

**Final
No Further Action Proposed Plan
for
RVAAP-032-R-01 40mm Firing Range Munitions Response Site**

**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®**

**U.S. Army Corps of Engineers
Baltimore District
2 Hopkins Plaza
Baltimore, Maryland 21201**

**Prepared by:
HydroGeoLogic, Inc. (HGL)
11107 Sunset Hills Road
Suite 400
Reston, Virginia 20190**

September 2018

This page was intentionally left blank.

REPORT DOCUMENTATION PAGE

*Form Approved
OMB No. 0704-0188*

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, to the Department of Defense, Executive Service Directorate (0704-0188). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ORGANIZATION.

1. REPORT DATE (DD-MM-YYYY) September 2018		2. REPORT TYPE Proposed Plan		3. DATES COVERED (From - To) August 2016 to December 2019	
4. TITLE AND SUBTITLE Final Proposed Plan for RVAAP-032-R-01 40mm Firing Range MRS				5a. CONTRACT NUMBER W912DR-15-D-0016, Delivery Order 0001	
				5b. GRANT NUMBER NA	
				5c. PROGRAM ELEMENT NUMBER NA	
6. AUTHOR(S) Kimberly Vaughn, PG, HydroGeoLogic, Inc. (HGL) Emily Justice, APTIM				5d. PROJECT NUMBER NA	
				5e. TASK NUMBER NA	
				5f. WORK UNIT NUMBER NA	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) HGL 11107 Sunset Hills Rd, Suite 400 Reston, VA 20190				8. PERFORMING ORGANIZATION REPORT NUMBER NA	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) U.S. Army Corps of Engineers, Baltimore District 2 Hopkins Plaza Baltimore, MD 21201				10. SPONSOR/MONITOR'S ACRONYM(S) USACE	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S) NA	
12. DISTRIBUTION/AVAILABILITY STATEMENT Reference distribution page					
13. SUPPLEMENTARY NOTES None					
14. ABSTRACT The U.S. Department of the Army (U.S. Army) is presenting this No Further Action (NFA) Proposed Plan to involve the public in the remedy selection process for the former Ravenna Army Ammunition Plant, RVAAP-032-R-01 40mm Firing Range Munitions Response Site (MRS), in Portage and Trumbull Counties, Ohio. This NFA Proposed Plan presents the U.S. Army's preliminary recommendations for addressing the RVAAP-032-R-01 40mm Firing Range MRS. Investigations have found no munitions and explosives of concern or concentrated areas of munitions debris, and no potential source of munitions constituents exists at the MRS. Therefore, there is no source material or impacted environmental media resulting from historical U.S. munitions-related activities at the MRS.					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 36	19a. NAME OF RESPONSIBLE PERSON Kimberly Vaughn
a. REPORT U	b. ABSTRACT U	c. THIS PAGE U			19b. TELEPHONE NUMBER (Include area code) 512-658-6828

Reset

This page was intentionally left blank.



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

October 16, 2018

Mr. David Connolly
Army National Guard Directorate
Environmental Programs Division
ARNG-ILE-CR
111 South George Mason Drive
Arlington, VA 22204

**Re: US Army Ravenna Ammunition Plt RVAAP
Remediation Response
Plans
Remedial Response
Portage County
267000859071**

Subject: Review and Concurrence of the "Final No Further Action Proposed Plan for RVAAP-032-R-01 40-mm Firing Range Munitions Response Site" Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio: Dated September 2018 (Work Activity No. 267000859071)

Dear Mr. Connolly:

The Ohio Environmental Protection Agency (Ohio EPA), Northeast District Office (NEDO), Division of Environmental Response and Revitalization (DERR) has received and reviewed the "Final No Further Action Proposed Plan for RVAAP-032-R-01 40-mm Firing Range Munitions Response Site" dated September 2018. This document received by Ohio EPA, NEDO on September 17, 2018, was prepared by HydroGeoLogic, Inc. Ohio EPA concurs with the selected remedy. Any additional investigations completed in the future will be completed under the Installation Restoration Program.

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

Sincerely,

A handwritten signature in blue ink, appearing to read "J. Sferra", is written over a faint, larger version of the signature.

James Sferra, Chief
Division of Environmental Response and Revitalization

JS/NCR/nvp

ec: Nat Peters, USACE
Katie Tait/Kevin Sedlak, OHARNG RTLS
Craig Coombs, USACE
Rebecca Shreffler, Chenega
David Connolly, ARNG
Mark Johnson Ohio EPA, NEDO, DERR
Bob Princic, Ohio EPA, NEDO, DERR
Tom Schneider, Ohio EPA, SWDO, DERR
Nicholas Roope, Ohio EPA, NEDO, DERR

RECEIVED
16 OCT 2018

This page was intentionally left blank.

CONTRACTOR'S STATEMENT OF INDEPENDENT TECHNICAL REVIEW

HydroGeoLogic, Inc., has completed the *Final No Further Action Proposed Plan for RVAAP-032-R-01 40mm Firing Range Munitions Response Site*, at the Ravenna Army Ammunition Plant in Portage and Trumbull Counties, Ohio. 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 United States Army Corps of Engineers policy.

Prepared/Approved by:



Date: September 17, 2018

Emily Justice
Project Manager
APTIM Federal Services

Reviewed/Approved
by:



Date: September 17, 2018

Kimberly Vaughn
Project Manager
HydroGeoLogic, Inc.

This page was intentionally left blank.

DOCUMENT DISTRIBUTION

Final No Further Action Proposed Plan for RVAAP-032-R-01 40mm Firing Range MRS

Name/Organization	Number of Printed Copies	Number of Electronic Copies
Kevin Sedlak, ARNG Restoration Project Manager, ARNG – IED	0	1
Katie Tait, Environmental Specialist, OHARNG	1	0
Craig Coombs, USACE Louisville District Project Manager	0	1
Travis McCoun, USACE Baltimore District COR	0	1
Nicholas Roope, Site Coordinator, Ohio Environmental Protection Agency	1	1
Mark Johnson, Project Manager, Ohio Environmental Protection Agency	0	Email/Transmittal Letter
Tom Schneider, Ohio Environmental Protection Agency, Federal Facilities	0	Email/Transmittal Letter
Gail Harris, RVAAP Administrative Records Manager	2	2

ARNG – Army National Guard

COR – Contracting Officer’s Representative

IED – Installation and Environmental Division

OHARNG – Ohio Army National Guard

USACE – United States Army Corps of Engineers

This page was intentionally left blank.

TABLE OF CONTENTS

SF-298 FORM

OHIO EPA CONCURRENCE LETTER

**CONTRACTOR'S STATEMENT OF
INDEPENDENT TECHNICAL REVIEW**

DOCUMENT DISTRIBUTION

1.0 INTRODUCTION.....	1
2.0 FACILITY AND MRS BACKGROUNDS 1	
2.1 Facility History.....	1
2.2 MRS Background and History	3
2.3 MRS Historical Investigations	3
2.3.1 Historical Records Review.....	3
2.3.2 Site Inspection Summary	3
2.4 Remedial Investigation Results	4
2.5 Remedial Action Objective	5
3.0 EVALUATION OF THE NO FURTHER ACTION ALTERNATIVE	5
3.1 Detailed Analysis of NFA Alternative	5
3.2 Overall Evaluation.....	6
4.0 SCOPE AND ROLE OF RESPONSE ACTION.....	6
5.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS	7
6.0 PREFERRED ALTERNATIVE	7
7.0 COMMUNITY PARTICIPATION	7
7.1 Public Comment Period	7
7.2 Public Meeting	7
7.3 Written Comments	7
7.4 Army Review of Public Comments.....	8
GLOSSARY OF TERMS	9
REFERENCES.....	13

LIST OF FIGURES

Figure 1 Location Map.....	17
Figure 2 MRS Location Map	19
Figure 3 2007 Site Inspection Results.....	21
Figure 4 2011 Remedial Investigation Results....	23

ACRONYMS AND ABBREVIATIONS

ARAR	applicable relevant and appropriate requirements	NCP	<i>National Oil and Hazardous Substances Pollution Contingency Plan</i>
Army	U.S. Department of the Army		
CB&I	CB&I Federal Services LLC	NFA	No Further Action
Camp Ravenna	Camp Ravenna Joint Military Training Center	OHARNG	Ohio Army National Guard
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>	Ohio EPA	Ohio Environmental Protection Agency
		RDX	Research Department Explosives
DMM	discarded military munitions	RI	Remedial Investigation
DoD	U.S. Department of Defense	ROD	Record of Decision
e ² M	engineering-environmental Management, Inc.	RVAAP	Ravenna Army Ammunition Plant
Final FS	<i>Final Feasibility Study for RVAAP-032-R-01 40mm Firing Range Munitions Response Site, Version 1.0</i>	SI	Site Inspection
Final RI Report	<i>Final Remedial Investigation Report for RVAAP-032-R-01 40mm Firing Range Munitions Response Site</i>	TNT	2,4,6-Trinitrotoluene
FS	Feasibility Study	U.S.	United States
HE	high explosives	USP&FO	U.S. Property and Fiscal Officer for Ohio
HGL	HydroGeoLogic, Inc.	UXO	unexploded ordnance
HRR	Historical Records Review		
ISM	Incremental Sampling Methodology		
LUC	land use control		
MC	munitions constituents		
MD	munitions debris		
MEC	munitions and explosives of concern		
MMRP	Military Munitions Response Program		
MRS	Munitions Response Site		
MRSP	Munitions Response Site Prioritization Protocol		

1.0 INTRODUCTION

The United States (U.S.) Department of the Army (Army) is presenting this No Further Action (NFA) **Proposed Plan** to involve the public in the **remedy selection process** for the RVAAP-032-R-01 40mm Firing Range **Munitions Response Site (MRS)**. The former Ravenna Army Ammunition Plant (RVAAP) is located in Portage and Trumbull Counties, Ohio, as shown on **Figure 1**. The location of the 40mm Firing Range MRS in relation to the former RVAAP is shown on **Figure 2**.

The Army, in consultation with the Ohio Environmental Protection Agency (Ohio EPA), is the lead agency for investigating, reporting, making **remedial decisions**, and taking **remedial actions** at the former RVAAP. This NFA Proposed Plan presents the Army's preliminary recommendations for addressing the 40mm Firing Range MRS. Investigations indicate that no **U.S. Department of Defense (DoD) military munitions** were confirmed as **munitions and explosives of concern (MEC)** or risks associated with **munitions constituents (MC)**-related contamination exist.

The Army is issuing this NFA Proposed Plan to address its public participation responsibilities under Section 117(a) of the **Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)**, as amended by the Superfund Amendments and Reauthorization Act of 1986 and Section 300.430(f)(2) of the **National Oil and Hazardous Substances Pollution Contingency Plan (NCP)** (40 Code of Federal Regulations 300). Implementation of the selected remedy at the MRS will comply with the requirements of the *Director's Final Findings and Orders for RVAAP* (Ohio EPA, 2004).

This NFA Proposed Plan summarizes information contained in the *Final Remedial Investigation Report for RVAAP-032-R-01 40mm Firing Range Munitions Response Site, Version 1.0* (Final **Remedial Investigation [RI]** Report; CB&I Federal Services LLC [CB&I], 2015) and the *Final Feasibility Study for RVAAP-032-R-01 40mm Firing Range*

Munitions Response Site, Version 1.0 (Final **Feasibility Study [FS]**) (HydroGeoLogic, Inc. [HGL], 2018). The Army encourages the public to review these documents to better understand the history of the MRS, activities that have been conducted there, and determinations that have been made for the MRS under the **Military Munitions Response Program (MMRP)**.

The Army, in consultation with the Ohio EPA, will review and consider all comments on this NFA Proposed Plan received during the 30-day public comment period. The public is encouraged to review and comment on all recommendations presented in this NFA Proposed Plan.

2.0 FACILITY AND MRS BACKGROUNDS

This section summarizes the history of the former RVAAP and the 40mm Firing Range MRS.

2.1 Facility History

The former RVAAP (Federal Facility ID No. OH213820736), now known as the Camp Ravenna Joint Military Training Center (Camp Ravenna), is located in northeastern Ohio within Portage and Trumbull Counties and is approximately 3 miles east-northeast of the city of Ravenna. The federally owned facility, approximately 11 miles long and 3.5 miles wide, is bounded by a Norfolk Southern railroad line to the north; State Route 5, the Michael J. Kirwan Reservoir, and a CSX railroad line to the south; State Route 534 to the east; and Garret, McCormick, and Berry Roads to the west. 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 for Ohio (USP&FO) and subsequently licensed to the Ohio Army National Guard (OHARNG) for use as a training site, Camp Ravenna. The restoration program for the facility involves the remediation of areas affected by past activities of the former RVAAP.

Public Comment Period:

October 25 to December 1, 2018

Public Meeting:

The Army will hold an open house/public meeting to explain the NFA Proposed Plan. Oral and written comments on the document will be accepted at the meeting. The open house/public meeting is scheduled for 6:00 p.m. on November 1, 2018, at the Shearer Community Center (Paris Township Hall) at 9355 Newton Falls Road, Ravenna, Ohio 44266.

Information Repositories:

Information used in selecting the **Preferred Alternative** is available online at www.rvaap.org and at the following locations:

Reed Memorial Library

167 East Main Street
Ravenna, Ohio 44266
(330) 296-2827

Hours of Operation:

9 a.m.–9 p.m., Monday–Thursday
9 a.m.–6 p.m., Friday
9 a.m.–5 p.m., Saturday
1 p.m.–5 p.m., Sunday

Newton Falls Public Library

204 South Canal Street
Newton Falls, Ohio 44444
(330) 872-1282

Hours of Operation:

9 a.m.–8 p.m., Monday–Thursday
9 a.m.–5 p.m., Friday and Saturday

The **Administrative Record** File, which includes the information used to select the Preferred Alternative, is available for review at the following location:

Camp Ravenna Joint Military Training Center (Camp Ravenna)

Environmental Office
1438 State Route 534
Newton Falls, Ohio 44444
(614) 336-6136

Note: Access to Camp Ravenna is restricted, but an appointment to review the Administrative Record File can be scheduled.

The former RVAAP was constructed in 1940 and 1941 for assembly/loading and **depot storage** of ammunition. While serving as an ammunition plant, the former RVAAP was a U.S. Government-owned and contractor-operated industrial facility. The ammunition plant consisted of 12 munitions assembly facilities, referred to as “load lines.” Load Lines 1 through 4 were used to melt and load 2,4,6-Trinitrotoluene (TNT) and Composition B (a mixture of TNT and Research Department Explosive (RDX)) into **large-caliber shells** and bombs. Operations on the load lines produced explosive dust, spills, and vapors that collected on the floors and walls of each building. Periodically, the floors and walls were cleaned with water and steam. After cleaning, the “pink water” wastewater, which contained TNT and Composition B was collected in concrete holding tanks, filtered, and pumped into unlined ditches for transport to **earthen settling ponds**. Load Lines 5 through 11 manufactured **fuzes, primers, and boosters**. From 1946 to 1949, Load Line 12 produced ammonium nitrate for explosives and fertilizers; subsequently it was used as a **weapons demilitarization facility**.

In 1950, the facility was placed in standby status, and operations were limited to **renovation, demilitarization**, and normal maintenance of equipment, along with storage of munitions. **Production** activities were resumed from July 1954 to October 1957 and again from May 1968 to August 1972. Demilitarization and production activities were conducted at Load Lines 1, 2, 3, and 12. Demilitarization activities included disassembling munitions and melting out and recovering explosives using hot water and steam processes. These activities continued through 1992.

In addition to production and demilitarization activities at the load lines, other facilities at the former RVAAP included areas used for the burning, demolition, and testing of munitions. These burning and demolition grounds consisted of large, open areas and abandoned

quarries. Other areas of concern at the former RVAAP include landfills, an aircraft fuel tank testing area, and various industrial support and maintenance facilities (CB&I, 2015).

2.2 MRS Background and History

The 40mm Firing Range MRS is an 8.55-acre parcel located in the southern-central portion of Camp Ravenna within Portage County. The MRS is the location of a former 40mm **firing range** that operated between 1969 and 1971. The area of the MRS consists of the 5.17 acres former firing range itself and the overshoot area that includes the furthest location that a 40mm grenade used at the former range could have travelled from the firing point. Munitions reportedly fired at the former firing range included the M407A1-series 40mm **practice grenades** and the M406-series **high explosive (HE)** 40mm grenade. The 40mm practice grenades contained yellow marker dye, M9-series **propellant**, and RDX booster pellets (Army, 1977). The M406-series HE 40mm grenades contained Composition B explosive (engineering-environmental Management, Inc. [e²M], 2007). According to the *Final Installation Assessment of RVAAP Report No. 132* (U.S. Army Toxic and Hazardous Materials Agency, 1978), each of the approximately 2,500 rounds fired on this range was accounted for.

The furthest possible target distance for the 40mm grenades reported to have been fired at the MRS is 350 meters from the firing point (Army, 2003). The target impact area was well-defined with a **berm** that has since been removed. The firing point was situated at the eastern portion of the former range. Remnants of the firing point location still remain and include a wooden structure believed to be the former storage shed, gun mount foundation, and chronograph foundation (CB&I, 2015).

2.3 MRS Historical Investigations

The following investigations and reports have been completed for the 40mm Firing Range MRS under the MMRP:

- *Final Military Munitions Response Program Historical Records Review (HRR), Ravenna Army Ammunition Plant, Ohio* (HRR; e²M, 2007)
- *Final Site Inspection Report, Ravenna Army Ammunition Plant, Ohio* (Final Site Inspection [SI] Report; e²M, 2008)
- Final RI Report (CB&I, 2015)
- Final FS (HGL, 2018)

2.3.1 Historical Records Review

The HRR described the 40mm Firing Range as an approximate 5.17-acre area surrounded by forest. A wooden structure believed to be the former storage shed, gun mount foundation, and chronograph foundation located at the firing point were the only remnants of range, as the impact area berm had been removed. The HRR reported that facility personnel identified **unexploded ordnance (UXO)** beyond the impact point, on the slope that leads down to the Fuze and Booster Quarry MRS. However, the HRR did not identify the type or disposition of the UXO reported by the facility personnel (e²M, 2007).

2.3.2 Site Inspection Summary

In 2007, the Army completed an MMRP SI at Camp Ravenna that included the 40mm Firing Range MRS. At the time of the SI, the size of the 40mm Firing Range MRS was approximately 5.17 acres that included an open field surrounded by forest. As part of the SI activities, a meandering path magnetometer and metal detector assisted surveys for DoD military munitions were completed at the down-range target impact area, overshoot area, and firing point portions at the MRS

No DoD military munitions that were confirmed as MEC were observed at the firing point or in the area between the firing point and impact area; however, multiple DoD military munitions that were confirmed by UXO-qualified personnel as munitions debris (MD) were found on the ground surface at the suspected impact area and 100 feet beyond.

The MD consisted of aluminum 40mm grenade nose caps and casings.

No samples for MC-related contamination were planned for the SI field activities since chemical contamination at the MRS was still being addressed under the Installation Restoration Program at the time of the SI work plan development. However, by the time the SI Report was completed, the responsibility for investigation for MC-related contamination at the MRS was to be addressed under the MMRP going forward.

The impact and overshoot areas where the MD was found encompassed 1.27 acres and became the revised MRS following the SI (e²M, 2008). **Figure 3** presents the impact and overshoot area at the MRS and the results of the SI field work.

2.4 Remedial Investigation Results

During planning for the RI field work, the previous findings of MD were evaluated and it was determined that the area between the firing point and the furthest possible target distance for the 40mm grenades reported to have been fired at the former 40mm Firing Range (350 meters from the firing point) required further investigation for DoD military munitions. The revised RI area was determined to be 8.55 acres that was inclusive of the 1.27-acre MRS identified during the SI. The combined area was referred to as the “Investigation Area” in the Final RI Report (CB&I, 2015). Numerous DoD military munitions were encountered on the ground surface and in subsurface soils. The items were evaluated by UXO-qualified personnel, determined to be safe, and considered MD. The MD were associated with the 40mm practice grenades that are known to have been discharged at the former firing range. No DoD military munitions confirmed to be MEC were identified at the 40mm Firing Range MRS during the RI field activities.

Sampling for MC-related contamination was conducted during the RI at predetermined locations at the former impact area and 100 feet beyond as well as the location of the former

firing point. In all, a total of three surface soil samples, not including quality control samples, were collected during the RI using the **Incremental Sampling Methodology (ISM)**. Two ISM surface soil samples, each comprising 0.63 acres, were collected at the impact area and 100 feet beyond. A third ISM sample was collected at the 0.05-acre firing point at the east end of the former firing range. All three ISM samples were collected at depths between 0 and 0.5 feet. The soil sample locations were based on locations where the MD was identified and where MC-related contamination associated with historical activities were expected. The MC-related contamination sampling locations are presented in **Figure 4**.

The analytes detected during the RI sampling event consisted of **nitroguanidine** at the firing point and **aluminum** and **lead** at the former down range impact area. Nitroguanidine was detected at a very low concentration and is not an MC-related contaminant associated with the 40mm practice rounds fired at the former test range. Therefore, nitroguanidine was removed from further consideration as an MC-related contaminant at the MRS. The concentrations for both aluminum and lead were all detected below the Camp Ravenna **background screening values** and were not retained as MC-related contamination. Because no detected analytes were identified as MC-related contamination during the RI field activities, a **Human Health Risk Assessment** and **Ecological Risk Assessment** were not required for inclusion in the Final RI Report.

The 8.55-acre Investigation Area where the MD was found became the MRS following the RI (CB&I, 2015). **Figure 4** depicts the current MRS boundaries, the site features associated with the historical activities that occurred at the MRS, and the locations where MD were found during the RI field work.

To date, no DoD military munitions confirmed to be MEC have been found at the 40mm Firing Range MRS. The RI fieldwork confirmed the results of previous investigations at the MRS;

therefore, an explosive hazard is not expected to be present at the MRS. As a result, no MEC hazard assessment was required. The results of the RI did not indicate the presence of MC-related contamination at the MRS. The MRS was assigned a **Munitions Response Site Prioritization Protocol** (MRSP) priority of 5 (CB&I, 2015).

2.5 Remedial Action Objective

As established in the RI, there are no identifiable hazards from MEC in soil and the MC in soil poses no risk to human or ecological receptors. Therefore, no remedial action objectives were developed for the MRS.

3.0 EVALUATION OF THE NO FURTHER ACTION ALTERNATIVE

Based on further evaluation of the RI results, the Army concluded the 40mm Firing Range MRS be recommended for NFA. The Army also determined that, because the RI recommended conducting a FS, the FS should be conducted to provide the necessary rationale to support and document the NFA determination. An FS (HGL, 2018) was prepared by the Army to perform a detailed analysis of the NFA alternative for the MRS. The purpose of this detailed analysis was to support NFA at the MRS.

3.1 Detailed Analysis of NFA Alternative

The detailed analysis presented in the Final FS (HGL, 2018) consisted of evaluating the NFA alternative using the nine criteria listed in the NCP. The NCP states that the first two criteria, protection of human health and the environment and compliance with **applicable or relevant and appropriate requirements** (ARARs), are “threshold criteria” that 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” that are evaluated following the comment periods on the Final FS (HGL, 2018) and the Proposed Plan.

Threshold Criteria

Overall Protection of Human Health and the Environment—A determination and declaration that this threshold criterion will be met by the selected remedy must be made in the **Record of Decision** (ROD). 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.

Balancing Criteria

Long-Term Effectiveness and Permanence—The long-term level of risk associated with DoD military munitions and MC-related contamination after implementation of the remedial alternative is evaluated by this criterion. No explosive hazards or unacceptable risks associated with MC-related contamination are present at this MRS; therefore, the No Action alternative will be effective in the long-term and no residual hazards or risks 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, into 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. No services or equipment are necessary to implement the No Action alternative. 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.

Modifying Criteria

State Acceptance—The Ohio EPA has indicated they support NFA as the Preferred Alternative recommended in this Proposed Plan; however, final approval may be reserved until public comments are satisfactorily addressed in the ROD.

Community Acceptance — Community acceptance of the Preferred Alternative will be evaluated after the public comment period ends and will be described in the ROD for the MRS.

3.2 Overall Evaluation

The NFA alternative is technically and administratively implementable and there are no costs. The No Action alternative is protective of human health and the environment because no explosive hazard or unacceptable risk due to MC-related contamination is present at the MRS.

The MRSPP tables were updated in the FS in accordance with the MRSPP Primer. The revised MRSPP priority in the Final FS (HGL, 2018) is “No Longer Required”.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

The results of the RI fieldwork and evaluation in the Final FS (HGL, 2018) for the 40mm Firing Range MRS support the selection of NFA as the Preferred Alternative for the MRS. The remedy must be protective of the receptors associated with the future land use. The future land use at the 40mm Firing Range 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 likely **human receptor** for the future land is the Industrial Receptor. The NFA determination is protective of other potential future human receptors (such as residential receptors). Though there are no current plans for the MRS to change from an industrial land use to a residential land use, there are no unacceptable risks to a potential future residential receptor from explosive hazards. **Environmental receptors** for the future land use include terrestrial invertebrates

(earthworms), voles, shrews, robins, foxes, and hawks (CB&I, 2015).

No DoD military munitions confirmed to be MEC were encountered at the 40mm Firing Range MRS. The results of the RI did not indicate the presence of MC-related contamination at the MRS. Therefore, no explosive safety hazards or risks associated with MC-related contamination exist for the receptors that may be present on the MRS. No other investigations are ongoing at the MRS under the MMRP.

5.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS

Under the MMRP, a recommendation of NFA must be protective of the human and environmental receptors at the MRS. The likely human receptors identified for future land use at the 40mm Firing Range MRS is the Industrial Receptor. The likely environmental receptors include terrestrial invertebrates (earthworms), voles, shrews, robins, foxes, hawks (CB&I 2015).

No DoD military munitions confirmed to be MEC are present on the MRS. Therefore, no explosive safety hazard or risks associated with MC-related contamination exist at the MRS.

6.0 PREFERRED ALTERNATIVE

The results of the RI fieldwork and the evaluation conducted in the FS for the 40mm Firing Range MRS support the determination that there are no hazards associated with exposure to DoD military munitions and MC-related contamination to human or environmental receptors exist at the 40mm Firing Range MRS. The Army, in consultation with the Ohio EPA, is recommending NFA as the Preferred Alternative under the MMRP for the MRS.

As no risks have been identified at the MRS, the overall recommendation of NFA under the MMRP is protective of receptors that may be present at the MRS. This recommendation is not a final decision. The Army, in consultation with the Ohio EPA, will select the alternative

for the MRS after reviewing and considering all comments submitted during the 30-day public comment period.

7.0 COMMUNITY PARTICIPATION

Public participation is an important component of the remedy selection process. The Army, in coordination with the Ohio EPA, is soliciting input from the community on the Preferred Alternative. The comment period extends from October 25 to December 1, 2018. This period includes a public meeting at which the Army will present this NFA Proposed Plan. The Army will accept oral and written comments on the NFA Proposed Plan at this meeting.

7.1 Public Comment Period

The minimum 30-day comment period extends from October 25 to December 1, 2018, and provides an opportunity for public involvement in the decision-making process for the proposed action. The public is encouraged to review and comment on this NFA Proposed Plan. The Army and Ohio EPA will consider all public comments before selecting a remedy. During the comment period, the public is also encouraged to review documents pertinent to the 40mm Firing Range MRS. This information is available at the Information Repositories and online at www.rvaap.org. To obtain further information, contact the Camp Ravenna Environmental Office.

7.2 Public Meeting

The Army will hold an open house and public meeting on this NFA Proposed Plan on November 1, 2018, at Shearer Community Center (Paris Township Hall) at 9355 Newton Falls Road, Ravenna, Ohio 44266. This meeting will provide an opportunity for the public to comment on the proposed remedy. Comments made at the meeting will be transcribed.

7.3 Written Comments

If the public would like to provide comments, questions, or suggestions on this NFA Proposed Plan or other relevant issues in writing, they should be delivered to the Army at the public

meeting or mailed (postmarked no later than December 1, 2018). The public can also submit comments, questions, or suggestions via email before the end of the comment period to the Camp Ravenna Environmental Office using the following email address:
kathryn.s.tait.nfg@mail.mil.

**POINT OF CONTACT FOR
WRITTEN COMMENTS**

Ms. Kathryn Tait
Camp Ravenna Environmental Office
1438 State Route 534 SW
Newton Falls, Ohio 44444

7.4 Army Review of Public Comments

The Army will review the public's comments before selecting the most appropriate action for the MRS. A **Responsiveness Summary**, a document that summarizes the Army's responses to comments received during the public comment period, will be included in the ROD. The Army's final choice of action will be documented in the ROD. The ROD will be added to the RVAAP Administrative Record and Information Repositories.

GLOSSARY OF TERMS

Administrative Control: Direction or exercise of authority over subordinate or other organizations in respect to administration and support, including organization of Service forces, control of resources and equipment, personnel management, unit logistics, individual and unit training, readiness, mobilization, demobilization, discipline, and other matters not included in the operational missions of the subordinate or other organizations.

Administrative Record: This is a collection of documents, typically reports and correspondence, generated during site investigation and remedial activities. Information in the Administrative Record is used to select the Preferred Alternative. It is available for public review at the Ravenna Army Ammunition Plant, Building 1037; call (330) 358-7311 for an appointment.

Aluminum: Aluminum and its compounds occur naturally and comprise about 8% of the Earth's surface. Natural processes account for most of the redistribution of aluminum in the environment. Acidic precipitation mobilizes aluminum from natural sources, and direct anthropogenic (i.e., human made) releases of aluminum compounds associated with industrial processes occur mainly to air. Certain uses lead to the presence of aluminum in drinking water and foodstuffs.

Applicable or Relevant and Appropriate Requirements (ARARs): The federal and state requirements that a selected alternative will attain. These requirements may vary among sites and alternatives

Background Screening Values: Concentrations established at Camp Ravenna for inorganic elements (i.e., metals) that are either naturally occurring or anthropogenic (i.e., human made). Although detected results may be above remediation goals, cleanup does not typically occur if the detected results are below the established background screening values.

Berm: An earthen backstop constructed to stop or redirect bullets fired on a range.

Booster: A sensitive explosive charge that acts as a bridge between a (relatively weak)

conventional detonator and a low-sensitivity (but typically high-energy) explosive such as 2,4,6-Trinitrotoluene. By itself, the initiating detonator would not deliver sufficient energy to set off the low-sensitivity charge. However, it detonates the primary charge (the booster), which then delivers an explosive shockwave sufficient to detonate the secondary, main, high-energy charge.

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA): This federal law was passed in 1980 and is commonly referred to as the Superfund Program. It provides for liability, compensation, cleanup, and emergency response in connection with the cleanup of inactive hazardous waste release sites that endanger public health or the environment.

Demilitarization: The reduction of one or more types of weapons or weapons systems.

Depot Storage: A designated location for the storage of military supplies.

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.

Department of Defense (DoD) Military Munitions: A munition or explosive deposited by DoD activities that may pose an explosive safety risk because it either did not function as designed, was discharged and/or abandoned, or is an explosive constituent. The term includes UXO, DMM, and MC.

Earthen Settling Pond: An earthen structure that uses sedimentation to remove settleable matter and turbidity from wastewater.

Ecological Risk Assessment: The process for evaluating how likely it is that the environment may be impacted as a result of exposure to one or more environmental

GLOSSARY OF TERMS

stressors such as chemicals, land change, disease, invasive species and climate change.

Environmental Receptor: Living organisms other than humans, the habitat which supports such organisms, or natural resources which could be adversely affected by environmental contamination at a site.

Explosive Hazard: Any hazard containing an explosive component. Explosive hazards include UXO (including land mines), booby traps, improvised explosive devices, and bulk explosives.

Feasibility Study (FS): A study undertaken by the lead agency to develop and evaluate options for remedial action. The RI data are used to define the objectives of the response action, to develop remedial action alternatives, and to undertake an initial screening and detailed analysis of the alternatives. The term also refers to a report that describes the results of the study.

Fuze: A device that detonates a munition's explosive material under specified conditions. In addition, a fuze has safety and arming mechanisms that protect users from premature or accidental detonation.

High Explosives (HE): An explosive, such as TNT, that combusts nearly instantaneously, thereby producing a violent, shattering effect.

Human Health Risk Assessment: The process used to estimate the nature and probability of adverse health effects in humans who may be exposed to hazards in contaminated environmental media, now or in the future.

Human Receptor: Any human individual or population that is presently or will potentially be exposed to, and adversely affected by, the release or migration of contaminants or exposure to potentially explosive hazards.

Incremental Sampling Methodology (ISM): A sample collection and processing approach having specific elements designed to control data that is variable due to non-continuous distribution of contaminants in environmental media. ISM samples consist of collecting a sufficient number of discrete "increments" (typically 30 to 100) in an unbiased manner

throughout a specified area, combining and variously processing the increments into a single larger sample, and incrementally separating out smaller samples (i.e., sub-samples) from the processed larger sample to obtain a representative aliquot (i.e., smaller sized sample) for analysis. Properly executed, the method provides unbiased, representative and reproducible estimates of the mean concentration of analytes for that sample area.

Information Repository: A collection of documents relating to a facility with investigations and response actions under CERCLA and/or a site's permitting activity or corrective action. It includes documents and information about site activities as well as general information about environmental regulations and CERCLA. The purpose of an Information Repository is to (1) ensure open and convenient public access to site-related documents and (2) better inform the public of the restoration process.

Land Use Controls (LUCs): Used in CERCLA remedies to prevent or control exposures of potential receptors to contamination remaining in place at the site and to assure continued effectiveness of the response action. LUCs include access controls and monitoring.

Large-Caliber Shell: A projectile or shell is a missile fired from the muzzle of a gun or cannon. Projectiles above 7 inches in caliber are considered large-caliber.

Lead: Lead is ubiquitous in the environment, and human exposure arises from both natural and anthropogenic activities. Exposure from lead at high enough concentrations to receptors is typically through ingestion or inhalation.

Military Munitions Response Program (MMRP): A U.S. Department of Defense program consisting of actions necessary to ensure protection of human health, welfare, and the environment from the hazards associated with MEC and MC at locations impacted by historical military activities.

GLOSSARY OF TERMS

Mobility: The ability to move or to be moved freely and easily.

Munitions Constituents (MC): Any material originating from UXO, DMM, or other military munitions, including explosive and nonexplosive materials, and emission, degradation, or breakdown elements of such ordnance or munitions.

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

Munitions and Explosives of Concern (MEC): A munitions or explosive that may pose an explosive safety risk because it either did not function as designed, was discharged and/or abandoned, or is an explosive constituent. MEC includes UXO, DMM, and explosive constituents of munitions present in high enough concentrations to pose an explosive hazard.

Munitions Response Site (MRS): Any area on a defense site that is known or suspected to contain MEC or MC.

Munitions Response Site Prioritization Protocol (MRSP): The methodology developed by the Army for prioritizing MRSs for response actions under the MMRP.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): The National Oil and Hazardous Substances Pollution Contingency Plan. These CERCLA regulations provide the federal government the authority to respond to the problems of abandoned or uncontrolled hazardous waste disposal sites as well as to certain incidents involving hazardous wastes (e.g., spills).

Nitroguanidine: An organic compound that is colorless and is in crystalline solid form. It is not flammable and is a low-sensitivity explosive; however, its detonation velocity is high. It is used as a propellant, fertilizer, and for other purposes.

Practice Grenade: A low-velocity 40mm grenade that was used to train soldiers to fire the M406-series low-velocity HE round. The M407A1-series practice grenades contained

yellow marker dye, M9-series propellant, and RDX booster pellets. Upon impact, the windshield was either broken or became detached from the pusher, releasing the signal dye (usually a yellowish-orange powder) marking the impact.

Preferred Alternative: The best remedial response presented in the FS that meets the Remedial Action Objectives as identified in coordination by the Army and the Ohio EPA. The determination to make this alternative “final” is made after reviewing and considering all comments submitted during the 30-day public comment period.

Primer: A primer, also known as a blasting cap, is a small, sensitive, primary explosive device generally used to detonate a larger, more powerful and less-sensitive secondary explosive such as TNT, dynamite, or plastic explosive. Primers come in a variety of types, including nonelectric caps, electric caps, and fuse caps.

Production: The action of making or manufacturing from components or raw materials.

Propellant: Something that causes munitions to move or be driven forward or outward.

Proposed Plan: This CERCLA document provides the public with information necessary to participate in the selection of an alternative. It is designed to solicit public comment on a Preferred Alternative before a ROD is established.

Receptor: See environmental receptor and human receptor.

Remedial Action: The actual construction or implementation phase of a CERCLA site cleanup that follows Remedial Design.

Record of Decision: A legal record signed by the Army and Ohio EPA. It describes the cleanup action or alternative selected for a site, the basis for selecting that alternative, public comments, responses to comments, and the estimated cost of the alternative.

Remedial Decision: A formal, written communication from the regulating authority that approves a site investigation, identifies

GLOSSARY OF TERMS

the Preferred Alternative, and approves the remedial action, if any, at a site.

Remedial Investigation (RI): A CERCLA investigation that involves sampling environmental media, such as air, soil, and water, to determine the nature and extent of contamination and to calculate human health and environmental risks that result from the contamination.

Renovation: The process of improving a broken, damaged, or outdated structure or piece of equipment.

Responsiveness Summary: A section of the ROD where the Army documents and responds to written and oral comments received from the public about the Proposed Plan.

Site Inspection (SI): Part of the CERCLA evaluation process that is conducted following a Preliminary Assessment to further evaluate the extent to which a site presents a threat to human health or the environment.

Toxicity: The degree to which a substance can damage an organism

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

Volume: The amount of space that a substance or object occupies

Weapons Demilitarization Facility: A facility or installation involved in the reduction of a nation's army, weapons, weapons systems, or military vehicles to an agreed upon minimum.

REFERENCES

CB&I Federal Services LLC (CB&I), 2015. *Final Remedial Investigation Report for RVAAP-032-R-01 40mm Firing Range MRS*, Version 1.0, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio, April.

engineering-environmental Management, Inc. (e²M), 2007. *Final Military Munitions Response Program Historical Records Review*, Ravenna Army Ammunition Plant, Ohio, January.

e²M, 2008. *Final Site Inspection Report*, Ravenna Army Ammunition Plant, Ohio, Military Munitions Response Sites, Ravenna Army Ammunition Plant, Ohio, May.

HydroGeoLogic, Inc. (HGL), 2018. *Final Feasibility Study for RVAAP-032-R-01 40mm Firing Range MRS*, Version 1.0, Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio, January.

Ohio Environmental Protection Agency (Ohio EPA), 2004. *Director's Final Findings and Orders*, June 10.

U.S. Department of the Army, 1977. *Army Ammunition Data Sheets, Artillery Ammunition Guns, Howitzers, Mortars, Recoilless Rifles, Grenade Launchers, and Artillery Fuzes*, Technical Manual (TM) 43-0001-28, April.

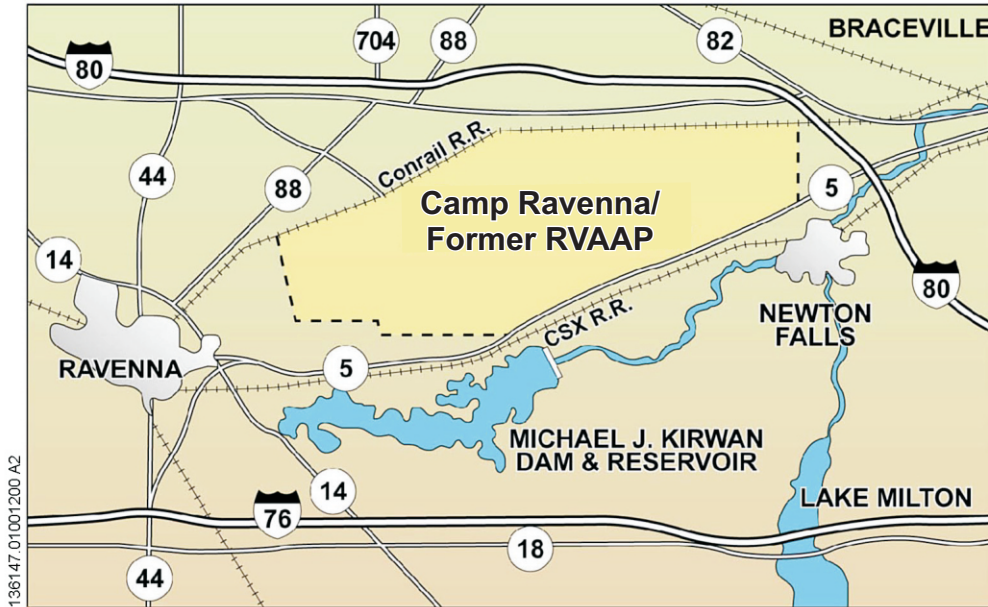
U.S. Department of the Army, 2003. *40mm Grenade Launcher, M203, Field Manual 3-22.31*, Washington, D.C., February 13.

U.S. Army Toxic and Hazard Materials Agency, 1978. *Final Installation Assessment of RVAAP Report No. 132*.

This page was intentionally left blank.

FIGURES

This page intentionally left blank.



136147_01001200_A2



\\Gst-srv-01\HGL\GIS\Ravenna_AAP\AtlasScrapYard
 \PP\01\Location_Map.cdr
 4/10/2017 JAR
 Source: CB&I

Legend

 Camp Ravenna/Former RVAAP




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



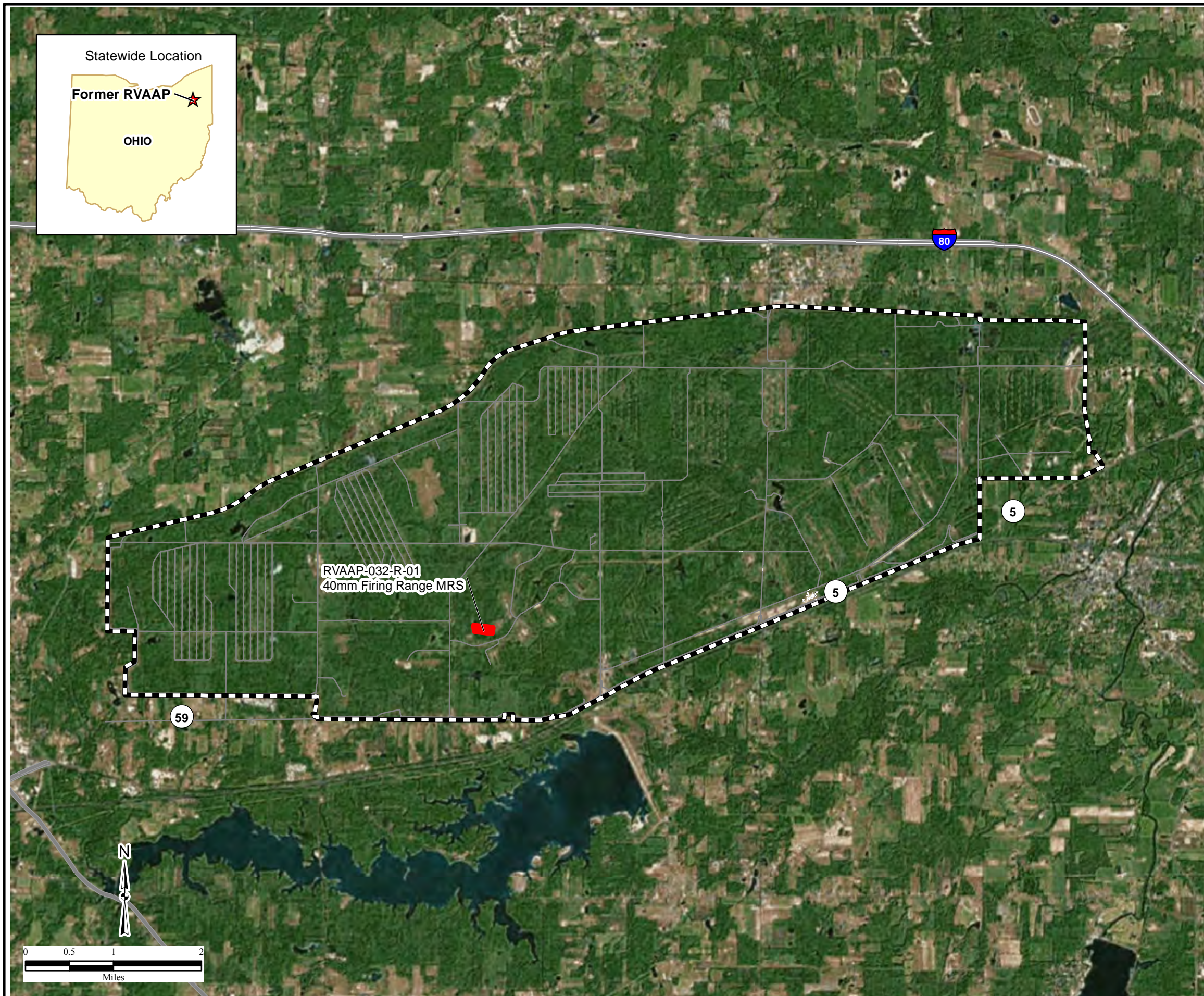
This page intentionally left blank.

Figure 2
MRS Location Map
40mm Firing Range MRS
Camp Ravenna/Former RVAAP
Portage/Trumbull Counties, Ohio

Legend

-  40mm Firing Range MRS Boundary
-  Facility Boundary
-  Road

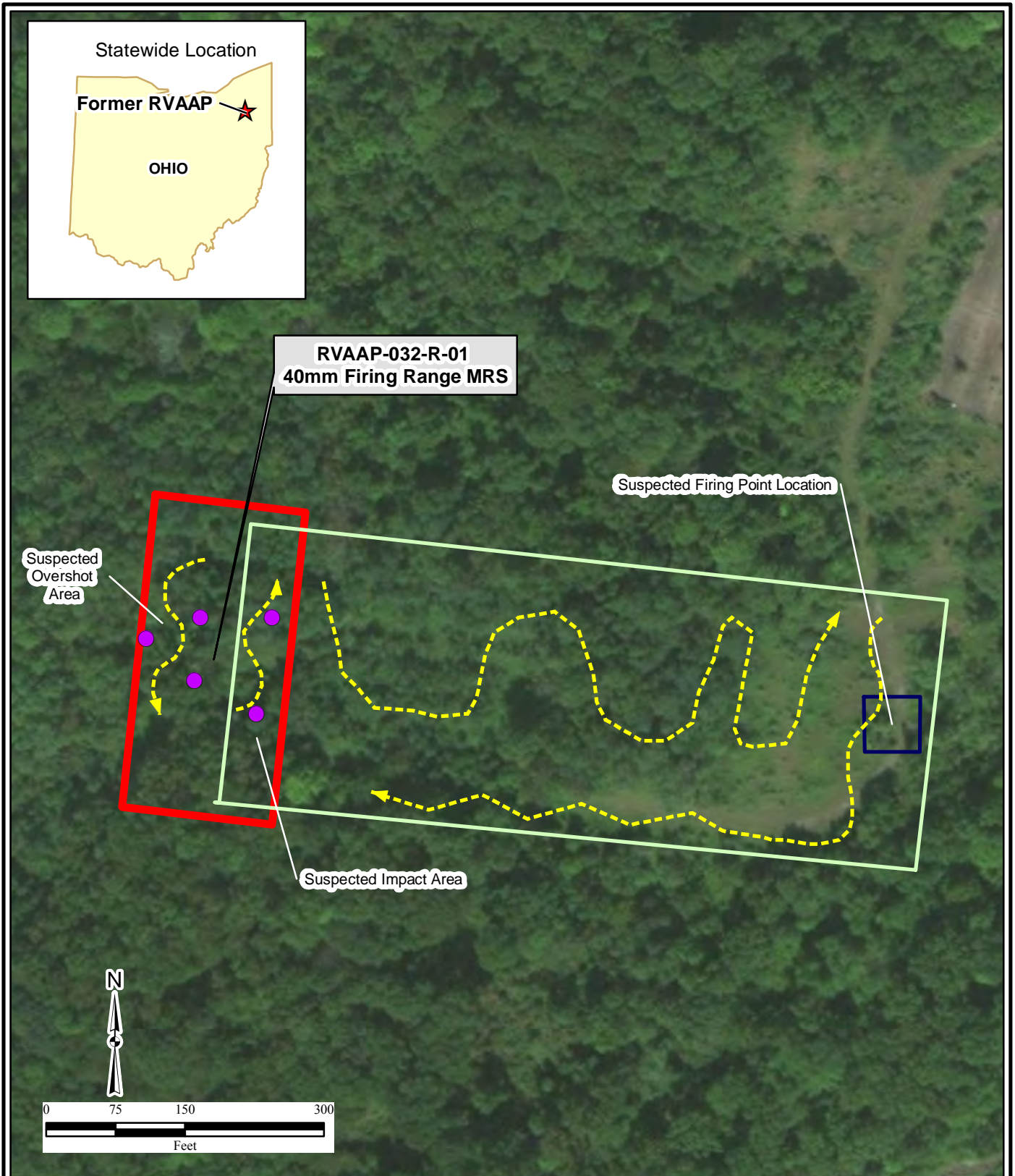
Notes:
MRS denotes Munitions Response Site
RVAAP denotes Ravenna Army Ammunition Plant



H:\MAMMS\Ravenna\GIS_Documents\Project_Maps
HGL\March2017\40mmFireRange\HGL_40mm_Fire_Range_002_Fig1_2_MRS_Loc_Map.mxd
2/28/2017 JWR
Source CB&I



This page intentionally left blank.



H:\MAMMS\Ravenna\GIS_Documents\Project_Maps
VHGL\Feb2018\40mmFireRange\HGL_40mm_Fire_Range_003
_Fig3_2007_Site_Inspection_Results.mxd
02/26/2018 JWR
Source APTIM

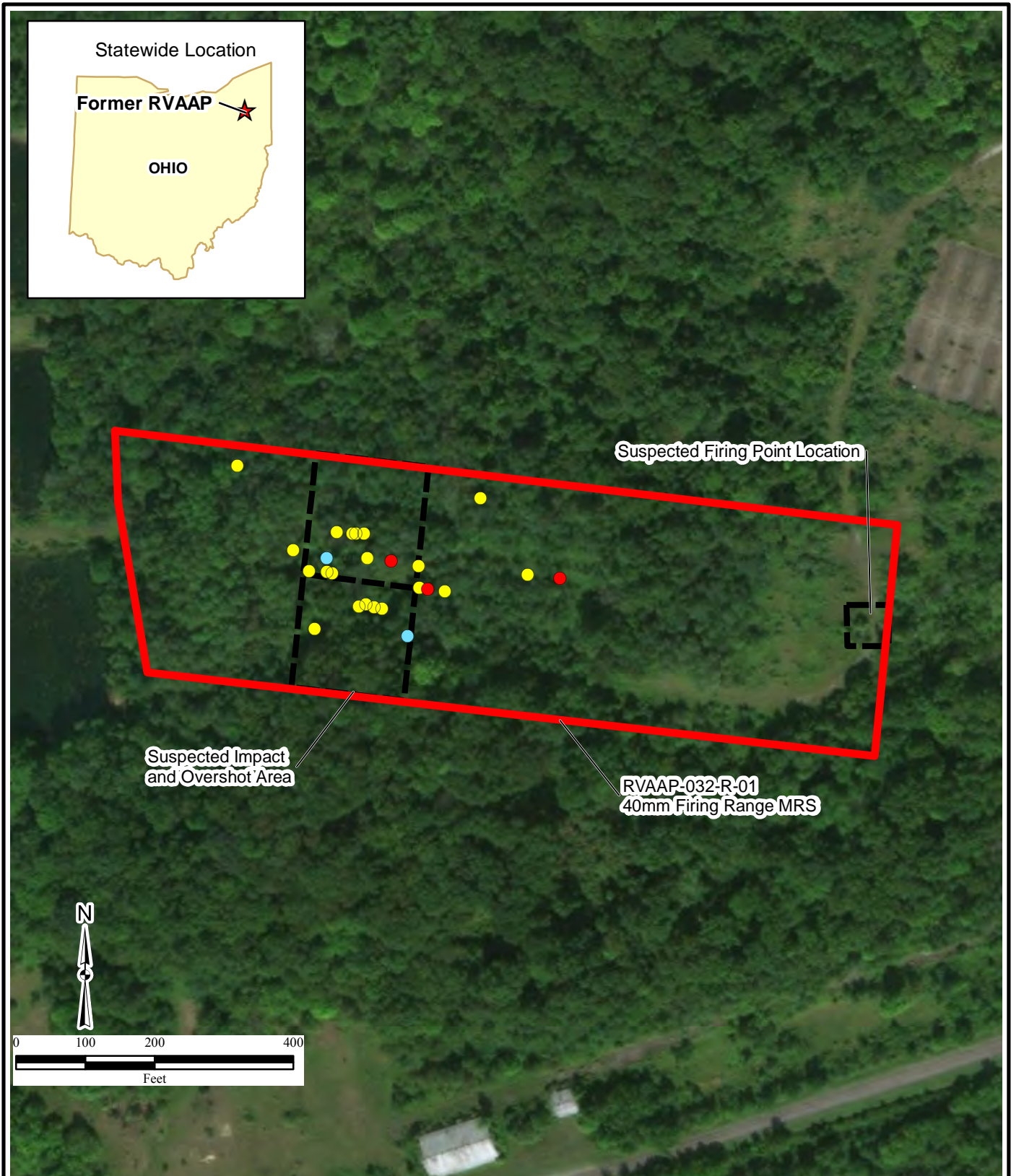
Legend

- Historical Records Review MRS Boundary
- SI Recommended MRS Boundary
- Suspected Firing Point Location
- Meandering Path Survey Area
- Munitions Debris Location

Figure 3
2007 Site Inspection Results
40mm Firing Range MRS
Camp Ravenna/Former RVAAP
Portage/Trumbull Counties, Ohio



This page intentionally left blank.



H:\MAMMS\Ravenna\GIS_Documents\Project_Maps
 VHGL\Feb2018\40mmFireRange\HGL_40mm_Fire_Range_004
 _Fig4_2011_Remedial_Investigation_Results.mxd
 02/26/2018 JWR
 Source APTIM

Legend

- Concentrated Subsurface MD Location
- Individual Subsurface MD Location
- Surface MD Location
- ▭ 40mm Firing Range MRS Boundary
- MC Sample Location

MD denotes Munitions Debris
 MC denotes Munitions Constituents

Figure 4
2011 Remedial Investigation Results
40mm Firing Range MRS
Camp Ravenna/Former RVAAP
Portage/Trumbull Counties, Ohio



This page intentionally left blank.