Final
Feasibility Study for
RVAAP-001-R-01 Ramsdell Quarry Landfill Munitions Response Site Area 2 (South)
Version 1.0

Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

Contract No. W912DR-15-D-0016
Delivery Order No. 0001

Prepared for:

US Army Corps of Engineers®
North Atlantic Division, Baltimore District
10 S. Howard Street, Room 7000
Baltimore, Maryland 21201

Prepared by:

HydroGeoLogic, Inc.
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January 17, 2018

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14. ABSTRACT
This Final Feasibility Study for RVAAP-001-R-01 Ramsdell Quarry Landfill Munitions Response Site (MRS) Area 2 (South), Version 1.0 is submitted in support of the Multiple Award Military Munitions Services (MAMMS) Contract No. W912DR-15-D-0016, Task Order 0001. The objective of this FS is to develop, evaluate, and compare remedial action alternatives that will meet the remedial action objectives for the MRS so that the Department of Defense can select and propose an appropriate remedy. This FS used the information obtained during the Remedial Investigation to determine appropriate remedial actions based on the current and anticipated future land uses of the MRS.

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Ohio Environmental Protection Agency

John R. Kasich, Governor
Mary Taylor, Lt. Governor
Craig W. Butler, Director

February 16, 2018

Mr. Mark Leeper, P.G., MBA
Team Lead, Cleanup and Restoration
Branch ARNG Directorate
111 South George Mason Drive
Arlington, VA 22204

Re: US Army Ravenna Ammunition Plt RVAAP
Remediation Response
Project Records
Remedial Response
Portage County
267000859239

Subject: Receipt and Review of the "Final Feasibility Study for RVAAP-001-R-01 Ramsdell Quarry Landfill Munitions Response Site Area 2 (South), Version 1.0," Dated January 17, 2018 (Work Activity No. 267000859239)

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Environmental Response and Revitalization (DERR) has received and reviewed the document entitled *Final Feasibility Study for RVAAP-001-R-01 Ramsdell Quarry Landfill Munitions Response Site Area 2 (South), Version 1.0,* dated January 17, 2018. This document, received by Ohio EPA NEDO on January 18, 2018, was prepared for the U.S. Army Corps of Engineers (USACE) Baltimore District, by HydroGeoLogic, Inc. in response to Ohio EPA's request for the final document sent January 3, 2018.

This document was reviewed by personnel from Ohio EPA, DERR, pursuant to the Director's Findings and Orders paragraph 39 (b), and we concur with the feasibility study in its final format. Please note, the document did not contain the Disclaimer Statement at the beginning of the document. This does not affect the technical aspects of the document.

If you have any questions or concerns, please do not hesitate to contact me at (330) 963-1235.

Sincerely,

Nicholas Roope
Site Coordinator
Division of Environmental Response and Revitalization

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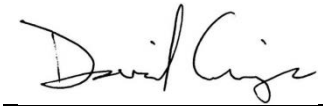
CONTRACTOR'S STATEMENT OF INDEPENDENT TECHNICAL REVIEW

HydroGeoLogic, Inc. has completed this *Final Feasibility Study for RVAAP-001-R-01 Ramsdell Quarry Landfill Munitions Response Site Area 2 (South), Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio, Version 1.0*. 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 data quality objectives, technical assumptions; methods, procedures, and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets customer's needs consistent with law and existing USACE policy.

Prepared/Approved by:  Date: January 12, 2018

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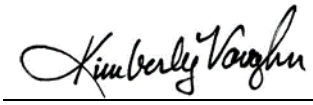
Prepared/Approved by:  Date: January 17, 2018

Kimberly Vaughn
Project Manager

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RVAAP-001-R-01 Ramsdell Quarry Landfill Munitions Response Site Area 2 (South), Version1.0

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ARNG – Army National Guard
COR – Contracting Officer's Representative
IED – Installation and Environmental Division
OHARNG – Ohio Army National Guard
RVAAP – Former Ravenna Army Ammunition Plant
USACE – United States Army Corps of Engineers

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Acronyms and Abbreviations

AEDB-R	Army Environmental Database - Restoration Module
ARAR	applicable or relevant and appropriate requirement
ARNG	Army National Guard
bgs	below ground surface
Camp Ravenna	Camp Ravenna Joint Military Training Center
CB&I	CB&I Federal Services LLC
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
CHE	Chemical Warfare Material Hazard Evaluation
CSM	conceptual site model
DERP	Defense Environmental Restoration Program
DoD	U.S. Department of Defense
EHE	Explosive Hazard Evaluation
EPA	U.S. Environmental Protection Agency
Final RI Report	*Final Remedial Investigation Report for RVAAP-001-R-01 Ramsdell Quarry Landfill MRS*
FS	Feasibility Study
GP	general purpose
HHE	Health Hazard Evaluation
lb	pound
LUC	land-use control
MC	munitions constituents
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
MMRP	Military Munitions Response Program
MPPEH	material potentially presenting an explosive hazard
MRS	Munitions Response Site
MRSPP	*Munitions Response Site Prioritization Protocol*
NCP	*National Oil and Hazardous Substances Pollution Contingency Plan*
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
RAO	remedial action objective
RI	Remedial Investigation
ROD	Record of Decision
RVAAP	former Ravenna Army Ammunition Plant
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USP&FO	U.S. Property and Fiscal Officer

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EXECUTIVE SUMMARY

HydroGeoLogic, Inc. has been contracted by the United States (U.S.) Army Corps of Engineers (USACE), North Atlantic Division, Baltimore District, to complete a Feasibility Study (FS) for the Ramsdell Quarry Landfill Munitions Response Site (MRS) Area 2 (South) at the former Ravenna Army Ammunition Plant (RVAAP). The former RVAAP, now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), is located in Portage and Trumbull Counties, Ohio. This FS is being prepared under Delivery Order No. 0001 under the *Multiple Award Military Munitions Services* Performance-Based Acquisition Contract No. W912DR-15-D-0016. The Delivery Order was issued by the USACE, Baltimore District, on August 26, 2016.

No explosive hazards or unacceptable risks associated with munitions-constituents (MC)-related contamination are present on the MRS. Therefore; this FS evaluates the No Action alternative for the Ramsdell Quarry Landfill MRS Area 2 (South) to support No Action at the MRS.

Ramsdell Quarry Landfill MRS Area 2 (South) History and Background

The Ramsdell Quarry Landfill MRS Area 2 (South) is 6.93 acres and is located at the northeast portion of Camp Ravenna within Portage County. The MRS is heavily wooded with thick ground vegetation and contains a small, inactive soil/rock quarry at the east side of the MRS. Approximately 0.5 acres of wetland are now located in the former soil/rock quarry and along the eastern boundary of the MRS.

No U.S. Department of Defense (DoD) military munitions confirmed to be munitions and explosives of concern (MEC) were found at the MRS. However, material potentially presenting an explosive hazard (MPPEH) were found on the ground surface and in subsurface soils at the MRS during the Remedial Investigation (RI). These MPPEH were evaluated, determined to be safe, and classified as munitions debris (MD). The MD consisted of fragments and parts associated with the 20-pound (lb) AN-M41 series bomb, the 155-millimeter MK-1 series projectile, the 250-lb AN-M57 series general purpose (GP) bomb, and the 500-lb AN-M64 series GP bomb. There is no available information regarding the historical munitions-related activities that occurred at the MRS or how the MD arrived there. It is suspected that the MRS may have been used as a disposal area for munitions that were treated at the Ramsdell Quarry Landfill MRS Area 1 (North) located adjacent to the north of the MRS (CB&I Federal Services LLC [CB&I], 2015).

Current activities at the Ramsdell Quarry Landfill MRS Area 2 (South) include maintenance, natural resource management, and environmental sampling activities (CB&I, 2015). The future land use at the MRS will include maintenance, natural resource management, and environmental sampling activities in addition to military training. The human receptor that has the greatest opportunity for exposure to an explosive hazard at the MRS is the Industrial Receptor. The Industrial Receptor represents a full-time occupational receptor whose activities are consistent with full-time employees or career military personnel who are expected to work daily at Camp Ravenna over their career (Army National Guard, 2014).

Problem Identification

No explosive hazards are present at the MRS based on the findings of the RI. No DoD military munitions confirmed to be MEC were found at the MRS and only MD were found. No risks associated with MC-related contamination were found at the MRS during the RI. Based on the results presented in the *Final Remedial Investigation Report for RVAAP-001-R-01 Ramsdell Quarry Landfill MRS* (CB&I, 2015), and in accordance with the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, there is no basis

for a remedial action at the MRS. Therefore, this FS evaluates the No Action alternative for the Ramsdell Quarry Landfill MRS Area 2 (South) to support No Action at the MRS.

Remedial Action Objectives

As established during the RI, no explosive hazards or unacceptable risks associated with MC-related contamination are present at the Ramsdell Quarry Landfill MRS Area 2 (South); therefore, the development of remedial action objectives is unnecessary (CB&I, 2015).

Evaluation of the No Action Alternative

A detailed analysis was completed for the No Action alternative using the nine evaluation criteria defined by the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP) (Section 300.430[e][9]). The No Action alternative is technically and administratively implementable and there are no costs. There are no explosive hazards or unacceptable risks associated with MC-related contamination at the MRS and the No Action alternative is protective of human health and the environment. No applicable or relevant and appropriate requirements are triggered by the No Action alternative. Therefore, the No Action alternative meets the threshold criteria established in the NCP (Section 300.430[f]).

1.0 INTRODUCTION

HydroGeoLogic, Inc. has been contracted by the United States (U.S.) Army Corps of Engineers (USACE), North Atlantic Division, Baltimore District, to complete a Feasibility Study (FS) for the Ramsdell Quarry Landfill Munitions Response Site (MRS) Area 2 (South) at the former Ravenna Army Ammunition Plant (RVAAP). The former RVAAP, now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), is located in Portage and Trumbull Counties, Ohio. This FS is being prepared under Delivery Order No. 0001 under the *Multiple Award Military Munitions Services* Performance-Based Acquisition Contract No. W912DR-15-D-0016. The Delivery Order was issued by the USACE, Baltimore District, on August 26, 2016.

1.1 Regulatory Framework and Authorization

Pursuant to the U.S. Department of Defense (DoD) Manual 4715.20, *Defense Environmental Response Program* (*DERP) Management* (DoD, 2012), the USACE is conducting Military Munitions Response Program (MMRP) activities as established in the DERP statute (10 United States Code [USC] 2701 et seq.), the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) (42 USC§9620), Executive Orders 12580 and 13016, and the *National Oil and Hazardous Substances Pollution Contingency Plan* (NCP) (40 Code of Federal Regulations [CFR] Part 300).

1.2 Purpose

The purpose of an FS is to develop, evaluate, and perform a detailed analysis of potential remedial alternatives for the MRS that will meet remedial action objectives (RAOs) and allow the U.S. DoD to select and propose an appropriate remedy. This FS used the information obtained during the Remedial Investigation (RI) to perform a systematic analysis of the No Action alternative based on the current and anticipated future land uses of the MRS. This FS was developed in accordance with the *Final United States Army Munitions Response Program Remedial Investigation/Feasibility Study Guidance* (U.S. Army, 2009) and in accordance with U.S. Environmental Protection Agency's (EPA) *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA* (EPA, 1988).

1.3 Physical Setting and Administrative Control

Camp Ravenna (Federal Facility Identification No. OH213820736) is located in northeastern Ohio within Portage and Trumbull Counties and is approximately 3 miles east-northeast of the city of Ravenna (Figure 1-1). The facility is approximately 11 miles long and 3.5 miles wide and is bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad to the south; Garret, McCormick, and Berry Roads to the west; the Conrail Railroad to the north; and State Route 534 to the east. The facility is surrounded by the communities of Windham, Garrettsville, Newton Falls, Charlestown, and Wayland.

Administrative control of the 21,683-acre facility has been transferred to the U.S. Property and Fiscal Officer (USP&FO) for Ohio and subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a training site, Camp Ravenna. The OHARNG/Camp Ravenna oversees the cleanup of former production areas across the facility related to former operations under the RVAAP and utilizes the Installation Restoration Program and the MMRP to implement the cleanup work.

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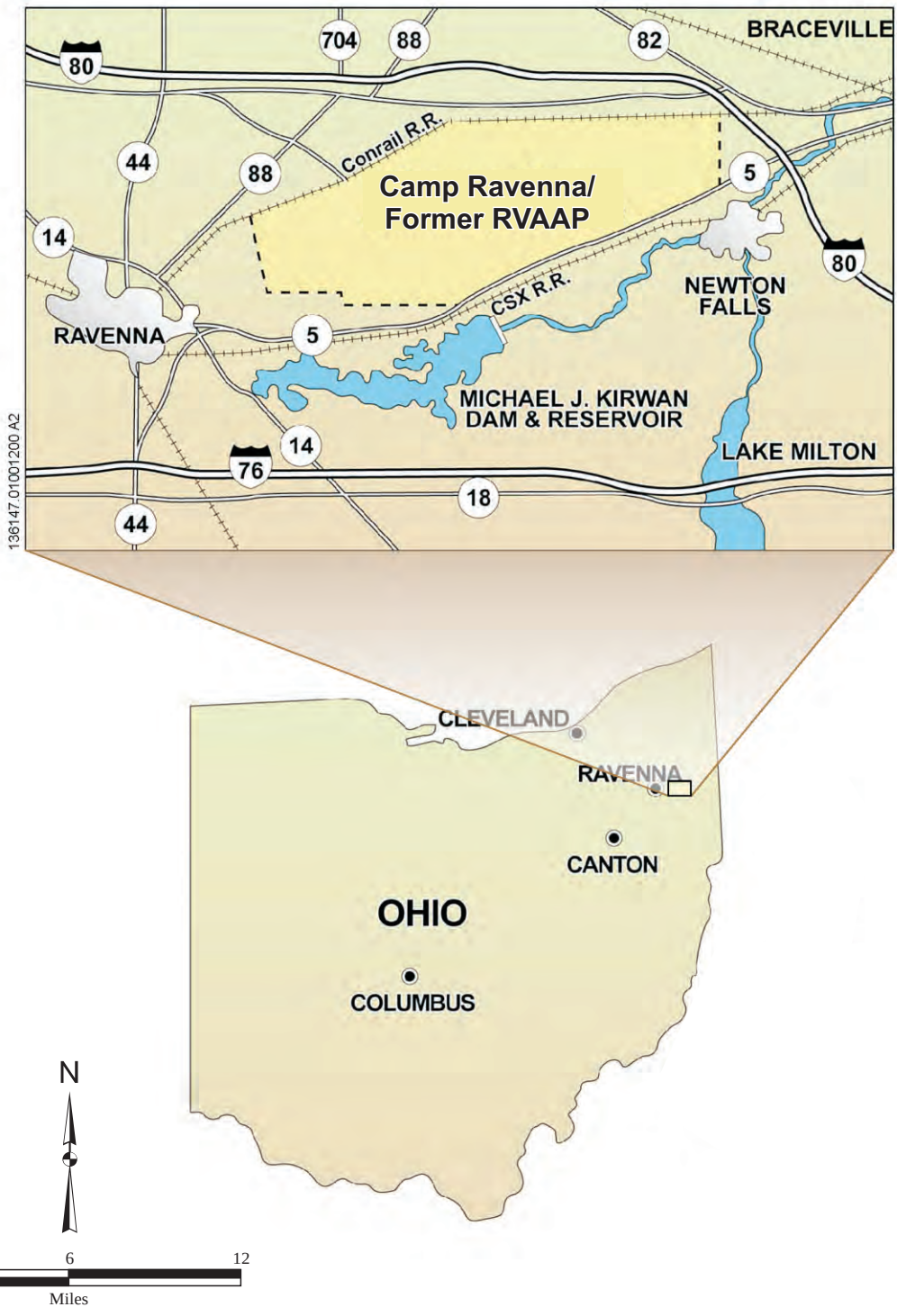

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Source: CB&I

Legend

Camp Ravenna/Former RVAAP

Figure 1-1
Location Map
Camp Ravenna/
Former RVAAP
Portage and Trumbull Counties, Ohio

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The Ramsdell Quarry Landfill MRS Area 2 (South) is a 6.93-acre parcel located in the northeast portion of Camp Ravenna within Portage County (Figure 1-2). The MRS is located south of the Ramsdell Quarry Landfill MRS Area 1 (North) and north of Load Line #1. The MRS is on federal property with administrative accountability assigned to the USP&FO for Ohio. The MRS is managed by the Army National Guard (ARNG) and the OHARNG. Table 1-1 summarizes the administrative description for the MRS.

Table 1-1. Administrative Description Summary of the Ramsdell Quarry Landfill MRS Area 2 (South)

Investigation Area	AEDB-R MRS Number	Area (Acres)	Property Owner	MRS Management Responsibility
Ramsdell Quarry Landfill MRS Area 2 (South)	RVAAP-001-R-01	6.93	USP&FO for Ohio	ARNG/OHARNG

ARNG denotes Army National Guard.
AEDB-R denotes Army Environmental Database - Restoration Module.
MRS denotes Munitions Response Site.
OHARNG denotes Ohio Army National Guard.
USP&FO denotes U.S. Property and Fiscal Officer.

1.4 MRS Description

The Ramsdell Quarry Landfill MRS Area 2 (South) is heavily wooded with thick ground vegetation and contains a small, inactive soil/rock quarry at the east side of the MRS. Approximately 0.5 acres of wetland are now located in the former soil/rock quarry and along the eastern boundary of the MRS. No U.S. DoD military munitions confirmed to be munitions and explosives of concern (MEC) were found at the MRS. However, material potentially presenting an explosive hazard (MPPEH) were found on the ground surface and in subsurface soils at the MRS during the RI. These MPPEH were evaluated, determined to be safe, and classified as munitions debris (MD). The MD consisted of fragments and parts associated with the 20-pound (lb) AN-M41 series bomb, the 155-millimeter (mm) MK-1 series projectile, the 250-lb AN-M57 series general purpose (GP) bomb, and the 500-lb AN-M64 series GP bomb (CB&I Federal Services LLC [CB&I], 2015). There is no available information regarding the historical munitions-related activities that occurred at the MRS or how the MD arrived there. It is suspected that the MRS may have been used as a disposal area for munitions that were treated at the Ramsdell Quarry Landfill MRS Area 1 (North) located adjacent to the north of the MRS. The Ramsdell Quarry Landfill MRS Area 2 (South) is shown on Figure 1-3.

1.5 Current and Projected Land Use

The human health risk assessment in the RI was completed prior to the completion of the *Final Technical Memorandum: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program* (Technical Memorandum; ARNG, 2014). The Technical Memorandum was prepared by the ARNG and the Ohio Environmental Protection Agency (Ohio EPA) to amend the risk assessment process to address changes in the RVAAP restoration program. The Technical Memorandum defined three categorical land uses and representative receptors to be considered during the RI phase of the CERCLA process. The three land uses and representative receptors are as follows:

1) Unrestricted (Residential) Land Use—Resident Receptor (Adult and Child)

2) Military Training Land Use—National Guard Trainee

3) Commercial/Industrial Land Use—Industrial Receptor (U.S. EPA Composite Worker)

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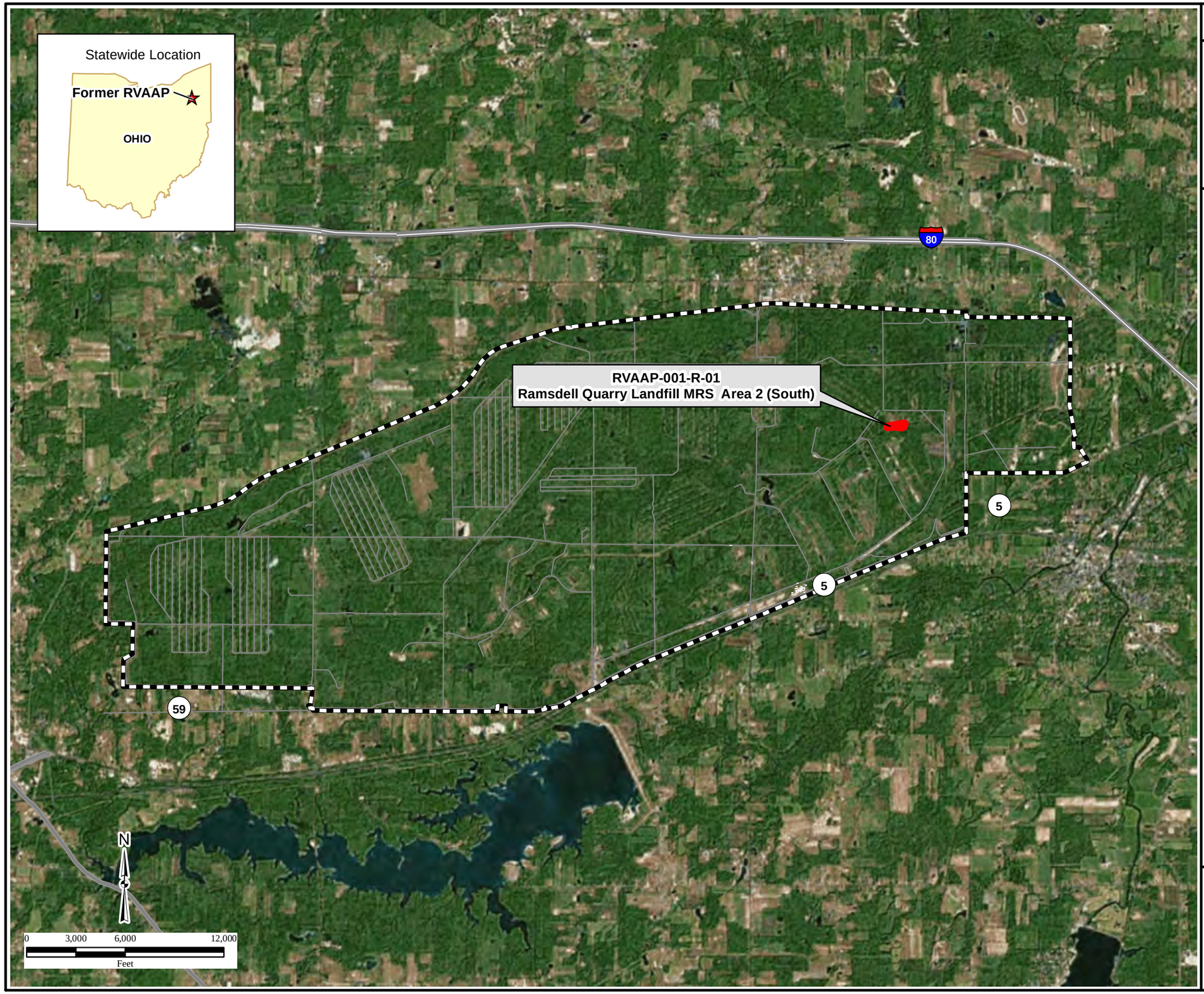

HGL—Feasibility Study
Former RVAAP, Ohio

Figure 1-2
MRS Location Map
Ramsdell Quarry Landfill MRS
Area 2 (South)
Camp Ravenna/Former RVAAP
Portage and Trumbull Counties, Ohio

Legend

- Munitions Response Site Boundary
- Facility Boundary
- Road

Notes:
MRS denotes Munitions Response Site
RVAAP denotes Ravenna Army Ammuntion Plant

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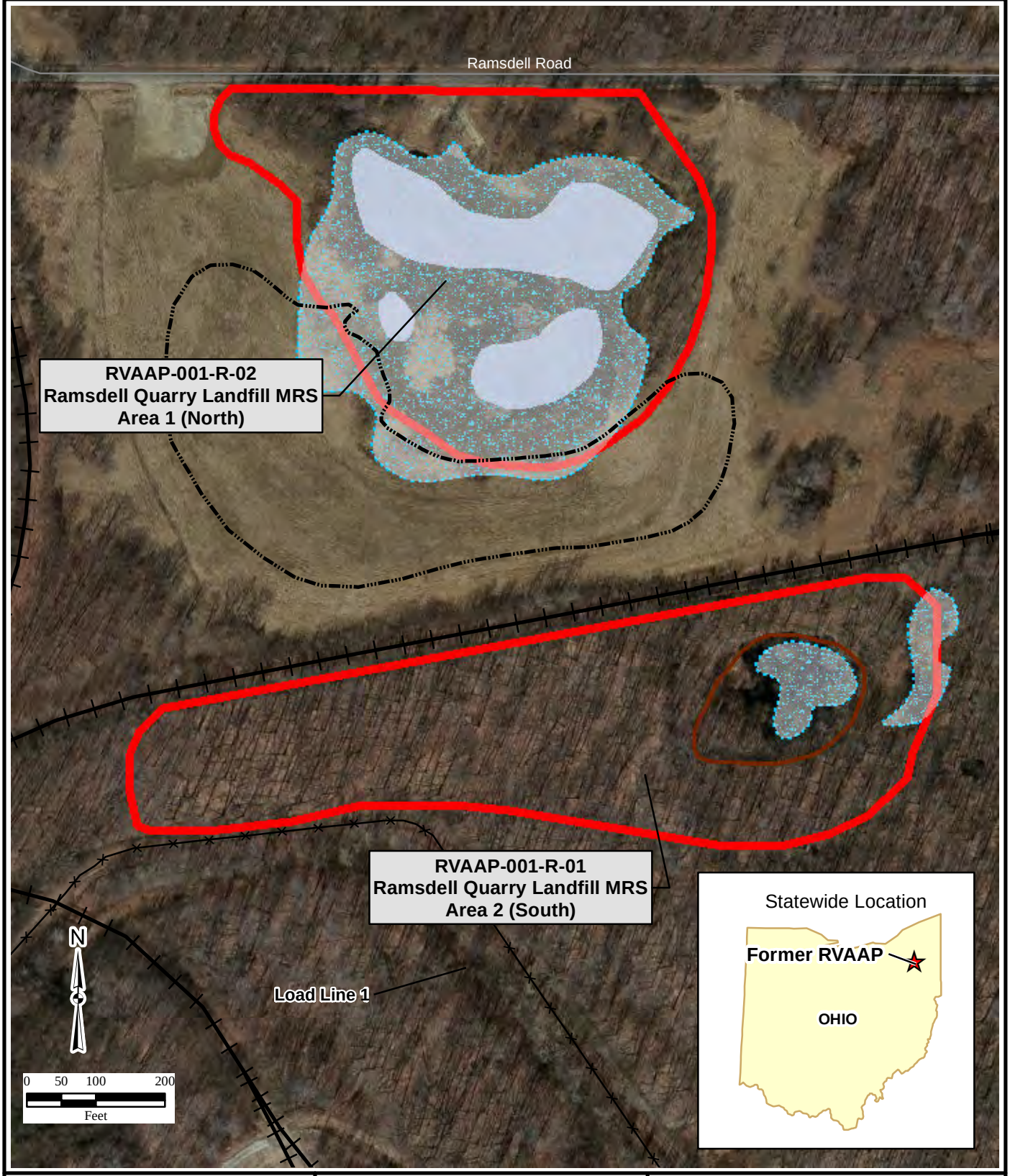

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Source CB&I

Legend
- MRS Boundary
- Surface Water
- Wetland
- Approximate Landfill Boundary
- Former Soil Borrow Pit
- Former Railbed
- Fence Line

Figure 1-3
MRS Map
Ramsdell Quarry Landfill MRS Area 2 (South)
Camp Ravenna/Former RVAAP
Portage and Trumbull Counties, Ohio

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RI reports that were substantially in progress at the time of the Technical Memorandum's approval on February 11, 2014, as was the case for the *Final Remedial Investigation Report for RVAAP-001-R-01 Ramsdell Quarry Landfill MRS* (Final RI Report; CB&I, 2015), were not revised to include an evaluation of the Industrial Receptor in the human health risk assessment process. If Unrestricted (Residential) Land Use was not achieved for explosive hazards and/or munitions constituents (MC)-related contamination during the risk assessment process in the RI, then the Industrial Receptor would be evaluated during the FS.

The current land use activities that were presented in the Final RI Report (CB&I, 2015) were maintenance, natural resource management, and environmental sampling. The Military Training Land Use was identified as the anticipated future land use during the RI. The representative receptor for both the current and future land uses as identified in the RI was the National Guard Trainee. The future land use at the MRS will include maintenance, natural resource management, and environmental sampling activities in addition to military training. Therefore, when there is a possibility that a full-time occupational exposure may occur on the MRS, the Industrial Receptor is evaluated. For this FS, the Industrial Receptor is used to evaluate the No Action alternative and represents full-time occupational personnel that may work freely on the MRS (ARNG, 2014). The media of concern for the Industrial Receptor are surface and subsurface soils to a maximum exposure depth of 4 feet below ground surface (bgs). The exposure depth is determined based on the surface soil exposure scenarios for military personnel at Camp Ravenna (i.e., the National Guard Trainee and the Range Maintenance Solider) (Science Applications International Corporation, 2010). Evaluation of the Industrial Receptor in this FS is presented in further detail in Section 2.0.

1.6 Report Organization

The organization of this FS, including the specific sequence of steps used to develop, screen, and analyze remedial alternatives, is as follows:

- Section 1.0–Introduction: This section discusses the regulatory framework for and purpose of this FS, describes the MRS property and provides background information regarding it, and summarizes previous investigations.
- Section 2.0–Project Objectives: This section presents the conceptual site model (CSM), applicable or relevant and appropriate requirements (ARARs), and RAOs for the MRS.
- Section 3.0–Detailed Analysis of Alternative: This section presents a detailed evaluation of the No Action alternative. The evaluation is based on the nine criteria in the NCP: protection to human health and the environment; compliance with ARARs; long-term effectiveness and permanence; reduction of toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; cost; state acceptance; and community acceptance.
- Section 4.0–References: This section lists pertinent documents cited in this FS report.

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2.0 PROJECT OBJECTIVES

This section presents a summary of the CSM for the Ramsdell Quarry Landfill MRS Area 2 (South). Based on the results of the RI, no explosive hazards or unacceptable risk due to MC-related contamination are present at the MRS (CB&I, 2015). Section 2.1 describes the current CSM and discusses any changes to the CSM following the RI. Section 2.2 summarizes that the rationale for no basis for a remedial action at the MRS.

2.1 Conceptual Site Model

The information collected during the RI and the conclusions presented in the Final RI Report (CB&I, 2015) were used to update the CSM for MEC and MC-related contamination in this FS. The CSM identifies complete, potentially complete, or incomplete source-receptor interactions for the MRS, for both current and reasonably anticipated future land uses. The CSM for MEC and MC-related contamination has three sections: Sources, Interaction, and Receptors with the exposure pathways identified for each receptor. Each section is discussed below:

- Sources—Sources are those areas where MEC or MC-related contamination have entered (or may enter) the physical system. A MEC source is the location where MEC is situated or are expected to be found. An MC-related contamination source is a location where MC-related contamination from MEC or munitions-related activities has entered the environment.
- Interactions—Hazards from MEC and/or MC-related contamination arise from direct contact as a result of some human activity. Interactions describe ways that receptors come into contact with a source.
- Receptors—A receptor is an organism (human or ecological) that contacts a chemical or physical agent. The pathway evaluation must consider both current and reasonably anticipated future land use, as receptors are determined on that basis.

As discussed in Section 1.5, the land use receptor identified during the RI has changed since the completion of the Final RI Report (CB&I, 2015). The information collected during the RI field activities and any updated information identified since the completion of the RI activities are presented in Table 2-1 and are used to develop the revised CSM for the Ramsdell Quarry Landfill MRS Area 2 (South).

2.1.1 MEC Exposure Pathway Analysis

An exposure pathway is the course a chemical or physical agent takes from a source to a receptor. Each potential MEC pathway includes a source, interaction (access and activity), and a receptor. A pathway is considered complete when a source is known to exist and when receptors have access to the MRS while engaging in some activity that results in contact with the source. A pathway is considered potentially complete when a source has not been confirmed, but is suspected to exist and when receptors have access to the MRS while engaging in some activity that results in contact with the source. Lastly, an incomplete pathway is any case where one of the four components (source, activity, access, or receptors) is missing from the MRS.

Table 2-1. Summary of CSM Findings

Description	CSM Finding
Location Profile	
Boundaries	6.93 acres that are bound by a former rail bed to the north, Load Line #1 to the southwest, and a former soil/rock quarry with exposed bedrock and low-lying wetland areas to the east
Structures	No structures are located within the MRS
Utilities	No active utilities are located within the MRS
Security	Access to Camp Ravenna is controlled. Siebert stakes bound the MRS to deter access and alert facility personnel that the area is off limits
Land Use and Receptors	
Current Land Use	Maintenance, natural resource management, and environmental sampling
Potential Future Land Use	Maintenance, natural resource management, environmental sampling, and military training
Human Receptor(s)	Industrial Receptor
Ecological Receptors (MC-related contamination exposure only)	Terrestrial invertebrates (earthworms), voles, shrews, robins, foxes, barn owls, hawks, muskrat, mink, mallards, great blue heron, benthic invertebrates, and aquatic biota
Wetlands, Waterways, or Sensitive Areas	0.5 acres of a planning-level wetland area at the eastern portion of the MRS
Cultural Resources	A cultural resources survey was conducted at the MRS and no sites were identified; however, all activities need to adhere to the Inadvertent Discovery Policy for Cultural or Archeological Resources
MEC/MC-Related Contamination Exposure	
MEC Exposure	No explosive risks
MC-Related Contamination Exposure	No unacceptable risks to any receptor including the Unrestricted (Residential) Receptor

CSM denotes conceptual site model.

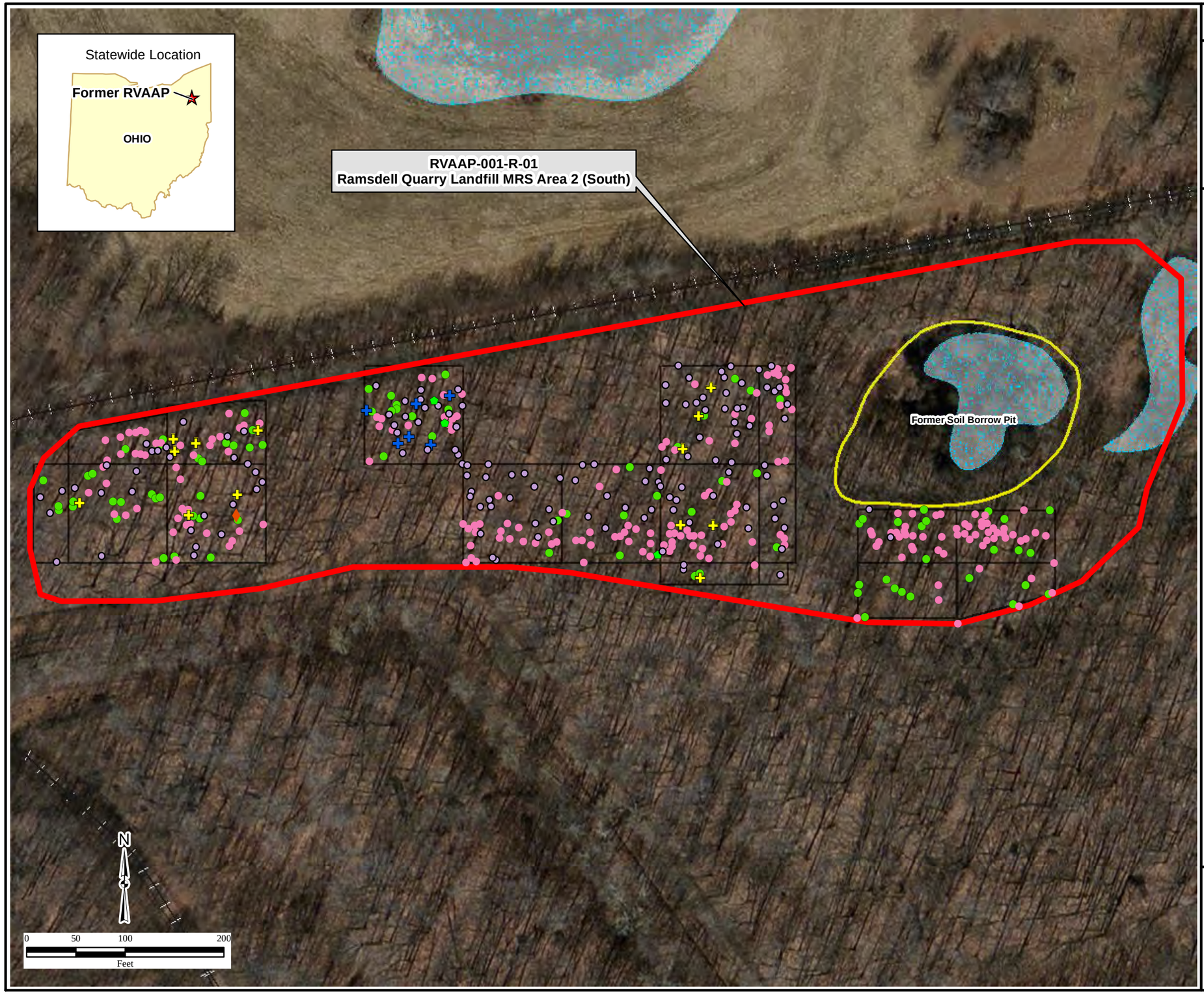
MC denotes munitions constituents.

MEC denotes munitions and explosives of concern

MRS denotes Munitions Response Site.

2.1.1.1 Source

No U.S. DoD military munitions confirmed to be MEC were found at the MRS; however, MPPEH that were evaluated, determined to be safe, and classified as MD were encountered on the ground surface and in subsurface soils during the RI. Most of the MD was found at the western portion of the MRS. The MD items found consisted of fragments and parts associated with the 20-lb AN-M41 series bomb, the 155 mm MK-1 series projectile, the 250-lb AN-M57 series GP bomb, and the 500-lb AN-M64 series GP bomb (CB&I, 2015). Figure 2-1 present the locations for the MD that were found during the RI field activities.



HGL—Feasibility Study
Former RVAAP, Ohio

Figure 2-1
Munitions Debris Locations
Ramsdell Quarry Landfill MRS
Area 2 (South)
Camp Ravenna/Former RVAAP
Portage and Trumbull Counties, Ohio

Legend

- MRS Boundary
- Wetland
- Former Soil Borrow Pit
- DGM Grid Boundaries
- Former Railroad

Munition Debris (MD) and Other Debris

- Bomb, 250 lb, General Purpose, AN-M57
- Bomb, 500 lb, General Purpose, AN-M64
- Bomb, fragment, 20 lb, AN-M41
- Projectile, 155mm, Shrapnel, MK 1
- MD fragment, unknown
- Other Debris
- Anomaly Type Unknown

H:\MAMMS\Ravenna\GIS_Documents\Project_Maps
\HGL\June2017\RQLF\HHGL_RVAAP_RQLF_004_Fig2_1_Area_2_RI_Invest_R2.mxd
6/22/2017 JWR
Source CB&I

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2.1.1.2 Receptors

A receptor for the CSM is any human who comes into physical contact with a potential explosive hazard. The future land use at the MRS will include maintenance, natural resource management, and environmental sampling activities in addition to military training. The National Guard Trainee was identified as the representative receptor for the MRS in the RI; however, in accordance with the Technical Memorandum (ARNG, 2014), the human receptor that has the greatest opportunity for exposure to an explosive hazard at the MRS is the Industrial Receptor. The Industrial Receptor represents a full-time occupational receptor at the MRS whose activities are consistent with full-time employees or career military personnel who are expected to work daily at Camp Ravenna over their career. The maximum exposure depth for the Industrial Receptor is 4 feet bgs that is below the maximum depth that MD was found during the RI field work (2 feet bgs).

Ecological receptors were identified for the MRS in the Final RI Report (CB&I, 2015). These receptors included terrestrial invertebrates (earthworms), voles, shrews, robins, foxes, barn owls, hawks, muskrat, mink, mallards, great blue heron, benthic invertebrates, and aquatic biota. In accordance with current guidance, humans are typically considered as the primary and often the only receptor to MEC and; therefore, there are no ecological receptors for MEC at the MRS (USACE, 2016).

2.1.1.3 Interaction

Interaction describes ways that receptors contact a source and includes both access and activity considerations. Activity describes ways that receptors come into contact with a source. Access describes the degree to which MEC is available to potential receptors. A receptor may contact MEC that is on the surface by walking. A receptor may contact MEC in the subsurface when performing intrusive activities.

Current activities at the Ramsdell Quarry Landfill MRS Area 2 (South) include maintenance, natural resource management, and environmental sampling activities (CB&I, 2015). The future land use at the MRS will include maintenance, natural resource management, and environmental sampling activities in addition to military training.

Based on the soil types and climate conditions at the MRS, soil to a depth of 30 inches bgs is considered as being susceptible to freeze-thaw cycling. The potential for the erosion at the MRS is minimal due to the presence of woods and overgrown vegetation.

2.1.1.4 MEC Exposure Conclusions

No explosive hazards are present at the MRS based on the RI findings. No U.S. DoD military munitions confirmed to be MEC were found during the RI and only MD were found. The surface and the subsurface pathways for MEC are considered incomplete for the Industrial Receptor. The updated CSM for MEC at the Ramsdell Quarry Landfill MRS Area 2 (South) is presented on Figure 2-2.

2.1.2 MC-Related Contamination Exposure Pathway Analysis

The RI confirmed that no known or suspected risks associated with MC-related contamination exist at the MRS, including evaluation for the Unrestricted (Residential) Land Use, and the MC-Related Contamination exposure pathway for all receptors is incomplete. The CSM for MC-Related Contamination at the Ramsdell Quarry Landfill MRS Area 2 (South) has been updated to include the Industrial Receptor and is presented on Figure 2-3.

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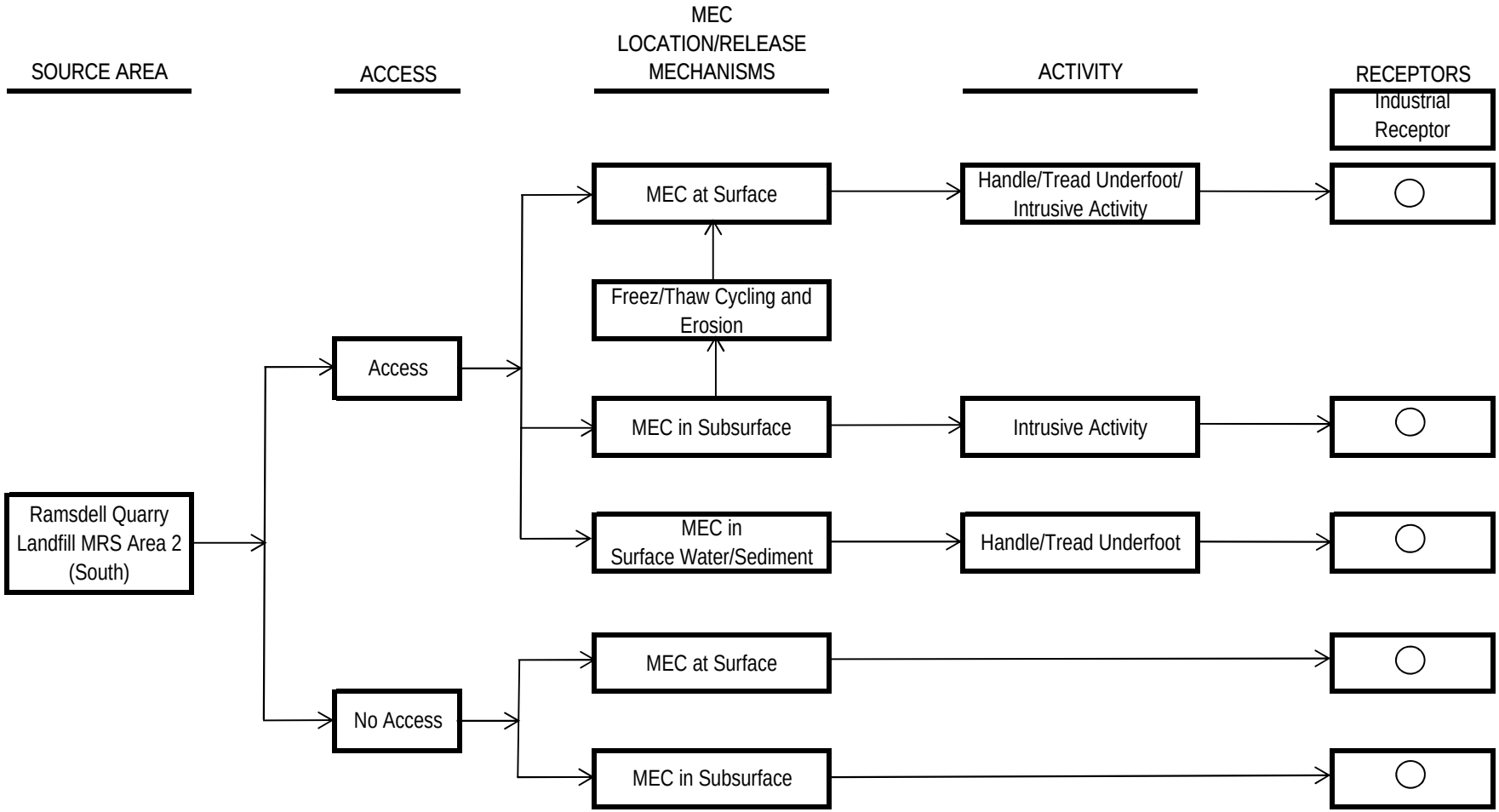
FIGURE 2-2. MEC CONCEPTUAL SITE MODEL
RVAAP-001-R-01 RAMSDELL QUARRY LANDFILL MRS AREA 2 (SOUTH)



Receptor Exposure Scenarios (feet bgs)		
Receptor	ent	Subsurface
Industrial Receptor	0	>0 to 4

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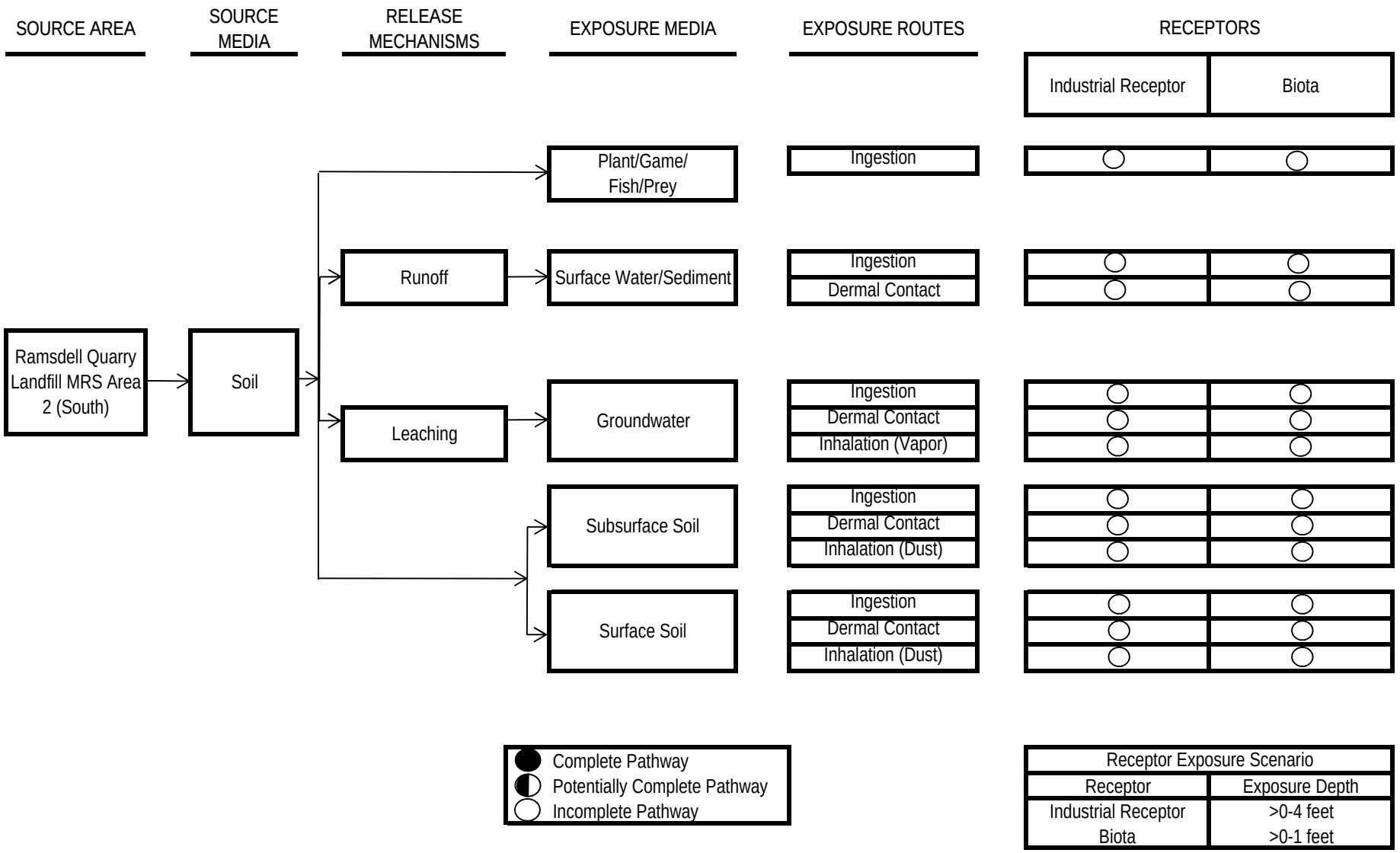
FIGURE 2-3. MC-RELATED CONTAMINATION CONCEPTUAL SITE MODEL
RVAAP-001-R-01 RAMSDELL QUARRY LANDFILL MRS AREA 2 (SOUTH)



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2.2 Problem Identification

No explosive hazards are present at the MRS based on the findings of the RI. No U.S. DoD military munitions confirmed to be MEC was found at the MRS and only MD was found. No unacceptable risks associated with MC-related contamination were found at the MRS during the RI. Based on the results presented in the Final RI Report (CB&I, 2015), and in accordance with CERCLA, there is no basis for a remedial action at the MRS. Therefore, this FS evaluates the No Action alternative for the Ramsdell Quarry Landfill MRS Area 2 (South) to support No Action at the MRS.

2.3 Preliminary Identification of ARARs and "To Be Considered" Information

Because no unacceptable risks associated with MC-related contamination are present on the MRS, no chemical-specific ARARs are identified. Because no actions will be implemented under the No Action alternative, no location- or action-specific ARARs are identified.

2.4 Remedial Action Objectives

As established during the RI, no explosive hazards or unacceptable risks associated with MC-related contamination are present at the Ramsdell Quarry Landfill MRS Area 2 (South); therefore, the development of RAOs is unnecessary (CB&I, 2015).

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3.0 DETAILED ANALYSIS OF THE NO ACTION ALTERNATIVE

This section presents a detailed analysis of the No Action alternative. The analysis consists of evaluating No Action using the nine criteria listed in the NCP. The purpose of this detailed analysis is to support No Action at the MRS.

3.1 Overview of Evaluation Criteria

Section 300.430(e) of the NCP lists nine CERCLA criteria against which each remedial alternative must be assessed. The NCP (Section 300.430[f]) states that the first two criteria, protection of human health and the environment and compliance with ARARs, are "threshold criteria", which must be met by the selected remedial action unless a waiver is granted under Section 121(d)(4) of CERCLA. The next five criteria are "primary balancing criteria", and the trade-offs within this group must be balanced. The final two criteria, state and community acceptance, are "modifying criteria", which are evaluated following the public comment period on the Proposed Plan.

3.2 Individual Analysis of the No Action Alternative

The following sections provide a detailed analysis of the No Action alternative using the nine NCP criteria.

3.2.1 Threshold Criteria

Overall Protection of Human Health and the Environment—A determination and declaration that this criterion will be met by the proposed remedial action must be made in the Record of Decision (ROD); therefore, the selected remedy must meet this threshold criterion. The threshold criterion will be met if the risks associated with the human exposures are eliminated, reduced, or controlled through treatment, engineering, or land use controls (LUCs), and if the remedial action is protective of the environment. No explosive hazards or unacceptable risks associated with MC-related contamination are present at the MRS; therefore, the No Action alternative is protective of human health and the environment and meets this criterion.

Compliance with ARARs—Compliance with ARARs is a threshold criterion that must be met by the proposed remedial alternative. There are no chemical-specific, location-specific, or action-specific ARARs identified for this alternative. Therefore, the No Action alternative meets this criterion.

3.2.2 Balancing Criteria

Long-Term Effectiveness and Permanence—This criterion evaluates the long-term level of risk associated with MEC and MC-related contamination after implementation of the remedial alternative. No explosive hazards or unacceptable risks associated with MC-related contamination are present at the MRS; therefore, the No Action alternative will be effective in the long-term and no residual hazards will remain at the MRS.

Reduction of Toxicity, Mobility, or Volume Through Treatment—The statutory preference for remedial technologies that significantly and permanently reduce the toxicity, mobility, or volume of the waste is addressed by this criterion. The No Action alternative includes no treatment because there are no explosive hazards or unacceptable risks associated with MC-related contamination present at the MRS.

Short-Term Effectiveness—Because no active remediation activities are conducted, no additional hazards are posed to current receptors or the future industrial receptor as a result of implementing the No Action alternative. The No Action alternative will not result in any adverse short-term effects on the environment.

Implementability—The technical and administrative feasibility of implementing the remedial alternative will be addressed. Technical feasibility refers to the ability to construct, reliably operate, and meet technology-specific regulations for process options until a remedial action is complete; it also includes operation, maintenance, replacement, and monitoring of technical components of an alternative, if required, until the future after the remedial action is complete. Administrative feasibility refers to the ability to obtain approvals from other offices and agencies, the availability of treatment, storage, and disposal services and capacity, and the requirements for, and availability of, specific equipment and technical specialists. The No Action alternative does not involve active remediation; therefore, technical feasibility is not a consideration. This alternative will not interfere with any planned remedial action in the future. The No Action alternative is administratively feasible to OHARNG/Camp Ravenna because no explosive hazards or unacceptable risks associated with MC-related contamination are present on the MRS and no services or equipment is necessary to implement this alternative. The No Action alternative is expected to receive Ohio EPA concurrence because no explosive hazards or unacceptable risks associated with MC-related contamination are present at the MRS.

Cost—Capital and long-term management costs are estimated under this criterion. The No Action alternative does not include treatment, removal, or any other remedial action because no explosive hazards or risks due to MC-related contamination are present.

3.2.3 Modifying Criteria

State Acceptance—This criterion will be evaluated during incorporation of regulatory review comments into the FS and during the future submittals of the Proposed Plan and the ROD.

Community Acceptance—This criterion will be evaluated when the Proposed Plan is presented to the public for review and comment.

3.3 Overall Evaluation

The No Action alternative is technically and administratively implementable and there are no costs. There are no explosive hazards or unacceptable risks associated with MC-related contamination at the MRS and the No Action alternative is protective of human health and the environment. No ARARS are triggered by the No Action alternative. Therefore, the No Action alternative meets the threshold criteria as established in the NCP (Section 300.430[f]).

3.4 Munitions Response Site Prioritization Protocol

In response to a 2002 *National Defense Authorization Act* requirement, the U.S. DoD developed the *Munitions Response Site Prioritization Protocol* (MRSPP) as the methodology for prioritizing MRSs for response actions. In 2005, the Final Rule for the MRSPP was issued and codified at 32 CFR Part 179. The MRSPP provided in the RI was revised for this FS in accordance with 32 CFR Part 179 and the guidance provided in the *Munitions Response Site Prioritization Protocol Primer* (DoD, 2007). The MRSPP consists of the following three modules to evaluate the unique characteristics of each hazard type at an MRS: Explosive Hazard Evaluation (EHE), Chemical Warfare Materiel Hazard Evaluation (CHE), and Health Hazard Evaluation (HHE). The composite rating of the three modules is used to assign an MRS priority ranking for the MRS ranging from 1 to 8, with alternative ratings of Evaluation Pending, No Known or Suspected Hazard, or No Longer Required. The revised composite MRSPP priority for the Ramsdell Quarry Landfill MRS Area 2 (South) is “No Longer Required”. The updated MRSPP document for the Ramsdell Quarry Landfill MRS Area 2 (South) is included in Appendix A.

4.0 REFERENCES

Army National Guard (ARNG), 2014. *Final Technical Memorandum: Land Uses and Revised Risk Assessment Process for the Ravenna Army Ammunition Plant (RVAAP) Installation Restoration Program*, Portage/Trumbull Counties, Ohio. February.

CB&I Federal Services LLC (CB&I), 2015. *Final Remedial Investigation Report for RVAAP-001-R-01 Ramsdell Quarry Landfill MRS, Version 1.0, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio*, January 27.

Ohio Environmental Protection Agency (Ohio EPA), 2004. *Director's Final Findings and Orders (DFFO) for RVAAP*, Division of Emergency and Remedial Response, June 10.

Science Applications International Corporation, 2010. *Final Facility-Wide Human Health Cleanup Goals for the Ravenna Army Ammunition Plant, Ravenna, Ohio*, March 23.

U.S. Army, 2009. *Final United States Army Munitions Response Program Remedial Investigation/Feasibility Study Guidance*, November.

U.S. Army Corps of Engineers (USACE), 2016. *Technical Project Planning Process, Engineering Manual (EM) 200-1-2*, February 29.

U.S. Department of Defense (DoD), 2007. Office of Deputy Under Secretary of Defense Installations and Environment, *Munitions Response Site Prioritization Protocol Primer*, April.

DoD, 2012. Manual Number 4715.20: *Defense Environmental Restoration Program (DERP) Management*, March 9.

U.S. Environmental Protection Agency (EPA), 1988. *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, Office of Emergency and Remedial Response, Washington, D.C., EPA/540/G-89/004, OSWER Directive 9355.3-01, October.

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Appendix A
Munitions Response Site Prioritization Protocol

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Table A

MRS Background Information

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

Munitions Response Site (MRS) Name:	**Ramsdell Quarry Landfill Munitions Response Site Area 2 (South)**
Component:	US Army
Installation/Property Name:	**Ravenna Army Ammunition Plant/Camp Ravenna**
Location (City, County, State):	Ravenna, Portage and Trumbull Counties, Ohio
UTM Coordinates (NAD83):	X =498490.3 Y =4562138.7
Site Name (RMIS ID):	OH213820736
Project Name (Project No.):	USACE MAMMS II (W912DR-15-D-0016/TO 0001)
Date Information Entered/Updated:	27-Nov-2017
Point of Contact (Name/Phone):	Craig Coombs, USACE Louisville District/(502) 315-6324

Project Phase ("X" only one):										
	PA		**SI**		**RI**	X	**FS**		**RD**
	RA-C		**RIP**		**RA-O**		**RC**		**LTM**

Media Evaluated ("X" all that apply):				
	Groundwater (human receptor)		**Sediment (human receptor)**
X	**Surface soil (human receptor)**		**Surface water (ecological receptor)**
	Sediment (ecological receptor)		**Surface water (human receptor)**

MRS Summary

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

The Ramsdell Quarry Landfill MRS Area 2 (South) is a 6.93-acre area where material potentially presenting an explosive hazard (MPPEH) were historically observed by Former Ravenna Army Ammunition Plant/Camp Ravenna personnel. No United States (U.S.) Department of Defense (DoD) military munitions confirmed to be munitions and explosives of concern (MEC) have been found at the MRS; however, MPPEH were found on the ground surface and in subsurface soils at the MRS during the Remedial Investigation (RI). The MPPEH were evaluated, determined be safe, and were as classified munitions debris (MD) . There is no available information regarding the historical munitions-related activities that occurred at the MRS or how the MD arrived there but it is suspected that the MRS may have been used as a disposal area for munitions that were treated at the Ramsdell Quarry Landfill MRS Area 1 (North) located adjacent to the north of the MRS (CB&I Federal Services LLC [CB&I], 2015). The MD consisted of fragments and parts associated with the 20-pound (lb) AN-M41 series bomb, the 155-millimeter MK-1 series projectile, the 250-lb AN-M57 series general purpose (GP) bomb, and the 500-lb AN-M64 series GP bomb. Sampling for munitions constituents (MC)-related contamination was conducted during the RI at the areas of concentrated MD. It was determined that there are no site-related contaminations (SRCs) and; therefore, no risks associated with MC-related contamination at the MRS (CB&I, 2015).

Description of Pathways for Human and Ecological Receptors:

No explosive hazard is present at the MRS based on the RI findings. No U.S. DoD military munitions confirmed to be MEC were found during the RI intrusive investigation and only MD were found. The surface and subsurface pathways for MEC are considered incomplete for all receptors.

Description of Receptors (Human and Ecological):

A receptor for the conceptual site model (CSM) is any human who comes into physical contact with a potential explosive hazard (i.e., MEC) or contamination (i.e., MC) that orginates from MEC or muntions-related activities. The future land use at the MRS will include maintenance and natural resource activities. It will also include military training and most likely construction activities as part of military use. The National Guard Trainee was identified as the representative receptor for the MRS in the RI; however, in accordance with the Technical Memorandum (ARNG, 2014), the human receptor that has the greatest opportunity for exposure to an explosive hazard at the MRS is the Industrial Receptor. The Industrial Receptor represents a full-time occupational receptor at the MRS whose activities are consistent with full-time employees or career military personnel who are expected to work daily at Camp Ravenna over their career (ARNG, 2014). The maximum exposure depth for the Industrial Receptor is 4 feet bgs which is below the maximum depth that MD was found during the RI field work (2 feet bgs). In accordance with current guidance (USACE, 2016), there are no ecological receptors associated with the potential for MEC. The ecological receptors identified in the RI for potential exposure to MC-related contamination at the MRS include terrestrial invertebrates (earthworms), voles, shrews, robins, foxes, barn owls, hawks, muskrat, mink, mallards, great blue heron, benthic invertebrates, and aquatic biota (CB&I, 2015).

Table 1
EHE Module: Munitions Type Data Element Table

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

Note: The terms *practice munitions* , *small arms* , *physical evidence* , and *historical evidence* are defined in Appendix C of the MRSPP Primer (Draft, Dec 2005).

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

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

To date, no DoD military munitions confirmed to be MEC have been found at the Ramsdell Quarry Landfill MRS Area 2 (South) however, MD consisting of fragments and parts associated with the 20 lb AN-M41 series bomb, the 155mm MK-1 series projectile, the 250 lb AN-M57 series GP bomb, and the 500 lb AN-M64-series GP bomb were encountered during the RI. Based on the results of the RI, there is no physical evidence of UXO or DMM at the Ramsdell Quarry Landfill MRS Area 2 (South). As such, Tables 2-9 are not applicable and are intentionally omitted according to active Army guidance.

Tables 2 through 9 are intentionally omitted according to Army Guidance.

Table 10

Determining the EHE Module Rating

DIRECTIONS:

1. From Tables 01 - 09, record the data element scores in the **Score** boxes to the right.

2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.

3. Add the three **Value** boxes and record this number in the **EHE Module Total** box below.

4. Identify the appropriate range for the **EHE Module Total** at right.

5. Identify the **EHE Module Rating** that corresponds to the range selected and record this rating in the **EHE Module Rating** box at the lower right corner of this table.

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

	Source	Score	Value
Explosive Hazard Factor Data Elements			
Munitions Type	Table 01	0	0
Source of Hazard	Table 02	0	
Accessibility Factor Data Elements			
Location of Munitions	Table 03	0	0
Ease of Access	Table 04	0	
Status of Property	Table 05	0	
Receptor Factor Data Elements			
Population Density	Table 06	0	0
Population Near Hazard	Table 07	0	
Types of Activities/Structures	Table 08	0	
Ecological and/or Cultural Resources	Table 09	0	
EHE MODULE TOTAL			**0**

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

Table 11

CHE Module: CWM Configuration Data Element Table

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

Note: The terms *CWM/UXO*, *CWM/DMM*, *physical evidence*, and *historical evidence* are defined in Appendix C of the MRSPP Primer (Draft, Dec 2005).

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

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

The RVAAP is listed on the Non-Stockpile CWM List as a site with known or possible buried CWM; however, there is no known historical or physical evidence of CWM being produced, stored, or used at the MRS. As such, Tables 12-19 are not applicable and are intentionally omitted according to active Army Guidance.

Tables 12 through 19 are intentionally omitted according to Army Guidance.

Table 20

Determining the CHE Module Rating

DIRECTIONS:

1. From Tables 11 - 19, record the data element scores in the **Score** boxes to the right.

2. Add the **Score** boxes for each of the three factors and record this number in the **Value** boxes to the right.

3. Add the three **Value** boxes and record this number in the **CHE Module Total** box below.

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

4. Identify the appropriate range for the **CHE Module Total** at right.

5. Identify the **CHE Module Rating** that corresponds to the range selected and record this rating in the **CHE Module Rating** box at the lower right corner of this table.

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

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

Table 21

HHE Module: Groundwater Data Element Table

Contaminant Hazard Factor (CHF)

Directions: Record the **maximum concentrations** of all contaminants in the MRS's groundwater and their **comparison values** (from Appendix B, Relative Risk Site Evaluation (RRSE) Primer, Summer 1997 - Revised) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the groundwater, select the box at the bottom of the table.

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

Contaminant [CAS No.]	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No groundwater samples have been collected at the MRS under the MMRP			
(CB&I, 2015).			
		Total from Table 27	

CHF Scale	CHF Value	Sum the Ratios	
CHF > 100	H (High)	CHF = $\sum$ ([Max Conc of Contaminant] / [Comparison Value for Contaminant])	
100 > CHF >2	M (Medium)		
2 > CHF	L (Low)		

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

Migratory Pathway Factor

Directions: Annotate the value that corresponds most closely to the groundwater migratory pathway at the MRS.

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

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

Receptor Factor

Directions: Annotate the value that corresponds most closely to the groundwater receptors at the MRS.

Classification	Description	Value
Identified	There is a threatened water supply well downgradient of the source and the groundwater is a current source of drinking water or source of water for other beneficial uses such as irrigation/agriculture (equivalent to Class I or IIA aquifer).	H
Potential	There is no threatened water supply well downgradient of the source and the groundwater is currently or potentially usable for drinking water, irrigation, or agriculture (equivalent to Class I, IIA, or IIB aquifer).	M
Limited	There is no potentially threatened water supply well downgradient of the source and the groundwater is not considered a potential source of drinking water and is of limited beneficial use (equivalent to Class IIIA or IIIB aquifer, or where perched aquifer exists only).	L

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

Place an "X" in the box to the right if there is no known or suspected Groundwater MC Hazard	

Table 22

HHE Module: Surface Water - Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

Directions: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B, Relative Risk Site Evaluation (RRSE) Primer, Summer 1997 - Revised) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface water, select the box at the bottom of the table.

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

Contaminant [CAS No.]	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples have been collected at the MRS under the MMRP			
(CB&I, 2015).			
		Total from Table 27	
		Sum the Ratios	

CHF Scale	CHF Value
CHF > 100	H (High)
100 > CHF >2	M (Medium)
2 > CHF	L (Low)

CHF = $\sum$ ([Max Conc of Contaminant] / [Comparison Value for Contaminant])

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

Migratory Pathway Factor

Directions: Annotate the value that corresponds most closely to the surface water migratory pathway at the MRS.

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

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

Receptor Factor

Directions: Annotate the value that corresponds most closely to the surface water receptors at the MRS.

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

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

Place an "X" in the box to the right if there is no known or suspected Surface Water (Human Endpoint) MC Hazard	

Table 23

HHE Module: Sediment - Human Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

Directions: Record the **maximum concentrations** of all contaminants in the site's sediment and their **comparison values** (from Appendix B, Relative Risk Site Evaluation (RRSE) Primer, Summer 1997 - Revised) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for human endpoints present in the sediment, select the box at the bottom of the table.

Note: N/A

Contaminant [CAS No.]	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples have been collected at the MRS under the MMRP			
(CB&I, 2015).			
		Total from Table 27	
CHF Scale	**CHF Value**	**Sum the Ratios**	
CHF > 100	**H (High)**		
100 > CHF >2	**M (Medium)**	**CHF = $\sum$ ([Max Conc of Contaminant] / [Comparison Value for Contaminant])**	
2 > CHF	**L (Low)**		
CONTAMINANT HAZARD FACTOR	Directions: Record **the CHF Value** from above in the box to the right (maximum value = H).		

Migratory Pathway Factor

Directions: Annotate the value that corresponds most closely to the surface water migratory pathway at the MRS.

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

Receptor Factor

Directions: Annotate the value that corresponds most closely to the surface water receptors at the MRS.

Classification	Description	Value
Identified	Identified receptors have access to sediment to which contamination has moved or can move.	H
Potential	Potential for receptors to have access to sediment to which contamination has moved or can move.	M
Limited	Little or no potential for receptors to have access to sediment to which contamination has moved or can move.	L
RECEPTOR FACTOR	Directions: Record **the single highest value** from above in the box to the right (maximum value = H).	
Place an "X" in the box to the right if there is no known or suspected Sediment (Human Endpoint) MC Hazard		

Table 24

HHE Module: Surface Water - Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

Directions: Record the **maximum concentrations** of all contaminants in the MRS's surface water and their **comparison values** (from Appendix B, Relative Risk Site Evaluation (RRSE) Primer, Summer 1997 - Revised) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for ecological endpoints present in the surface water, select the box at the bottom of the table.

Note: Use either dissolved or total metals analyses.

Contaminant [CAS No.]	Maximum Concentration (µg/L)	Comparison Value (µg/L)	Ratios
No surface water samples have been collected at the MRS under the MMRP			
(CB&I, 2015).			
		Total from Table 27	
		Sum the Ratios	

CHF Scale	CHF Value
CHF > 100	H (High)
100 > CHF >2	M (Medium)
2 > CHF	L (Low)

CHF = $\sum$ ([Max Conc of Contaminant] / [Comparison Value for Contaminant])

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

Migratory Pathway Factor

Directions: Annotate the value that corresponds most closely to the surface water migratory pathway at the MRS.

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

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

Receptor Factor

Directions: Annotate the value that corresponds most closely to the surface water receptors at the MRS.

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

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

Place an "X" in the box to the right if there is no known or suspected Surface Water (Ecological Endpoint) MC Hazard	

Table 25

HHE Module: Sediment - Ecological Endpoint Data Element Table

Contaminant Hazard Factor (CHF)

Directions: Record the **maximum concentrations** of all contaminants in the MRS's sediment and their **comparison values** (from Appendix B, Relative Risk Site Evaluation (RRSE) Primer, Summer 1997 - Revised) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard for ecological endpoints present in the sediment, select the box at the bottom of the table.

Note: N/A

Contaminant [CAS No.]	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
No sediment samples have been collected at the MRS under the MMRP			
(CB&I, 2015).			
		Total from Table 27	

CHF Scale	CHF Value	Sum the Ratios
CHF > 100	H (High)	CHF = $\sum$ ([Max Conc of Contaminant] / [Comparison Value for Contaminant])
100 > CHF >2	M (Medium)	
2 > CHF	L (Low)	

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

Migratory Pathway Factor

Directions: Annotate the value that corresponds most closely to the surface water migratory pathway at the MRS.

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

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

Receptor Factor

Directions: Annotate the value that corresponds most closely to the surface water receptors at the MRS.

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

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

Place an "X" in the box to the right if there is no known or suspected Sediment (Ecological Endpoint) MC Hazard	

Table 26

HHE Module: Surface Soil - Data Element Table

Contaminant Hazard Factor (CHF)

Directions: Record the **maximum concentrations** of all contaminants in the MRS's surface soil and their **comparison values** (from Appendix B, Relative Risk Site Evaluation (RRSE) Primer, Summer 1997 - Revised) in the table below. Additional contaminants can be recorded on Table 27. Calculate and record the **ratios** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** by adding the **ratios** for each medium together, including additional contaminants recorded on Table 27. Based on the **CHF**, use the **CHF Scale** to determine and record the **CHF Value**. If there is no known or suspected MC hazard present in the surface soil, select the box at the bottom of the table.

Note: N/A

Contaminant [CAS No.]	Maximum Concentration (mg/kg)	Comparison Value (mg/kg)	Ratios
See list of detected SRCs in surface soil in Table 27 (Human Health Risks). None of the detected SRCs exceeded the comparison			
values in Appendix B of the 1997 RRSE Primer. No SRCs were idenfied as chemicals of potential concern in the human health			
risk assessment for any of the human receptors. Therefore, it was determined that no unacceptable risks due to MC-related			
contamination are present in the surface soil at the MRS (Section 9.2; CB&I, 2015).			
		Total from Table 27	0
		Sum the Ratios	0

CHF Scale	CHF Value	
CHF > 100	H (High)	CHF = $\sum$ ([Max Conc of Contaminant] / [Comparison Value for Contaminant])
100 > CHF >2	M (Medium)	
2 > CHF	L (Low)	

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

Migratory Pathway Factor

Directions: Annotate the value that corresponds most closely to the surface soil migratory pathway at the MRS.

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

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

Receptor Factor

Directions: Annotate the value that corresponds most closely to the surface soil receptors at the MRS.

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

RECEPTOR FACTOR	Directions: Record **the single highest value** from above in the box to the right (maximum value = H).	**L**
Place an "X" in the box to the right if there is no known or suspected Surface Soil MC Hazard		**X**

Table 27

HHE Module: Supplemental Contaminant Hazard Factor Table

Contaminant Hazard Factor (CHF)

Directions: **Only use this table if there are more than five contaminants present at the MRS.** This is a supplemental table designed to hold information about contaminants that do not fit in the previous tables. Indicate the **media** in which these contaminants are present. Then record all **contaminants**, their **maximum concentrations** and their **comparison values** (from Appendix B, Relative Risk Site Evaluation (RRSE) Primer, Summer 1997 - Revised) in the table below. Calculate and record the **ratio** for each contaminant by dividing the **maximum concentration** by the **comparison value**. Determine the **CHF** for each medium on the appropriate media-specific tables.

Note: For human exposures to groundwater and surface water, use dissolved, rather than total, metals analyses when both are available. Remember not to add ratios from different media.

Media	Contaminant [CAS No.]	Maximum Concentration	Units	Comparison Value	Units	Ratios
Surface soil	Nitroguanidine [556-88-7]	0.28	mg/kg	6,500.00	mg/kg	0
Surface soil	Antimony [7440-36-0]	1.80	mg/kg	31.00	mg/kg	0
Surface soil	Cadmium [7440-43-9]	0.65	mg/kg	38.00	mg/kg	0
Surface soil	Chromium [7440-47-3]	165.00	mg/kg	3,000.00	mg/kg	0
Surface soil	Copper [7440-50-8]	23.30	mg/kg	2,800.00	mg/kg	0
Surface soil	Lead [7439-92-1]	30.50	mg/kg	400.00	mg/kg	0
Surface soil	Mercury [7439-97-6]	0.06	mg/kg	23.00	mg/kg	0
Surface soil	Strontium [7440-24-6]	3.60	mg/kg	46,000.00	mg/kg	0
Surface soil	Bis(2-Ethylhexyl)phthalate [117-81-7]	0.82	mg/kg	3,200.00	mg/kg	0
Surface soil	Di-n-Butyl Phthalate [84-74-2]	0.11	mg/kg	6,500.00	mg/kg	0
Surface soil	Fluoranthene [206-44-0]	0.03	mg/kg	2,600.00	mg/kg	0
Surface soil			mg/kg		mg/kg	
Surface soil			mg/kg		mg/kg	
				SUBTOTAL FOR SURFACE SOIL		**0**
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
Sediment			mg/kg		mg/kg	
				SUBTOTAL FOR SEDIMENT		**0**
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
Surface water			µg/L		µg/L	
				SUBTOTAL FOR SURFACE WATER		**0**
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
Groundwater			µg/L		µg/L	
				SUBTOTAL FOR GROUNDWATER		**0**

Table 28

Determining the HHE Module Rating

DIRECTIONS:

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

Medium (Source)	Contaminant Hazard Factor Value	Migratory Pathway Factor Value	Receptor Factor Value	Three-Letter Combination (Hs-Ms-Ls)	Media Rating (A - G)
Table 21 - Groundwater					
Table 22 - Surface Water (Human Endpoint)					
Table 23 - Sediment (Human Endpoint)					
Table 24 - Surface Water (Ecological Endpoint)					
Table 25 - Sediment (Ecological Endpoint)					
Table 26 - Surface Soil	L	L	L	LLL	G
			HHE MODULE RATING		**No Known or Suspected MC Hazard**

DIRECTIONS (Continued):

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

HHE Ratings (for reference only)	
HHH	A
HHM	B
HHL	C
HMM	
HML	D
MMM	
HLL	E
MML	
MLL	F
LLL	G

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

Alternative Module Ratings	
	Evaluation Pending
	No Longer Required
	No Known or Suspected MC Hazard

Table 29

MRS Priority

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

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

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

Reference Table 10:		Reference Table 20:		Reference Table 28:	
EHE Module Rating	Priority	CHE Module Rating	Priority	HHE Module Rating	Priority
No Known or Suspected Explosive Hazard	No Known or Suspected Explosive Hazard	No Known or Suspected CWM Hazard	No Known or Suspected CWM Hazard	No Known or Suspected MC Hazard	No Known or Suspected MC Hazard

MRS or Alternative Priority	No Longer Required