected concentrations in the ambient samples and human health screening criteria based on the decision rules established during the TPP process and documented in this HRR/WP, may warrant a recommendation for further investigation of MC. A weight-of-evidence approach will be applied as noted in Table 5-1 to determine the final recommendation.

5.3 DATA QUALITY OBJECTIVES FOR MUNITIONS RESPONSE SITE PRIORITIZATION PROTOCOL

Specific input data will be collected and the MRSPP modules populated as part of the SI. These data will be collected from existing document sources and SI field data. Source documents will include the PA and HRR/WP. Data gaps will be filled via sampling, local and state agencies' records, interviews, internet searches, and other database searches.

5.4 MUNITIONS RESPONSE SITE-SPECIFIC DATA QUALITY OBJECTIVES

The qualitative and quantitative statements summarized above were refined to clarify study objectives, define the type of data needed, and specify the potential decision errors for the 28 MRSs in New York. The resulting Field Data Collection Plan (Step 7 of the DQO process) for New York is presented in Table 5-2.

CHAPTER 6
SAMPLING AND ANALYSIS PLAN

6.0 INTRODUCTION

6.1 A Field Sampling Plan (FSP) was developed to describe Parsons' specific activities and procedures for conducting VS and sample collection during the SIs at the MMRP NDNODS eligible MRSs in the State of New York. The FSP is provided as Appendix D to this HRR/WP.

6.2 The FSP includes information on definitions and generic goals for data quantity and minimum requirements for QA/QC samples. The procedures address sampling and decontamination protocols, geophysical investigation, field documentation, sample handling, custody and shipping, instrument calibration and maintenance, field and laboratory auditing, data reduction, validation, reporting, corrective action requirements, and QA reporting.

6.3 Table 6-1 provides a summary of the SI field work that will be conducted at the New York MRSs.

Table 6-1 Summary of New York SI Field Plans

MRS (Sample) ID	MRS	Total Acreage	Munitions Use	Anticipated Recommendation	Visual Survey?	Visual Survey Length	Estimated number of samples[1]	Media/Analysis
NYHQ5-R1	Amsterdam Range	25	Small Arms	NFA	Yes	1.9 miles	10 Soil	Soil (antimony, copper, and lead)
NYHQ6-R1	Binghamton Rifle Range (new)	67	Small Arms	NFA	Yes	2.0 miles	7 Soil	Soil (antimony, copper, and lead)
NYHQ7-R1	Camp Blauvelt	447	Small Arms	NFA or RI/FS	Yes	3.6 miles	10 Soil	Soil (antimony, copper, and lead)
NYHQ8-R1	Camp O'Ryan MRS 1	7	Small Arms	RI/FS	Yes	0.3	6 Soil	Soil (antimony, copper, and lead)
NYHQ7-R2	Camp O'Ryan MRS 3	394	Maneuvering Area	NFA or RI/FS	Yes	4.9	4 Soil	Soil (aluminum, barium, copper, and lead) and explosives
NYHQ9-R1	Elmira	132	Small Arms	NFA or RI/FS	Yes	1.7 miles	10 soil	Soil (antimony, copper, and lead)
NYHQ10-R1	Geneva Range	92	Small Arms	NFA or RI/FS	Yes	2.1 miles	7 Soil	Soil (antimony, copper, and lead)
NYHQ10-R2	Geneva Range SDZ	846	Small Arms	NFA	No	N/A	N/A	N/A
NYHQ11-R1	Glens Falls Range	215	Small Arms	NFA or RI/FS	Yes	2.9 miles	7 Soil	Soil (antimony, copper, and lead)
NYHQ11-R2	Glens Falls Range SDZ	661	Small Arms	NFA	No	N/A	N/A	N/A
NYHQ12-R1	Hoosick Falls Range (new)	23	Small Arms	NFA or RI/FS	Yes	1.2 miles	7 Soil	Soil (antimony, copper, and lead)
NYHQ13-R1	Hornell Rifle Range	100	Small Arms	NFA	Yes	2 miles	7 Soil	Soil / Antimony, copper, and lead
NYHQ14-R1	Jamestown Rifle Range	10	Small Arms	NFA or RI/FS	Yes	4.4 miles	10 Soil or Sediment - Determination of medium sampled will occur during the fieldwork event	Sediment (antimony, copper, and lead)
NYHQ15-R1	Malone LTA	43	Maneuvering Area	NFA	No	N/A	N/A	N/A
NYHQ16-R1	Mohawk Rifle Range	73	Small Arms	NFA or RI/FS	Yes	0.8 mile	5 Soil and 3 Sediment	Soil (antimony, copper, and lead); Sediment (antimony, copper, and lead)
NYHQ1-R1	NDNODS Creedmoor Rifle Range	432	Small Arms	NFA	No	Not Applicable (N/A)	N/A	N/A
NYHQ2-R1	NDNODS Geneseo Range (old)	3.7	Small Arms	NFA or RI/FS	Yes	0.5 mile	6 Soil and 3 Sediment	Soil (antimony, copper, and lead); Sediment (antimony, copper, and lead)
NYHQ3-R1	NDNODS Rensselaer Wyck Target Range	30	Small Arms	NFA or RI/FS	Yes	1.7 miles	6 Soil and 3 Sediment	Soil (antimony, copper, and lead); Sediment (antimony, copper, and lead)
NYHQ4-R1	NDNODS Rochester Rifle Range	7.5	Small Arms	NFA or RI/FS	Yes	1.0 mile	8 Soil	Soil (antimony, copper, and lead)
NYHQ17-R1	Olean Target Range (new)	235	Small Arms	NFA	Yes	1.6 miles	7 Soil	Soil (antimony, copper, and lead)
NYHQ18-R1	Oneida Range	7.5	Small Arms	NFA or RI/FS	Yes	1.5 miles	6 Soil	Soil (antimony, copper, and lead)
NYHQ19-R1	Poughkeepsie Rifle Range	89	Small Arms	NFA or RI/FS	Yes	1.0 mile	7 Soil and 3 Sediment	Soil (antimony, copper, and lead); Sediment (antimony, copper, and lead)
NYHQ20-R1	Saratoga Springs Rifle Range	48	Small Arms	NFA or RI/FS	Yes	1.7 miles	7 Soil	Soil (Antimony, copper, and lead)

Table 6-1 Summary of New York SI Field Plans

MRS (Sample) ID	MRS	Total Acreage	Munitions Use	Anticipated Recommendation	Visual Survey?	Visual Survey Length	Estimated number of samples[1]	Media/Analysis
NYHQ21-R1	Ticonderoga Range (old)[2]	12.5	Small Arms	NFA or RI/FS	No	N/A	N/A	N/A
NYHQ21-R2	Ticonderoga Range (old) SDZ	394	Small Arms	NFA	No	N/A	N/A	N/A
NYHQ22-R1	Ticonderoga Training Range (new)	105	Small Arms	NFA	Yes	2.3 miles	10 Soil	Soil (antimony, copper, and lead)
NYHQ23-R1	Walton Rifle Range (new)	4	Small Arms	NFA	Yes	1.0 mile	7 Soil	Soil (antimony, copper, and lead)

1- The total number of samples includes ambient samples (2 ambient samples per surface soil and 1 ambient sample per sediment).
2- The ROE for Ticonderoga Range (old) was refused and fieldwork cannot be conducted.

CHAPTER 7
ACCIDENT PREVENTION PLAN

7.0 INTRODUCTION

An Accident Prevention Plan (APP), including Activity Hazard Analyses (AHA) documentation, is included as Appendix F to this HRR/WP. The APP provides specific details relating to the procedures that will be used during the SI to ensure worker safety throughout the process. This plan addresses exposure to the elements, wildlife, vehicle safety, explosive hazards, and chemical hazards.

CHAPTER 8
ANOMALY AVOIDANCE

8.0 INTRODUCTION

8.0.1 An MEC Support Work Plan is included as Appendix H to this HRR/WP. The MEC Support WP identifies specific details regarding the approach, methods, and operational procedures to be used to perform UXO support during the SI activities in addition to the avoidance procedures described here.

8.0.2 Anomaly avoidance refers to techniques used by personnel at sites with known or suspected MEC. The purpose of anomaly avoidance is to avoid any potential surface MEC and subsurface anomalies during sampling activities. SI activities with the potential for encountering MEC include visual surveys and sampling. Intrusive anomaly investigation is not permitted during anomaly avoidance operations. For anomaly avoidance during SI field activities, compliance with anomaly avoidance procedures will be the responsibility of the field UXO Technician III/Site Safety and Health Officer (SSHO). In addition, an Installation Communication Protocol and Ordnance Contact Form (Appendix G) will be followed. The SSHO will be responsible for conducting safety briefings for all site personnel and visitors.

8.1 ANOMALY AVOIDANCE PLAN

8.1.1 Prior to initiation of SI field activities, the SSHO will provide the field teams with information to aid in the recognition of items that may be anticipated at each MRS. The SSHO will emphasize that although the potential for certain MEC items may exist at an MRS, the field teams must be prepared to recognize all potential MEC.

8.1.2 The site visit team (SVT) conducting SI field activities will consist of a minimum of two members. One of these members will be the SSHO. The other required member of the team will consist of the Field Team Leader (FTL). Other team members, such as a Sampling Technician, will be used as needed. The SSHO is responsible for providing MEC recognition, location, and safety functions during VS and MC sampling. The SSHP will escort the team members and site visitors at all times. Hand-held magnetometers will be used to enhance visual sweep procedures and identify potential MEC items to ensure worker safety. The VS will be tracked using a hand-held Global Positioning System (GPS) instrument. If GPS initialization is lost or horizontal error exceeds acceptable accuracy due to lack of satellites or poor satellite geometry, the VS will be hand recorded on maps or aerial photographs.

8.1.3 All MEC and significant munitions-related debris encountered during the field effort will be marked as GPS waypoints and recorded in a field log. Digital photographs of representative MD will be documented. Parsons will not conduct UXO/MEC detonations or removal as part of this SI. Characteristics and preliminary identification (if possible) will be documented by the SSHO and reported to the Parsons State Lead who will notify the appropriate contacts in accordance with the Installation Communication Protocol (Appendix H). In summary, if suspect UXO/MEC is identified within an MRS, the property owner will be notified

first (unless absentee owner) followed by the local law enforcement agency second (if the property owner is not available), and the NYARNG designated POCs, ARNG PMs, and USACE PMs, third. In addition, the NYSDEC will be notified by the NYARNG if UXO/DMM is identified. Information regarding MEC identified during SI field activities will be documented on an Ordnance Contact Report, also included in Appendix G. Information on the form will assist in relocating and identifying the MEC item for future mitigation or disposal by other parties. If MEC items are identified, the survey will be halted and the SSHO will review safety risks and may select an alternate VS route around the item.

8.1.4 Prior to MC sampling, the SSHO will visually survey the proposed sampling location for indication of MEC. In addition, the area will be swept with the handheld electromagnetic device to confirm the absence of subsurface anomalies (potential MEC). If anomalies are detected within the proposed sampling location, an alternate location will be selected. Once the intended soil sample site has been determined to be clear of anomalies, soil will be excavated from the cleared point(s).

CHAPTER 9
RIGHTS OF ENTRY/SITE ACCESS

9.0. INTRODUCTION

9.0.1 The USACE Omaha District will be responsible for coordinating and executing all ROEs to allow access and completion of SI activities at each MRS. Parsons will provide coordination and technical support as needed for the USACE to complete the ROE requests. Copies of the ROEs are included in Appendix J.

9.0.2 Table 9-1 summarizes ownership information for the parcels for which ROEs have been requested for the 28 New York ARNG MRSs. The parcel boundaries are depicted in Figures 9-1 through 9-21. The property information is based on the best available knowledge at the time of plan preparation.

Table 9-1
Property Ownership Information for New York MRSs

MRS Name	Property Owner	Parcel Number	Significance of Parcel*	Status
Amsterdam Range	Mark Damin	21.-1-2.12; 20.-1-15	Primary	Pending
Amsterdam Range	Bryan A & Ann M Rulison	21.-1-37	Primary	3/2 – Obtained
Binghamton Rifle Range (new)	Rebecca S Trick	129.01-1-10	Primary	Pending
Binghamton Rifle Range (new)	William A and Michelle L Phillips	129.01-1-14	Primary	3/2 – Obtained
Binghamton Rifle Range (new)	Joseph A and Lynda P Carpenter	129.01-1-15	Primary	3/2 – Obtained
Binghamton Rifle Range (new)	Barry A & Kimberly A Kilmer	129.01-1-8	Primary	Pending
Binghamton Rifle Range (new)	Jay Abbey	129.13-1-5	Primary	5/25 – Obtained
Camp Blauvelt	New York State Office of Parks, Recreation & Historic Preservation	Blauvelt State Park	Primary	3/2 – Obtained
Camp O'Ryan	William King	106.-2-61.2	Primary	Pending
Camp O'Ryan	Edward N. George	106.-2-61.1	Primary	Pending

Table 9-1
Property Ownership Information for New York MRSs

MRS Name	Property Owner	Parcel Number	Significance of Parcel*	Status
Camp O'Ryan	Rick Faucett	106.-2-59	Primary	3/2 - Obtained
Elmira	Brewer, Robert	69.00-1-11.3	Primary	6/1 – Obtained
Elmira	NYSEG	69.00-1-18	Primary	3/23 - Obtained
Elmira	McCann, Bette J	69.00-1-12	Primary	4/27 – Obtained
Geneva Range	Eva M Millerd	88.00-1-12.100	Primary	Pending
Geneva Range	Dmytro Malyj	89.00-1-3.000	Primary	Pending
Geneva Range	Dale Hemminger	89.00-1-68.200	Primary	7/10 – Refused
Geneva Range	Richard McFadden	89.00-1-68.100	Primary	Pending
Glens Falls Range	City Of Glens Falls, Water and Sewer Dept	301.10-1-1; 301.16-1-1	Primary	3/2 – Obtained
Hoosick Falls Range (new)	Larry A & Katherine L Bugbee	27.-1-3.3	Primary	Pending

Table 9-1
Property Ownership Information for New York MRSs

MRS Name	Property Owner	Parcel Number	Significance of Parcel*	Status
Hoosick Falls Range (new)	Nickolas W Chirasello Jr	27.-1-2	Primary	Pending
Hornell Rifle Range	Steuben County	149.00-01-001.000	Primary	5/25 - Obtained
Hornell Rifle Range	U.S. General Services Administration	135.00-01-012.100	Primary	Pending
Jamestown Rifle Range	Raymond N Lee	422.00-2-22	Primary	Pending
Jamestown Rifle Range	Robert J Bauer	422.00-2-23	Primary	Pending
Jamestown Rifle Range	Jamestown Ren Co Inc	422.00-2-24	Primary	1/14 - Obtained
Mohawk Rifle Range	Anthony T and Jolene Bianco	113.2-1-21; 113.2-1-55	Primary	Refused; negotiations unsuccessful
Mohawk Rifle Range	Daniel and Dorthy Perry	113.2-1-1.1	Primary	Pending
Mohawk Rifle Range	Donald J Mitchell	113.2-1-22	Primary	Pending
Mohawk Rifle Range	Terry M and Mary Ives	113.2-1-20.1	Primary	Pending

Table 9-1
Property Ownership Information for New York MRSs

MRS Name	Property Owner	Parcel Number	Significance of Parcel*	Status
Mohawk Rifle Range	Dorothy L Suits	113.1-1-78.1	Primary	4/12 - Obtained
NDNODS Geneseo Range (old)	The Abbey of the Genesee	61.-1-25.111	Primary	3/2 – Obtained
NDNODS Rensselaer Wyck Target Range	City of Rensselaer	133.71-9-11; 144.22-4-1; 133.78-8-1	Primary	1/19 – Obtained
NDNODS Rensselaer Wyck Target Range	Davies Gregory S & Brenda J	144.22-3-12	Primary	2/18 - Refused
NDNODS Rochester Rifle Range	County of Monroe, Dept. of Parks	108.09-2-1.1	Primary	1/14 - Obtained
Olean Target Range (new)	John E Colwell Revocable Trust	103.002-2-12	Primary	6/28 – Obtained
Oneida Range	Donald Cole, Qtip	37.-3-63; 45.-2-43.1	Primary	Pending
Oneida Range	Scott and Susan George	38.-1-1.2	Primary	2/3 - Obtained
Oneida Range	Shawn M and Roselle A Lynch	38.-1-1.6; 38.-1-1.1	Primary	Pending
Oneida Range	Randy J Schaal	38.-1-1.5; 38.-1-1.1	Primary	Pending

Table 9-1
Property Ownership Information for New York MRSs

MRS Name	Property Owner	Parcel Number	Significance of Parcel*	Status
Oneida Range	Jill S Schaal	38.-1-1.5	Primary	Pending
Oneida Range	Myles W and Dyann Nashton	38.-1-1.4	Primary	Pending
Oneida Range	Mark and Sylvia DeMassa	38.-1-1.7	Primary	2/3 – Obtained
Oneida Range	John E and Theresa Gentil Femia	38.-1-1.10	Primary	3/2 – Obtained
Poughkeepsie Rifle Range	Dutchess County	083639	Primary	7/12 – Obtained
Poughkeepsie Rifle Range	Morgan Manor, LLC	690014	Primary	Pending
Saratoga Springs Rifle Range	Brewer, James	167.-6-5	Primary	Pending
Saratoga Springs Rifle Range	G Bar G Associates	153.-1-11.2	Primary	Pending
Saratoga Springs Rifle Range	Saratoga Springs Police Benevolent Association	166.-2-5; 166.-2-6	Primary	Pending
Saratoga Springs Rifle Range	Zablinis, William	167.-6-4	Primary	7/12 – Obtained

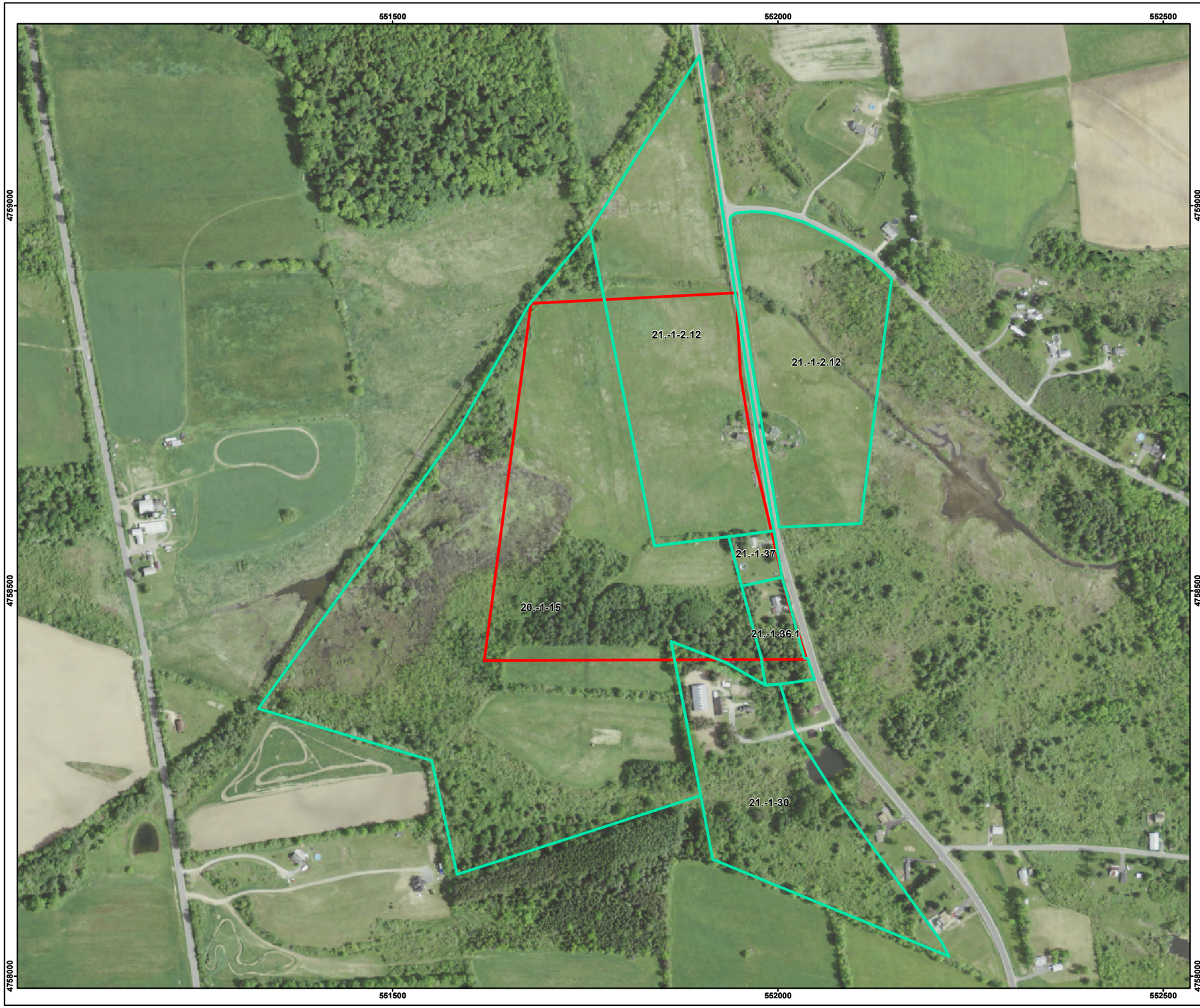
Table 9-1
Property Ownership Information for New York MRSs

MRS Name	Property Owner	Parcel Number	Significance of Parcel*	Status
Saratoga Springs Rifle Range	Niel V Nielsen	167.-6-6	Secondary	5/25 - Obtained
Saratoga Springs Rifle Range	Alberto Machado	167.-6-7	Secondary	6/21 - Obtained
Saratoga Springs Rifle Range	Stephen J Ott	167.-6-8	Secondary	Pending
Ticonderoga Range (old)	Eric A Olsen	138.2-1-27.000; 138.2-2-4.110; 138.2-2-5.000	Primary	Refused; negotiations unsuccessful
Ticonderoga Training Range (new)	Cynthia and Robert R Childs	139.2-2-7.112	Primary	Pending
Ticonderoga Training Range (new)	Phillip and Justina Huestis	139.2-2-33.000	Primary	Pending
Walton Rifle Range (new)	Walton Central School District	273.1-10; 273.12-5-1; 273.15-1-2	Primary	Pending

** - Primary indicates parcels identified as significant for SI field activities based on range features and history. Secondary indicates parcels for which ROE was not aggressively pursued.*

Figure 9-1
Amsterdam Range
AEDB-R # NYHQ-005-R-01

Montgomery County, New York



Legend

- MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS

DESIGNED BY: BT	ROE Map		
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CHECKED BY: IG	SCALE: As Shown	PROJECT NUMBER: 747648.13000	
SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-6	
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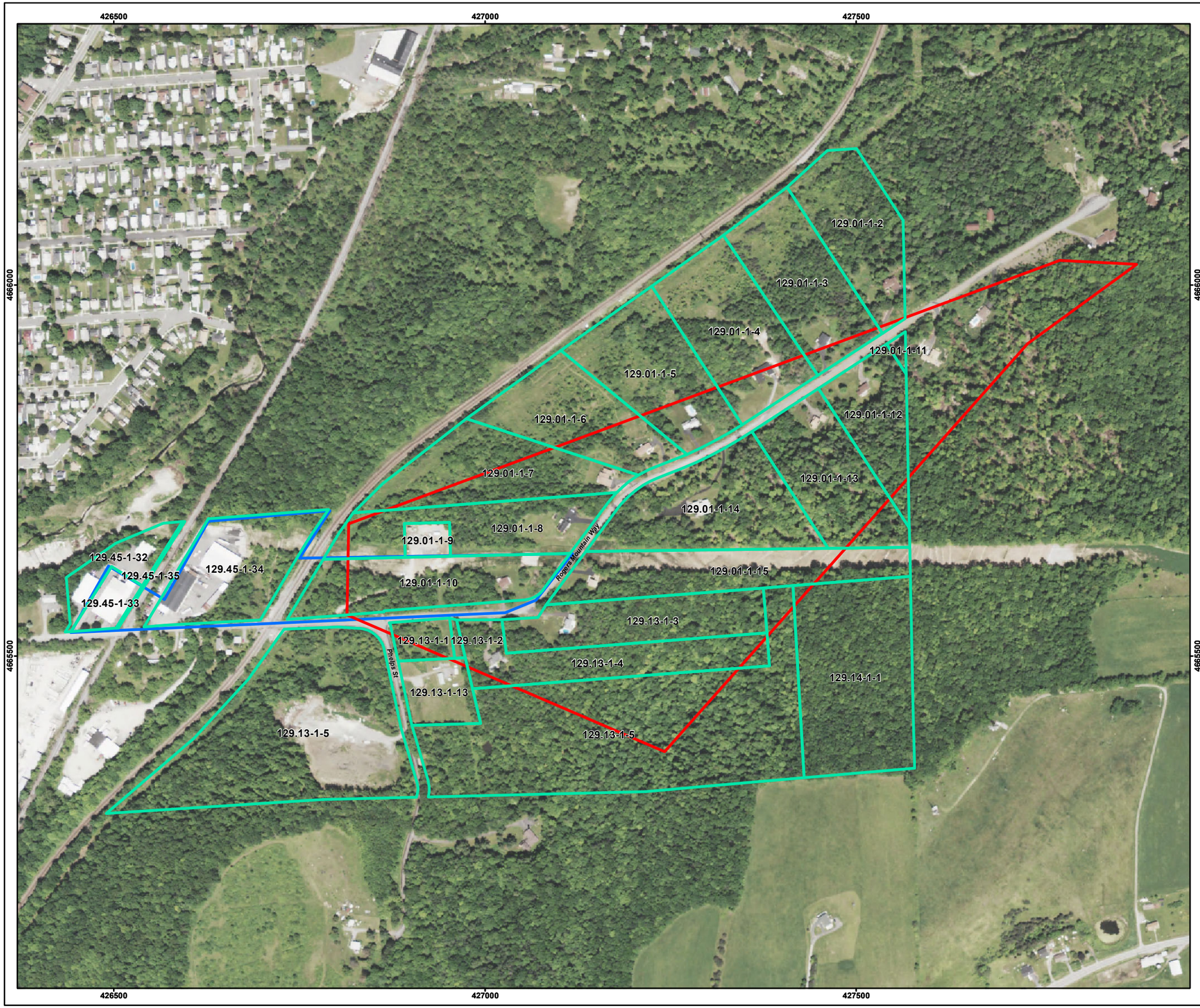
Figure 9-2
Binghamton Rifle Range (new)
AEDB-R # NYHQ-006-R-01

Broome County, New York



Legend

- Proposed Revised MRS Boundary
- Current MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS

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Figure 9-3
Camp Blauvelt
AEDB-R # NYHQ-007-R-01

Rockland County, New York

Legend

- MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

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SUBMITTED BY: IG	DATE: June 2011	PAGE NUMBER: 9-8	
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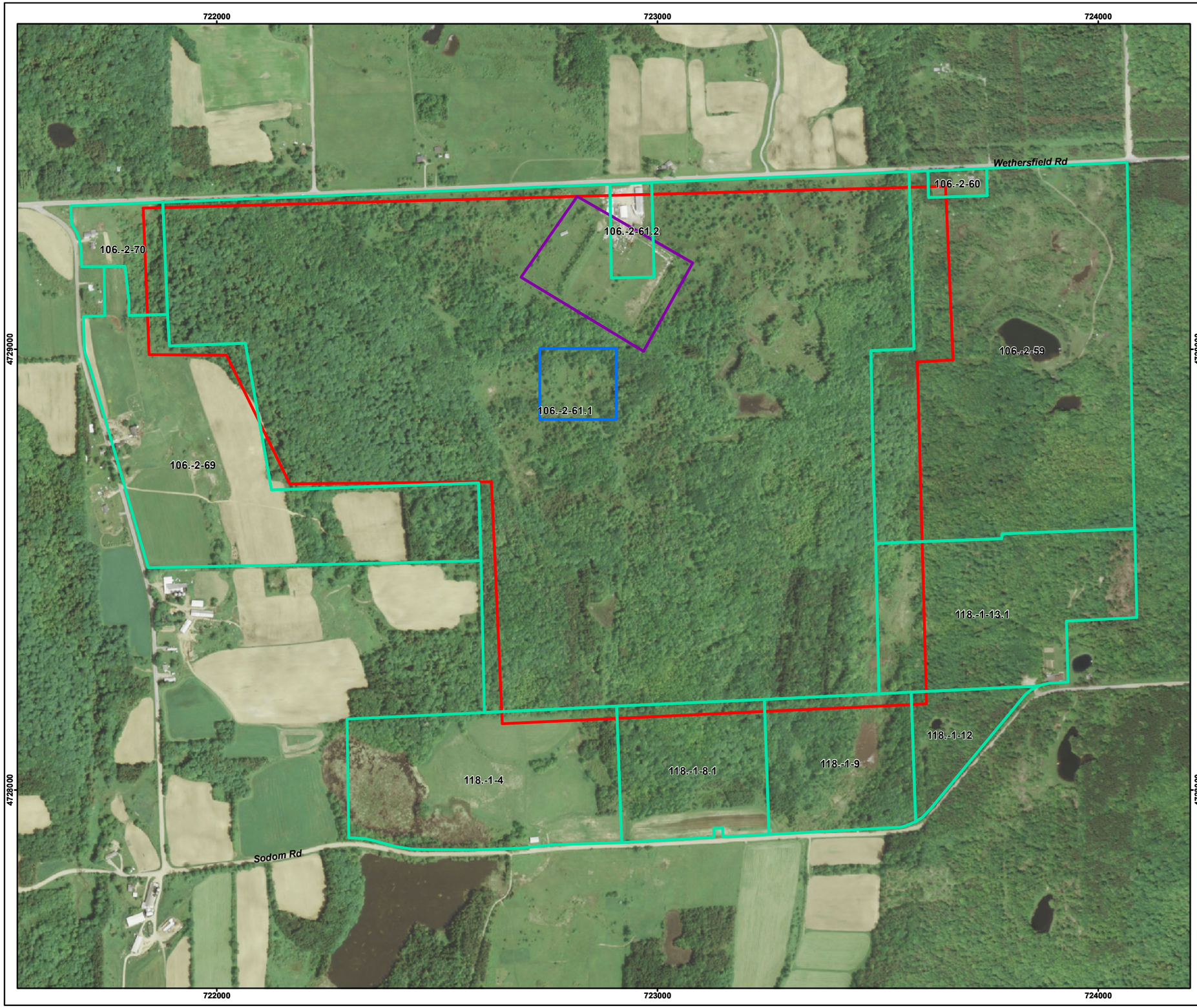
Figure 9-4
Camp O'Ryan
AEDB-R # NYHQ-008-R-01

Wyoming County, New York



Legend

- MRS 1 - Pistol Range
- MRS 2 - Rifle Range
- MRS 3 - Maneuvering Area
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 17, WGS84, Meters

200 100 0 200 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

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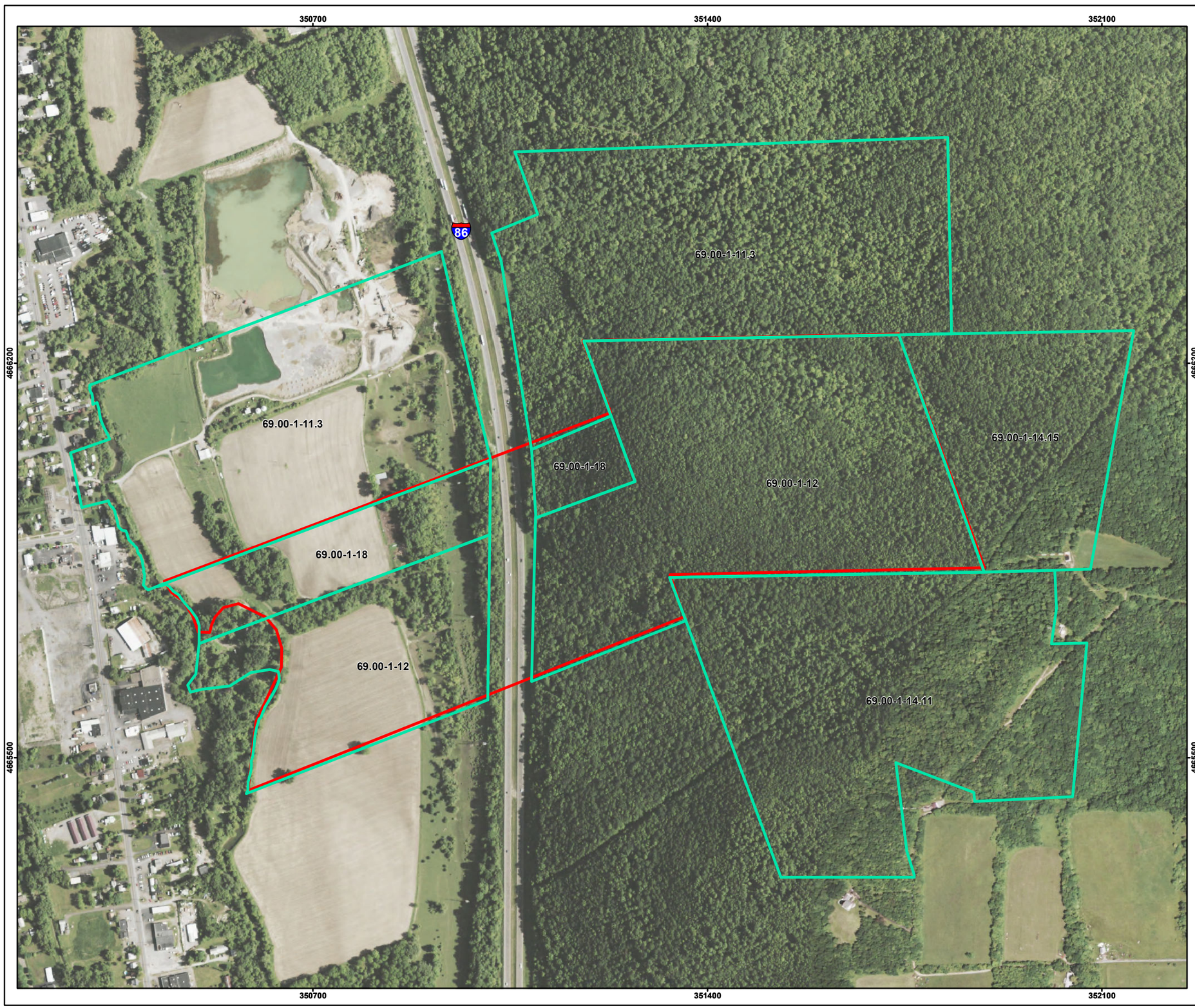
Figure 9-5
Elmira Rifle Range
AEDB-R # NYHQ-009-R-01

Chemung County, New York



Legend

- MRS Boundary
- Parcel Boundary

Site Location in New York

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

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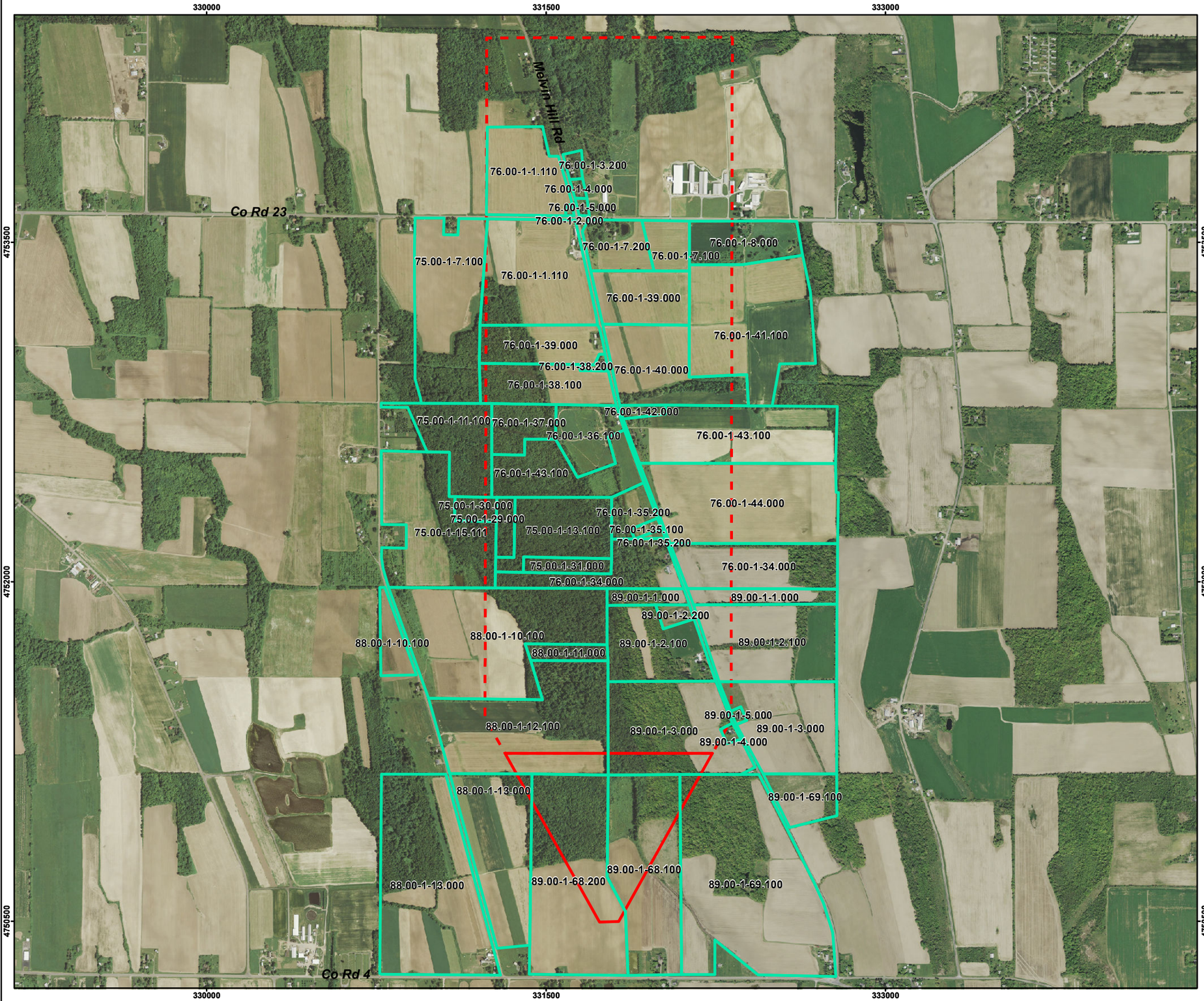

Figure 9-6
Geneva Rifle Range
AEDB-R # NYHQ-010-R-01

Ontario County, New York

Legend

- MRS Boundary
- MRS (SDZ)
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

500 250 0 500 Meters

PARSONS

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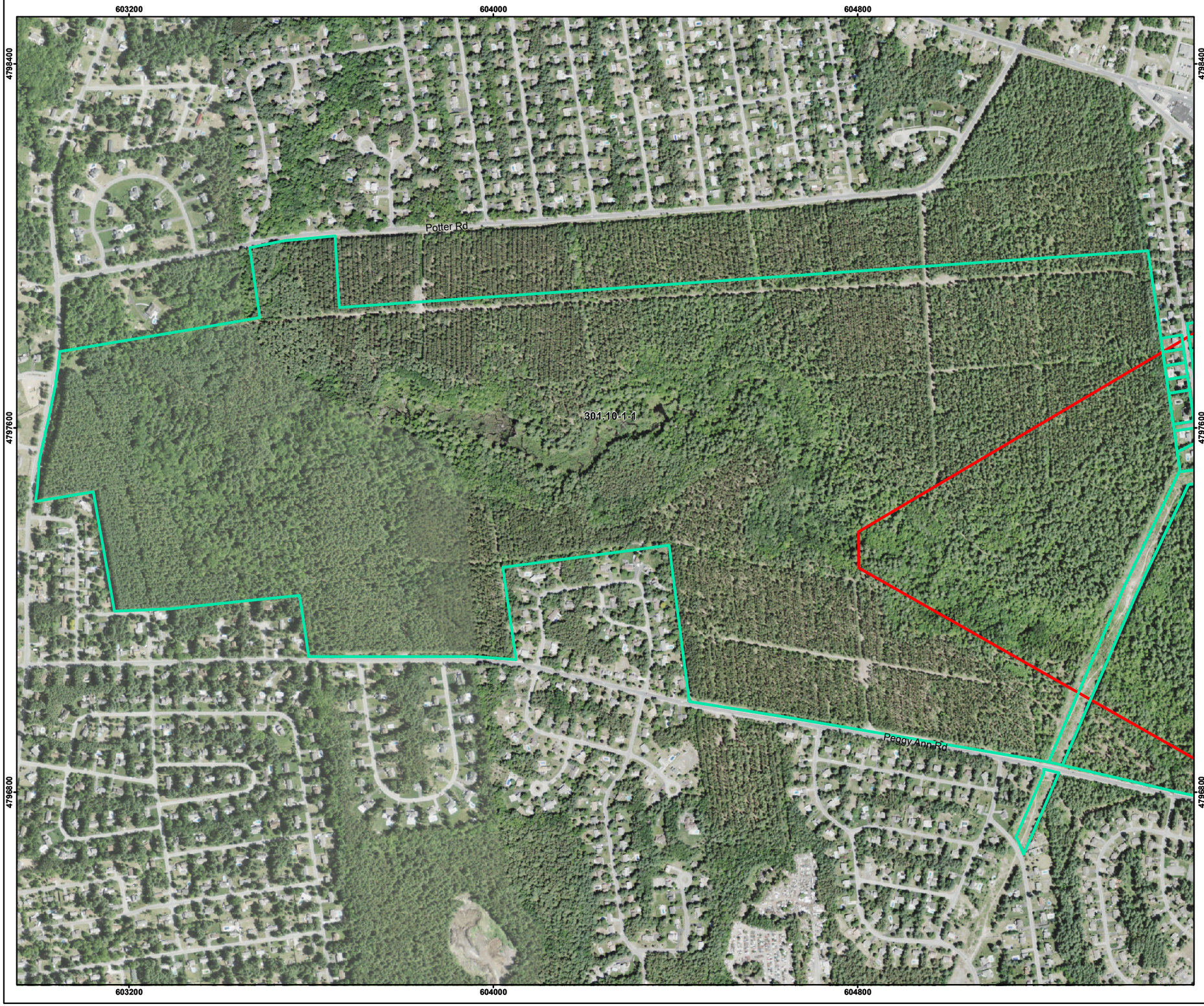

Figure 9-7a
Glen Falls Range
AEDB-R # NYHQ-011-R-01

Warren County, New York

Legend

- MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS

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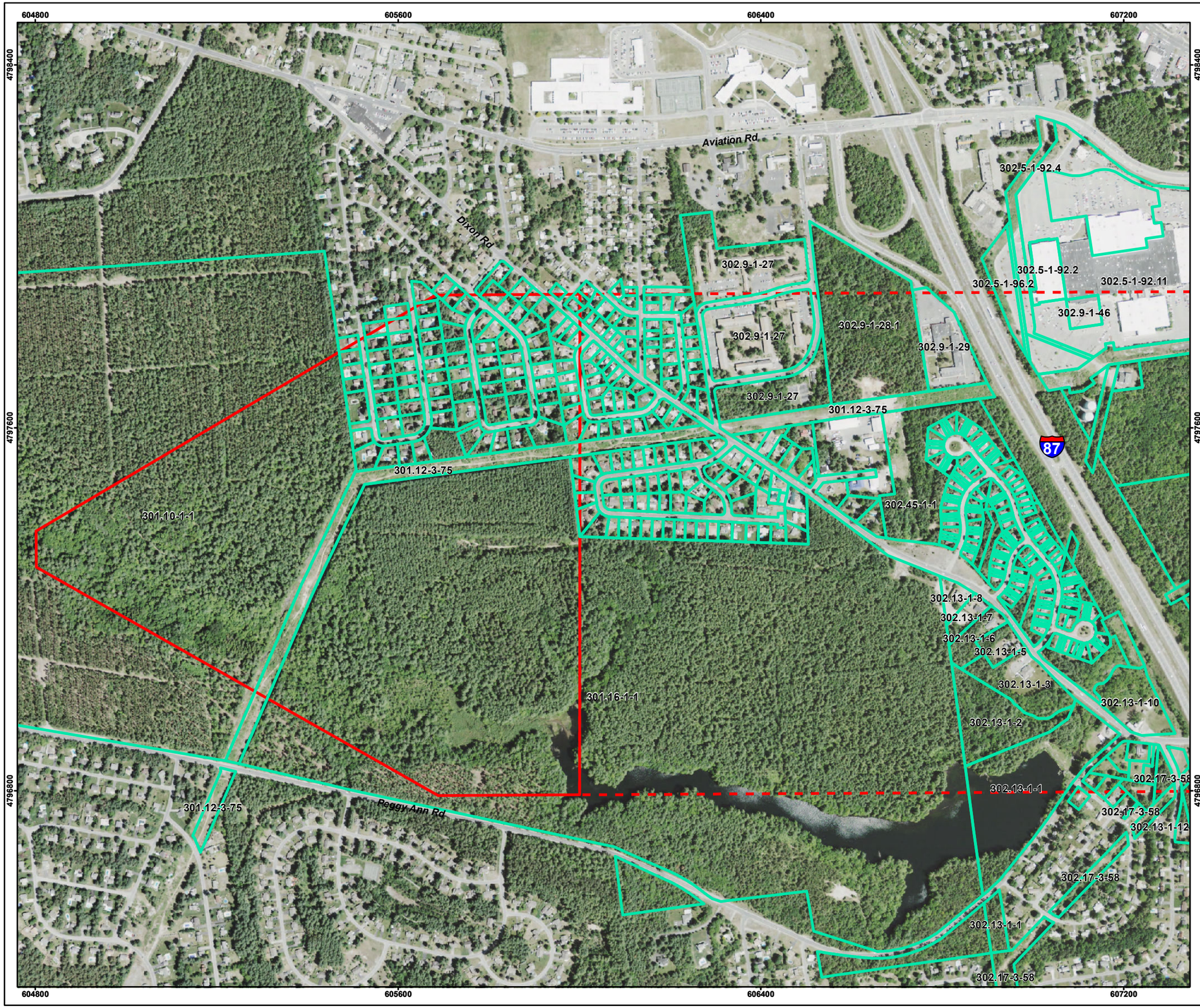
Figure 9-7b
Glen Falls Range
AEDB-R # NYHQ-011-R-01

Warren County, New York



Legend

- MRS Boundary
- SDZ Boundary
- Parcel Boundary

Site Location in New York

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS

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CHECKED BY: IG	SCALE: As Shown	PROJECT NUMBER: 747648.13000	
SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-13	
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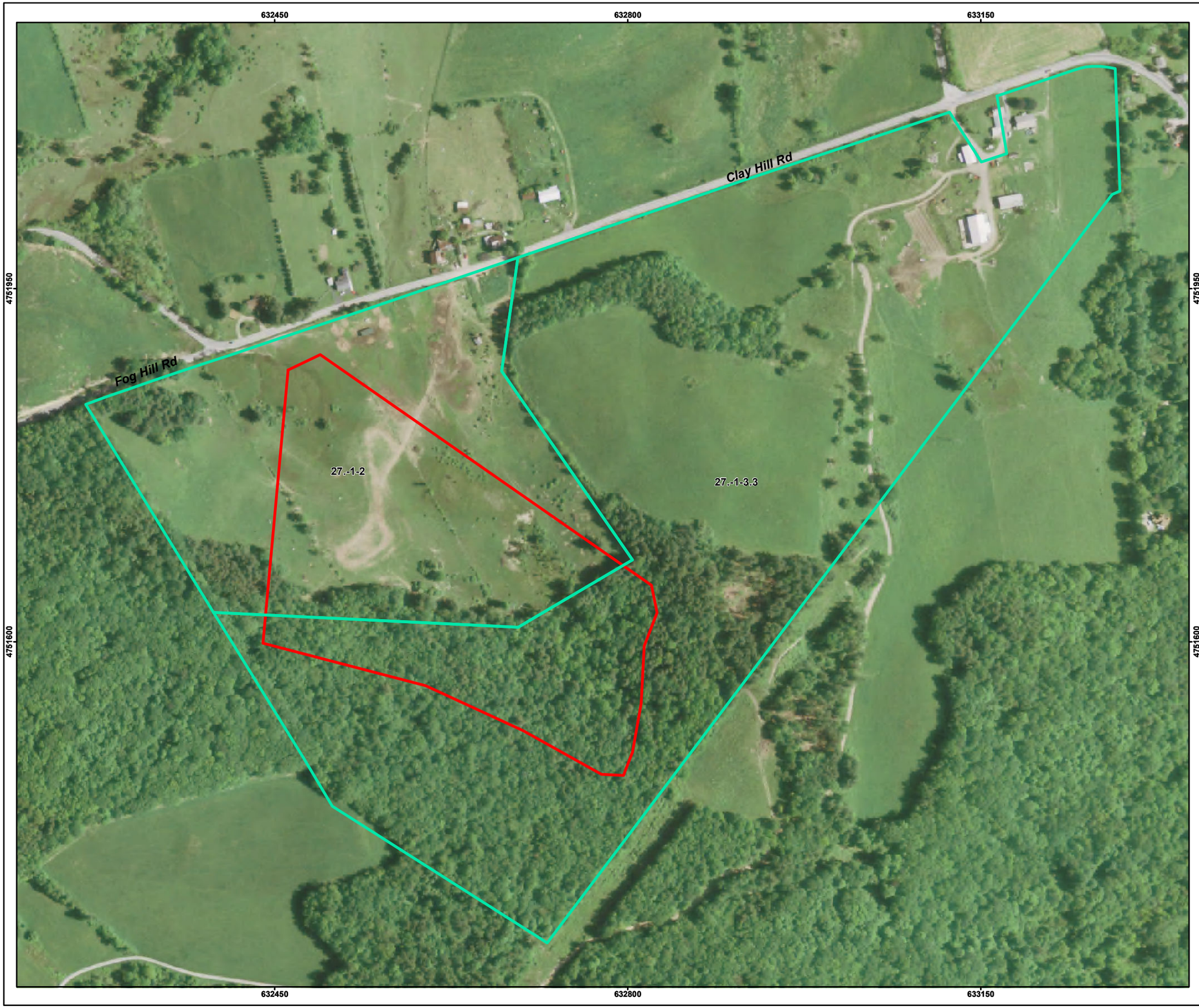

Figure 9-8
Hoosick Falls Range (New)
AEDB-R # NYHQ-012-R-01

Rensselaer County, New York

Legend

- MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

100 50 0 100 Meters

PARSONS

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SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-14
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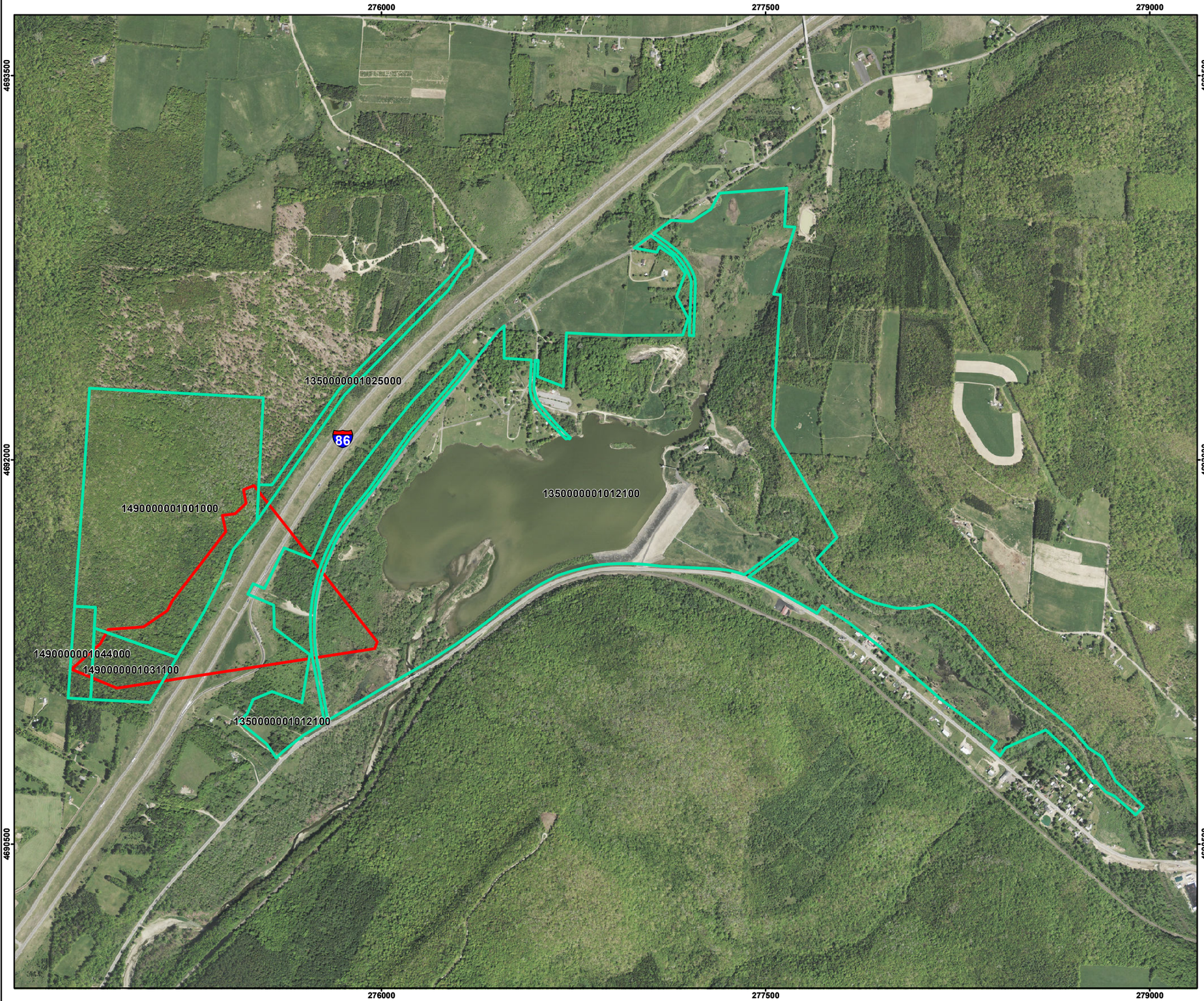

Figure 9-9
Hornell Rifle Range
AEDB-R # NYHQ-013-R-01

Steuben County, New York

Legend

- MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

500 250 0 500 Meters

PARSONS

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SUBMITTED BY: DS	DATE: June 2011		PAGE NUMBER: 9-15
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649600 650400 651200

4657600 4656800 4656000

62 62

422.00-2-21 422.00-2-22 422.00-2-23 422.00-2-24 422.00-2-28

423.00-1-5 423.00-1-5 423.00-1-6

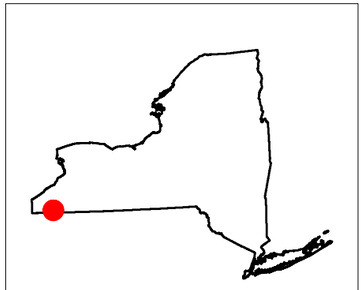
649600 650400 651200

Figure 9-10
Jamestown Rifle Range
AEDB-R # NYHQ-014-R-01

Chautauqua County, New York

Legend

- MRS Boundary
- Parcel Boundary



Site Location in New York

N

Image: 2008 Orthophoto
Projection: UTM Zone 17, WGS84, Meters

150 75 0 150 Meters

PARSONS

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SUBMITTED BY: DS	FILE:	

499500 500400 501300

4768200 4767300

113.1-1-95.2
113.2-1-1.1
113.2-1-1.1
113.2-1-1.1
113.2-1-1.1
113.2-1-20.1
28
113.1-1-95.2
113.2-1-21
113.2-1-55
113.1-1-78.1
113.1-1-78.2
113.1-1-79
113.1-1-79
113.1-1-79
113.2-1-22
113.2-1-23

Figure 9-11
Mohawk Rifle Range
AEDB-R # NYHQ-016-R-01

Herkimer County, New York

Legend

- MRS Boundary
- Parcel Boundary

Site Location in New York

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

200 100 0 200 Meters

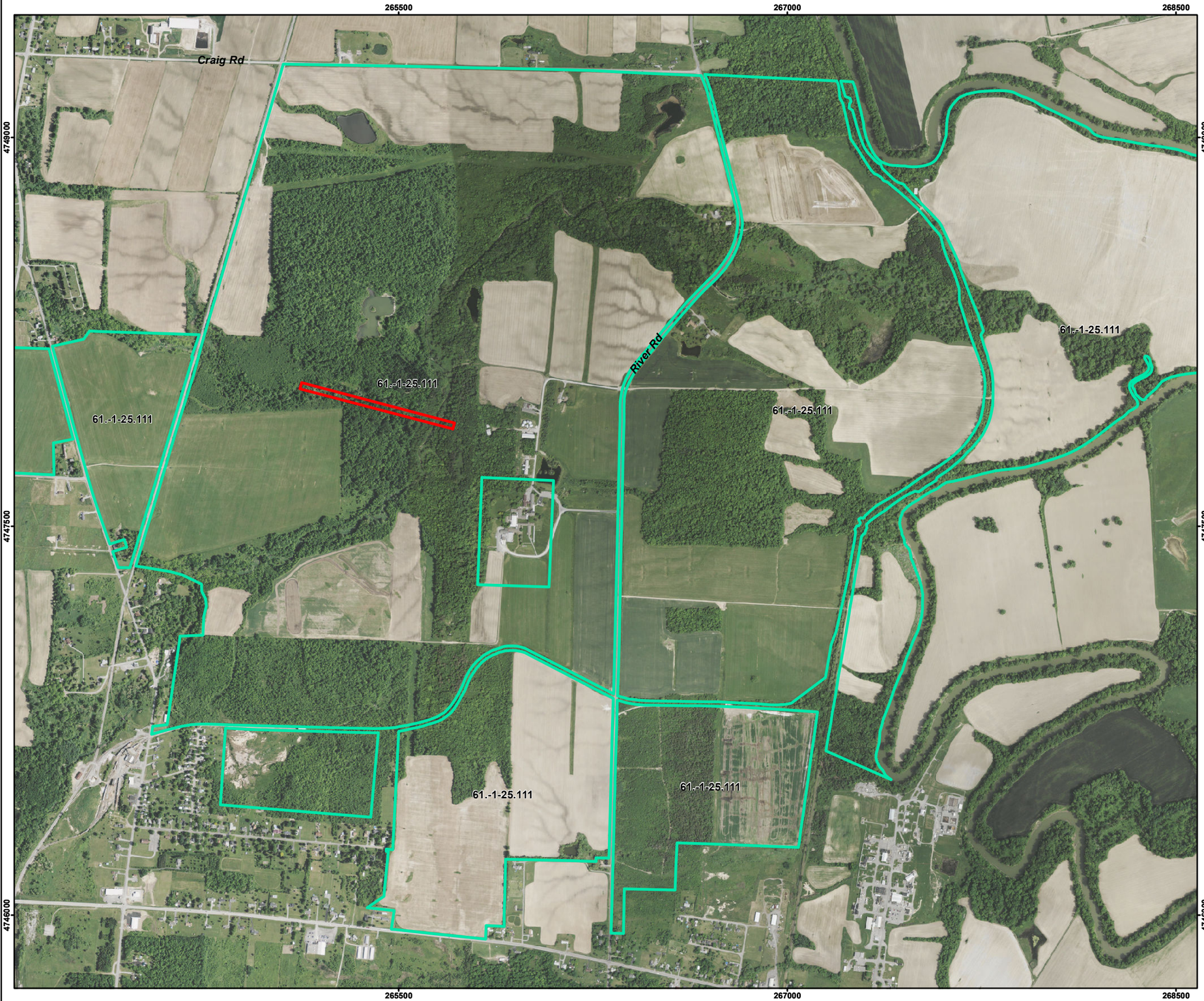
N

PARSONS

DESIGNED BY: BT	ROE Map	
DRAWN BY: BT	SCALE: As Shown	PROJECT NUMBER: 747648.13000
CHECKED BY: IG	DATE: June 2011	PAGE NUMBER: 9-17
SUBMITTED BY: DS	FILE:	

Figure 9-12
NDNODS Geneseo Range (old)
AEDB-R # NYHQ-002-R-01

Livingston County, New York



Legend

- MRS Boundary
- Parcel Boundary

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

N

300 150 0 300 Meters

PARSONS	U.S. ARMY CORPS OF ENGINEERS HUNTSVILLE CENTER

DESIGNED BY: BT	**ROE Map**		
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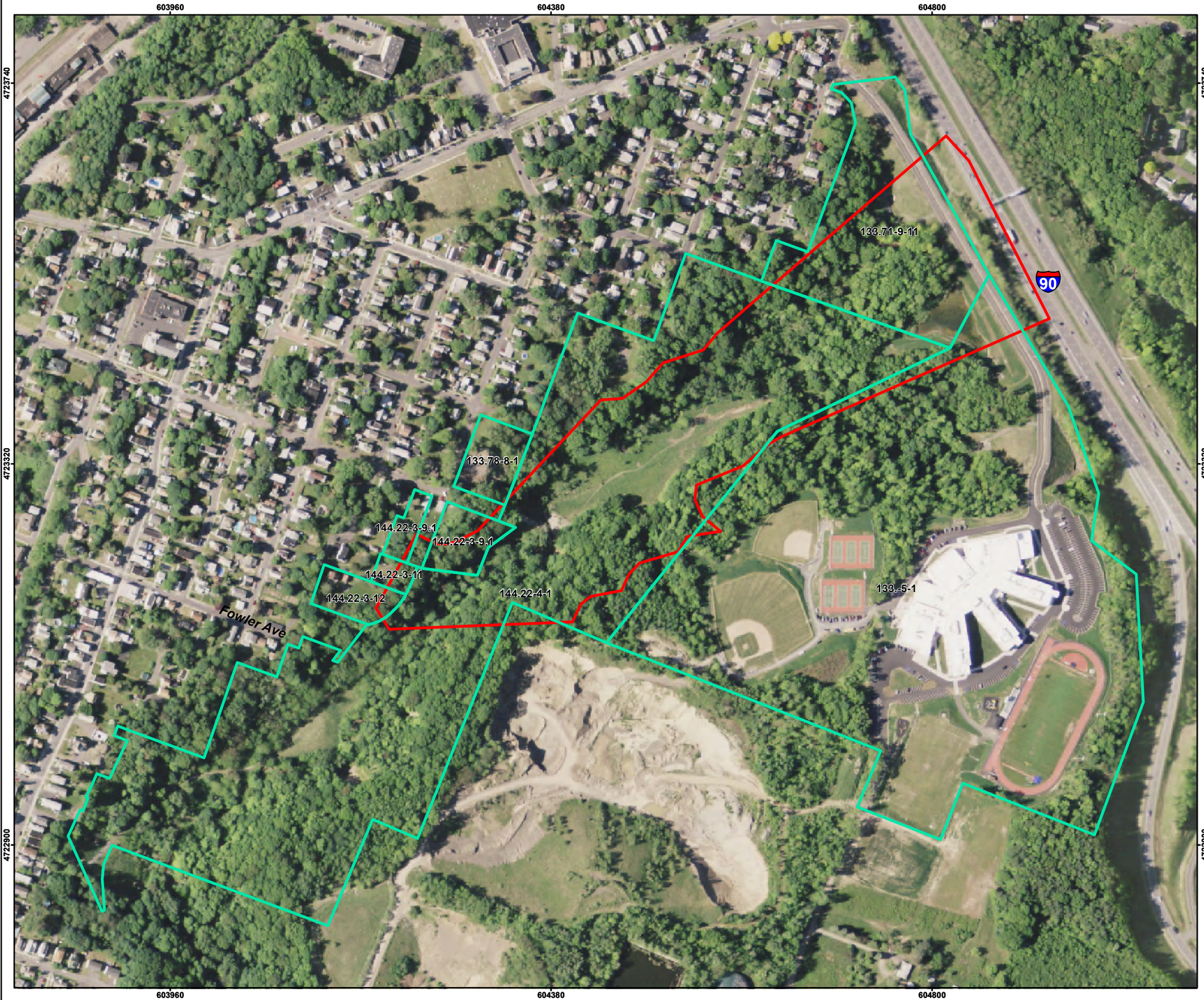
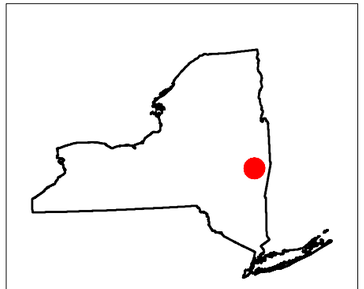


Figure 9-13
NDNODS Rensselaer Wyck Target Range
AEDB-R # NYHQ-003-R-01

Rensselaer County, New York

Legend

- MRS Boundary
- Parcel Boundary



N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

100 50 0 100 Meters

PARSONS

DESIGNED BY: BT	ROE Map		
DRAWN BY: BT		SCALE: As Shown	PROJECT NUMBER: 747648.13000
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Figure 9-14
NDNODS Rochester Rifle Range
AEDB-R # NYHQ-004-R-01

Monroe County, New York

Legend

- MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

100 50 0 100 Meters

PARSONS

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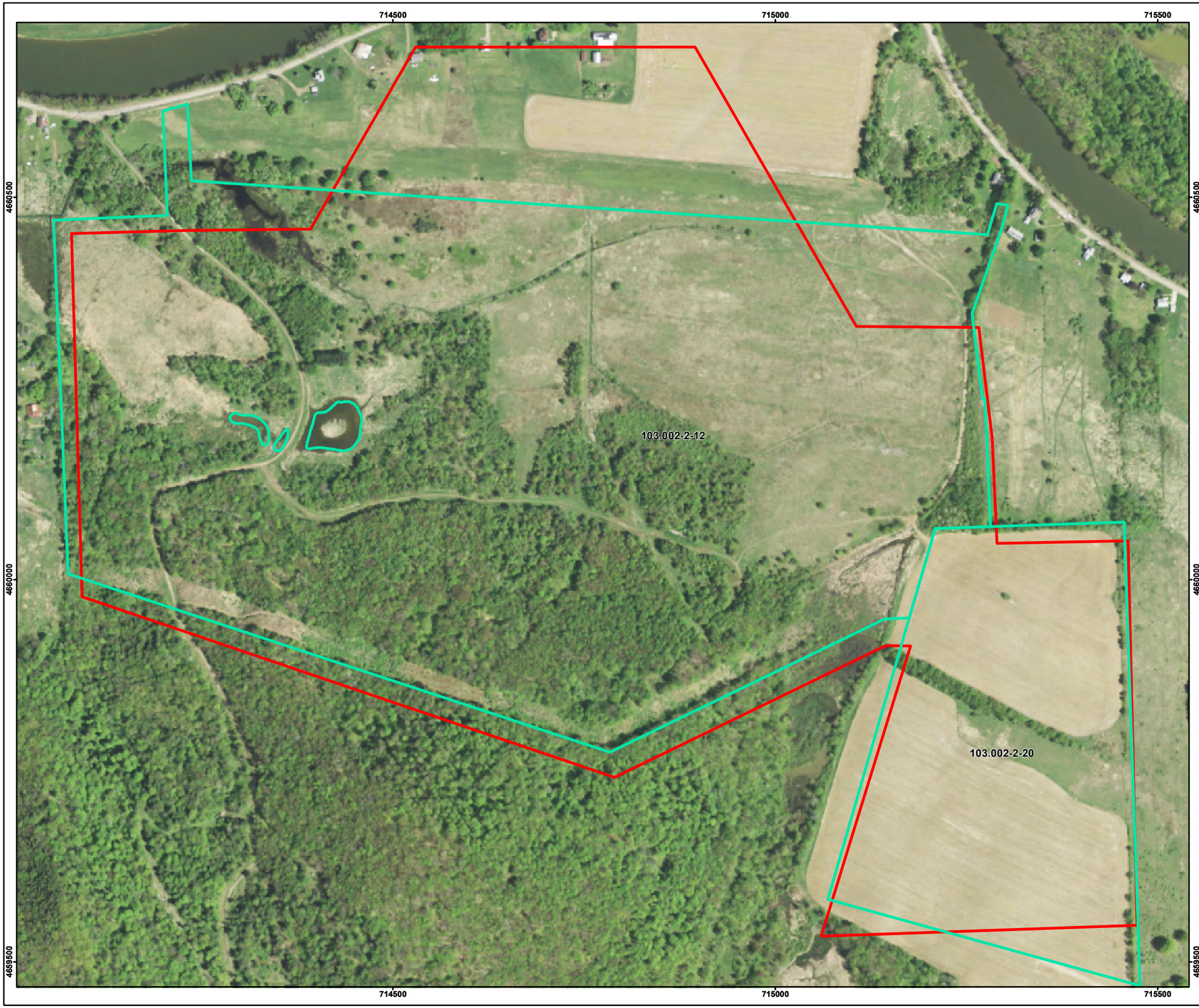
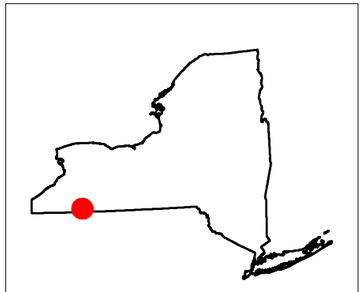


Figure 9-15
Olean Target Range (new)
AEDB-R # NYHQ-017-R-01

Cattaraugus County, New York

Legend

- MRS Boundary
- Parcel Boundary



Site Location in New York

N

Image: 2009 Orthophoto
Projection: UTM Zone 17, WGS84, Meters

100 50 0 100 Meters

PARSONS

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DRAWN BY: BT	SCALE: As Shown	PROJECT NUMBER: 747648.13000
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Figure 9-16
Oneida Range
AEDB-R # NYHQ-018-R-01

Madison County, New York

Legend

- MRS Boundary
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS

DESIGNED BY: BT	ROE Map	
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CHECKED BY: IG	SCALE: As Shown	PROJECT NUMBER: 747648.13000
SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-22
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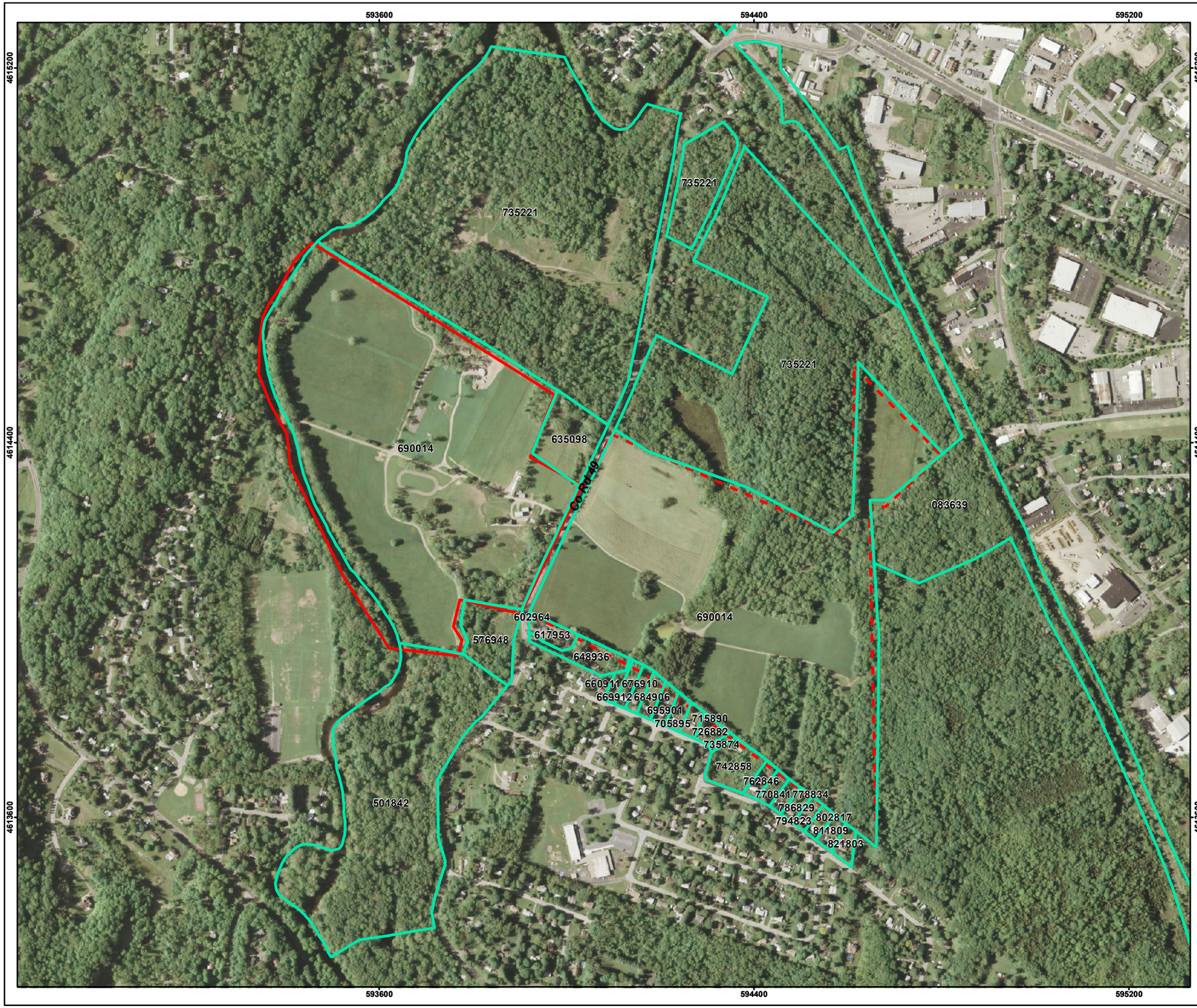

Figure 9-17
Poughkeepsie Rifle Range
AEDB-R # NYHQ-019-R-01

Dutchess County, New York

Legend

- MRS East (Revised)
- MRS East (Original)
- Parcel Boundary

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

250 125 0 250 Meters

PARSONS

DESIGNED BY: BT	ROE Map	
DRAWN BY: BT		
CHECKED BY: IG	SCALE: As Shown	PROJECT NUMBER: 747648.13000
SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-23
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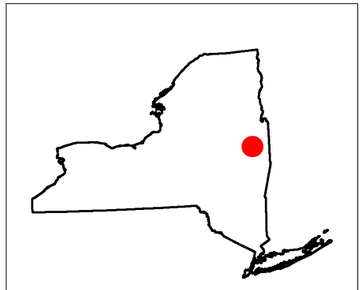
602550
603000
603450
4772250
4771800
4771350
153.-1-11.1
153.-1-11.2
154.-2-33
154.-2-34
154.-2-28
154.-2-27
Alfred Ct
154.-2-25
154.-2-24
154.-2-23
154.-2-22
154.-2-26
167.-6-8
167.-6-9
167.-6-10
167.-6-11
Weibel Ave
166.-2-5
167.-6-5
167.-6-7
167.-6-6
167.-6-99.4
167.-6-4
167.-6-99.1
167.-6-3
167.-6-2
167.-6-1
166.-2-6
166.-2-4
166.-2-8.1
166.-2-7.2
166.-2-7.2

Figure 9-18
Saratoga Springs Rilfle Range
AEDB-R # NYHQ-020-R-01

Saratoga County, New York

Legend
- MRS Boundary
- Parcel Boundary



Site Location in New York

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

150 75 0 150 Meters

PARSONS

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SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-24
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616500
618000
619500
4861500
4860000

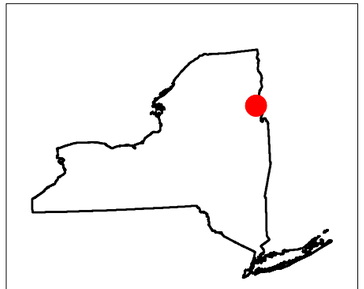
138.2-1-8.000
138.2-3-3.000
138.2-1-27.000
138.2-1-26.000
138.2-1-25.000
138.2-1-12.000
138.2-2-6.000
138.2-2-5.000
138.2-2-4.110
138.2-2-7.000
138.2-1-24.000
138.2-1-23.000
138.2-3-3.000
138.2-2-8.000
138.2-2-9.000
138.2-2-17.000

Figure 9-19
Ticonderoga Range (Old)
AEDB-R # NYHQ-021-R-01

Essex County, New York

Legend

- MRS Boundary
- SDZ Boundary
- Parcel Boundary



Site Location in New York

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

250 125 0 250 Meters

PARSONS

DESIGNED BY: BT	ROE Map	
DRAWN BY: BT		
CHECKED BY: IG	SCALE: As Shown	PROJECT NUMBER: 747648.13000
SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-25
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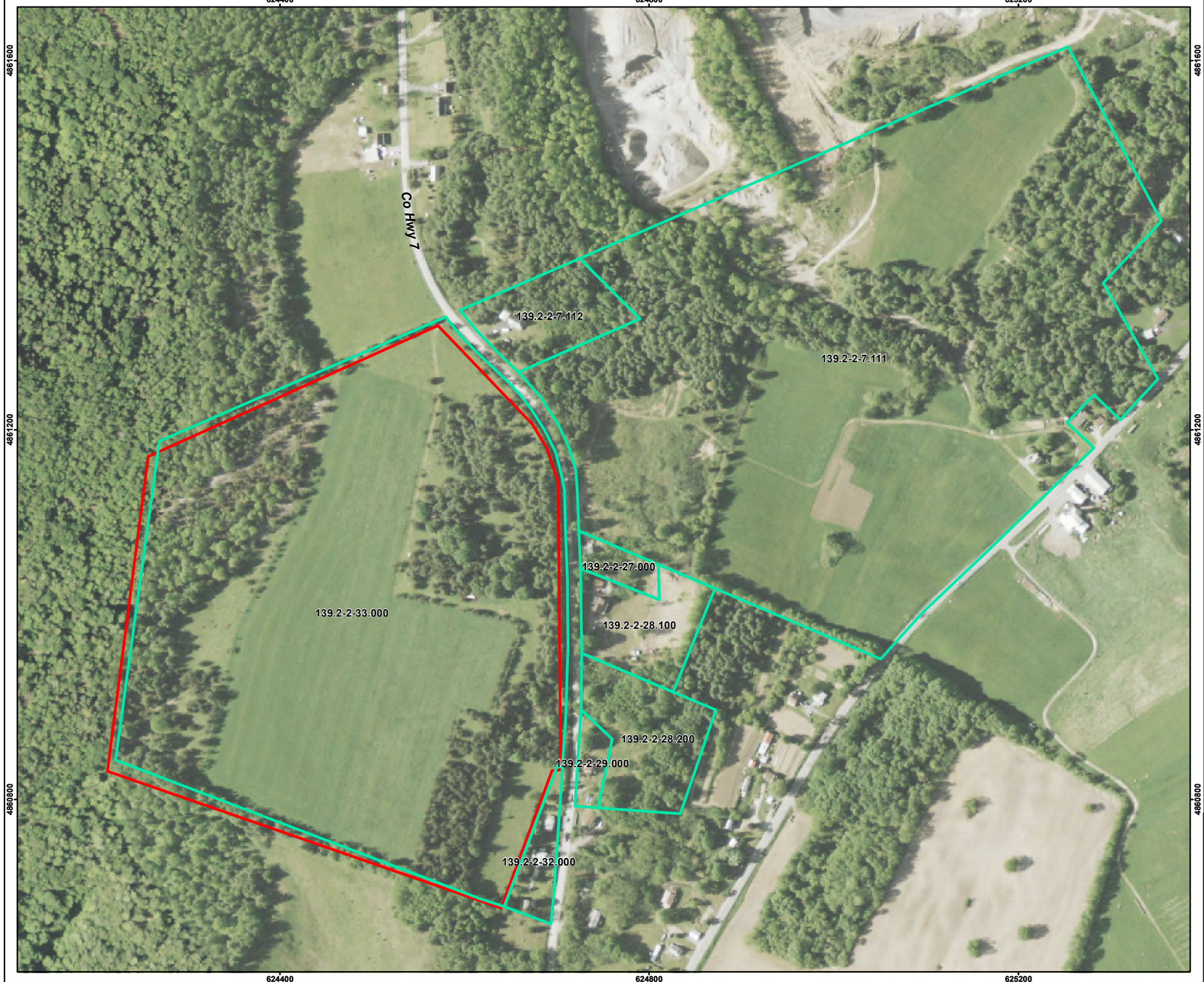
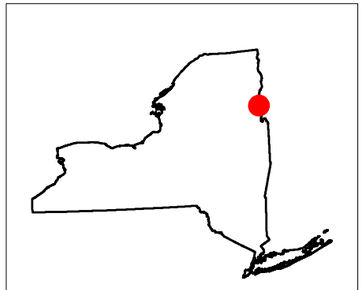
Figure 9-20
Ticonderoga Training (New)
AEDB-R # NYHQ-021-R-01

Essex County, New York



Legend

- MRS Boundary
- Parcel Boundary



Site Location in New York

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

100 50 0 100 Meters

PARSONS

DESIGNED BY: BT	ROE Map		
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CHECKED BY: IG	SCALE: As Shown	PROJECT NUMBER: 747648.13000	
SUBMITTED BY: DS	DATE: June 2011	PAGE NUMBER: 9-26	
	FILE:		

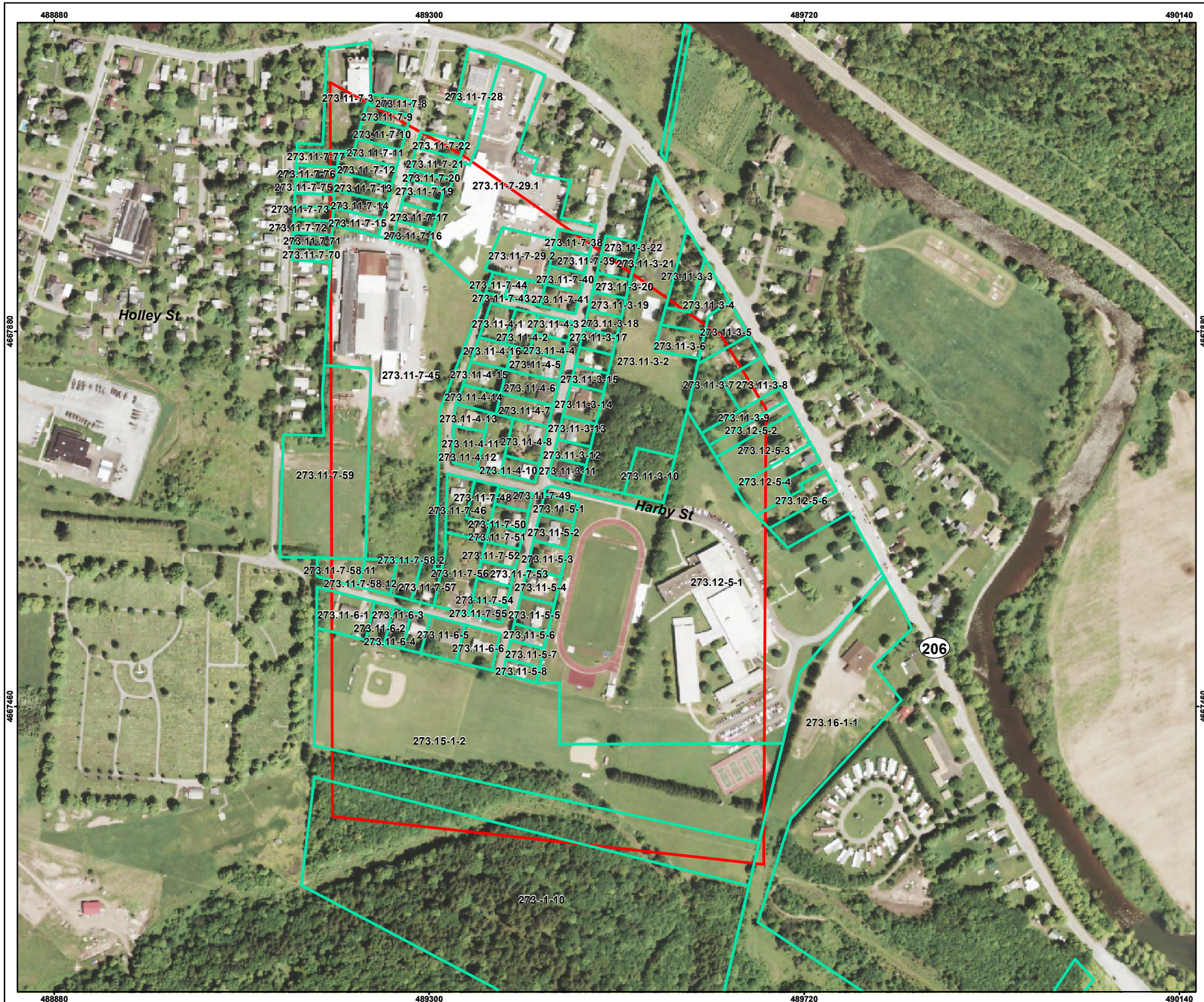
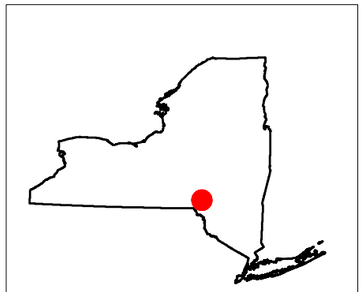


Figure 9-21
Walton Rifle Range (new)
AEDB-R # NYHQ-023-R-01

Delaware County, New York

Legend

- MRS Boundary
- Parcel Boundary



Site Location in New York

N

Image: 2009 Orthophoto
Projection: UTM Zone 18, WGS84, Meters

100 50 0 100 Meters

PARSONS

DESIGNED BY: BT	ROE Map		
DRAWN BY: BT		SCALE: As Shown	PROJECT NUMBER: 747648.13000
CHECKED BY: IG		DATE: June 2011	PAGE NUMBER: 9-27
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CHAPTER 10
COMMUNICATION

10.0 INTRODUCTION

10.1 The primary means of on-site communication will be mobile telephones or hand-held radios. Satellite phones will be used where MRS conditions necessitate a back-up to mobile phones; however, this is not anticipated to be necessary for all 28 MRSs identified in New York. The SVT will remain together throughout all aspects of the field activities. Communications will be checked at the start of each work day and after breaks when work resumes. Regular communication checks will be conducted throughout the day by the SSHO.

10.2 Additional communication protocols are discussed in the Accident Prevention Plan (Appendix F) and the MEC Support Work Plan (Appendix H).

CHAPTER 11
ENVIRONMENTAL PROTECTION PLAN

11.0 INTRODUCTION

11.0.1 Environmental protection relates to the approaches, methods, and procedures that will be employed to protect the natural environment and cultural resources of the New York MRSs during execution of the ARNG MRS SI fieldwork. These protection measures establish general procedures for avoiding, minimizing, and mitigating potential impacts to environmental and cultural resources during field activities and they have been developed in accordance with Army Regulation 200-2 and USACE Military Munitions Center of Expertise Data Item Description MR-005-12.

11.0.2 These protection measures address the documented environmental concerns/issues associated with the New York MRSs and cannot predict unforeseen developments that may arise during SI activities that, if encountered, will suspend operations until the environmental impact is understood and appropriate safeguards are developed. The typical procedures for addressing unforeseen situations include the following:

- Immediately notifying the USACE PM and as directed ARNG POCs.
- Initiating discussions with New York regulators (NYSDEC), as appropriate.
- Developing/implementing appropriate mitigation measures in consultation with USACE PM, ARNG, and regulators, as appropriate.

11.1 IDENTIFICATION OF ENVIRONMENTAL RESOURCES

11.1.0.1 The management of threatened and endangered (T&E) species/habitats, culturally significant artifact sites, and wetland areas or water resources is necessary so that SI project activities are implemented in a proactive protective manner while maintaining compliance with applicable federal and state regulations. The following sections detail the general procedures for the planned NYARNG MRS SI activities.

11.1.0.2 Natural and cultural resource legislation that applies to the New York ARNG MRS SI project includes:

- The Endangered Species Act (ESA) of 1973
- Clean Water Act (CWA) of 1972
- National Historic Preservation Act (NHPA) of 1966

11.1.0.3 Due to the non-intrusive work associated with planned SI fieldwork, discussions with the U.S. Fish & Wildlife Service (USFWS), New York State Department of Environmental

Conservation (NYSDEC), and New York Office of Parks, Recreation and Historic Preservation are not planned.

11.1.1 Threatened and Endangered Species

11.1.1.1 There is no federally designated critical habitat on or near any of the New York MRSs (USFWS, 2011a). According to the USFWS Northeast Region, there are 24 federally listed T&E species among the 21 New York counties where MRSs are located. The listed T&E species comprise nine plants, five reptiles, five invertebrates, three fish, one mammal, and one bird species (USFWS, 2011b). The listed T&E species have limited distributions and specific habitat requirements, and none are known to occur on the New York ARNG MRSs (USFWS 2011a and 2011b). The NDNODS Creedmoor Rifle Range MRS is located in Queens County, which contains limited marine habitat, but the site is not on the shoreline and does not have any marine habitat; therefore, the threatened and endangered sea turtle species would not occur at the site because of a lack of suitable habitat.

11.1.1.2 The piping plover (*Charadrius melodus*) is a shorebird listed in Queens County, New York. The piping plover nests and feeds along coastal sand and gravel beaches. The piping plover would not occur in the NDNODS Creedmoor Rifle Range MRS because the MRS is a highly developed urban area and is devoid of coastal habitat the plover would utilize.

11.1.1.3 The federally threatened bog turtle (*Clemmys muhlenbergii*) is listed in Rensselaer, Dutchess, and Rockland counties. The bog turtle is unlikely to occur at the Rensselaer Wyck Target Range MRS because there is no wetland habitat at the MRS. Camp Blauvelt and Hoosick Falls Range MRSs contain wetland habitat that may be suitable for the bog turtle; however, there are no known occurrence of the species at these MRSs.

11.1.1.4 The federally endangered Indiana bat (*Myotis sodalis*) prefers both cave and forested habitats. During winter months the Indiana bat hibernates in caves and mines. Summer roosting and foraging habitat occurs in wooded stream corridors, bottomland and upland forests (USFWS, 2010). The Indiana bat is listed as occurring in five New York counties (USFWS, 2011b) in which the following NDNODS MRSs are located: Camp Blauvelt, Glens Falls Range, Oneida Range, Poughkeepsie Rifle Range, Ticonderoga Range (old), and the Ticonderoga Training Range MRSs. Each of these MRSs contains various elements of suitable habitat but there are no known occurrences of the Indiana bat at these MRSs.

11.1.1.5 The federally endangered Karner blue butterfly (*Lycaeides melissa samuelis*) is listed in Warren and Saratoga Counties. The Glens Falls Range and Saratoga Springs Rifle Range MRSs occur in these two counties. The Karner blue butterfly is found in isolated regions on sandy soil types that have populations of lupine (*Lupinus perennis*), a flowering perennial herb with purple or blue flowers. Lupine is the only known food source for the larval butterfly. Wild lupine is commonly found in well-drained, dry, sandy openings such as those found in savannas, woodland clearings, or disturbed areas (Meyer, 2006). The Glens Falls Range is unlikely to contain the Karner blue butterfly because aerial photography indicates that the site is heavily wooded and lacks open savanna habitat and clearings that support the lupine. The Saratoga Springs Rifle Range MRS may have suitable habitat for the Karner blue butterfly; there are no known occurrences of the butterfly at the MRS.

11.1.1.6 The endangered northeastern bulrush (Scirpus ancistrochaetus) is a wetland obligate that prefers beaver ponds, sinkhole ponds or wet depressions with seasonally fluctuating water levels (USFWS, 2006). The northeastern bulrush is listed in Steuben County, but is unlikely to occur in the Hornell Rifle Range MRS because there is no wetland habitat at the MRS.

11.1.1.7 The clubshell (Pleurobema clava) is an endangered mussel that is listed in Chautauqua and Cattaraugus counties, where the Jamestown Rifle Range and Olean Target Range MRSs are located. The clubshell is only found in riparian habitats and prefers clean, loose sand and gravel in medium to small rivers and streams. The clubshell buries itself in bottom substrates to depths of four inches (NatureServe, 2010). The clubshell will not occur in the Olean Target Range MRS, because there is no riparian habitat at the site. The Conewango Creek flows through the eastern portion of the Jamestown Rifle Range MRS, and the clubshell was located in the Cassadaga Creek, an adjoining tributary of the Conewango Creek. Although suitable habitat may be present within the MRS there are no known occurrences of the clubshell occurring at the site (Smith and Horn, 2006; NatureServe, 2010).

11.1.1.8 American hart's-tongue fern (*Asplenium scolopendrium* var. *americanum*) is described as an extremely rare threatened plant. The American hart's-tongue fern requires deep shade, continuously high humidity, moist soil, and the presence of dolomitic limestone (USFWS, 1990; USFWS, 1993). Because the Oneida Range MRS is composed of fragmented forest and agricultural land composed of silty loam and silty clay soils (NRCS, 2011) the American hart's-tongue fern is unlikely to occur in the MRS.

11.1.1.9 The threatened Chittenango ovate amber snail (*Succinea chittenangoensis*) listed in Madison County will not occur in the Oneida Range MRS because this species can be found at a waterfall in Chittenango State Park (NYDEC, 2011b). The Chittenango State Park does not occur in or near this MRS.

11.1.1.10 The federally endangered dwarf wedgemussel (Alasmidonta heterodon) is listed in Delaware and Dutchess Counties. The dwarf wedgemussel is a freshwater mussel that is found in creeks and rivers with substrates ranging from mixed sand to pebble, and gravel (USFWS, 2007). The wedgemussel will not occur in the Walton Rifle Range MRS because no riparian habitat exists in the MRS. Although Wappinger Creek may provide suitable habitat for the wedgemussel at the Poughkeepsie Rifle Range MRS, there are no known occurrences at the MRS.

11.1.1.11 The northern wild monkshood (Aconitum noveboracense) is a threatened flowering plant listed in Delaware County. The northern wild monkshood prefers shaded to partially shaded cliffs or talus slopes which are not present in the Walton Rifle Range MRS (USFWS, 1983). The Walton Rifle Range MRS is primarily developed urban land with minimal natural habitat and no slope or cliff side terrain. The northern wild monkshood would not occur at the Walton Rifle Range MRS.

11.1.1.12 According to the New York State Department of Environmental Conservation, 13 MRSs were identified as having state listed rare species near the MRSs (Table 11-3) (New York State Department of Environmental Conservation, 2011d). Rare species listed by the State of New York are those which are identified as needing protection due to habitat threats, species scarcity, or other environmental concerns that may threaten the health of the species in the state. Table 11-1 provides a description of the plants and animals that may have suitable habitat at one

or more of the MRSs in New York. Parsons will ensure that the site visit team is aware of these species and field personnel will not disturb them if encountered in accordance with the Endangered Species Act of 1973.

TABLE 11-1
FEDERAL AND STATE-LISTED SPECIES
VARIOUS COUNTIES OF NEW YORK

Common Name	Scientific Name	Federal Status	State Status	County	Description and Preferred Habitat
	*Clemmys muhlenbergii*	Threatened	Endangered	Rensselaer Rockland Dutchess	The bog turtle is 3-4.5 inches long and has distinguishing orange blotches on each side of the head. The bog turtles occur in a mosaic of wetland types that range from saturated areas that periodically flood, to dry pocket areas of wetlands. Occupied areas of vegetated wetlands include open-canopy sedge meadows and fens (NYSDEC, 2011a).

TABLE 11-1
FEDERAL AND STATE-LISTED SPECIES
VARIOUS COUNTIES OF NEW YORK

Common Name	Scientific Name	Federal Status	State Status	County	Description and Preferred Habitat
Indiana Bat 	*Myotis sodalis*	Endangered	Endangered	Rockland Warren Madison Dutchess Essex	The Indiana bat is 2 inches long with dark gray to brownish-black fur. This species has a pinkish nose and small hind feet with short hairs at the toes. The Indiana bat prefers limestone caves for hibernation. Floodplain and riparian forests serve as important habitats for both foraging and roosting. During the summer, maternity colonies can be found under loose tree bark (NYSDEC, 2011c).

TABLE 11-1
FEDERAL AND STATE-LISTED SPECIES
VARIOUS COUNTIES OF NEW YORK

Common Name	Scientific Name	Federal Status	State Status	County	Description and Preferred Habitat
Karner blue butterfly  	*Lycaeides melissa samuelis*	Endangered	Endangered	Warren and Saratoga	The Karner blue butterfly has a wingspan of 1 inch, the upperside of the wing is violet blue with a black margin and white fringed edge. The Karner blue butterfly is dependent on wild lupine, its only known larval food plant. These plants historically occurred in savanna and barrens habitats typified by dry sandy soils. Fire is recognized as the key element maintaining savanna vegetation structure and composition. They are also found along roadsides, military bases, and some forest lands (USFWS, 2003).

TABLE 11-1
FEDERAL AND STATE-LISTED SPECIES
VARIOUS COUNTIES OF NEW YORK

Common Name	Scientific Name	Federal Status	State Status	County	Description and Preferred Habitat
Clubshell 	*Pleurobema clava*	Endangered	Not listed	Chautauqua and Cattaraugus	Maximum length is approximately 3.5 inches. The shell is tan/ yellow, with broad rays that are almost always present and are interrupted at the growth rings. This mussel prefers clean, loose sand and gravel in medium to small rivers and streams. The clubshell will bury itself in the bottom substrate to depths of up to four inches (NatureServe, 2010).

TABLE 11-1
FEDERAL AND STATE-LISTED SPECIES
VARIOUS COUNTIES OF NEW YORK

Common Name	Scientific Name	Federal Status	State Status	County	Description and Preferred Habitat
Dwarf wedgemussel  	*Alasmidonta heterodon*	Endangered	Endangered	Delaware and Dutchess	The dwarf wedgemussel rarely exceeds 1.75 inches in length. The shell is smooth and may be brownish to olive-brown or brownish-black and have a triangular or trapezoidal shape. It inhabits small creeks to large rivers and can be found in clay, sand, and gravel substrates. The dwarf wedgemussel is found in shallow and deep (25 feet) water riparian habitats (USFWS, 2007).

TABLE 11-1
FEDERAL AND STATE-LISTED SPECIES
VARIOUS COUNTIES OF NEW YORK

Common Name	Scientific Name	Federal Status	State Status	County	Description and Preferred Habitat
Northeastern bulrush 	*Scirpus ancistrochaetus*	Endangered	Not listed	Steuben	The northeastern bulrush appears to be a grass-like bush growing up to 48 inches tall. The leaves are narrow and green to brownish. This species requires shallow water along the margins of ponds, beaver ponds, backwater ponds in river floodplains, and boggy marsh areas. Encroaching shade adversely affects its ability to thrive (USFWS, 2006).

11.1.2 Cultural, Archaeological and Historical Resources

11.1.2.1 According to the National Heritage Areas Program, the National Historic Landmarks Program, and the National Register of Historic Places (NRHP), no cultural or archaeological resources are listed within the New York MRSs (National Park Service, 2011a, 2011b, and 2011c) with the exception of the Walton Rifle Range MRS. A NRHP-listed property is located in the northwestern corner of the MRS, the Walton Grange No. 1454 / Former Armory building, state inventory number 98NR01325.

11.1.2.2 Site-specific information regarding additional cultural and archaeological resources that may be present within the New York MRSs was evaluated through the online Geographic Information System for Archeology and National Register, administered by the New York State Office of Parks, Recreation and Historic Preservation. Results from the online database search indicate that 13 New York MRSs overlap or partially overlap areas considered by the state to possess archeological sensitivity (Table 11-2; New York State Office of Parks, Recreation and Historic Preservation, 2011). This classification does not necessarily indicate the presence of archaeological resources; rather it denotes a higher likelihood of their presence.

Table 11-2 Environmental Protection Plan Summary of Sensitive Environments and Special Status Species

Site	Wetlands	Federally Listed T&E	Critical Habitat	Nationally Registered Cultural Resource	State Recognized Cultural Resources	State Listed Rare Wildlife	Parks (State or City)	Other Sensitive Resources	Terrestrial Ecoregion	County
NDNODS Creedmoor Rifle Range	No	No	No	No	No	Yes	Little League Baseball Park	Creedmoor Psychiatric Center	Northeastern Coastal Zone	Queens
NDNODS Geneseo Range (old)	Yes	No	No	No	No	No	No	No	Eastern Great Lakes and Hudson Lowlands	Livingston
NDNODS Rensselaer Wyck Target Range	No	No	No	No	Partial overlap with area of archeological sensitivity	Yes	No	No	Northeastern Coastal Zone	Rensselaer
NDNODS Rochester Rifle Range	No	No	No	No	Within area of archeological sensitivity	Yes	Ellison Park (Monroe County)	No	Eastern Great Lakes and Hudson Lowlands	Monroe
Amsterdam Range	No	No	No	No	Partial overlap with area of archeological sensitivity	No	No	No	Eastern Great Lakes and Hudson Lowlands	Montgomery
Binghamton Rifle Range (new)	No	No	No	No	Completely within area of archeological sensitivity	Yes	No	No	Northern Appalachian Plateau and Uplands	Broome
Camp Blauvelt	Yes	No	No	No	Partial overlap with area of archeological sensitivity	Yes	Blauvelt State Park	No	Northern Piedmont	Rockland

Table 11-2 Environmental Protection Plan Summary of Sensitive Environments and Special Status Species

Site		Wetlands	Federally Listed T&E	Critical Habitat	Nationally Registered Cultural Resource	State Recognized Cultural Resources	State Listed Rare Wildlife	Parks (State or City)	Other Sensitive Resources	Terrestrial Ecoregion	County
Camp O'Ryan	**MRS 1**	No	No	No	No	No	No	No	No	Northern Appalachian Plateau and Uplands	Wyoming
	MRS 3	Yes	No	No	No	No	No	No	No	Northern Appalachian Plateau and Uplands	Wyoming
Elmira Rifle Range		Yes	No	No	No	Mostly overlaps with area of archeological sensitivity	Yes	No	No	Northern Appalachian Plateau and Uplands	Chemung
Geneva Range		Yes	No	No	No	Mostly overlaps with area of archeological sensitivity	No	No	No	Eastern Great Lakes and Hudson Lowlands	Ontario
Glens Falls Range		Yes	No	No	No	Slight overlap with area of archeological sensitivity	Yes	Crandall Park (City). Former range located in wooded area with hiking trails	No	Northeastern Coastal Zone	Warren
Hoosick Falls Range (new)		Yes	No	No	No	No	No	No	No	Northeastern Highlands	Rensselaer
Hornell Rifle Range		No	No	No	No	No	No	Finger Lakes Hiking Trail, Kanakadea Park (county park)	Owned by U.S. GSA for federal flood control project	Northern Appalachian Plateau and Uplands	Steuben

Table 11-2 Environmental Protection Plan Summary of Sensitive Environments and Special Status Species

Site	Wetlands	Federally Listed T&E	Critical Habitat	Nationally Registered Cultural Resource	State Recognized Cultural Resources	State Listed Rare Wildlife	Parks (State or City)	Other Sensitive Resources	Terrestrial Ecoregion	County
Jamestown Rifle Range	Yes	No	No	No	Completely within area of archeological sensitivity	Yes	No	No	Erie Drift Plans	Chautauqua
Malone LTA	Yes	No	No	No	Slight overlap with area of archeological sensitivity	No	No	Franklin Correctional Facility, no access	Eastern Great Lakes and Hudson Lowlands	Franklin
Mohawk Rifle Range	Not delineated by USFWS mapper. River within MRS.	No	No	No	No	No	No	No	Eastern Great Lakes and Hudson Lowlands	Herkimer
Olean Target Range (new)	Not delineated by USFWS mapper. Streams / pond onsite.	No	No	No	Mostly overlaps with area of archeological sensitivity	No	No	No	North Central Appalachians	Cattaraugus
Oneida Range	Yes	No	No	No	Completely within area of archeological sensitivity	Yes	No	Owned by Oneida Water Dept. May be relevant to local water supply	Eastern Great Lakes and Hudson Lowlands	Madison
Poughkeepsie Rifle Range MRS & NFA	Yes	No	No	No	Completely within area of archeological sensitivity	Yes	No	No	Northeastern Coastal Zone	Dutchess
Saratoga Springs Rifle Range	No	No	No	No	No	Yes	No	No	Northeastern Coastal Zone	Saratoga

Table 11-2 Environmental Protection Plan Summary of Sensitive Environments and Special Status Species

Site		Wetlands	Federally Listed T&E	Critical Habitat	Nationally Registered Cultural Resource	State Recognized Cultural Resources	State Listed Rare Wildlife	Parks (State or City)	Other Sensitive Resources	Terrestrial Ecoregion	County
Ticonderoga Range (old)	**MRS**	Not delineated by USFWS mapper.	No	No	No	No	No	No	No	Eastern Great Lakes and Hudson Lowlands	Essex
	SDZ MRS	Yes, but not delineated by USFWS mapper. Streams / pond onsite.	No	No	No	No	No	No	No	Eastern Great Lakes and Hudson Lowlands	Essex
Ticonderoga Training Range (new)		No	No	No	No	No	No	No	No	Eastern Great Lakes and Hudson Lowlands	Essex
Walton Rifle Range (new)		Yes	No	No	Yes	Very slightly overlaps area of archeological sensitivity; a NRHP listed property located in the northwestern corner of the MRS - 98NR01325 - Walton Grange No. 1454 / Former Armory	Yes	No	No	Northern Appalachian Plateau and Uplands	Delaware

11.1.3 Wetlands

11.1.3.1 The USFWS Wetlands Mapper, through the National Wetlands Inventory, was used to identify wetlands within the New York MRSs. Wetlands are land areas that are transitional between terrestrial and deep-water habitats in which the water table usually is at or near the surface or in which the land is covered by shallow water. Wetlands are found in 15 of the New York MRSs. The wetland classifications listed below best describe the variety of wetlands in these sites (USFWS, 2011c). Table 11-3 lists all of the wetland types that occur at the 15 MRSs.

- PEM: Palustrine, Emergent, Persistent
- PUBH: Palustrine, Unconsolidated Bottom, Permanently Flooded
- PSS: Palustrine, Scrub-Shrub
- PFO: Palustrine, Forested
- L1UBH: Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded
- R2UB: Riverine, Lower Perennial, Unconsolidated Bottom

11.1.3.2 The Wetlands Mapper is used primarily for planning and does not accurately indicate jurisdictional limits of wetlands that are considered Waters of the United States. Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than in this inventory. There is no attempt, in either the design or product of this inventory, to define the limits of proprietary jurisdiction of any federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. A formal wetland delineation will not be performed by the SVT.

TABLE 11-3
WETLAND TYPES FOUND IN NDNODS MRS RANGES
NEW YORK

Site	Wetland Code	Wetland Description
Camp Blauvelt MRS	PUBHh	Palustrine, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded
	PUBHx	Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated
	PFO1E	Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated
NDNODS Geneseo Range (old) MRS	PEM1C	Palustrine, Emergent, Persistent, Seasonally Flooded
Camp O'Ryan MRS 3	PFO1/SS1A	Palustrine, Forested, Broad-Leaved Deciduous / Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Temporary Flooded
	PFO5/UBFh	Palustrine, Forested, Dead / Palustrine, Unconsolidated Bottom, Semipermanently Flooded, Diked/Impounded
	PFO1E	Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated
	PUBHx	Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated
	PEM1E	Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated

TABLE 11-3
WETLAND TYPES FOUND IN NDNODS MRS RANGES
NEW YORK

Site	Wetland Code	Wetland Description
	PSS1F	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Semipermanently Flooded
	PSS1/EM1Fb	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous/ Palustrine, Emergent, Persistent, Semipermanently Flooded, Beaver
	PEM1Fb	Palustrine, Emergent, Persistent, Semipermanently Flooded, Beaver
Elmira Rifle Range MRS	PEM1F	Palustrine, Emergent, Persistent, Semipermanently Flooded
	PSS1E	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated
Geneva Rifle Range MRS	PF01E	Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated
	PUBHh	Palustrine System, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded
	PEM1E	Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated
	PSS1E	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated

TABLE 11-3
WETLAND TYPES FOUND IN NDNODS MRS RANGES
NEW YORK

Site	Wetland Code	Wetland Description
	PSS1/EM1E	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous / Palustrine, Emergent, Persistent, Seasonally Flooded/Saturated
Glens Falls Range MRS	L1UBHh	Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded
	PSS1/FO1Ch	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous / Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded, Diked/Impounded
	PEM1C	Palustrine, Emergent, Persistent, Seasonally Flooded
	PSS1C	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded
	PFO1C	Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded
	PSS1E	Palustrine, Scrub-Shrub, Broad-Leaved Deciduous, Seasonally Flooded/Saturated
	PFO1A	Palustrine, Forested, Broad-Leaved Deciduous, Temporary Flooded
Hoosick Falls Range (new)	PEM1b	Palustrine, Emergent, Persistent, Saturated

TABLE 11-3
WETLAND TYPES FOUND IN NDNODS MRS RANGES
NEW YORK

Site	Wetland Code	Wetland Description
Jamestown Rifle Range MRS	R2UBH	Riverine, Lower Perennial, Unconsolidated Bottom, Permanently Flooded
	PFO1A	Palustrine, Forested, Broad-Leaved Deciduous, Temporary Flooded
	PFO1C	Palustrine System, Forested, Broad-Leaved Deciduous, Seasonally Flooded
	PFO1/5E	Palustrine, Forested, Broad-Leaved Deciduous / Dead, Seasonally Flooded/Saturated
Malone LTA MRS	R3UBH	Riverine, upper perennial (characterized by high water velocity), unconsolidated bottom, permanently flooded
	PSS1/EM5E	Palustrine, Scrub-Shrub, broad leaved deciduous
Mohawk Rifle Range MRS	Unknown	Riverine
Olean Target Range MRS	Unknown	Artificially impounded
Oneida Range MRS	PUBHx	Palustrine, Unconsolidated Bottom, Permanently Flooded, Excavated
Poughkeepsie Rifle Range MRS	R2UBH	Riverine, Lower Perennial, Unconsolidated Bottom

TABLE 11-3
WETLAND TYPES FOUND IN NDNODS MRS RANGES
NEW YORK

Site	Wetland Code	Wetland Description
	PFO1E	Palustrine, Forested, Broad-Leaved Deciduous, Seasonally Flooded/Saturated
	PUBH	Palustrine, Unconsolidated Bottom, Permanently Flooded
Ticonderoga Range (old) MRS	Unidentified by USFWS Wetlands Mapper, but visible on topographic quadrangle	Unknown
Walton Rifle Range MRS	PEM1A	Palustrine, Emergent, Persistent Temporary Flooded
	PSS1E	Palustrine, Scrub-Shrub, Leaved Deciduous, Seasonally Flooded/Saturated

11.1.4 Water Resources

11.1.4.1 During the ARNG MRS SI field effort, Parsons will not conduct any activities that discharge pollutants into adjacent waterways within, or outside, the MRS.

11.1.5 Other Sensitive Resources

Table 11.2 identifies the sensitive resources and environmental concerns by site for all of the New York MRSs.

11.2 ACCESS ROUTES AND SITE RESTORATION

11.2.1 To minimize disturbing natural habitat, all vehicular travel will be on designated roads. All off road travel will be on foot. Work areas and access routes, including public and private easements, will be restored to their original pre-SI condition to the extent practical. Damage to trees, shrubs, and the native wildlife habitat will be minimized to the greatest extent possible. No trees or shrubs will be removed during this project.

11.2.2 Field personnel will maintain a clean and unobstructed working environment. No tools, equipment, materials, or trash used or generated in connection with New York ARNG MRS SI will remain on the MRS property following completion of project operations. Trash and other materials brought to the MRS, including dedicated sampling equipment that has been used / expended, will be removed. No burning activities will take place during this project. No heavy equipment will be used on site and all vehicles will be in good working order and will meet applicable vehicle emissions requirements. No temporary facilities or storage areas will be installed as part of the ARNG MRS

CHAPTER 12
NON-MUNITIONS RELATED WASTE

12.0 INTRODUCTION

12.1 During SI field activities, if non-munitions related waste (e.g., drums, batteries) is encountered and/or evidence of hazardous substance or oil discharges are observed, the location (GPS coordinates) and relevant photographs will be recorded in the field log book or Daily Field Report by the FTL or his/her designee. In addition, the following procedures will be followed if a release of hazardous substance or oil is witnessed, or evidence of a historical spill is observed within or during access to the MRS:

- The PM or representative will notify the USACE PM.
- The NYARNG will notify the NYSDEC project team representative.

12.2 The ARNG Regional Lead will complete all appropriate Army notifications and follow up with NYSDEC as required regarding reportable spills/discharges. Parsons will continue to provide assistance and documentation support to the USACE and ARNG as needed.

CHAPTER 13
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