Final

Proposed Plan
for Soil and Dry Sediment at
Open Demolition Area #2 (RVAAP-04)

Ravenna Army Ammunition Plant
Ravenna, Ohio

February 2007

Contract No. GS-10F-0076J
Delivery Order No. W912QR-05-F-0033

Prepared for:

US Army Corps of Engineers®

United States Army Corps of Engineers
Louisville District

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

AOC	area of concern
BGS	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COC	constituent of concern
IRP	Installation Restoration Program
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
NGB	National Guard Bureau
ODA2	Open Demolition Area #2
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
ROD	Record of Decision
RTLS	Ravenna Training and Logistics Site
RVAAP	Ravenna Army Ammunition Plant
SVOC	semivolatile organic compound
USACE	U. S. Army Corps of Engineers
UXO	unexploded ordnance
VOC	volatile organic compound

1.0 INTRODUCTION

This Proposed Plan presents conclusions and recommendations for soil and dry sediment within Open Demolition Area #2 (ODA2) at the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio (Figure 1), and provides the rationale for this recommendation. The US Army, in consultation with the Ohio Environmental Protection Agency (Ohio EPA), issues this Proposed Plan. The Proposed Plan provides the public with information to comment upon the selection of an appropriate response action. The US Army, in consultation with Ohio EPA, will select the remedy for the area of concern (AOC) after reviewing and considering all comments during the 30-day public comment period. Therefore, the public is encouraged to review and comment on the conclusions and recommendations presented in this Proposed Plan.

The US Army is issuing this Proposed Plan as part of its public participation responsibilities under Section 117(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 and Section 300.430(f)(2) of the National Oil and Hazardous Substances Pollution Contingency Plan (40 *Code of Federal Regulations* 300). Selection and implementation of the remedy will also satisfy the requirements of the Ohio EPA Director's Final Findings and Orders, June 10, 2004.

The Proposed Plan summarizes information that can be found in greater detail in the Remedial Investigation (RI) Reports [U. S. Army Corps of Engineers (USACE) 1998 and 2005a], the Addendum to the Phase II RI (USACE 2006), and other documents contained in the Administrative Record file for ODA2. The US Army encourages the public to review these documents to gain a more comprehensive understanding of the AOC and activities that have been conducted to date.

Public Comment Period:
March 7, 2007, to April 5, 2007

Public Meeting:
The US Army will hold an open house and public meeting to explain the Proposed Plan and the conclusions and recommendations presented in the Remedial Investigations. Oral and written comments will also be accepted at the meeting. The open house and public meeting is scheduled for 6:00PM, March 13, 2007, at the Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio, 44444.

Information Repositories:
Information used in selecting the preferred alternative 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:
10AM – 8:45PM Monday – Friday
10AM – 5:45PM Saturday

Newton Falls Public Library
204 South Canal Street
Newton Falls, Ohio 44444
(330) 872-1282
Hours of operation:
9AM – 8PM Monday – Thursday
9AM – 5PM Friday and Saturday
12PM – 5PM Sunday

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

RVAAP
Building 1037
8451 State Route 5
Ravenna, Ohio 44266-9297
(330) 358-7311
Fax: (330) 358-7314
Note: Access is restricted to the RVAAP, but the file can be obtained or viewed with prior notice to RVAAP.

2.0 RVAAP AND AREA OF CONCERN BACKGROUND

RVAAP is approximately 4.8 km (3 miles) east-northeast of the city of Ravenna and approximately 1.6 km (1 mile) northwest of the city of Newton Falls. When the RVAAP Installation Restoration Program (IRP) began in 1989, RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a 2-year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683 acres. As of February 2006, a total of 20,403 acres of the former RVAAP have been transferred to the National Guard Bureau (NGB) and subsequently licensed to OHARNG for use as a military training site. The current RVAAP consists of 1,280 acres scattered throughout the Ravenna Training and Logistics Site (RTLS). The current RVAAP portions of the property are solely located within Portage County.

The RVAAP IRP includes investigation and cleanup related to past activities over the entire 21,683 acres of the former RVAAP. References to RVAAP in this document include the historical extent of RVAAP, which is the combined acreages of the current RTLS and RVAAP, unless otherwise specifically stated.

RVAAP is approximately 17.7 km (11 miles) long and 5.6 km (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east (Figure 1). RVAAP is surrounded by several communities: Windham on the north; Garrettsville 9.6 km (6 miles) to the northwest; Newton Falls 1.6 km (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 km (3 miles) to the south.

RVAAP was constructed in 1940 and 1941 for depot storage and ammunition assembly/loading and placed on standby status in 1950. Production activities were resumed during 1954 to 1957 and 1968 to 1972. Demilitarization activities, including disassembly of munitions and explosives melt-out and recovery, continued until 1992. When RVAAP was operational, the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. The only activities still being carried out at RVAAP are environmental restoration, ordnance clearance and infrequent demolition of any unexploded ordnance (UXO) discovered during investigation and remediation activities, and building decontamination and demolition.

ODA2 is situated in the central portion of the facility and is 25 acres in size (Figures 2 and 3). Starting in 1948, the US Army used ODA2 to detonate bombs, various caliber munitions, and off-specification bulk explosives that could not be destroyed through any other means due to their condition. Materials to be destroyed by open detonation were typically placed in pits excavated to depths of at least 4 ft, then covered with 2 ft of soil, and detonated. Following detonation, the site was searched for scrap metal, shrapnel, or any UXO. Munitions fragments and UXO items were sometimes found several thousand feet from the detonation site. Munitions fragments and UXO items have been found throughout ODA2. Collectively, these fragments and ordnance items are referred to as munitions and explosives of concern (MEC).

Other operations at this AOC included the burial of MEC and a munitions firing area. Known historical areas of operation within ODA2 include:

- Open Detonation Areas [including the Resource Conservation and Recovery Act (RCRA)-permitted unit] where, following detonation and the removal of metal pieces, the pits were backfilled, mulched, and seeded.

- Open Burning Area: From 1981 to 1986, the US Army used this area within the RCRA unit to thermally destroy explosives-contaminated sludges and residues from other RVAAP production areas.

- 40-mm Projectile Prototype Testing Range: The US Army fired projectiles into targets in this area.

- Three explosive storage bunkers, Buildings 1501, 1502, and 1503, respectively.

- Burial Sites 1 and 2: Burial Site 1 is located approximately 200 ft northeast of Building 1501 and is approximately 2 acres in size. Burial Site 2 is located approximately 100 ft north of Building 1503 and is approximately 1 acre in size. MEC was likely buried at both areas.

- Rocket Ridge: An MEC disposal area located along a 70-ft embankment northeast of Building 1503 overlooking Sand Creek. MEC exists at the ground surface in this part of the AOC.

ODA2 was identified as an AOC in the Preliminary Assessment (USACE 1996). The US Army completed a Phase I RI in 1998 (USACE 1998) and a Phase II RI in 2005 (USACE 2005a). The US Army completed a an Addendum to the Phase II RI in 2006 (USACE 2006).

ODA2 is managed as "Restricted Access" due to the presence of MEC. The area is closed to all normal training and administrative activities. Certain activities, such as security patrols, surveying, and sampling, may be conducted at ODA2 only after authorized personnel have been properly briefed on potential hazards. Individuals unfamiliar with the hazards are escorted by authorized personnel at all times while in the restricted area (USACE 2005a).

3.0 AREA OF CONCERN CHARACTERISTICS

Elevations across ODA2 range from approximately 1,017 to 1,071 ft above mean sea level. ODA2 is characterized by gently to steeply sloping topography. As shown in Figure 3, the AOC is bisected by Sand Creek. Structures at ODA2 include three above-ground explosive storage bunkers and gravel access and paved roads. Site access is restricted by a locked gate on the main access road that enters the site from the south.

Soil sampling during the RI phase identified explosives, propellants, and metals. Semivolatile organic compounds (SVOCs) and volatile organic compounds (VOCs) were either not detected or were present at low concentrations in surface soil [(0 to 1 ft below ground surface (BGS)]; however, some were detected in subsurface soils (1 to 3 ft BGS). Pesticides and polychlorinated biphenyls (PCBs) were either not detected in soil or were limited to low concentrations.

Some metals were detected in sediment samples from Sand Creek. SVOCs, VOCs, pesticides, and PCBs were either not detected or were limited to low concentrations at only a few sampling locations.

Groundwater samples contained site-related metals in all except three monitoring wells. Explosive compounds were detected in two wells. Only one SVOC and one VOC compound were detected in groundwater.

Groundwater contaminant migration was modeled as part of the RI. Modeling included evaluation of potential leaching of contaminants from soil to groundwater. Also, the potential for contaminants to migrate from sources to the AOC boundary was evaluated. Modeling results presented in the RI show some metals and explosive compounds may leach from soil to groundwater at concentrations above Ohio drinking water maximum contaminant levels. Migration of these contaminants beyond the AOC boundary is not expected to occur. Groundwater monitoring will continue to be conducted under the facility-wide monitoring program.

A facility-wide investigation of surface water near ODA2 (USACE 2005b) showed that surface water in Sand Creek traversing ODA2 exhibits full attainment for warm water habitat. This status in the Ohio Water Quality Standards means that the stream is functioning

well according to chemical, physical, and biological attributes. For example, at the sampling site downstream of ODA2 the following chemical, physical, and biological full attainment measures were observed and reported (USACE 2005b):

- no chemical concentrations exceeded Ohio Water Quality Standards (aquatic life maximum or average water quality criteria);
- the physical stream habitat was excellent;
- fish community indices are marginally good;
- macroinvertebrate community indices are very good; and
- there is no evidence of biological impairment.

Sediment samples were not chemically contaminated and all metals concentrations were below Ohio reference values in Sand Creek at stream mile 4.5, located approximately 1500 feet downstream of the eastern edge of ODA2. This is interpreted to mean that ODA2 is not releasing any chemicals or other influences that are negatively affecting the water quality of Sand Creek according to the Ohio Water Quality Standards in the joint U.S. Army and Ohio EPA study (USACE 2005b). Surface water monitoring may be conducted in the future if conditions warrant.

4.0 SCOPE AND ROLE OF RESPONSE ACTION

The US Army intends to transfer ODA2 to NGB for subsequent licensing to OHARNG. The intended future land use for ODA2 will be restricted access because of the presence of MEC. The area is currently closed to all normal training, recreational, and administrative activities. ODA2 is not currently a candidate for unrestricted release due to the presence of MEC. The preferred remedy is based on the intended future land use.

This Proposed Plan addresses soil and dry sediment at ODA2. Dry sediment is classified as being located within drainage swales and ditches outside of Sand Creek. Remediation of groundwater, surface water, and wet sediment within Sand Creek are not included in the scope of the Proposed Plan. These media will be addressed in a future action. However, the selected remedy for soil/dry sediment at ODA2 must be protective of these other media. Groundwater at ODA2 may also be monitored under the RVAAP Facility-Wide Groundwater Monitoring Program conducted in accordance with the Ohio EPA Director's Findings and Orders. Monitoring of surface water may be conducted in the future if conditions warrant.

Portions of ODA2 are known to contain MEC based on operational history and field observations. The potential exists for MEC to exist throughout most the AOC. Because of the unique hazards associated with MEC, response actions are regulated separately from environmental hazards at the federal level. The EPA Military Munitions Rule (40 CFR Part 266) addresses the management and response for MEC. The Department of Defense implements the regulations through the Military Munitions Response Program (MMRP), which is separate from IRP. MEC throughout ODA2 will be addressed under the MMRP. In addition, two specific areas of ODA2 known to contain MEC are not included in the scope of this Proposed Plan, but are subject to future actions under the MMRP and other regulatory programs:

- "Rocket Ridge" and adjacent areas along Sand Creek within ODA2.
- The RCRA-permitted open detonation/open burn unit located within ODA2 will be addressed separately in accordance with RCRA closure requirements or other program documentation.

5.0 SUMMARY OF HUMAN AND ECOLOGICAL RISKS

The human health risk assessment evaluated risks and hazards associated for one potential human receptor (Security Guard/Maintenance Worker) exposed to shallow surface soil (0 to 1 ft deep). The extensive presence of MEC prevents most activity at ODA2, including OHARNG training activities, and precludes unrestricted (residential) land use. Because of these issues, OHARNG training and residential land use receptors were not evaluated in the RI.

Total carcinogenic risk to a National Guard Security Guard/Maintenance Worker from all contaminants was calculated as 5.3E-06. This estimated risk is below the Ohio EPA target risk level of 1E-05 and at the lower end of the U.S. Environmental Protection Agency target risk range of 1E-06 to 1E-04. The chemical hazard index was 0.051, indicating no unacceptable hazard.

One metal (arsenic) was identified as a constituent of concern (COC) in surface soil for the Security Guard/Maintenance Worker at ODA2. This COC does not require remediation because the estimated exposure point concentration (EPC) for arsenic in soil at ODA2 (14 mg/kg) is less than the preliminary cleanup goal established for the Security Guard/Maintenance Worker (26 mg/kg) and the RVAAP background value (15 mg/kg).

The 25 acres of ecological habitats at ODA2 include old fields, woodlots, and grassy areas. The aquatic resource at ODA2 consists of Sand Creek that flows through the central portion of ODA2. These habitats support a variety of wildlife including vegetation, small and large mammals, birds, insects, and fish. There are currently no federally-listed species or critical habitat on RVAAP property. State-endangered, State-threatened, State species of concern, and State special interest species have been identified at RVAAP. ODA2 has not been previously surveyed for State-listed species; therefore, none have been documented at this site.

The ecological risk assessment for ODA2 evaluated risk to plants and animals from contaminants in soil, surface water, and sediment. Chemicals of potential ecological concern identified for these media include metals, one explosive, one pesticide, SVOCs, and one VOC. The Addendum to the Phase II RI (USACE 2006) presents a weight-of-evidence evaluation for ecological impacts and recommends that no quantitative ecological preliminary cleanup goals be developed at ODA2.

6.0 CONCLUSIONS AND RECOMMENDATIONS

ODA2 will be transferred to NGB for subsequent licensing to OHARNG and is not a candidate for unrestricted release. The extensive presence of MEC prevents most activity at ODA2, including most OHARNG training activities. As outlined in the Addendum to the Phase II RI (USACE 2006), no COCs in soil and dry sediment were identified for remediation for the National Guard Security Guard/Maintenance Worker. Therefore, no further action is protective of human health and environment based on current and reasonably foreseeable future use. The US Army, in consultation with Ohio EPA, is recommending no further action with respect to chemical contamination in soil/dry sediment at ODA2. MEC issues at ODA2 will be addressed under the MMRP. Interim use restrictions will be maintained at ODA2 until such time that final actions regarding MEC are completed under the MMRP. This recommendation is not a final decision. The US Army, in consultation with Ohio EPA, will select the remedy for this AOC after reviewing and considering all comments submitted during the 30-day public comment period.

7.0 COMMUNITY PARTICIPATION

7.1 Community Participation

Public participation is an important component of remedy selection. The US Army and Ohio EPA are soliciting input from the community on the preferred alternative. The comment period extends from March 7, 2007

to April 5, 2007. This period includes a public meeting at which the US Army will present the Proposed Plan as agreed to by Ohio EPA. The US Army will accept both oral and written comments at this meeting.

7.2 Public Comment Period

The 30-day comment period is from March 7, 2007 to April 5, 2007, and provides an opportunity for public involvement in the decision-making process for the proposed action. All public comments will be considered by the US Army and Ohio EPA before selecting the remedy. The public is encouraged to review and comment on this Proposed Plan. During the comment period, the public is encouraged to review documents pertinent to ODA2. This information is available at the Information Repository and online at www.rvaap.org. To obtain further information, contact the RVAAP Facility Manager.

7.3 Written Comments

If the public would like to comment in writing on the Proposed Plan or other relevant issues, please deliver comments to the US Army at the public meeting or mail written comments (postmarked no later than April 5, 2007).

7.4 Public Meeting

The US Army will hold an open house and public meeting on this Proposed Plan on March 13, 2007, at 6:00PM, in the Newton Falls Community Center, 52 East Quarry Street, Newton Falls, Ohio, 44444 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.

7.5 US Army Review of Public Comments

The US Army will review the public's comments as part of the process in reaching a final decision on the most appropriate action to be taken. A Responsiveness S ummary, a document that summarizes the US Army's responses to comments received during the public comment period, will be included in the Record of Decision (ROD). The US Army's final choice of action will be documented in the ROD. The ROD will be added to the RVAAP Administrative Record and Information Repositories.

ADMINISTRATIVE RECORD FILE

RVAAP
Building 1037
8451 State Route 5
Ravenna, Ohio 44266-9297
(330) 358-7311
Fax: (330) 358-7314

Note: Access is restricted to the Ravenna Army Ammunition Plant (RVAAP), but the file can be obtained or viewed with prior notice to RVAAP.

POINT OF CONTACT FOR WRITTEN COMMENTS

Facility Manager
Ravenna Army Ammunition Plant
Building 1037
8451 State Route 5
Ravenna, Ohio 44266-9297
Office: (330) 358-7311
Fax: (330) 358-7314

INFORMATION REPOSITORIES

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(330) 872-1282
Hours of operation:
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9AM – 5PM Friday and Saturday
12PM – 5PM Sunday

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. It is available for public review at RVAAP, Building 1037; call (330) 358-7311 for an appointment.

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.

Constituent of concern (COC): site-specific chemical substance that potentially poses significant human health or ecological risks. COCs are typically further evaluated for remedial action.

Exposure point concentration (EPC): The EPC is used in the human health and ecological risk assessments to quantify exposures for all or part of an area of concern. The EPC is the smaller value between the maximum detected concentration and the calculated 95% upper confidence limit (UCL_{95}) of the average concentration for the area.

Human receptor: a hypothetical person, based on current or potential future land use, who may be exposed to an adverse condition. For example, a Security Guard/Maintenance Worker is considered the human receptor in this Proposed Plan.

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

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

Remedial Action Objective (RAO): these specific goals, developed from the evaluation of ARARs, are to be protective of human health and the environment.

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.

Resource Conservation and Recovery Act (RCRA): a federal law that addresses the handling of hazardous waste.

Responsiveness Summary: a section of the ROD where the US Army 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.

Target Risk: the Ohio EPA (2004b) identifies 1E-05 as a target for cancer risk for carcinogens and an acceptable target hazard index of 1 for non-carcinogens.

Weight-of-evidence: a procedure for identifying, organizing, and evaluating or weighing various types, quantities, and qualities of information about natural resources, ecological risk from chemicals, and likely consequences of any remediation on those plants, animals, and ecological systems.

REFERENCES

Ohio EPA 2004. *Director's Final Findings and Orders in the matter of US Army, Ravenna Army Ammunition Plant.* June.

Ohio EPA, Division of Emergency and Remedial Response (DERR), 2004b. *Technical Decision Compendium: Human Health Cumulative Carcinogenic Risk and Non-carcinogenic Hazard Goals for DERR Remedial Response and Office of Federal Facility Oversight*. April 28, 2004.

USACE (U. S. Army Corps of Engineers) 1996. *Preliminary Assessment for the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA62-94-D-0029, Delivery Order 0009, February.

USACE 1998. *Phase I Remedial Investigation Report for the Phase I Remedial Investigation of High Priority Areas of Concern at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, DACA-62-94-D-0029, Delivery Order Nos. 0010 and 0022, Final, February.

USACE 2005a. *Phase II Remedial Investigation Report for the Open Demolition Area #2 (RVAAP-04) at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, GS-10F-0076J, Delivery Order W912QR-05-F-0033, Final, September.

USACE. 2005b. *Facility-wide Biological and Surface Water Quality Study 2003, Ravenna Army Ammunition Plant. Part 1 -- Streams and Part 2 -- Ponds. USACE, Louisville District, with Ohio Environmental Protection Agency, Division of Surface Water*. Pp. 144 and appendices.

USACE 2006. *Addendum to the Phase II Remedial Investigation Report for Open Demolition Area #2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, GS-10F-0076J, Delivery Order W912QR-05-F-0033, Final, September 2006.

FIGURES

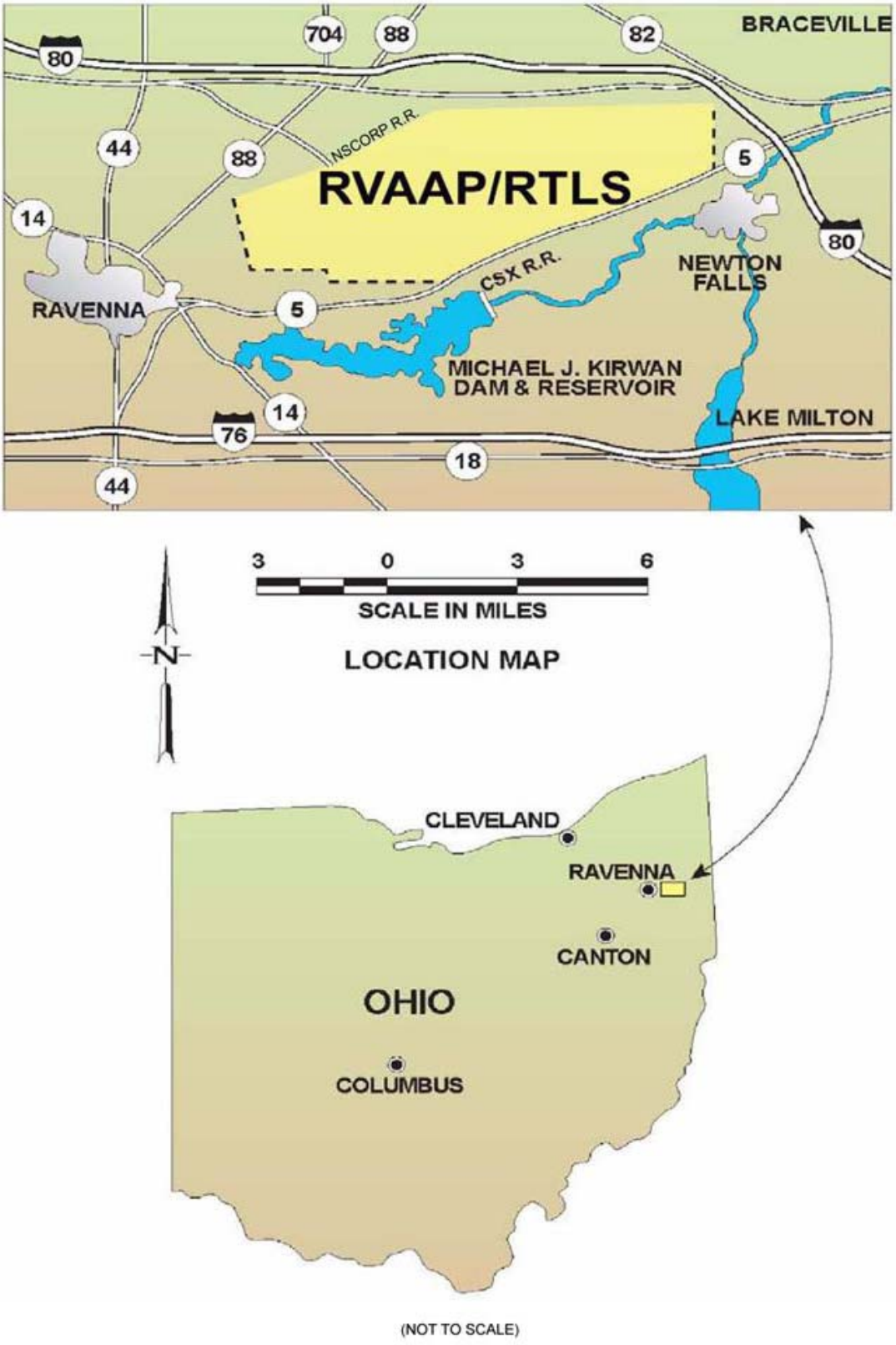

Figure 1. General Location and Orientation of RVAAP/RTLS

Figure 2. RVAAP/RTLS Installation Map

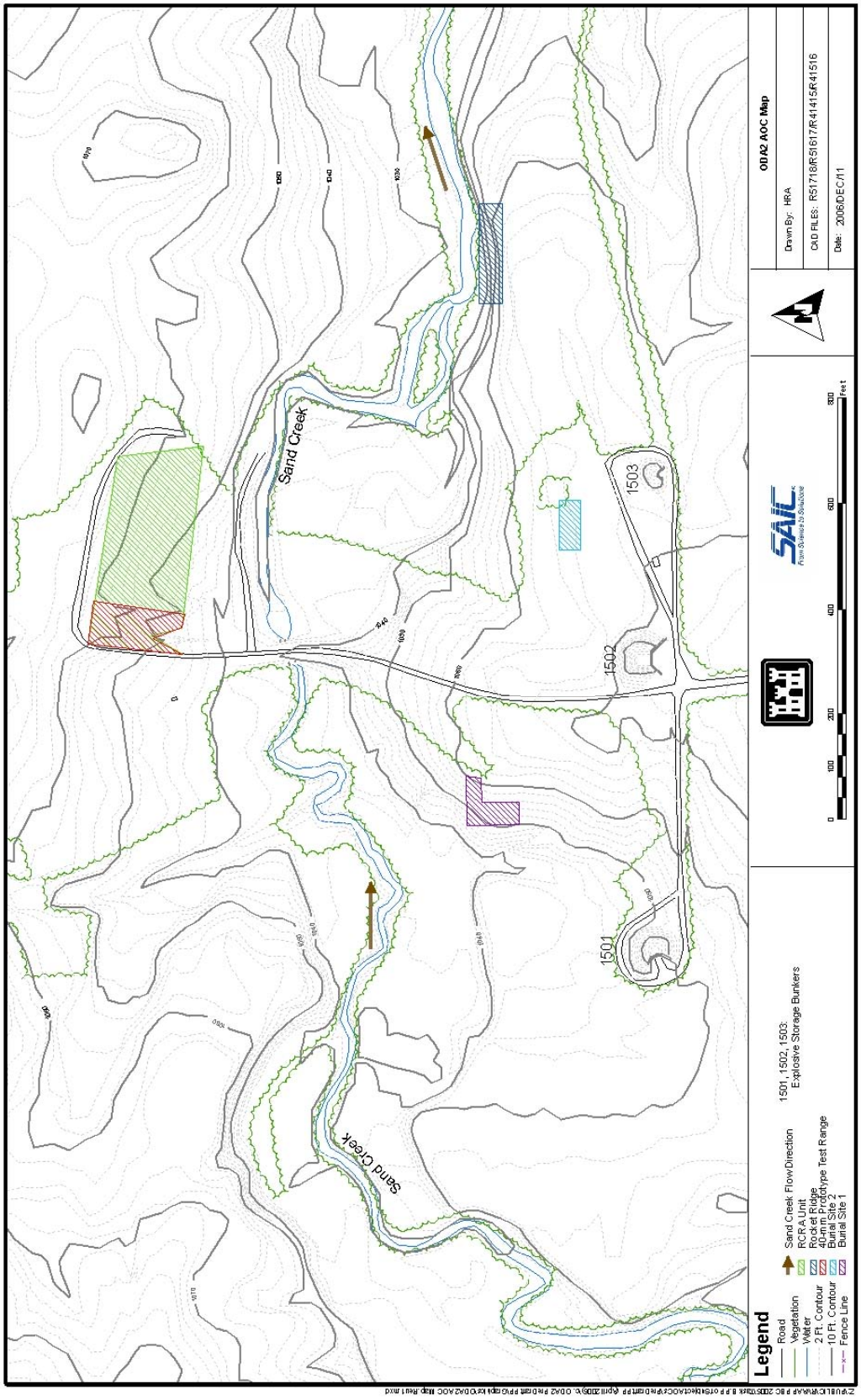

Figure 3. Open Demolition Area #2 Area of Concern Map