

1 **Draft No Further Action Proposed Plan for**  
2 **RVAAP-061-R-01 Block D Igloo-TD Munitions Response Site**  
3 **Version 1.0**  
4

5  
6 **Former Ravenna Army Ammunition Plant**  
7 **Portage and Trumbull Counties, Ohio**  
8

9  
10  
11  
12  
13 **Contract No. W912DR-15-D-0016**  
14 **Delivery Order No. 0001**  
15

16 **Prepared for:**  
17



18 **US Army Corps**  
19 **of Engineers®**

20 **U.S. Army Corps of Engineers**  
21 **Baltimore District**  
22 **10 S. Howard Street, Room 7000**  
23 **Baltimore, Maryland 21201**  
24

25  
26  
27  
28 **Prepared by:**

29  
30 **HydroGeoLogic, Inc. (HGL)**  
31 **11107 Sunset Hills Road**  
32 **Suite 400**  
33 **Reston, Virginia 20190**  
34

35  
36 **March 3, 2017**  
37

**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.**

<b>1. REPORT DATE (DD-MM-YYYY)</b> 3-3-2017		<b>2. REPORT TYPE</b> Proposed Plan		<b>3. DATES COVERED (From - To)</b> March 2017	
<b>4. TITLE AND SUBTITLE</b> Draft No Further Action Proposed Plan for RVAAP-061-R-01 Block D Igloo-TD Munitions Response Site Version 1.0				<b>5a. CONTRACT NUMBER</b> W912DR-15-D-0016, Delivery Order 0001	
				<b>5b. GRANT NUMBER</b> NA	
				<b>5c. PROGRAM ELEMENT NUMBER</b> NA	
<b>6. AUTHOR(S)</b> Kimberly Vaughn, PG, HydroGeoLogic, Inc. (HGL) David Crispo, CB&I Caitlyn Martin, HGL				<b>5d. PROJECT NUMBER</b> NA	
				<b>5e. TASK NUMBER</b> NA	
				<b>5f. WORK UNIT NUMBER</b> NA	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> HGL 11107 Sunset Hills Rd, Suite 400 Reston, VA 20190				<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b> NA	
<b>9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> U.S. Army Corps of Engineers, North Atlantic Division, Baltimore District 10 South Howard Street Baltimore, MD 21201				<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b> USACE	
				<b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b> NA	
<b>12. DISTRIBUTION/AVAILABILITY STATEMENT</b> Reference distribution page					
<b>13. SUPPLEMENTARY NOTES</b> None					
<b>14. ABSTRACT</b> 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)-061-R-O I Block D Igloo-Transferred (TD) 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 Block D Igloo-TD MRS. Investigations have not found material potentially presenting an explosive hazard (MPPEH) or munitions and explosives of concern (MEC) at the MRS. Therefore, no explosive hazards and no risk to receptors exist from historical activities associated with manufacturing, storing, transporting, testing, training, and/or disposal that occurred at the facility.					
<b>15. SUBJECT TERMS</b>					
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b> SAR	<b>18. NUMBER OF PAGES</b> 38	<b>19a. NAME OF RESPONSIBLE PERSON</b> Kimberly Vaughn
<b>a. REPORT</b> U	<b>b. ABSTRACT</b> U	<b>c. THIS PAGE</b> U			<b>19b. TELEPHONE NUMBER (Include area code)</b> 512-828-6684

**This page was intentionally left blank.**

1  
2  
3  
4

**PLACEHOLDER PAGE FOR:**  
**Documentation of Ohio EPA Concurrence of Final Document**  
*(Documentation to be provided once concurrence is issued.)*

**This page was intentionally left blank.**

1

## **DISCLAIMER STATEMENT**


2 This document is a work prepared for the United States Government by HydroGeoLogic, Inc. In no  
3 event shall either the United States Government or the United States Army Corps of Engineers have  
4 any responsibility or liability for any consequences of any use, misuse, inability to use, or reliance on  
5 the information contained herein, nor does either warrant or otherwise represent in any way the  
6 accuracy, adequacy, efficacy, or applicability of the contents hereof.

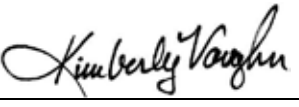
**This page was intentionally left blank.**



1                   **CONTRACTOR’S STATEMENT OF INDEPENDENT TECHNICAL REVIEW**

2 HydroGeoLogic, Inc. has completed the *Draft No Further Action Proposed Plan for RVAAP-061-R-01*  
3 *Block D Igloo-TD Munitions Response Site*, Version 1.0, at the former Ravenna Army Ammunition  
4 Plant in Portage and Trumbull Counties, Ohio. Notice is hereby given that an independent technical  
5 review has been conducted that is appropriate to the level of risk and complexity inherent in the  
6 project. During the independent technical review, compliance with established policy, principles, and  
7 procedures, utilizing justified and valid assumptions, was verified. This included review of data quality  
8 objectives; technical assumptions; methods, procedures, and materials to be used; the appropriateness  
9 of data used and level of data obtained; and reasonableness of the results, including whether the  
10 product meets customer’s needs consistent with law and existing United States Army Corps of  
11 Engineers policy.

Prepared/Approved by:                     Date: March 3, 2017  
David Crispo, P.E.  
Project Manager  
CB&I Federal Services LLC

Reviewed/Approved by:                     Date: March 3, 2017  
Kimberly Vaughn  
Project Manager  
HydroGeoLogic, Inc.

**This page was intentionally left blank.**

**DOCUMENT DISTRIBUTION**

1  
2

<b>Name/Organization</b>	<b>Number of Printed Copies</b>	<b>Number of Electronic Copies</b>
Mark Leeper, Chief (Acting), Cleanup and Restoration Branch (IED)	0	1
Kevin Sedlak, ARNG Restoration Program Manager, ARNG-IED	0	1
Katie Tait, Environmental Specialist, OHARNG	1	1
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	3
Rodney Beals, Environmental Manager, Ohio Environmental Protection Agency	0	Email/Transmittal Letter
Kelly Kaletsky, Ohio Environmental Protection Agency, Federal Facilities	0	1
Gail Harris, RVAAP Administrative Record Manager	2	2

4  
5  
6  
7  
8  
9  
10

- ARNG—Army National Guard
- COR—Contracting Officer’s Representative
- IED—Installation and Environment Division
- OHARNG—Ohio Army National Guard
- RVAAP—former Ravenna Army Ammunition Plant
- USACE—United States Army Corps of Engineers

**This page was intentionally left blank.**

**TABLE OF CONTENTS**

1 **SF-298 FORM**  
2 **OHIO EPA CONCURRENCE LETTER**  
3 **DISCLAIMER STATEMENT**  
4 **CONTRACTOR'S STATEMENT OF**  
5 **INDEPENDENT TECHNICAL REVIEW**  
6 **DOCUMENT DISTRIBUTION**  
7 **LIST OF FIGURES ..... i**  
8 **ACRONYMS AND ABBREVIATIONS ..... ii**  
9 **1.0 INTRODUCTION..... 1**  
10 **2.0 FACILITY AND MRS BACKGROUND..... 1**  
11 2.1 Facility History ..... 1  
12 2.2 MRS History ..... 3  
13 2.3 MRS Historical Investigations ..... 3  
14 2.4 RI Results..... 4  
15 **3.0 SCOPE AND ROLE OF RESPONSE**  
16 **ACTION..... 4**  
17 **4.0 SUMMARY OF HUMAN AND**  
18 **ECOLOGICAL RISKS ..... 5**  
19 **5.0 CONCLUSIONS AND**  
20 **RECOMMENDATIONS ..... 5**  
21 **6.0 COMMUNITY PARTICIPATION ..... 5**  
22 6.1 Public Comment Period ..... 5  
23 6.2 Public Meeting ..... 5  
24 6.3 Written Comments ..... 5  
25 6.4 U.S. Army Review of Public Comments .... 6  
26 **GLOSSARY OF TERMS ..... 7**  
27 **REFERENCES ..... 11**

28  
29

**LIST OF FIGURES**

30  
31  
32 Figure 1 Installation Location Map..... 15  
33 Figure 2 MRS Location Map ..... 17  
34 Figure 3 Pre-Site Inspection MRS  
35 Boundaries Map ..... 19  
36 Figure 4 Post-Site Inspection MRS  
37 Boundaries Map ..... 21  
38 Figure 5 Post-Remedial Investigation MRS  
39 Boundaries Map ..... 23  
40

## ACRONYMS AND ABBREVIATIONS

1	Camp Ravenna	Camp Ravenna Joint
2		Military Training Center
3	CB&I	CB&I Federal Services LLC
4	CERCLA	<i>Comprehensive</i>
5		<i>Environmental Response,</i>
6		<i>Compensation, and Liability</i>
7		<i>Act of 1980</i>
8	DFFO	Director's Final Findings
9		and Orders
10	DMM	discarded military munitions
11	e <sup>2</sup> M	engineering-environmental
12		Management, Inc.
13	Final RI Report	<i>Final Remedial Investigation</i>
14		<i>Report for RVAAP-019-R-01</i>
15		<i>Landfill North of Winklepeck</i>
16		<i>MRS and RVAAP-060-R-01</i>
17		<i>Block D Igloo MRS, Version</i>
18		<i>1.0</i>
19	HRR	Historical Records Review
20	MC	munitions constituents
21	MD	munitions debris
22	MEC	munitions and explosives of
23		concern
24	MMRP	Military Munitions
25		Response Program
26	MPPEH	material potentially
27		presenting an explosive
28		hazard
29	MRS	Munitions Response Site
30	NFA	no further action
31	Ohio EPA	Ohio Environmental
32		Protection Agency
33	RI	Remedial Investigation
34	RVAAP	former Ravenna Army
35		Ammunition Plant
36	Shaw	Shaw Environmental &
37		Infrastructure, Inc.
38	SI	Site Inspection
39	SI Report	Final Site Inspection Report
40	TD	transferred
41	TNT	trinitrotoluene
42	U.S.	United States
43	U.S. Army	U.S. Department of the
44		Army
45	UXO	unexploded ordnance

1 **1.0 INTRODUCTION**

2 The United States (U.S.) Department of the  
3 Army (U.S. Army) is presenting this *No*  
4 *Further Action (NFA) Proposed Plan* to  
5 involve the public in the **remedy selection**  
6 **process** for the RVAAP-061-R-01 Block D  
7 Igloo-TD **Munitions Response Site (MRS)**.  
8 The former Ravenna Army Ammunition Plant  
9 (RVAAP) is located in Portage and Trumbull  
10 Counties, Ohio, as shown on **Figure 1**. The  
11 location of the Block D Igloo-TD MRS in  
12 relation to the former RVAAP is shown on  
13 **Figure 2**.

14  
15 The U.S. Army, in consultation with the Ohio  
16 Environmental Protection Agency (Ohio EPA),  
17 is the lead agency for investigating, reporting,  
18 making **remedial decisions**, and taking  
19 **remedial actions** at the former RVAAP. This  
20 NFA Proposed Plan presents the U.S. Army’s  
21 preliminary recommendations for addressing  
22 the Block D Igloo-TD MRS. Investigations do  
23 not indicate that **material potentially**  
24 **presenting an explosive hazard (MPPEH),**  
25 **munitions and explosives of concern (MEC),**  
26 or concentrated areas of **munitions debris**  
27 **(MD)** are present at the MRS. Since there is no  
28 MPPEH, MEC, or MD present, there cannot be  
29 a source for **munitions constituents (MC)**.  
30 Therefore, no explosive hazards or MC risks to  
31 human or environmental receptors exist.

32  
33 The U.S. Army is issuing this NFA Proposed  
34 Plan to address its public participation  
35 responsibilities under Section 117(a) of the  
36 ***Comprehensive Environmental Response,***  
37 ***Compensation, and Liability Act of 1980***  
38 **(CERCLA)**, as amended by the Superfund  
39 Amendments and Reauthorization Act of 1986,  
40 and Section 300.430(f)(2) of the **National Oil**  
41 **and Hazardous Substances Pollution**  
42 **Contingency Plan** (40 Code of Federal  
43 Regulations 300). Implementation of the  
44 selected remedy at the MRS will comply with  
45 the requirements of the *Director’s Final*  
46 *Findings and Orders (DFFO) for RVAAP*  
47 (Ohio EPA, 2004).

48 This NFA Proposed Plan summarizes  
49 information contained in the ***Final Remedial***  
50 ***Investigation Report for RVAAP-019-R-01***  
51 ***Landfill North of Winklepeck MRS and***  
52 ***RVAAP-060-R-01 Block D Igloo MRS, Version***  
53 ***1.0*** (Final Remedial Investigation [RI] Report)  
54 (CB&I Federal Services LLC [CB&I], 2015).  
55 The U.S. Army encourages the public to review  
56 this document to better understand the history  
57 of the MRS, activities that have been conducted  
58 there, and determinations that have been made  
59 for the MRS under the **Military Munitions**  
60 **Response Program (MMRP)**.

61  
62 The U.S. Army, in consultation with the Ohio  
63 EPA, will review and consider all comments on  
64 this NFA Proposed Plan received during the  
65 30-day public comment period. The public is  
66 encouraged to review and comment on all  
67 recommendations presented in this NFA  
68 Proposed Plan.

69 **2.0 FACILITY AND MRS**  
70 **BACKGROUND**

71 This section presents a summary of the history  
72 of the former RVAAP and of the Block D  
73 Igloo-TD MRS.

74 **2.1 Facility History**

75 The former RVAAP (Federal Facility ID No.  
76 OH213820736), now known as the Camp  
77 Ravenna Joint Military Training Center (Camp  
78 Ravenna), is located in northeastern Ohio  
79 within Portage and Trumbull Counties and is  
80 approximately 3 miles east-northeast of the city  
81 of Ravenna. The federally owned facility,  
82 approximately 11 miles long and 3.5 miles  
83 wide, is bounded by a Norfolk Southern  
84 railroad line to the north; State Route 5, the  
85 Michael J. Kirwan Reservoir, and a CSX  
86 railroad line to the south; State Route 534 to the  
87 east; and Garret, McCormick, and Berry Roads  
88 to the west. The facility is surrounded by the  
89 communities of Windham, Garrettsville,  
90 Newton Falls, Charlestown, and Wayland.

91

**Public Comment Period:****April 17 to May 12, 2017****Public Meeting:**

The U.S. 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 **April 19, 2017, at the Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio 44444.**

**Information Repositories:**

Information used in selecting the preferred remedy 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:

10 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 remedy, 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  
(330) 872-8003

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

3 **Administrative control** of the 21,683-acre  
4 facility has been transferred to the U.S.  
5 Property and Fiscal Officer for Ohio and  
6 subsequently licensed to the Ohio Army  
7 National Guard for use as a training site, Camp  
8 Ravenna. The restoration program for the  
9 facility involves the remediation of areas  
10 affected in the past by the activities of the  
11 former RVAAP.

12  
13 The former RVAAP was constructed in 1940  
14 and 1941 for assembly/loading and **depot**  
15 **storage** of ammunition. While serving as an  
16 ammunition plant, the former RVAAP was a  
17 U.S. Government-owned and contractor-  
18 operated industrial facility. The ammunition  
19 plant consisted of 12 munitions assembly  
20 facilities, referred to as “load lines.” Load  
21 Lines 1 through 4 were used to melt and load  
22 2,4,6-trinitrotoluene (TNT) and Composition B  
23 (a mixture of TNT and Research Department  
24 Explosive]) into **large-caliber shells** and  
25 bombs. Operations on the load lines produced  
26 explosive dust, spills, and vapors that collected  
27 on the floors and walls of each building.  
28 Periodically, the floors and walls were cleaned  
29 with water and steam. After cleaning, the “pink  
30 water” wastewater, which contained TNT and  
31 Composition B, was collected in concrete  
32 holding tanks, filtered, and pumped into  
33 unlined ditches for transport to **earthen**  
34 **settling ponds**. Load Lines 5 through 11  
35 manufactured **fuzes, primers, and boosters**.  
36 From 1946 to 1949, Load Line 12 produced  
37 ammonium nitrate for explosives and  
38 fertilizers; subsequently it was used as a  
39 **weapons demilitarization facility**.

40  
41 In 1950, the facility was placed on standby  
42 status, and operations were limited to  
43 **renovation, demilitarization,** and normal  
44 maintenance of equipment and storing  
45 munitions. **Production** activities resumed from  
46 July 1954 to October 1957 and again from  
47 May 1968 to August 1972. Demilitarization  
48 and production activities were conducted at  
49 Load Lines 1, 2, 3, and 12. Demilitarization  
50 activities included disassembling munitions and  
51 melting out and recovering explosives using



1 hot water and steam processes. These activities  
2 continued through 1992.

3  
4 In addition to production and demilitarization  
5 activities at the load lines, other facilities at the  
6 former RVAAP included MRSs used for the  
7 burning, demolition, and testing of munitions.  
8 These burning and demolition grounds  
9 consisted of large, open areas and abandoned  
10 quarries. Other areas of concern at the former  
11 RVAAP include landfills, an aircraft fuel tank  
12 testing area, and various industrial support and  
13 maintenance facilities (Science Applications  
14 International Corporation, 2011).

## 15 **2.2 MRS History**

16 The “D” Block storage bunkers (igloos) are  
17 located in the north-central portion of the  
18 facility. On March 24, 1943, 2,516 clusters of  
19 M-41 20-pound **fragmentation bombs**  
20 exploded in Igloo 7-D-15 as they were being  
21 loaded into the bunker for storage. The  
22 explosion was reported to have been caused by  
23 rough handling and the faulty design of the M-  
24 110 fuze. At the time of the incident, the igloo  
25 was 95 percent full.

26  
27 The 60-foot-long igloo was constructed of  
28 reinforced concrete with a steel door. The  
29 bunker was primarily earthen covered with the  
30 exception for the front of it. The igloo-shaped  
31 configuration of the bunker was designed to  
32 protect from external force in the event of an  
33 internal explosion. The **directional**  
34 **configuration** of Igloo 7-D-15 and the door  
35 location was toward the east.

36  
37 Concrete fragments were distributed as far as  
38 3,800 feet east towards the “E” Block igloos  
39 following the blast. Prior to the 2007 Site  
40 Inspection (SI) field work, the debris field for  
41 the explosion was identified as 622.24 acres  
42 within the former RVAAP boundaries and  
43 approximately 19.25 acres outside the facility  
44 to the northwest of former Igloo 7-D-15. The  
45 area outside of the facility consisted of  
46 residences, farm fields that were separated by  
47 stands of woodlands, railroad tracks, and a  
48 right-of-way. These locations inside and

49 outside of the facility were considered  
50 separately as the Block D Igloo MRS and  
51 Block D Igloo-TD MRS, respectively, prior to  
52 the SI (**Figure 3**).

## 53 **2.3 MRS Historical Investigations**

54 The following investigations and reports have  
55 been completed under the MMRP for the Block  
56 D Igloo MRS, the location of Igloo-7-D-15 that  
57 exploded and impacted areas within the facility  
58 boundaries, and Block D Igloo-TD MRS that is  
59 located outside of the facility boundaries:

- 60 · *Final Military Munitions Response Program*  
61 *Historical Records Review* (HRR)  
62 (engineering-environmental Management,  
63 Inc. [e<sup>2</sup>M], 2007)
- 64 · *Final Site Inspection Report* (SI Report)  
65 (e<sup>2</sup>M, 2008)
- 66 · Final RI Report (CB&I, 2015)

### 67 **2.3.1 SI Summary**

68 In 2007, SI field activities were conducted at  
69 MRSs under the MMRP at the former RVAAP  
70 that included both the Block D Igloo MRS and  
71 the Block D Igloo-TD MRS. Recommendations  
72 were made in the SI Report to reduce the  
73 3,000-foot radius of the Block D Igloo MRS  
74 around former Igloo 7-D-15. The  
75 recommendations to reduce the MRS radius  
76 around the former igloo eliminated the 19.25-  
77 acre area outside the northern portion of the  
78 facility that was the original Block D Igloo-TD  
79 MRS.

80  
81 During preparation of the HRR in support of  
82 the SI activities, e<sup>2</sup>M identified additional  
83 information from a U.S. Army Corps of  
84 Engineers Rock Island District Map that  
85 nonmunitions-related debris fragments from the  
86 1943 explosion had been observed at two  
87 locations outside of the facility. The debris was  
88 reportedly observed as far as 2.9 miles  
89 (15,000 feet) to the northeast of former Igloo-7-  
90 D-15. These areas were not surveyed during the  
91 SI field work and additional investigation was  
92 recommended in the SI Report since the report  
93 of debris fragments at these two locations

1 indicated that MEC could be present outside of  
2 the facility. The combined area of these two  
3 locations is 14.13 acres. The SI Report  
4 recommended that the two areas that made up  
5 the 14.13 acres become the revised Block D  
6 Igloo-TD MRS (e<sup>2</sup>M, 2008). **Figure 4** presents  
7 the 2008 boundaries for the Block D Igloo and  
8 Block D Igloo-TD MRSs that were carried  
9 forward following the SI and into the RI.

### 10 **2.3.2 RI Work Plan Summary**

11 In 2011, CB&I evaluated the original estimate  
12 of how far fragments would have traveled away  
13 from former Igloo-7-D-15 when the bombs  
14 inside it exploded in 1943. The result of this  
15 second look is that, using more recent  
16 information, the estimate of how far fragments  
17 would have traveled was reduced from 3,800  
18 feet to 2,389 feet. Based on this new estimate,  
19 it was determined that no fragments could have  
20 traveled beyond the facility boundary or as far  
21 as the Block D Igloo-TD. Therefore, no MEC  
22 or MPPEH would have traveled beyond the  
23 facility boundary and into the Block D Igloo-  
24 TD. The new estimate of 2,389 feet is  
25 presented in a technical memorandum titled  
26 Rationale for Reduction in Investigation Area  
27 for Block D Igloo MRS (RVAAP-060-R-28  
28 01). This memorandum was reviewed and  
29 approved by Ohio EPA and is included as  
30 Appendix A to the Final RI Report  
31 (CB&I, 2015).

### 32 **2.4 Remedial Investigation Results**

33 No RI fieldwork activities were conducted at  
34 the Block D Igloo-TD MRS based on the  
35 revised estimate that no munitions fragments  
36 could have traveled beyond the facility  
37 boundary or as far as the Block D Igloo-TD  
38 MRS. An RI was conducted at the Block D  
39 Igloo MRS, located within the facility  
40 boundaries, to evaluate for potential MPPEH  
41 and MEC from the 1943 explosion. The RI  
42 included an **instrument-assisted visual survey**  
43 and an **analog intrusive (“mag and dig”)**  
44 **investigation**. The maximum horizontal  
45 distance of MD found on or just below the  
46 ground surface was 1,800 feet and supported  
47 the revised estimate of 2,389 feet. The results

48 of the RI fieldwork conducted at the Block D  
49 Igloo MRS confirmed no further investigation  
50 at the Block D Igloo-TD MRS would be  
51 required. **Figure 5** presents the boundaries of  
52 the Block D Igloo MRS following the RI which  
53 represents the maximum distance that MPPEH  
54 from the former Igloo-7-D-15 explosion could  
55 have traveled.

### 56 **3.0 SCOPE AND ROLE OF RESPONSE** 57 **ACTION**

58 The area of the Block D Igloo-TD MRS that  
59 was carried forward into the RI is situated  
60 outside of the facility on private land that is  
61 wooded and used for agricultural purposes  
62 (**Figure 4**). The results of the RI fieldwork  
63 conducted at the Block D Igloo MRS support  
64 the determination that NFA is the appropriate  
65 selected remedy for the Block D Igloo-TD  
66 MRS. The selected remedy must be protective  
67 of the **receptors** associated with future land  
68 use. The future land use of the MRS is  
69 residential, recreational, and agricultural. The  
70 likely **human receptors** for the future land use  
71 are the Resident Receptor (Adult and Child)  
72 (Shaw Environmental & Infrastructure, Inc.  
73 [Shaw], 2011). No **environmental receptors**  
74 have been identified, since an RI was not  
75 completed at the Block D Igloo-TD MRS.

76  
77 The Block D Igloo-TD MRS was reduced and  
78 eliminated from containing any MPPEH/MEC  
79 due to the studies carried out and the RI field  
80 work completed for the Block D Igloo MRS.  
81 Further, because no MPPEH/MEC or  
82 concentrated areas of MD are present, no  
83 potential source of MC exists. Therefore, there  
84 is no source material or impacted  
85 environmental media resulting from hazards at  
86 the MRS.

87  
88 No other investigations are ongoing at the MRS  
89 under the MMRP or the **Installation**  
90 **Restoration Program**. Although not  
91 anticipated, if additional hazards are identified  
92 at this MRS, they would be addressed under the  
93 MMRP as a separate response action.

1 **4.0 SUMMARY OF HUMAN AND**  
2 **ECOLOGICAL RISKS**

3 Under the MMRP, a recommendation of NFA  
4 must be protective of the human and  
5 environmental receptors at the MRS. The likely  
6 human receptors identified for future land use  
7 at the Block D Igloo-TD MRS are the Resident  
8 Receptor (Adult and Child) (Shaw, 2011). No  
9 environmental receptors have been identified,  
10 since an RI was not completed at the MRS.

11  
12 No MEC or any type of munitions fragment is  
13 present on the MRS. Therefore, there is no  
14 explosive safety hazard or risk due to chemical  
15 contamination to any receptors that may be  
16 present on the Block D Igloo-TD MRS.

17 **5.0 CONCLUSIONS AND**  
18 **RECOMMENDATIONS**

19 The results of the Block D Igloo MRS RI field  
20 work support the determination that no  
21 munitions fragments could have traveled  
22 beyond the facility boundary or as far as the  
23 Block D Igloo-TD MRS. Therefore, no hazards  
24 associated with exposures to MPPEH/MEC and  
25 no potential for MC risk to human or  
26 environmental receptors exist at the MRS. The  
27 U.S. Army, in consultation with the Ohio EPA,  
28 is recommending NFA as the preferred remedy  
29 under the MMRP for the Block D Igloo-TD  
30 MRS.

31 Since there are no risks identified at the MRS,  
32 the overall recommendation of NFA under the  
33 MMRP is protective of receptors that may be  
34 present at the MRS. This recommendation is  
35 not a final decision. The U.S. Army, in  
36 consultation with the Ohio EPA, will select the  
37 remedy for the MRS after reviewing and  
38 considering all comments submitted during the  
39 30-day public comment period.

40 **6.0 COMMUNITY PARTICIPATION**

41 Public participation is an important component  
42 of the remedy selection process. The U.S.  
43 Army, in coordination with the Ohio EPA, is  
44 soliciting input from the community on the  
45 preferred remedy. The comment period extends  
46 from **April 17 to May 12, 2017**. This period

47 includes a public meeting at which the U.S.  
48 Army will present this NFA Proposed Plan.  
49 The U.S. Army will accept oral and written  
50 comments at this meeting.

51 **6.1 Public Comment Period**

52 The 30-day comment period is from **April 17 to**  
53 **May 12, 2017**, and provides an opportunity for  
54 public involvement in the decision-making  
55 process for the proposed action. The public is  
56 encouraged to review and comment on this  
57 NFA Proposed Plan. The U.S. Army and Ohio  
58 EPA will consider all public comments before  
59 selecting a remedy. During the comment  
60 period, the public is also encouraged to review  
61 documents pertinent to the Block D Igloo-TD  
62 MRS. This information is available at the  
63 **Information Repositories** and online at  
64 [www.rvaap.org](http://www.rvaap.org). To obtain further information,  
65 contact the Camp Ravenna Environmental  
66 Office.

67 **6.2 Public Meeting**

68 The U.S. Army will hold an open house/public  
69 meeting on this NFA Proposed Plan on **April**  
70 **19, 2017**, at 6:00 p.m. at the **Newton Falls**  
71 **Community Center, 52 East Quarry Street,**  
72 **Newton Falls, Ohio 44444**. This meeting will  
73 provide an opportunity for the public to  
74 comment on the preferred remedy. Comments  
75 made at the meeting will be transcribed.

76 **6.3 Written Comments**

77 If the public would like to provide comments,  
78 questions, or suggestions on this NFA Proposed  
79 Plan or other relevant issues in writing, they  
80 should be delivered to the U.S. Army at the  
81 public meeting or mailed (postmarked no later  
82 than **May 12, 2017**). The public can also submit  
83 their comments, questions, or suggestions via  
84 email prior to the end of the comment period to  
85 the Camp Ravenna Environmental Office at  
86 [kathryn.s.tait.nfg@mail.mil](mailto:kathryn.s.tait.nfg@mail.mil).

**POINT OF CONTACT FOR  
WRITTEN COMMENTS**

**Camp Ravenna Environmental Office**  
1438 State Route 534 SW  
Newton Falls, Ohio 44444

1 **6.4 U.S. Army Review of Public**  
2 **Comments**

3 The U.S. Army will review all public  
4 comments before selecting the most appropriate  
5 action for the MRS. A **Responsiveness**  
6 **Summary**, a document that summarizes the  
7 U.S. Army's responses to comments received  
8 during the public comment period, will be  
9 included in the **Record of Decision**. The U.S.  
10 Army's final choice of action will be  
11 documented in the Record of Decision. The  
12 Record of Decision will be added to the  
13 RVAAP Administrative Record and  
14 Information Repositories.

## GLOSSARY OF TERMS

1 **Administrative Control:** Direction or exercise  
2 of authority over subordinate or other  
3 organizations in respect to administration and  
4 support, including organization of Service  
5 forces, control of resources and equipment,  
6 personnel management, unit logistics,  
7 individual and unit training, readiness,  
8 mobilization, demobilization, discipline, and  
9 other matters not included in the operational  
10 missions of the subordinate or other  
11 organizations.

12 **Administrative Record:** This is a collection of  
13 documents, typically reports and  
14 correspondence, generated during site  
15 investigation and remedial activities.  
16 Information in the Administrative Record is  
17 used to select the preferred remedy. It is  
18 available for public review at the Camp  
19 Ravenna Environmental Office; call  
20 (330) 872-8003 for an appointment.

21 **Analog Intrusive (“Mag and Dig”)**  
22 **Investigation:** An investigation process  
23 whereby hand-held analog geophysical  
24 instruments are passed back and forth in (i.e.,  
25 “in sweep mode”) by **Unexploded Ordnance**  
26 **(UXO) Technicians** in a well-defined area.  
27 Analog instruments emit an audible signal as  
28 the instrument is moved past a metallic item.  
29 The UXO Technician progresses along the  
30 search lane or throughout the area and stops  
31 when an anomaly is encountered. Anomalies  
32 identified are either flagged or immediately  
33 excavated. Detection depth is likely limited to  
34 2–4 feet.

35 **Booster:** A sensitive explosive charge that acts  
36 as a bridge between a (relatively weak)  
37 conventional detonator and a low-sensitivity  
38 (but typically high-energy) explosive such as  
39 TNT. By itself, the initiating detonator would  
40 not deliver sufficient energy to set off the  
41 low-sensitivity charge. However, it detonates  
42 the primary charge (the booster), which then  
43 delivers an explosive shockwave that is  
44 sufficient to detonate the secondary, main,  
45 high-energy charge.

46 **Comprehensive Environmental Response,**  
47 **Compensation, and Liability Act of 1980**  
48 **(CERCLA):** This federal law was passed in  
49 1980 and is commonly referred to as the

50 Superfund Program. It provides for liability,  
51 compensation, cleanup, and emergency  
52 response in connection with the cleanup of  
53 inactive hazardous waste release sites that  
54 endanger public health or the environment.

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

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

59 **Directional Configuration:** Construction of a  
60 system that is adapted to ensure a pre-  
61 determined direction for transmitting an item  
62 or signal.

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

66 **Environmental Receptor:** Any living  
67 organisms other than humans, the habitat that  
68 supports such organisms, or natural resources  
69 that could be adversely affected by  
70 environmental contaminations resulting from  
71 a release at or migration from a site.

72 **Explosive Hazard:** Any hazard containing an  
73 explosive component. Explosive hazards  
74 include unexploded explosive ordnance  
75 (including land mines), booby traps,  
76 improvised explosive devices, and bulk  
77 explosives.

78 **Fragmentation Bomb:** An aerial antipersonnel  
79 bomb that scatters shrapnel over a wide area  
80 upon explosion.

81 **Fuze:** A device that detonates a munition's  
82 explosive material under specified conditions.  
83 In addition, a fuze will have safety and  
84 arming mechanisms that protect users from  
85 premature or accidental detonation.

86 **Human Receptor:** Any human individual or  
87 population that is presently or will potentially  
88 be exposed to, and adversely affected by, the  
89 release or migration of contaminants.

90 **Information Repository:** A collection of  
91 documents relating to a facility with  
92 investigations and response actions under  
93 CERCLA and/or a site's permitting activity  
94 or corrective action. It includes documents  
95 and information about site activities as well  
96 as general information about environmental

## GLOSSARY OF TERMS

1 regulations and CERCLA. The purpose of an  
2 Information Repository is to (1) ensure open  
3 and convenient public access to site-related  
4 documents and (2) better inform the public of  
5 the restoration process.

6 **Installation Restoration Program (IRP):** A  
7 comprehensive program to identify,  
8 investigate, and clean up contamination at  
9 active/operating U.S. Army installations.  
10 Eligible sites include those contaminated by  
11 past defense activities that require response  
12 under CERCLA, as amended by the  
13 Superfund Amendments and Reauthorization  
14 Act (SARA), and certain corrective actions  
15 required by the Resource Conservation and  
16 Recovery Act (RCRA). The objective of the  
17 IRP is to clean up contaminated  
18 environmental impacts from past U.S. Army  
19 activities with the following goals: (1) reduce  
20 risk to acceptable levels to protect the health  
21 and safety of installation personnel and the  
22 public, and (2) restore the quality of the  
23 environment. The IRP also complies with  
24 state, regional, and local requirements  
25 applicable to the cleanup of hazardous  
26 materials contamination, as well as related  
27 site safety. Community involvement activities  
28 are an integral part of the U.S. Army's IRP.  
29 Installation commanders seek community  
30 involvement early and throughout the cleanup  
31 process.

32 **Instrument-Assisted Visual Survey:** An  
33 investigation process whereby a line of UXO  
34 Technicians walk across the property in a  
35 systematic manner to identify items on the  
36 ground surface by sight or metallic items on  
37 or just below the ground surface using a  
38 magnetometer or other instrument. This  
39 approach is necessary in areas where there is  
40 vegetation that cannot be removed.

41 **Large-Caliber Shell:** A projectile or shell is a  
42 missile fired from the muzzle of a gun; it is  
43 always the projectile, whether issuing from  
44 the muzzle of a breech-loading rifle, using  
45 separate ammunition, or from the muzzle of a  
46 rapid-fire gun, using fixed, cartridge-case  
47 ammunition. Projectiles for guns of and  
48 above 7 inches in caliber are considered  
49 large-caliber.

50 **Material Potentially Presenting an Explosive**  
51 **Hazard (MPPEH):** Material that, prior to  
52 determination of its explosives safety status,  
53 potentially contains explosives or munitions  
54 (e.g., munitions containers and packaging  
55 material; munitions debris remaining after  
56 munitions use, demilitarization, or disposal;  
57 and range-related debris); or potentially  
58 contains a high enough concentration of  
59 explosives such that the material presents an  
60 explosive hazard (e.g., equipment, drainage  
61 systems, holding tanks, piping, or ventilation  
62 ducts that were associated with munitions  
63 production, demilitarization, or disposal  
64 operations).

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

72 **Munitions Constituents (MC):** Any material  
73 originating from UXO, discarded military  
74 munitions (DMM), or other military  
75 munitions, including explosive and  
76 nonexplosive materials, and emission,  
77 degradation, or breakdown elements of such  
78 ordnance or munitions.

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

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

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

96 **National Oil and Hazardous Substances**  
97 **Pollution Contingency Plan:** The National  
98 Oil and Hazardous Substances Pollution

## GLOSSARY OF TERMS

1 Contingency Plan is a collection of CERCLA  
2 regulations that provide the U.S. Government  
3 the authority to respond to the problems of  
4 abandoned or uncontrolled hazardous waste  
5 disposal sites as well as to certain incidents  
6 involving hazardous wastes (e.g., spills).

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

15 **Production:** The action of making or  
16 manufacturing from components or raw  
17 materials, or the process of being so  
18 manufactured.

19 **Proposed Plan:** This CERCLA document  
20 provides the public with information  
21 necessary to participate in the selection of a  
22 remedy. It is designed to solicit public  
23 comment on a preferred remedy before a  
24 Record of Decision is established.

25 **Receptor:** See human or ecological receptor.

26 **Record of Decision:** A legal record signed by  
27 the U.S. Army following coordination and  
28 concurrence with the Ohio EPA as per a June  
29 10, 2004, agreement between the two parties.  
30 It describes the cleanup action or remedy  
31 selected for a site, the basis for selecting that  
32 remedy, public comments, responses to  
33 comments, and the estimated cost of the  
34 remedy.

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

38 **Remedial Decision:** A formal, written  
39 communication from the regulating authority,  
40 that approves a site investigation, identifies  
41 the preferred remedy, and approves the  
42 remedial action, if any, at a site.

43 **Remedial Investigation (RI):** A CERCLA  
44 investigation that involves sampling  
45 environmental media, such as air, soil, and  
46 water, to determine the nature and extent of  
47 contamination and to calculate human health

48 and environmental risks that result from the  
49 contamination.

50 **Remedy Selection Process:** A part of the  
51 CERCLA process, typically Proposed Plan  
52 through Record of Decision that involves  
53 public participation in identifying the  
54 preferred remedy. The final selection of the  
55 preferred remedy is made in the Record of  
56 Decision after taking into consideration the  
57 recommendations in the Proposed Plan and  
58 any comments received from the public  
59 during the 30-day comment period.

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

63 **Responsiveness Summary:** A section of the  
64 Record of Decision where the U.S. Army  
65 documents and responds to written and oral  
66 comments received from the public about the  
67 Proposed Plan.

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

76 **Weapons Demilitarization Facility:** A facility  
77 or installation that is involved in the  
78 reduction of a nation's army, weapons,  
79 weapons systems, or military vehicles to an  
80 agreed upon minimum.

**This page was intentionally left blank.**



## REFERENCES

- 1 CB&I Federal Services LLC (CB&I), 2015.
- 2 *Final Remedial Investigation Report for*
- 3 *RVAAP-019-R-01 Landfill North of Winklepeck*
- 4 *MRS and RVAAP-060-R-01 Block D Igloo*
- 5 *MRS*, Version 1.0, prepared for the U.S. Army
- 6 Corps of Engineers, Baltimore District, March.
  
- 7 engineering-environmental Management, Inc.
- 8 (e<sup>2</sup>M), 2007. *Final Military Munitions*
- 9 *Response Program Historical Records Review,*
- 10 *Ravenna Army Ammunition Plant, Ohio,*
- 11 January.
  
- 12 e<sup>2</sup>M, 2008. *Final Site Inspection Report,*
- 13 *Ravenna Army Ammunition Plant, Ohio,*
- 14 *Military Munitions Response Sites*, May.
  
- 15 Ohio Environmental Protection Agency
- 16 (Ohio EPA), 2004. *Director's Final Findings*
- 17 *and Orders (DFFO) for RVAAP*, Division of
- 18 Emergency and Remedial Response, June 10.
  
- 19 Science Applications International Corporation,
- 20 2011. *Phase II Remedial Investigation Report*
- 21 *for Soil, Sediment, and Surface Water at*
- 22 *RVAAP Load Line 6, Ravenna Army*
- 23 *Ammunition Plant, Ravenna, Ohio*, Draft,
- 24 November 4.
  
- 25 Shaw Environmental & Infrastructure, Inc.
- 26 (Shaw), 2011. *Work Plan Addendum for*
- 27 *Military Munitions Response Program*
- 28 *Remedial Investigation Environmental*
- 29 *Services*, Version 1.0, Final, December 7.

**This page was intentionally left blank.**

**FIGURES**

**This page was intentionally left blank.**




136147\_01002100\_A1



H:\MAMMS\Ravenna\GIS\_Documents\Project\_Maps  
 VHGL\March2017\HGL\_RVAAP\_001\_Fig\_1\_SiteLoc.mxd  
 2/28/2017 JWR  
 Source CB&I

**Legend**

 Camp Ravenna/Former RVAAP

**Figure 1**  
**Location Map**  
**Camp Ravenna/**  
**Former RVAAP**  
**Portage/Trumble Counties**  
**Ohio**






**This page was intentionally left blank.**



**Figure 2**  
**MRS Location**  
**Camp Ravenna/Former RVAAP**  
**Portage/Trumbull Counties, Ohio**

Legend

-  Block D Igloo - TD MRS Boundary
-  Facility Boundary
-  Road

Notes:  
MRS=munitions response site  
RVAAP=Ravenna Army Ammunition Plant



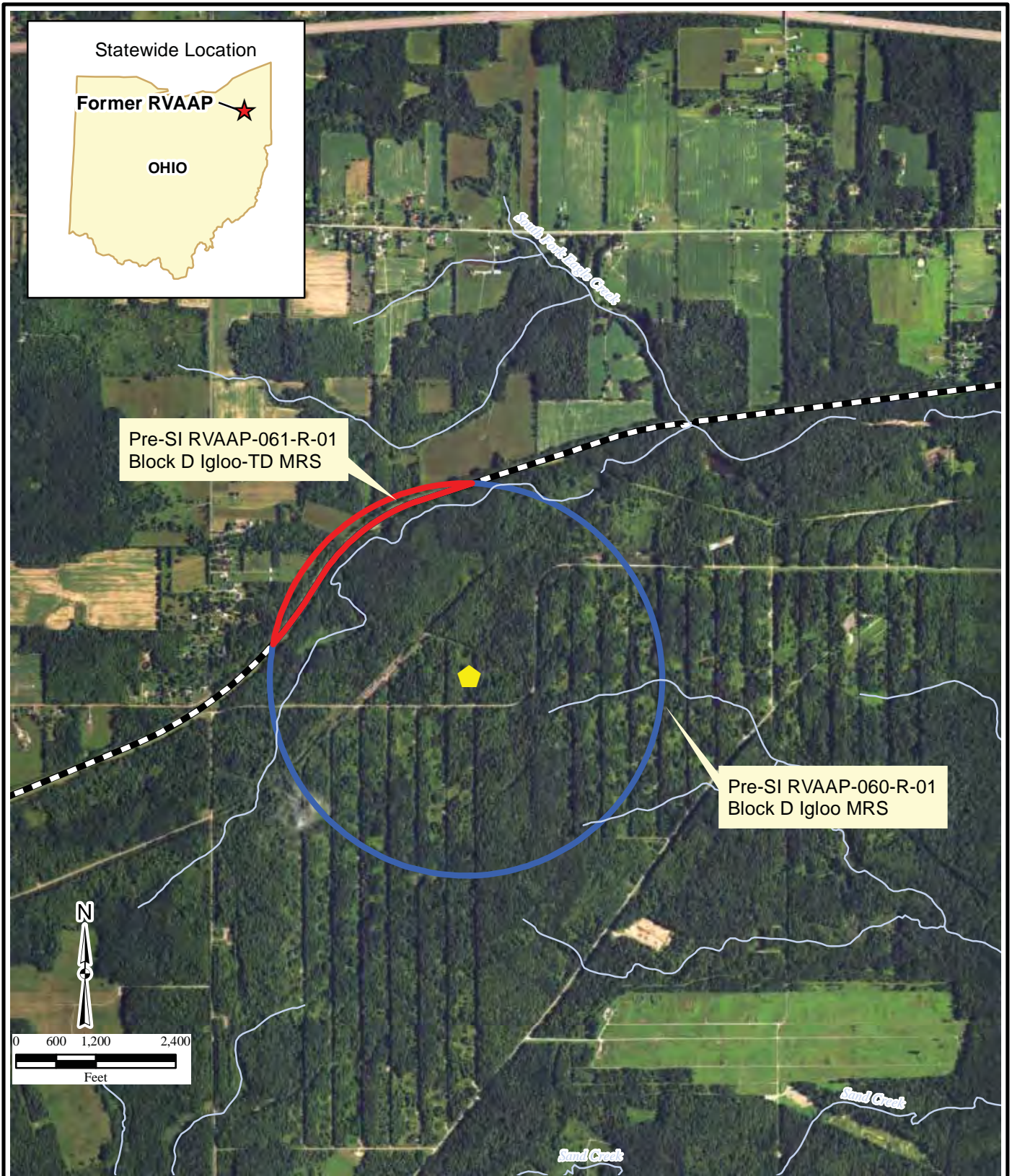
H:\MAMMS\Ravenna\GIS\_Documents\Project\_Maps  
HGL\March2017\HGL\_RVAAP\_BDI\_003\_Fig2\_Site\_Map.mxd  
2/28/2017 JWR  
Source CB&I










**This page was intentionally left blank.**





H:\MAMMS\Ravenna\GIS\_Documents\Project\_Maps  
 VHGL\March2017\HGL\_RVAAP\_BDI\_003\_Fig3\_BlockDIgloo\_Pre\_  
 SI\_MRS\_Bound.mxd  
 2/28/2017 JWR  
 Source CB&I

Legend

-  Location of Former Igloo 7-D-15
-  Stream
-  Pre-SI Block D Igloo-TD MRS
-  Pre-SI Block D Igloo-TD MRS
-  Facility Boundary

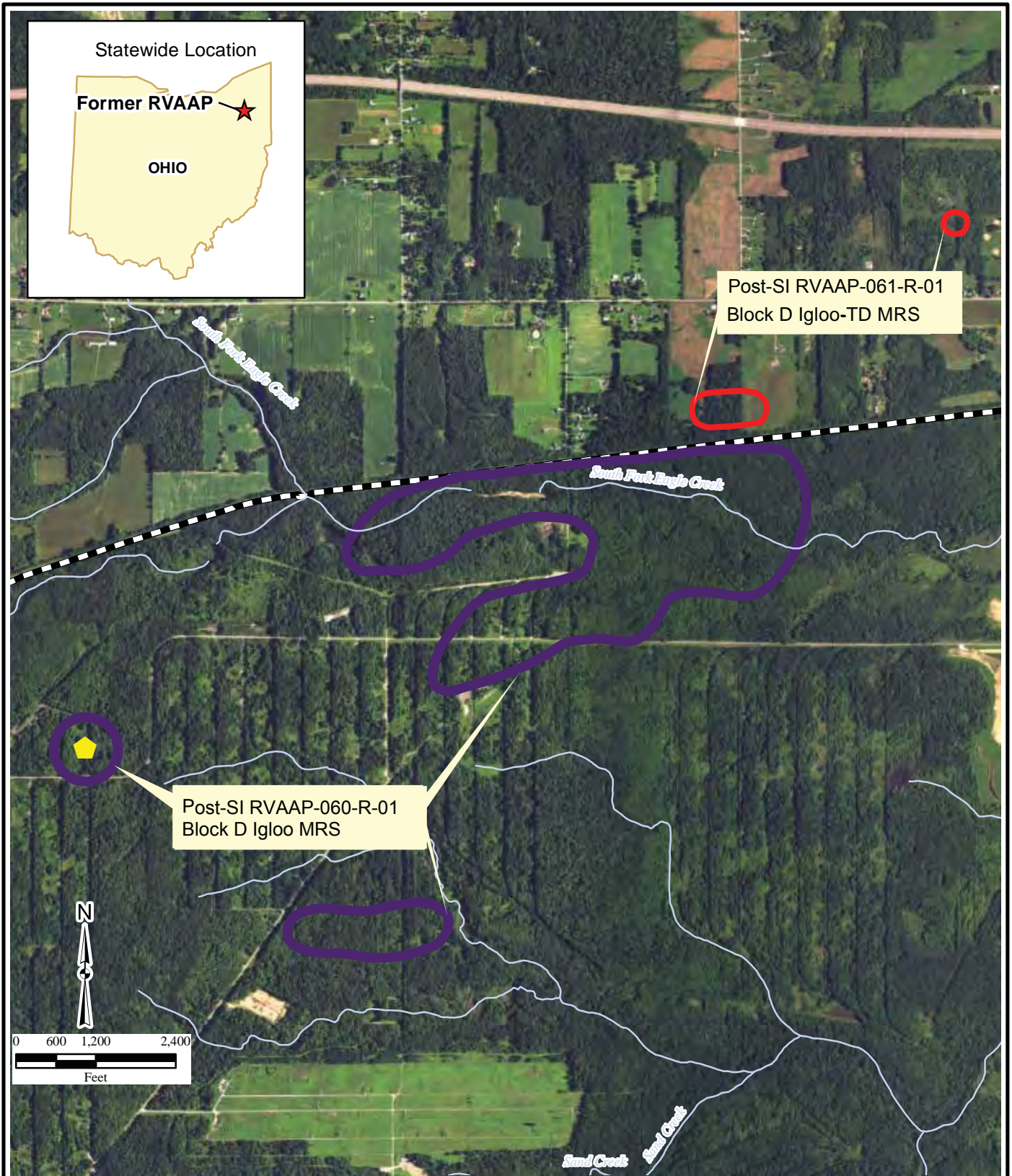
Note: SI denotes 2007 Site Inspection (e2M)

**Figure 3**  
**Pre-SI MRS Boundaries Map**  
**Block D Igloo-TD MRS**  
**Camp Ravenna/Former RVAAP**  
**Portage/Trumble Counties Ohio**



**This page was intentionally left blank.**










H:\MAMMS\Ravenna\GIS\_Documents\Project\_Maps  
 VHGL\March2017\HGL\_RVAAP\_BDI\_004\_Fig4\_BlockDIgloo\_Post\_  
 SI\_SiteFeatures.mxd  
 2/28/2017 JWR  
 Source CB&I



Legend

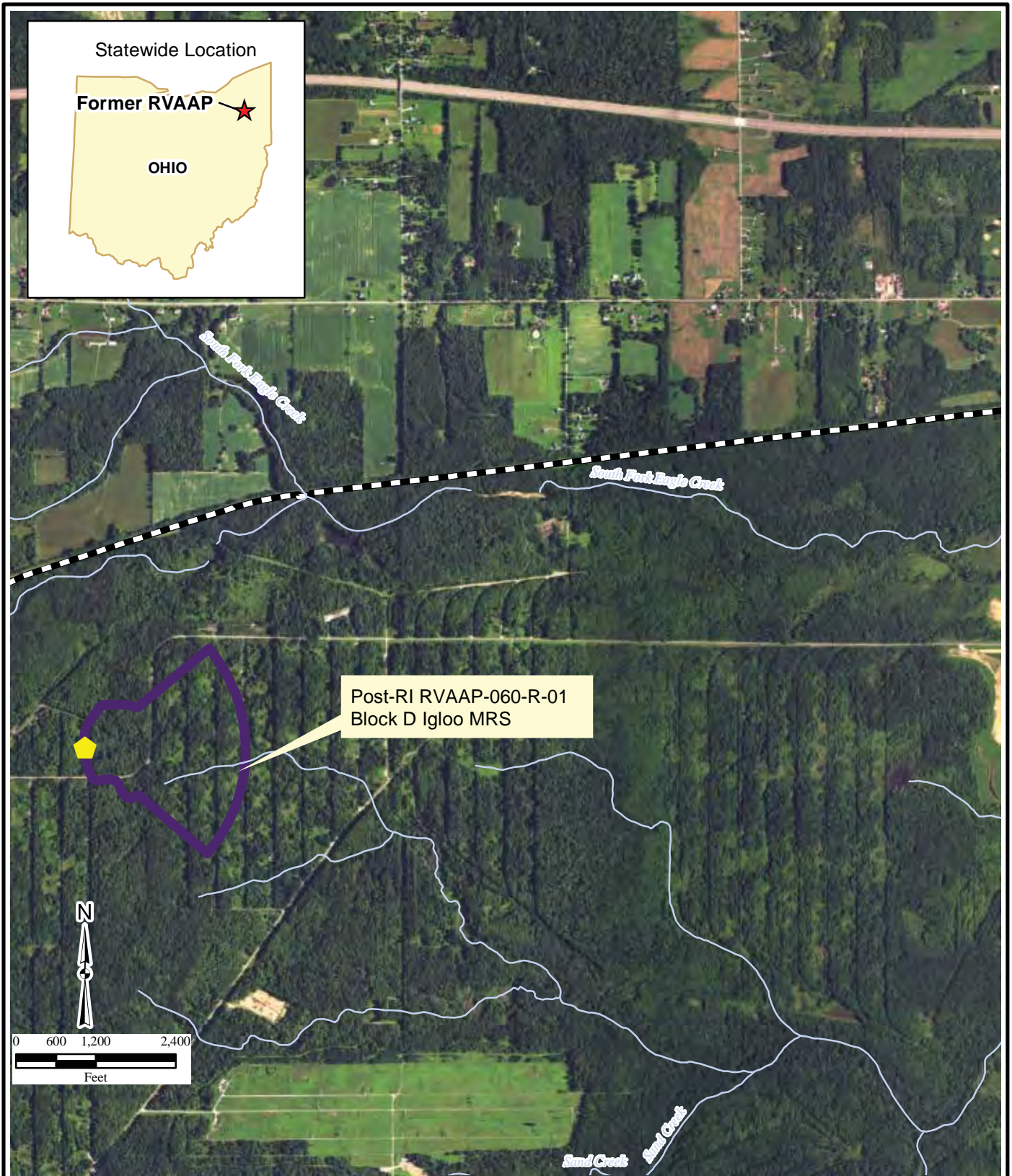
-  Location of Former Igloo 7-D-15
-  Stream
-  Post-SI Block D Igloo MRS
-  Post-SI Block D Igloo-TD MRS
-  Facility Boundary

Note: SI denotes Site Inspection (e2M)

**Figure 4**  
**Post-SI MRS Boundaries Map**  
**Block D Igloo-TD MRS**  
**Camp Ravenna/Former RVAAP**  
**Portage/Trumble Counties Ohio**





**This page was intentionally left blank.**





H:\MAMMS\Ravenna\GIS\_Documents\Project\_Maps  
 HGL\March2017\HGL\_RVAAP\_BDI\_005\_Fig5\_BlockDIgloo\_Post\_  
 RI\_SiteFeatures.mxd  
 2/28/2017 JWR  
 Source CB&I

Legend

-  Location of Former Igloo 7-D-15
-  Stream
-  Post-RI Block D Igloo MRS
-  Facility Boundary

Note: RI denotes 2015 Remedial Investigation (CB&I)

**Figure 5**  
**Post-RI MRS Boundaries Map**  
**Block D Igloo-TD MRS**  
**Camp Ravenna/Former RVAAP**  
**Portage/Trumble Counties Ohio**



**This page was intentionally left blank.**