

Revised Final

**Proposed Plan
for Soil, Sediment, and Surface Water
at RVAAP-33 Load Line 6**

**Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio**

Contract No. W912QR-15-C-0046

Prepared for:



**US Army Corps
of Engineers®**

**U.S. Army Corps of Engineers
Louisville District**

Prepared by:



**Leidos
8866 Commons Boulevard, Suite 201
Twinsburg, Ohio 44087**

April 12, 2017

REPORT DOCUMENTATION PAGE					Form Approved OMB No. 0704-0188	
<p>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 Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. 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.</p> <p>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</p>						
1. REPORT DATE (DD-MM-YYYY) 12-04-2017		2. REPORT TYPE Technical		3. DATES COVERED (From - To) Nov 1978 to Apr 2017		
4. TITLE AND SUBTITLE Revised Final Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6 Former Ravenna Army Ammunition Plant Portage and Trumbull Counties, Ohio				5a. CONTRACT NUMBER W912QR-15-C-0046		
				5b. GRANT NUMBER NA		
				5c. PROGRAM ELEMENT NUMBER NA		
6. AUTHOR(S) Hebert, Craig				5d. PROJECT NUMBER NA		
				5e. TASK NUMBER NA		
				5f. WORK UNIT NUMBER NA		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Leidos 8866 Commons Boulevard Suite 201 Twinsburg, Ohio 44087				8. PERFORMING ORGANIZATION REPORT NUMBER 16-046(E)/052317		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) USACE - Louisville District U.S. Army Corps of Engineers 600 Martin Luther King Jr., Place PO Box 59 Louisville, Kentucky 40202-0059				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 This Proposed Plan for Load Line 6 presents to the public the physical characteristics, geology, and hydrogeology of Load Line 6. This plan summarizes nature and extent of contamination in soil, sediment, and surface water; contaminant fate and transport; and human health and ecological risk assessments. These evaluations indicate there are no chemicals of concern (COCs) that pose unacceptable risk. Therefore, this plan presents a recommendation of No Further Action (NFA) with respect to soil, sediment, and surface water to attain Unrestricted (Residential) Land Use to the public.						
15. SUBJECT TERMS proposed plan, no further action, land use, chemicals of concern						
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON	
a. REPORT	b. ABSTRACT	c. THIS PAGE			Nathaniel Peters, II	
U	U	U	U	42	19b. TELEPHONE NUMBER (Include area code) 502.315.2624	

CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

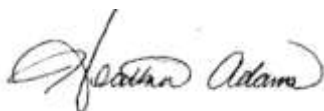
Leidos has completed the Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6 at the Former Ravenna Army Ammunition Plant, Portage and Trumbull Counties, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk 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 the customer's needs consistent with law and existing United States Army Corps of Engineers (USACE) policy. In addition, an independent verification was performed to ensure all applicable changes were made per regulatory and Army comments.



Craig Hebert, P.G.
Study/Design Team Leader

4/12/2017

Date



Heather Adams, P.G.
Independent Technical Review Team Leader

4/12/2017

Date

Significant concerns and the explanation of the resolution are as follows:

Internal Leidos Independent Technical Review comments are recorded on a Document Review Record per Leidos standard operating procedure ESE A3.1 Document Review. This Document Review Record is maintained in the project file. Changes to the report addressing the comments have been verified by the Study/Design Team Leader. As noted above, all concerns resulting from independent technical review of the project have been considered.



Lisa Jones-Bateman
Senior Program Manager

4/12/2017

Date



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

May 11, 2017

**Re: US Army Ravenna Ammunition PLT RVAAP
Remediation Response
Project Records
Remedial Response
Trumbull County
267000859117**

Mr. Mark Leeper
Restoration Program Manager
Army National Guard Directorate
ARNGD-ILE Clean Up
111 South George Mason Drive
Arlington, VA 22203

**SUBJECT: "RAVENNA ARMY AMMUNITION PLANT PORTAGE/TRUMBULL
COUNTIES, REVISED FINAL, PROPOSED PLAN FOR SOIL,
SEDIMENT, AND SURFACE WATER AT RVAAP-33 LOAD LINE 6,"
DATED APRIL 12, 2017**

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the "Revised Final, Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6" document for the Ravenna Army Ammunition Plant (RVAAP), Portage/Trumbull Counties. The document is dated and was received at the Northeast District Office (NEDO) on April 12, 2017. This letter serves to document Ohio EPA's approval regarding the proposal of No Further Action (NFA) for the RVAAP Load Line 6 site contained in the Revised Final Proposed Plan (PP).

Based on the information contained in the Revised Final PP document, other investigation documents/reports, and Ohio EPA's oversight participation during the investigation, Ohio EPA approves the Revised Final PP document for RVAAP Load Line 6 for NFA. As stated in the Revised Final PP, the Army will offer a public comment period and hold an open house/public meeting in the near future to present the conclusions and investigative findings for Load Line 6.

MR. MARK LEEPER
ARMY NATIONAL GUARD DIRECTORATE
PAGE 2

If you have any questions concerning the above, please feel free to contact Vicki Deppisch, NEDO, at (330) 963-1207.

Sincerely,



Michael Proffitt
Chief
Division of Environmental Response and Revitalization

VD/nvr

cc: Gail Harris/Rebecca Shreffler, Vista Sciences

ec: Mark Leeper, ARNGD, Arlington
Katie Tait/Kevin Sedlak, ARNG, Camp Ravenna
Tom Schneider, Ohio EPA, SWDO, DERR
Craig Coombs, USACE Louisville
Rod Beals, Ohio EPA, NEDO, DERR
Vanessa Steigerwald Dick, Ohio EPA, NEDO, DERR
Bob Princic, Ohio EPA, NEDO, DERR
Vicki Deppisch, Ohio EPA, NEDO, DERR
Bill Damschroder, Esq., Ohio EPA, Legal

Revised Final

**Proposed Plan
for Soil, Sediment, and Surface Water
at RVAAP-33 Load Line 6**

Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

Contract No. W912QR-15-C-0046

Prepared for:
United States Army Corps of Engineers
Louisville District

Prepared by:
Leidos
8866 Commons Boulevard, Suite 201
Twinsburg, Ohio 44087

April 12, 2017

DOCUMENT DISTRIBUTION
for the
Revised Final
Proposed Plan for Soil, Sediment, and Surface Water
at RVAAP-33 Load Line 6
Former Ravenna Army Ammunition Plant
Portage and Trumbull Counties, Ohio

Name/Organization	Number of Printed Copies	Number of Electronic Copies
Vicki Deppisch, Project Manager, Ohio EPA NEDO-DERR	1	3
Brian Tucker, Ohio EPA, CO-DERR	1	1
Bob Princic, Ohio EPA, NEDO-DERR	Email transmittal letter only	
Rod Beals, Ohio EPA, NEDO-DERR	Email transmittal letter only	
Tom Schneider, Ohio EPA, SWDO-DERR	Email transmittal letter only	
Mark Leeper, ARNG-IED Cleanup	0	1
Katie Tait, OHARNG, Camp Ravenna Kevin Sedlak, ARNG, Camp Ravenna	Email transmittal letter only	
Craig Coombs, USACE – Louisville District	Email transmittal letter only	
Nathaniel Peters II, USACE – Louisville District	1	1
Admin Records Manager – Camp Ravenna	2	2
Pat Ryan, Leidos-REIMS	0	1
Jed Thomas, Leidos	1	1
Leidos Contract Document Management System	0	1

ARNG = Army National Guard.

CO = Central Office.

DERR = Division of Environmental Response and Revitalization.

IED = Installation & Environment Division.

NEDO = Northeast District Office.

OHARNG = Ohio Army National Guard.

Ohio EPA = Environmental Protection Agency.

REIMS = Ravenna Environmental Information Management System.

SWDO = Southwest District Office.

USACE = U.S. Army Corps of Engineers.

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	RVAAP DESCRIPTION AND BACKGROUND.....	2
3.0	LOAD LINE 6 DESCRIPTION AND BACKGROUND.....	2
3.1	Site Description.....	2
3.2	Background.....	2
3.3	Potential Contaminants	3
4.0	REMEDIAL INVESTIGATIONS	3
4.1	Surface and Subsurface Soil.....	3
4.2	Sediment and Surface Water.....	4
4.3	Impacts to Groundwater.....	5
5.0	SCOPE AND ROLE OF RESPONSE ACTION	5
6.0	SUMMARY OF HUMAN AND ECOLOGICAL RISKS	6
6.1	Human Health Risk Assessment.....	6
6.2	Ecological Risk Assessment	6
7.0	CONCLUSIONS	7
8.0	COMMUNITY PARTICIPATION.....	7
8.1	Community Participation	7
8.2	Public Comment Period	7
8.3	Written Comments	7
8.4	Public Meeting	7
8.5	Army Review of Public Comments	7
	GLOSSARY OF TERMS	8
	REFERENCES	9

LIST OF FIGURES

Figure 1. General Location and Orientation of Camp Ravenna.....	13
Figure 2. Location of Load Line 6 at Camp Ravenna	15
Figure 3. Load Line 6 Site Features	17
Figure 4. Load Line 6 Sample Locations	18

LIST OF ATTACHMENTS

Attachment 1. Ohio EPA Comments and Responses
--

LIST OF ACRONYMS

AOC	Area of Concern
Army	U.S. Department of the Army
bgs	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CMCOPC	Contaminant Migration Chemical of Potential Concern
COC	Chemical of Concern
COPEC	Chemical of Potential Ecological Concern
ERA	Ecological Risk Assessment
EPC	Exposure Point Concentration
FPA	Former Production Area
FWCUG	Facility-wide Cleanup Goal
FWGWMP	Facility-wide Groundwater Monitoring Program
HHRA	Human Health Risk Assessment
HMX	Octahydro-1,3,5,7-tetranitro- 1,3,5,7-tetrazocine
HQ	Hazard Quotient
MRS	Munitions Response Site
Ohio EPA	Ohio Environmental Protection Agency
PBA08	2008 Performance-based Acquisition
PCB	Polychlorinated Biphenyl
PP	Proposed Plan
RDX	Hexahydro-1,3,5-trinitro-1,3,5- triazine
RI	Remedial Investigation
ROD	Record of Decision
RSL	Regional Screening Level
RVAAP	Ravenna Army Ammunition Plant
SRC	Site-related Contaminant
SVOC	Semi-volatile Organic Compound
TNT	2,4,6-Trinitrotoluene
TR	Target Risk
VOC	Volatile Organic Compound

THIS PAGE INTENTIONALLY LEFT BLANK.

1.0 INTRODUCTION

This Proposed Plan (PP) presents the conclusions and recommendations for soil, sediment, and surface water within the Load Line 6 area of concern (AOC) at the former Ravenna Army Ammunition Plant (RVAAP). The former RVAAP is now known as Camp Ravenna Joint Military Training Center, abbreviated as Camp Ravenna, and is located in Portage and Trumbull counties, Ohio (Figure 1). Load Line 6 is designated as AOC RVAAP-33. The U.S. Department of the Army (Army), in coordination with the Ohio Environmental Protection Agency (Ohio EPA), issues this PP to provide the public with information necessary to comment on the selection of an appropriate response action. The remedy will be selected for Load Line 6 after all comments submitted during the 30-day public comment period are considered. Therefore, the public is encouraged to review and comment on all alternatives presented in this PP.

The Army is issuing this PP as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, 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 (40 *Code of Federal Regulations* 300). Selection and implementation of a remedy will also be consistent with the requirements of the Ohio EPA *Director's Final Findings and Orders*, dated June 10, 2004.

This PP summarizes information that can be found in detail in the *Remedial Investigation Report for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6* (USACE 2016) and other documents contained in the Administrative Record file for Load Line 6.

The Army's preferred alternative at Load Line 6 is no further action for soil, sediment, and surface water. The Army encourages the public to review the site background documents to

Public Comment Period:

June 12, 2017 to July 12, 2017

Public Meeting:

The Army will hold an open house and public meeting to present the conclusions and additional details presented in the *Remedial Investigation Report for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6* (USACE 2016). Oral and written comments will also be accepted at the meeting. The open house and public meeting are scheduled for 6:00pm, June 27, 2017, at the Shearer Community Center, 9355 Newton Falls Road, Ravenna, Ohio 44266.

Information Repositories:

Information used in selecting the remedy is available for public review at the following locations:

Reed Memorial Library

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

Hours of operation:

9AM-9PM Monday-Thursday
9AM-6PM Friday
9AM-5PM Saturday
1PM-5PM Sunday

Newton Falls Public Library

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

Hours of operation:

10AM-8PM Monday-Thursday
9AM-5PM Friday and Saturday

Online

<http://www.rvaap.org/>

The **Administrative Record File**, containing information used in selecting the remedy, is available for public review at the following location:

Camp Ravenna Joint Military Training Center (former Ravenna Army Ammunition Plant)

Environmental Office
1438 State Route 534 SW
Newton Falls, Ohio 44444
(330) 872-8003

Note: Access is restricted to Camp Ravenna, but the file can be obtained or viewed with prior notice to Camp Ravenna.

gain a more comprehensive understanding of the AOC, activities that have been conducted to date, and the rationale for the preferred alternative.

2.0 RVAAP DESCRIPTION AND BACKGROUND

The facility, consisting of 21,683 acres, is federally owned and is located in northeastern Ohio within Portage and Trumbull counties, approximately 4.8 km (3 miles) east/northeast of the City of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the City of Newton Falls (Figure 1). The facility, previously known as RVAAP, was formerly used as a load, assemble, and pack facility for munitions production. As of September 2013, administrative accountability for the entire acreage of the facility has been transferred to the U.S. Property and Fiscal Officer for Ohio and subsequently licensed to the Ohio Army National Guard for use as a military training site (Camp Ravenna). References in this document to RVAAP relate to previous activities at the facility as related to former munitions production activities or to activities being conducted under the restoration/cleanup program.

3.0 LOAD LINE 6 DESCRIPTION AND BACKGROUND

3.1 Site Description

Load Line 6, formerly known as Fuze Line #2, is a 43-acre AOC located immediately south of Fuze and Booster Road at the intersection of Fuze and Booster Spur Road. The AOC is located in the south-central portion of Camp Ravenna, west of Load Line 5 and east of Load Line 8 (Figure 2).

Remaining features at Load Line 6 include a one-lane asphalt perimeter road that enters the AOC from the north that surrounded the former production buildings. Remnants of the Firestone Test Facility [Munitions Response Site (MRS) RVAAP-033-R-01] include the Shaped Charge Test Chamber foundation, Former Test Pond, concrete blocks around the pond, and access road to the pond. The perimeter fence at Load Line 6 is still in place, but it is not currently maintained. Small construction drainage ditches border the perimeter road.

Load Line 6 is currently overgrown with grass, trees, and scrub vegetation.

The topography at Load Line 6 is generally flat to gently sloping in the former production area (FPA) and slopes downwards towards the perennial drainage channel at the south-central side of the AOC. The elevation at the AOC averages 1,120 ft above mean sea level (Figure 3).

Surface water at Load Line 6 occurs intermittently as storm water runoff within constructed or natural drainage ditches or conveyances throughout the AOC. Surface water drainage generally follows the topography of the load line with drainage generally from the northern portion of the AOC towards the south. Perennial surface water at Load Line 6 is limited to the Former Test Pond located in the south-central portion of the AOC. The Former Test Pond is circular, approximately 35 ft in diameter, and has a maximum depth of 14 ft below ground surface (bgs).

A mixture of clay, clayey silt, sandy silt, sand, and silty sand overlies sandstone bedrock at Load Line 6, except where disturbed by RVAAP activities. During site investigations, bedrock was encountered at 13–20 ft bgs. Depth to groundwater averaged 11.5 ft bgs across the site and flows generally from east to southeast.

3.2 Background

From 1941–1945, Load Line 6 operated at full capacity as a finished product assembly line to produce fuzes for artillery projectiles. Load Line 5 also produced fuzes at this time. In total, Load Line 5 and Load Line 6 produced 19,257,297 miscellaneous fuzes.

Load Line 6 was deactivated at the end of World War II, and the process equipment was removed. From 1950–1970 Load Line 6 was used by the Firestone Tire and Rubber Company Defense Research Division for developing shaped charges for armor penetration. During that time, Firestone also

performed weapons experimentation towards the southern portion of the site. Three buildings located at the AOC were used for testing missiles and shaped charges. Additionally, a small pond (Former Test Pond) was installed near the buildings and was used as an underwater test chamber for testing shape charges and wire-guided missiles.

Physics International operated a pink water evaporation unit from 1981–1989 (historically designated as AOC RVAAP-14). The unit was closed under the Resource Conservation and Recovery Act regulations in 1989. From 1987–1989, effluent from the pink water treatment was discharged under a National Pollutant Discharge Elimination System permit to the George Road Sewage Treatment Plant (RVAAP-22).

Load Line 6 has not been used since 1989, and no historical information exists to indicate Load Line 6 was used for any other processes other than what is presented above (USACE 2016).

A total of 23 of the 27 production buildings were thermally decontaminated and demolished in 2002. The remaining four production buildings were demolished between 2005 and 2007 by conventional methods. All footers and floor slabs were removed to a minimum of 4 ft bgs.

3.3 Potential Contaminants

The 1978 Installation Assessment identified the major contaminants of the former RVAAP to be 2,4,6-trinitrotoluene (TNT); composition B [a combination of TNT and hexahydro-1,3,5-trinitro-1,3,5-triazine (also known as RDX)]; sulfates; nitrates; lead styphnate; and lead azide (USATHAMA 1978). Additional potential contaminants at Load Line 6 based on operation history include black powder, tetryl, RDX, potassium nitrate, mercury fulminate, pentaerythritol tetranitrate, antimony sulfide, lead thiocyanate, potassium chlorate, lead, cadmium, barium, mercury, and arsenic. Additionally, Octol [a mixture of TNT and Octahydro-1,3,5,7-tetranitro-1,3,5,7-

tetrazocine (HMX)] was processed and utilized at selected buildings and test chambers.

In summary, potential contaminants at Load Line 6 include explosives and inorganic chemicals (e.g., metals). Other potential contaminants at Load Line 6 include volatile organic compounds (VOCs) from former Building 2F-35, which was utilized for solvent storage, polychlorinated biphenyls (PCBs) from on-site transformers, and polycyclic aromatic hydrocarbons from former Building 2F-2 that was used as a heater house.

4.0 REMEDIAL INVESTIGATIONS

The AOC characteristics, nature and extent of contamination, and conceptual site model are based on investigations conducted from 1978–2014. The following environmental investigations have been conducted at Load Line 6:

- Installation Assessment (USATHAMA 1978);
- RCRA Facility Assessment (Jacobs 1989);
- Preliminary Assessment for the Characterization of Areas of Contamination (USACE 1996);
- Relative Risk Site Evaluation for Newly Added Sites (USACHPPM 1996);
- Phase I Remedial Investigation (RI) (MKM 2007);
- 2008 Performance-based Acquisition (PBA08) RI, as summarized in the *Remedial Investigation for Soil, Sediment, and Surface Water at the RVAAP 33 Load Line 6* (USACE 2016); and
- Military Munitions Response Program RI at RVAAP-033-R-01 Firestone Test Facility MRS (CB&I 2014).

4.1 Surface and Subsurface Soil

In surface soil (0–1 ft bgs) and subsurface soil (greater than 1 ft bgs), site-related contaminants (SRCs) and chemicals of potential concern were identified, as discussed below. Figure 4 shows the locations of samples included in the RI. Nine surface soil samples

from locations LL6ss-001 through LL6ss-009 were collected during the March 2002 azide screening event. None of the samples submitted for laboratory analysis reported explosives in excess of laboratory reporting limits.

In 2003, Phase I RI sampling was conducted at Load Line 6. Samples were collected from test trenches, surface and subsurface soil, surface water, sediment, and sub floors. Phase I RI field activities also assessed VOCs at a "Suspect VOC Disposal Pit". At the Suspect VOC Disposal Pit, none of the samples had VOCs detected during the field screening or laboratory analyses.

The results of the PBA08 RI sampling completed in 2010 were combined with the results of the Phase I RI to evaluate the nature and extent of contamination, assess potential future impacts to groundwater, conduct human health risk assessments (HHRAs) and ecological risk assessments (ERAs), and evaluate the need for remedial alternatives.

Ohio EPA identifies target risk (TR) of $1E-05$ as a cancer risk for carcinogens and an acceptable hazard quotient (HQ) of 1 for non-carcinogens. The evaluation summarized below was performed to assess which chemicals exceeded TR of $1E-05$, HQ of 1, and to establish which chemicals were above their respective background concentrations.

- All explosive, propellant, semi-volatile organic compound (SVOC), VOC, PCB, and pesticide concentrations were below a TR of $1E-05$, HQ of 1, or their respective background concentrations in surface or subsurface soil.
- The only metals that had concentrations that exceeded a TR of $1E-05$, HQ of 1, and their respective background concentrations were arsenic and manganese. However, arsenic and manganese were not identified as chemicals of concern (COCs) in the HHRA.
- Only 4 of 111 soil samples exceeded the arsenic subsurface background concentration. The exposure point

concentration (EPC) of arsenic in surface and subsurface soil was below the background concentration. Thus, arsenic is representative of background and is not a COC in soil.

- Only 2 of 111 soil samples exceeded the manganese surface soil background concentration of 1,450 mg/kg. None of the soil samples exceeded the subsurface background concentration of 3,030 mg/kg. The maximum concentration of 1,820 mg/kg was at sample location LL6ss-078. The EPC of manganese in surface and subsurface soil was below the background concentration. Thus, manganese is representative of background and is not a COC in soil.

4.2 Sediment and Surface Water

Sediment and surface water samples were collected from site drainage ditches, the Former Test Pond, potential exit points from the Fuze and Booster Hill area (which includes Load Lines 5 through 11), and near the southern boundary of Camp Ravenna to determine nature and extent.

The results of the samples taken from the drainage ditches are summarized below:

- No explosives, propellants, SVOCs, VOCs, pesticides, or PCBs were detected in sediment within the drainage ditches.
- Nitrocellulose and HMX were the only explosives/propellants detected in surface water and were at concentrations below laboratory reporting limits in surface water.
- The only inorganic chemical detected at a concentration that exceeded a TR of $1E-05$, HQ of 1, and its respective background concentration was cobalt. It was detected in surface water at a concentration of 0.0072 mg/L. The surface water sample was collected from a ditch that contains water for short periods only during precipitation or periods of snow melt. No surface water facility-wide cleanup goal (FWCUG) is available for cobalt;

therefore, the tap water regional screening level (RSL) of 0.006 mg/L was used for screening. Because the reported concentration in surface water only slightly exceeds the very conservative tap water RSL and is only present intermittently in a ditch, cobalt is not COC.

The results of the samples taken from the Former Test Pond are summarized below:

- Only one explosive (tetryl) was detected in sediment and one explosive (HMX) was detected in surface water. Both concentrations were detected below the laboratory reporting limits and were not considered HHRA COCs.
- All inorganic chemicals, SVOCs, VOCs, pesticides, and PCBs were at concentrations below a TR of 1E-05, HQ of 1, or their respective background concentrations.

The results of the samples taken from the potential exit points are summarized below:

- No SVOCs or PCBs were detected in sediment or surface water.
- Only low, estimated concentrations of VOCs (toluene at 0.00041J mg/kg in sediment at FWS-103 and gamma-chlordane at 0.000048J mg/L in surface water at FWS-101) were detected. Both concentrations were below laboratory reporting limits.
- No inorganic chemicals had concentrations above a TR of 1E-05, HQ of 1.
- No explosives or propellants were detected in sediment samples. HMX and RDX were detected in surface water at concentrations well below a TR of 1E-05, HQ of 1.

4.3 Impacts to Groundwater

The potential for soil and sediment contaminants to impact groundwater was evaluated in a fate and transport evaluation presented in the RI Report (USACE 2016). The fate and transport evaluation included an

analysis of leaching and migration from soil and sediment to groundwater. The modeling evaluated the potential for contaminants to leach from soil and sediment and impact groundwater beneath the AOC.

Modeling results indicated two contaminant migration chemicals of potential concern (CMCOPCs) in soil could potentially leach from soil and mix with groundwater beneath Load Line 6, resulting in concentrations above maximum contaminant levels, U.S. Environmental Protection Agency regional screening levels, and RVAAP groundwater FWCUGs. These two chemicals were selenium and naphthalene. No sediment CMCOPCs were identified during the evaluation.

Evaluation of modeling results with respect to current AOC groundwater data and model limitations indicated that identified soil SRCs (including selenium and naphthalene) are not currently influencing groundwater beneath the source areas and that predicted future impacts would be mitigated by factors such as chemical and biological degradation and lateral dispersivity. Based on the fate and transport evaluation, no contaminant migration chemicals of concern for soil or sediment were identified as impacting groundwater. The groundwater will be further evaluated under the Facility-wide Groundwater Monitoring Program (FWGWMP).

5.0 SCOPE AND ROLE OF RESPONSE ACTION

An evaluation using Resident Receptor (Adult and Child) FWCUGs was used to provide an Unrestricted (Residential) Land Use evaluation. Unrestricted (Residential) Land Use is considered protective for all categories of land use at Camp Ravenna, such as Military Training and Commercial/Industrial Land Use. Additional human health receptors associated with Camp Ravenna are the National Guard Trainee and Industrial Receptor. The response action evaluated alternatives to attain Unrestricted (Residential) Land Use for soil, sediment, and surface water.

Groundwater will be addressed under the RVAAP Facility-wide Groundwater AOC (RVAAP-66) as a separate decision. However, the selected remedy for soil at Load Line 6 must also be protective of groundwater.

6.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS

6.1 Human Health Risk Assessment

Using information presented in Section 4.0, an HHRA was performed to identify COCs and provide a risk management evaluation to determine if remediation is required under CERCLA based on potential risks to human receptors.

The media evaluated in the HHRA for the Resident Receptor (Adult and Child) were surface soil (0–1 ft bgs), subsurface soil (1–13 ft bgs), sediment, and surface water.

No COCs were identified in any of the media of concern for the Resident Receptor; therefore, the site is considered protective for Unrestricted (Residential) Land Use. Because the site is protective for Unrestricted (Residential) Land Use, it is also protective for Commercial/Industrial Land Use and Military Training Land Use.

6.2 Ecological Risk Assessment

The ecological habitat in Load Line 6 consists of 43 acres of mostly field (grasses) and shrubs with some forest. Load Line 6 also features surface water (e.g., Former Test Pond) near areas of contamination. This intermittent surface water flows in small drainage ditches bordering the roads and within the FPA. During most of the year, there is no water in the drainage ditches; however, there is sufficient precipitation at Camp Ravenna to maintain aquatic habitat.

The vegetation provides a habitat for birds, mammals, insects, and other organisms that typically require approximately 1 acre of habitat. The northern long-eared bat (*Myotis septentrionalis*; federally threatened) exists at

Camp Ravenna. There are no other federally listed species or critical habitats on Camp Ravenna. Load Line 6 has not been previously surveyed for federal- or state-listed species; however, there have been no documented sightings of state-listed, federally listed, threatened, or endangered species at the AOC (OHARNG 2014).

The Level I Scoping Level ERA presents important ecological resources on or near the AOC and evaluates the potential for current contamination to impact ecological resources. There is chemical contamination present in soil, sediment, and surface water at Load Line 6. This contamination was identified using RI data. Ecological resources at and near Load Line 6 were compared to the list of important ecological places and resources (USACE 2016). Based on the 39 criteria defining important places as identified by the Army and Ohio EPA, the Former Test Pond and nearby wetlands are important and significant ecological resources (USACE 2016). Because contamination is at or near the important resources, these findings invoked a requirement for a Level II ERA. The Level II ERA incorporated available data to identify integrated chemicals of potential ecological concern (COPECs). There are 19 integrated soil COPECs, five integrated sediment COPECs, and five integrated surface water COPECs that were identified in the Level II ERA at Load Line 6.

The soil, sediment, and surface water COPECs were further evaluated with technical and refinement factors agreed upon by the Army and Ohio EPA. The Level II ERA concluded that there are no chemicals requiring remediation or further evaluation to be conducted to protect the environment. Per the *Guidance for Conducting Ecological Risk Assessments* (Ohio EPA 2008), once the Level II assessment eliminates COPECs from further ecological evaluation, the ERA can be completed. No further action is recommended to be protective from an ecological perspective at Load Line 6.

7.0 CONCLUSIONS

The HHRA determined that no remediation is required to be protective for the Resident Receptor (Adult and Child). The ERA concluded that no chemicals require remediation or further evaluation to protect the environment. The fate and transport assessment determined chemicals in soil and sediment will not impact groundwater. Groundwater will be further evaluated under the FWGWMP. Accordingly, the Army, in coordination with Ohio EPA, is recommending no further action to attain Unrestricted (Residential) Land Use for soil, sediment, and surface water at Load Line 6.

This recommendation is not a final decision. The Army, in coordination with Ohio EPA, will select the remedy for Load Line 6 after reviewing and considering all comments submitted during the 30-day public comment period.

8.0 COMMUNITY PARTICIPATION

8.1 Community Participation

Public participation is an important component of the remedy selection. The Army, in coordination with Ohio EPA, is soliciting input from the community on the preferred alternative.

The comment period extends from June 12, 2017 to July 12, 2017. This period includes a public meeting at which the Army will present this PP. The Army will accept oral and written comments at this meeting.

8.2 Public Comment Period

The 30-day comment period is from June 12, 2017 to July 12, 2017, 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 PP.

The Army and Ohio EPA will consider all public comments before selecting a remedy.

During the comment period, the public is encouraged to review documents pertinent to Load Line 6.

This information is available at the Information Repository and online at www.rvaap.org. To obtain further information, contact Kathryn Tait of the Camp Ravenna Environmental Office at kathryn.s.tait.nfg@mail.mil.

8.3 Written Comments

If the public would like to comment in writing on this PP or other relevant issues, please deliver comments to the Army at the public meeting or mail written comments (postmarked no later than July 12, 2017).

POINT OF CONTACT FOR WRITTEN COMMENTS

Mailing Address:

**Camp Ravenna Joint Military Training
Center**

Environmental Office

Attn: Kathryn Tait

1438 State Route 534 SW

Newton Falls, Ohio 44444

E-mail Address:

kathryn.s.tait.nfg@mail.mil

8.4 Public Meeting

The Army will hold an open house and public meeting on this PP on June 27, 2017, at 6:00pm, in the Shearer Community Center, 9355 Newton Falls Road Ravenna, Ohio 44266 to accept comments.

This meeting will provide an opportunity for the public to comment on the proposed action. Comments made at the meeting will be transcribed.

8.5 Army Review of Public Comments

The Army will review the public's comments as part of the process in reaching a final

decision for the most appropriate action to be taken.

The Responsiveness Summary, a document that summarizes the Army's responses to comments received during the public comment period, will be included in the Record of Decision (ROD). The Army's final choice of action will be documented in the ROD.

The ROD will be added to the RVAAP Restoration Program Administrative Record and Information Repositories.

ADMINISTRATIVE RECORD FILE

Camp Ravenna Joint Military Training Center (former Ravenna Army Ammunition Plant)

Environmental Office
1438 State Route 534 SW
Newton Falls, Ohio 44444
(330) 872-8003

Note: Access is restricted to Camp Ravenna, but the file can be obtained or viewed with prior notice to Camp Ravenna.

INFORMATION REPOSITORIES

Reed Memorial Library

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

Hours of operation:
9AM-9PM Monday-Thursday
9AM-6PM Friday
9AM-5PM Saturday
1PM-5PM Sunday

Newton Falls Public Library

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

Hours of operation:
10AM-8PM Monday-Thursday
9AM-5PM Friday and Saturday

Online

<http://www.rvaap.org/>

GLOSSARY OF TERMS

Administrative Record: a collection of documents, typically reports and correspondence, generated during site investigation and remedial activities. Information in the Administrative Record represents the information used to select the preferred alternative.

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

Contaminant Migration Chemical of Concern (CMCOC): a chemical substance specific to an area of concern (AOC) that potentially poses significant potential to leach to groundwater at a concentration above human health risks goals. CMCOCs are typically further evaluated for remedial action.

Chemical of Concern (COC): a chemical substance specific to an AOC that potentially poses significant human health or ecological risks. COCs are typically further evaluated for remedial action.

Chemical of Potential Concern (COPC): a chemical substance specific to an AOC that potentially poses human health risks and requires further evaluation in the RI. COPCs are typically not evaluated for remedial action.

Chemical of Potential Ecological Concern (COPEC): a chemical substance specific to an AOC that potentially poses ecological risks and requires further evaluation in the RI. COPECs are typically not evaluated for remedial action.

Ecological Receptor: a plant, animal, or habitat exposed to an adverse condition.

Exposure Point Concentration (EPC): in accordance with the *RVAAP Facility-wide Human Health Risk Assessors Manual – Amendment 1* (USACE 2005), the EPC is the calculated 95% upper confidence limit of the mean concentration of a chemical or the maximum detected concentration of a chemical, whichever value is lowest.

Human Receptor: a hypothetical person, based on current or potential future land use, who may be exposed to an adverse condition. For example, the National Guard Trainee is considered the hypothetical person when evaluating Military Training Land Use at the former Ravenna Army Ammunition Plant (RVAAP).

National Oil and Hazardous Substances Pollution Contingency Plan (NCP): the set of regulations that implement CERCLA and address responses to hazardous substances and pollutants or contaminants.

Record of Decision (ROD): a signed legal record that describes the cleanup action or remedy selected for a site, the basis for selecting that remedy, public comments, and responses to comments.

Remedial Investigation (RI): 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.

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

Risk Assessment: an evaluation that determines potential harmful effects, or lack thereof, posed to human health and the environment due to exposure to chemicals found at a CERCLA site.

Sum-of-Ratio (SOR): to adjust for multiple chemicals, divide the standard for each COC by the number of COCs. The adjusted value can then be compared to the single chemical value, and each ratio summed. If the summed ratios are less than one, the applicable standards are met. If summed ratios exceed one, the applicable standards are not met.

Target Risk: the Ohio Environmental Protection Agency (2009) identifies 1E-05 as a target for cancer risk for carcinogens and an acceptable target hazard quotient of 1 for non-carcinogens.

Unrestricted (Residential) Land Use: A land use defined for the former RVAAP restoration that is considered protective for all three Land Uses at Camp Ravenna Joint Military Training Center. If an AOC meets the requirements for Unrestricted (Residential) Land Use, then the AOC can also be used for Military Training and Commercial/Industrial purposes.

REFERENCES

Jacobs (Jacobs Engineering Group, Inc.) 1989. *RCRA Facility Assessment, Preliminary Review/Visual Site Inspection Ravenna Army Ammunition Plant Ravenna, Ohio*. October 1989.

MKM (MKM Engineers, Inc.) 2007. *Characterization of 14 AOCs at Ravenna Army Ammunition Plant*. March 2007.

OHARNG (Ohio Army National Guard) 2014. *Integrated Natural Resources Management Plan at the Camp Ravenna Joint Military Training Center, Portage and Trumbull Counties, Ohio*. December 2014.

Ohio EPA (Ohio Environmental Protection Agency) 2004. *Director's Final Findings and Orders for the Ravenna Army Ammunition Plant*. June 2004.

Ohio EPA 2008. *Guidance for Conducting Ecological Risk Assessments*. Division of Emergency and Remedial Response. April 2008.

Ohio EPA 2009. *Technical Decision Compendium: Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for DERR Remedial Response Program*. August 2009.

USACE (U.S. Army Corps of Engineers) 1996. *Preliminary Assessment for the Characterization of Areas of Contamination at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. February 1996.

USACE 2005. *RVAAP Facility-wide Human Health Risk Assessors Manual – Amendment 1*. December 2005.

USACE 2016. *Remedial Investigation Report for Soil, Sediment, Surface Water at RVAAP-33 Load Line 6, Former Ravenna Army Ammunition Plant Portage and Trumbull Counties, Ohio*. June 2015.

USACHPPM (U.S. Army Center for Health Promotion and Preventive Medicine) 1996. *Relative Risk Site Evaluation for Newly Added Sites at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. Hazardous and Medical Waste Study No. 37-EF-5360-99. November. 1996.

USATHAMA (U.S. Army Toxic and Hazardous Materials Agency) 1978. *Installation Assessment of Ravenna Army Ammunition Plant*, Records Evaluation Report No. 132. 1978.

FIGURES

THIS PAGE INTENTIONALLY LEFT BLANK.

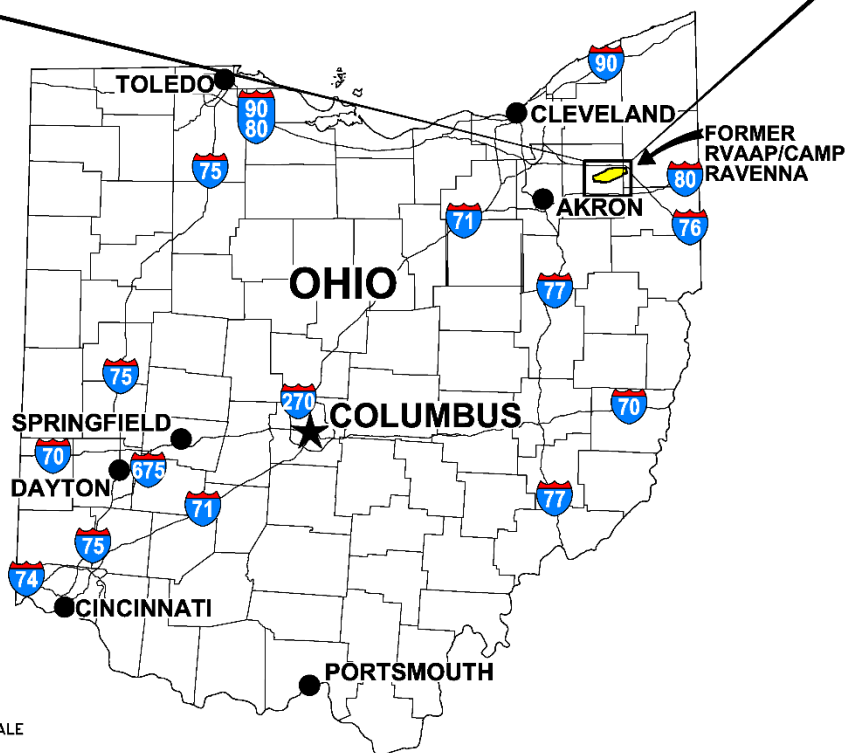
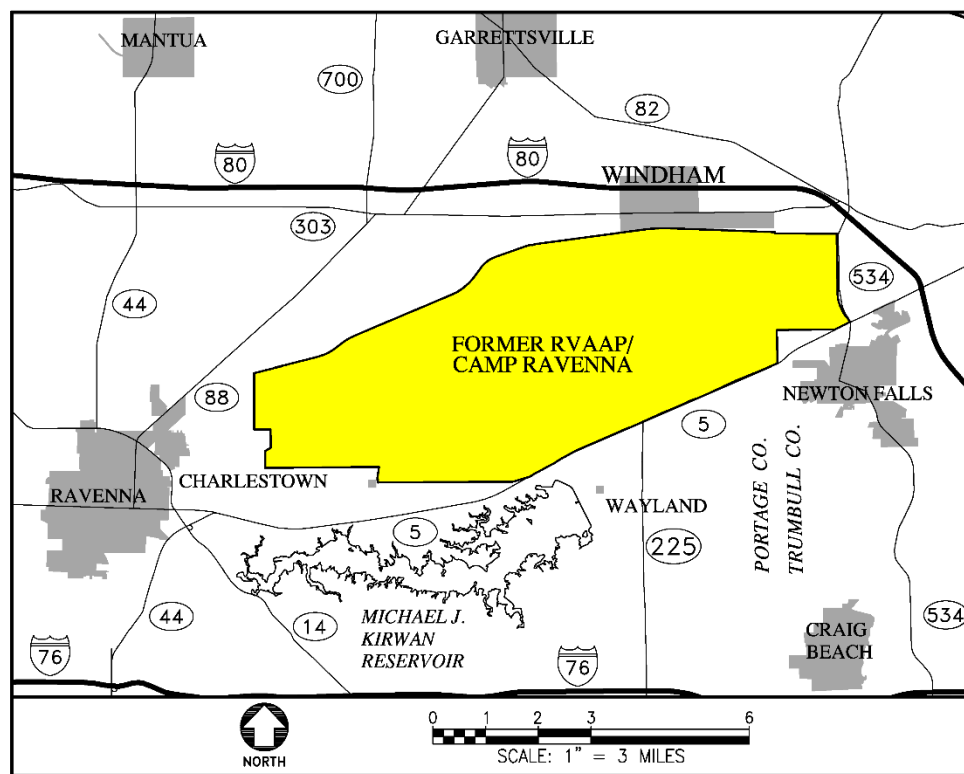


Figure 1. General Location and Orientation of Camp Ravenna

THIS PAGE INTENTIONALLY LEFT BLANK.

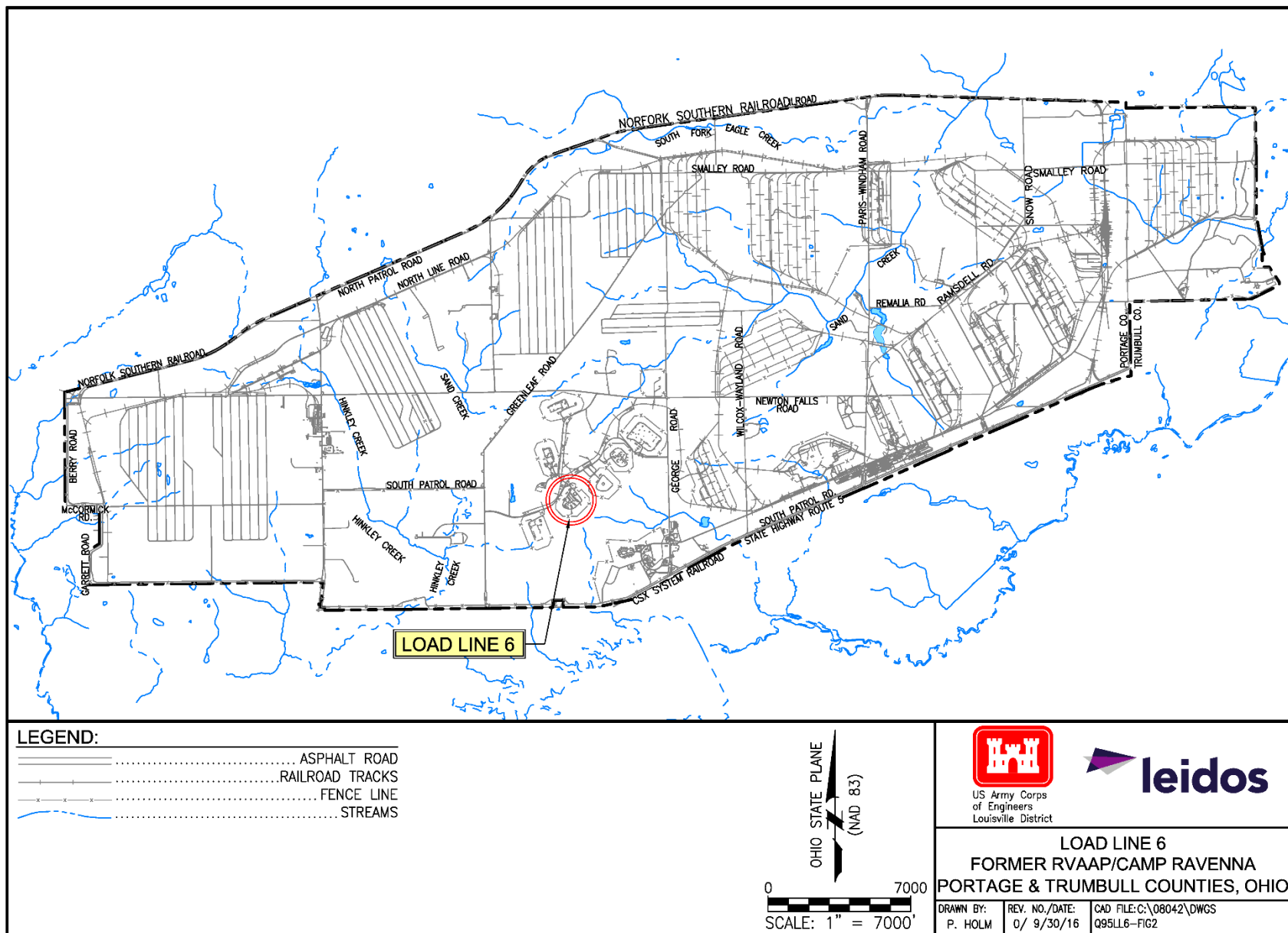


Figure 2. Location of Load Line 6 at Camp Ravenna

THIS PAGE INTENTIONALLY LEFT BLANK.

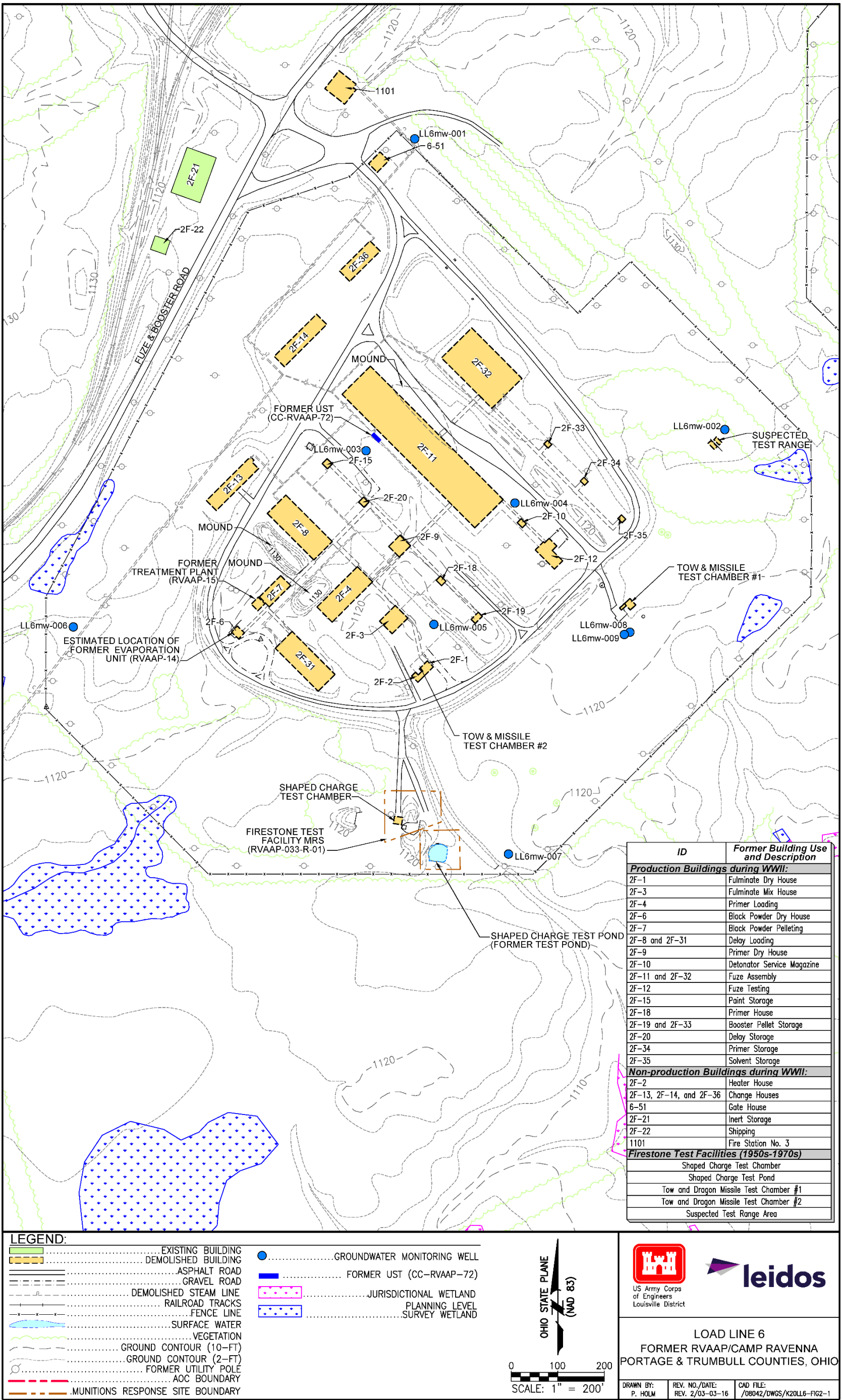


Figure 3. Load Line 6 Site Features

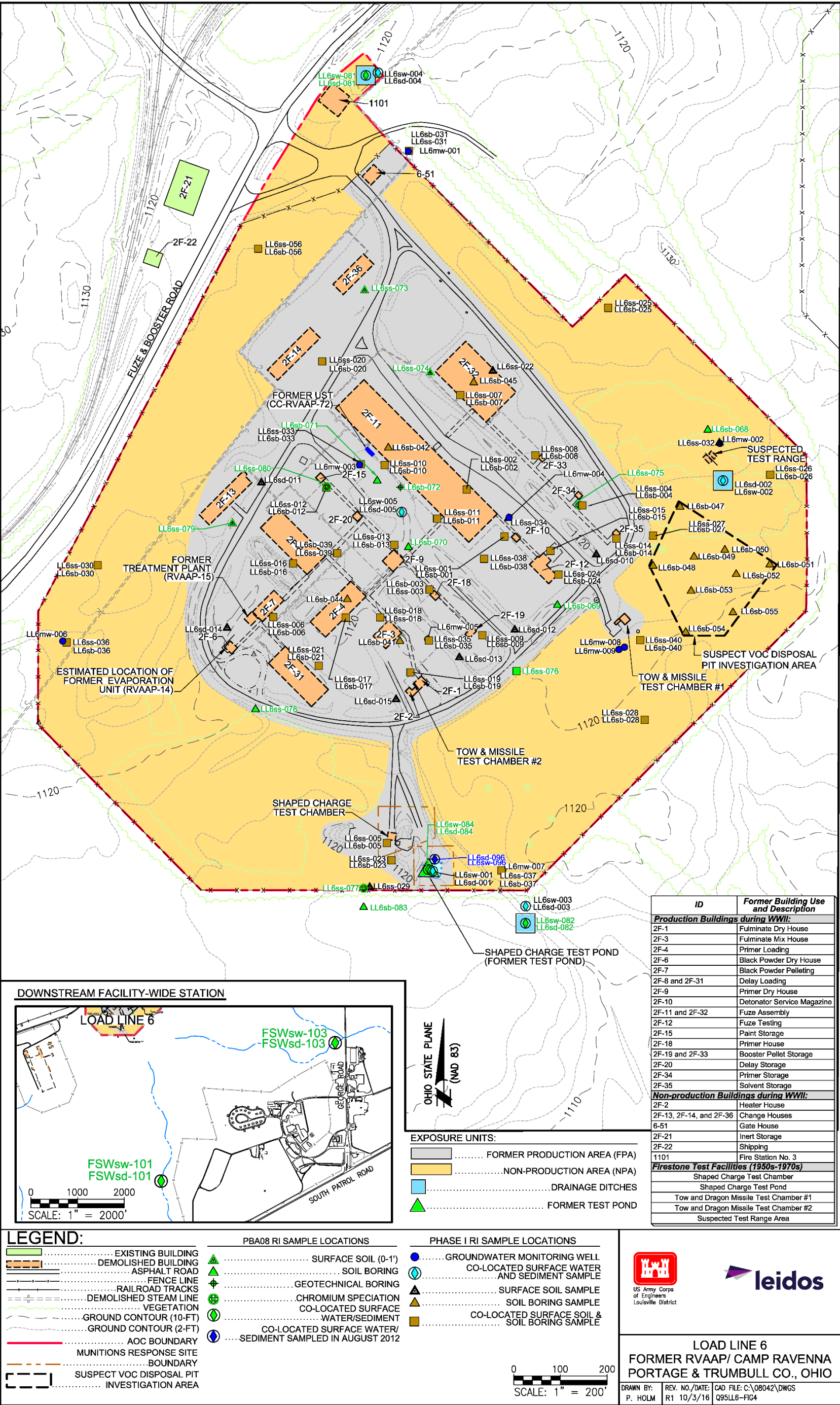


Figure 4. Load Line 6 Sample Locations

ATTACHMENT A

Ohio EPA Comments and Responses

THIS PAGE INTENTIONALLY LEFT BLANK.



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

March 6, 2017

Re: US Army Ammunition PLT RVAAP
Remediation Response
Project Records
Remedial Response
Portage County
267000859091

Mr. Mark Leeper
Acting Chief
Army National Guard Directorate
ARNGD-ILE Clean Up
111 South George Mason Drive
Arlington, VA 22204

Subject: Ravenna Army Ammunition Plant, Portage/Trumbull Counties. "Response to Ohio EPA Comment on the Draft, Proposed Plan, for Soil, Sediment, and Surface Water at RVAAP-33, Load Line 6" Letter, Dated February 27, 2017

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the "Response to Ohio EPA Comment on the Draft, Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6" letter for the Ravenna Army Ammunition Plant, Portage/Trumbull Counties. The letter is dated February 27, 2017 and was received at Ohio EPA, Northeast District Office (NEDO) on March 1, 2017.

The comment has been adequately addressed. Please forward the Final Proposed Plan for LL-6 to Ohio EPA and include the comment response.

It is the understanding of Ohio EPA that once the PPs for Load Lines 5, 6, 8, 11 are approved, a public meeting will be scheduled.

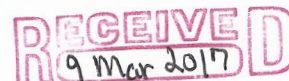
If you have any questions, please call me at (330) 963-1207.

Sincerely,

Vicki Deppisch
Hydrogeologist/Project Coordinator
Division of Environmental Response and Revitalization

VD/nvr

cc:	Katie Tait/Kevin Sedlak OHARNG RTLS Rebecca Shreffler, VISTA Sciences Corp.	Craig Coombs, USACE Gail Harris, VISTA Sciences Corp.
ec:	Mark Leeper, ARNG Rodney Beals, NEDO, DERR Nat Peters, USACE	Bob Princic, NEDO, DERR Tom Schneider, SWDO, DERR Vanessa Steigerwald-Dick, NEDO, DERR





NATIONAL GUARD BUREAU

111 SOUTH GEORGE MASON DRIVE
ARLINGTON VA 22204-1373

February 27, 2017

Ohio Environmental Protection Agency
DERR-NEDO
Attn: Ms. Vicki Deppisch
2110 East Aurora Road
Twinsburg, OH 44087-1924

Subject: Response to Ohio EPA Comment on the Draft Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6 for the Former Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties (Work Activity No. 267000859091)

Dear Ms. Deppisch:

The Army appreciates your review and comment letter (dated February 10, 2017) pertaining to the Draft Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6. Enclosed for your review and concurrence is the response to Ohio EPA's comment. Upon the final resolution, the Army will distribute the final version of this proposed plan.

Please contact the undersigned at (703) 607-7955 or mark.s.leeper.civ@mail.mil if there are issues or concerns with this submission.

Sincerely,

A handwritten signature in black ink, appearing to read "Mark Leeper", is positioned below the "Sincerely," text.

Mark Leeper
RVAAP Restoration Program Manager
Army National Guard Directorate

cc: Rodney Beals, Ohio EPA, NEDO-DERR
Robert Princic, Ohio EPA NEDO-DERR
Tom Schneider, Ohio EPA, SWDO-DERR
Vanessa Steigerwald-Dick, Ohio EPA, NEDO-DERR
Kevin Sedlak, ARNG, Camp Ravenna
Katie Tait, OHARNG, Camp Ravenna
Nat Peters, USACE Louisville
Craig Coombs, USACE Louisville
Gail Harris, Vista Sciences Corporation
Jed Thomas, Leidos

Subject: Ravenna Army Ammunition Plant (RVAAP) Restoration Program, Portage/Trumbull Counties, RVAAP-33 Load Line 6 Proposed Plan (Work Activity No. 267000859091)

Ohio EPA Comment:

- 1) Page 6, lines 86-89, regarding the ecological risk assessment: Please specify which Ohio EPA guidance document regarding ecological risk was used to provide “sufficient justification to recommend no further action to be protective of ecological receptors at Load Line 6.” Please add, where appropriate, to all forthcoming PPs and Decision Documents.

Army Response: Agree. The last paragraph of Section 6.2 (including page 6, lines 86-69) has been revised as presented below. This revision will be made to forthcoming proposed plans and decision documents, where appropriate.

“The soil, sediment, and surface water COPECs were further evaluated with technical and refinement factors agreed upon by the Army and Ohio EPA. The **Level II ERA** concluded that there are no chemicals requiring remediation or further evaluation to be conducted to protect the environment. **Per the *Guidance for Conducting Ecological Risk Assessments* (Ohio EPA 2008), once the Level II assessment eliminates COPECs from further ecological evaluation, the ERA can be completed. No further action is recommended to be protective from an ecological perspective at Load Line 6.**”

In addition, the following has been added to the References:

“Ohio EPA 2008. Guidance for Conducting Ecological Risk Assessments. Division of Emergency and Remedial Response. April 2008.”



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

February 10, 2017

**Re: US Army Ammunition PLT RVAAP
Remediation Response
Project Records
Remedial Response
Portage County
267000859091**

Mr. Mark Leeper
Restoration Program Manager
Army National Guard Directorate
ARNGD-ILE Clean Up
111 South George Mason Drive
Arlington, VA 22204

Subject: Ravenna Army Ammunition Plant, Portage/Trumbull Counties. "Draft, Proposed Plan, for Soil, Sediment, and Surface Water at RVAAP-33, Load Line 6," Dated January 13, 2017

Dear Mr. Leeper:

The Ohio Environmental Protection Agency (Ohio EPA) has received and reviewed the "Draft, Proposed Plan for Soil, Sediment, and Surface Water at RVAAP-33 Load Line 6" document for the Ravenna Army Ammunition Plant, Portage/Trumbull Counties. The Draft Proposed Plan (PP) is dated and was received at Ohio EPA, Northeast District Office (NEDO) on January 13, 2017.

Ohio EPA has one comment:

Page 6, lines 86-89, regarding the ecological risk assessment: Please specify which Ohio EPA guidance document regarding ecological risk was used to provide "sufficient justification to recommend no further action to be protective of ecological receptors at Load Line 6." Please add, where appropriate, to all forthcoming PPs and Decision Documents.

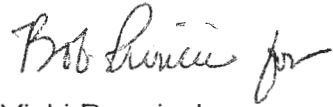
The above comment must be addressed to move forward with the PP for LL-6. It is the understanding of Ohio EPA that once the PPs for Load Lines 5, 6, 8, 11 are approved, a public meeting will be scheduled.

RECEIVED
15 Feb 2017

MR. MARK LEEPER
ARMY NATIONAL GUARD DIRECTORATE
FEBRUARY 10, 2017
PAGE 2

If you have any questions, please call me at (330) 963-1207.

Sincerely,

A handwritten signature in cursive script, appearing to read "Vicki Deppisch".

Vicki Deppisch
Hydrogeologist/Project Coordinator
Division of Environmental Response and Revitalization

VD/nvr

cc: Katie Tait/Kevin Sedlak OHARNG RTLS
Craig Coombs, USACE
Rebecca Shreffler/Gail Harris, VISTA Sciences Corp.

ec: Mark Leeper, ARNG
Bob Princic, Ohio EPA, NEDO, DERR
Rodney Beals, Ohio EPA, NEDO, DERR
Tom Schneider, Ohio EPA, SWDO, DERR
Nat Peters, USACE
Vanessa Steigerwald-Dick, Ohio EPA, NEDO, DERR

THIS PAGE INTENTIONALLY LEFT BLANK.