-FINAL-

INTERIM RECORD OF DECISION FOR THE REMEDIATION OF SOILS AT LOAD LINES 1 THROUGH 4 AT THE RAVENNA ARMY AMMUNITION PLANT

RAVENNA, OHIO

January 2007

prepared by
U.S. Army Corps of Engineers, Louisville District Office

with technical assistance from
Shaw Environmental, Inc.
Under Contract No. DACA45-03-D-0026

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ACRONYMS AND ABBREVIATIONS

AOC	Area of concern
ARAR	applicable or relevant and appropriate requirement
Army	United States Army
BERA	Baseline Ecological Risk Assessment
bgs	Below ground surface
BMPs	Best management practices
BRACD	U.S. Army Base Realignment and Closure Division
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
COC	chemical of concern
COEC	Chemical of ecological concern
COPC	Chemical of potential concern
COPEC	Chemical of potential ecological concern
cy	Cubic yard (yd^3)
DoD	U.S. Department of Defense
DOT	U.S. Department of Transportation
FFS	Focused Feasibility Study
FS	Feasibility Study
GOCO	Government-owned, contractor-operated
HI	Hazard Index
ILCR	Incremental lifetime cancer risk
IRP	Installation Restoration Program
kg	kilogram
LLs 1-4	Load Lines 1 through 4
mg	milligram
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NGB	National Guard Bureau
NPL	National Priorities List
O&M	operation and maintenance
OAC	Ohio Administrative Code
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
ORC	Ohio Revised Code
OSHA	Occupational Safety and Health Administration
PAHs	Polynuclear aromatic hydrocarbons
PCBs	Polychlorinated Biphenyls
PRG	Preliminary Remediation Goal

ACRONYMS AND ABBREVIATIONS (CONTINUED)

QA/QC	Quality Assurance/Quality Control
RAB	Restoration Advisory Board
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RDX	cyclotrimethylenetrinitramine
RI	Remedial Investigation
ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
SDS#	Soil and Dry Sediment Alternative #
SERA	Screening Ecological Risk Assessment
SVOCs	Semivolatile Organic Compounds
TAL	Target analyte list
TC	Toxicity characteristic
TCLP	Toxicity characteristic leaching procedure
TNT	2,4,6-trinitrotoluene
TSCA	Toxic Substances Control Act of 1976
USEPA	U.S. Environmental Protection Agency
VOCs	Volatile organic compounds

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PART I. DECLARATION

A. SITE NAME AND LOCATION

Ravenna Army Ammunition Plant (RVAAP), Ravenna, Portage County, Ohio.

Areas of Concern (AOCs): Load Lines 1 through 4 (LLs 1-4), Surface and Subsurface Soils and Dry Sediment. LLs 1-4 are identified in the Army Environmental Database for Restoration as RVAAP-08, RVAAP-09, RVAAP-10 and RVAAP-11, respectively.

The U.S. Environmental Protection Agency (USEPA) Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Identifier for RVAAP is OH5210020736.

B. STATEMENT OF BASIS AND PURPOSE

This Interim Record of Decision (ROD) presents the Selected Remedy for surface and subsurface soils and dry sediment that are currently exposed at LLs 1-4 at RVAAP in Ravenna, Ohio. The Selected Remedy was chosen in accordance with the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, as amended, 42 U.S.C. § 9601-9675. This decision is based on information contained in the Administrative Record file for LLs 1-4 at RVAAP and has been made by the United States Army (Army) with the approval of Ohio Environmental Protection Agency (Ohio EPA).

Work under this Interim ROD is also subject to the terms and conditions as set forth in the agreement between the Ohio Environmental Protection Agency and the Army entitled Ravenna Army Ammunition Plant - Director's Final Finding and Orders, June 2004 (Ohio EPA, 2004b).

C. ASSESSMENT OF THE SITE

The response action selected in this Interim ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

D. DESCRIPTION OF THE SELECTED REMEDY

The remedy described in this document addresses the remediation of surface and subsurface soils and dry sediment that are currently accessible at LLs 1-4 at RVAAP with concentrations of Chemicals of Concern (COCs) exceeding the clean-up goals. Although the sequence and timing for conducting remedial action at LLs 1-4 has not yet been determined, it is likely that remediation will begin at LL 1 and end at LL 4 with overlap due to the use of shared resources. Other COC-impacted media at LLs 1-4 and other AOCs at RVAAP will be managed as separate actions by the Army.

The selected remedy addresses surface and subsurface soils and dry sediment, the source materials constituting principal threats at LLs 1-4 at RVAAP, through removal and off-site disposal. The major components of the Selected Remedy, Alternative Soil and Dry Sediment 3

(SDS3) – Excavation and Off-Site Disposal, include the following (descriptions of this and other remedial alternatives are presented in Sections II.I and II.J of this Interim ROD):

- Excavation of discrete areas of contaminated surface and subsurface soils and dry sediment with concentrations of contaminants exceeding clean-up goals;
- Temporary on-site storage via stockpiling for characterization;
- Off-site disposal of soils at a permitted solid waste landfill and, as needed, disposal at a Toxic Substances Control Act (TSDA) and/or Resource Conservation and Recovery Act (RCRA) permitted hazardous waste landfill;
- Replacement of excavated material with clean compacted backfill;
- Groundwater monitoring to ensure the Selected Remedy did not impact groundwater;
- Maintenance of building slabs and foundations; and
- Five-year reviews.

E. STATUTORY DETERMINATIONS

The Selected Remedy is protective of human health and the environment, complies with Federal and State laws and regulations that are applicable or relevant and appropriate to the remedial action, is cost effective, and utilizes permanent solutions to the maximum extent practicable.

The remedy does not satisfy the statutory preference for treatment. The treatment technologies evaluated for soils were not found to be acceptable for implementation at LLs 1-4 at RVAAP. Multiple treatment technologies would have been required in succession to address the combinations of COCs present in the majority of surface and subsurface soils and dry sediment at LLs 1-4 which would have been cost prohibitive. Some other treatment technologies were not consistent with the planned future land use.

Because this remedy will result in COCs remaining on-site above concentrations that allow for unrestricted use and exposure, five-year reviews will be performed in compliance with CERCLA Section 121 (c) to ensure that the remedy remains protective of human health and the environment.

F. INTERIM ROD DATA CERTIFICATION CHECKLIST

The following provides the location of key remedy selection information contained in Interim ROD Part II, Decision Summary. Additional information can be found in the Administrative Record file for this site.

Interim ROD Data Checklist Item	Interim ROD Section	Page
COCs and their respective concentrations.	II.E	7
Baseline risk represented by the COCs.	II.G	9
Clean-up goals established for COCs and the basis for these goals.	II.H	10
How source materials constituting principal threats are addressed.	II.K	21
Current and reasonably anticipated future land use assumptions used in the baseline risk assessment and Interim ROD.	II.F	9
Potential land use that will be available at the site as a result of the Selected Remedy.	II.L.4	26
Estimated capital, annual operation and maintenance (O&M), and the total present worth costs, discount rate, and the number of years over which the remedy cost estimates are projected.	II.L.3	25
Key factor(s) that led to selecting the remedy.	II.L.1	21

G. AUTHORIZING SIGNATURES

James B. Balocki
Colonel, GS
Chief, Base Realignment and Closure Division

4 · JUN · 07
Date

Signature of the Director, Ohio EPA represents support agency acceptance of the remedy.

Chris Korleski
Director
Ohio EPA

7/3/07
Date

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PART II. DECISION SUMMARY

A. SITE NAME, LOCATION, AND DESCRIPTION

RVAAP is a government-owned, contractor-operated (GOCO) facility. The U.S. Army Base Realignment and Closure Division (BRACD) controls environmental AOCs and is responsible for completing their clean-up. Land and some existing facilities in non-AOC areas at RVAAP are used by the Ohio Army National Guard (OHARNG) for training purposes under an operating license issued by the National Guard Bureau (NGB). As it is remediated, remaining acreage will be transferred from BRACD to the NGB. Ohio EPA is the lead regulatory agency for the remediation conducted by the Army under the U.S. Department of Defense (DoD) Installation Restoration Program (IRP). The USEPA CERCLIS Identifier for RVAAP is OH5210020736.

RVAAP is located in northeastern Ohio within east-central Portage County and southwestern Trumbull County (Figure 1). The installation consists of 21,683 acres contained in an 11-mile long, 3.5-mile wide tract, bounded by State Route 534 on the east; State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garretsville and Berry roads on the west; and the CONRAIL Railroad on the north. Surrounding communities include: Windham, Garrettsville, Charlestown, and Wayland. Population data is provided in Table 1.

Table 1. Primary Population Data in the Vicinity of RVAAP

Locality	2000 Census Population
Portage County	152,061
Trumbull County	225,116
Ravenna	11,771
Newton Falls	5,002

RVAAP includes areas for industrial operations, burning, demolition, and testing of ordnance and explosives. For this Interim ROD, the AOC at RVAAP consists of LLs 1-4 and the media of surface and subsurface soils and dry sediment. (Other media within LLs 1-4 – groundwater, surface water, wet sediment and soils under existing building slabs - are being addressed as separate actions by the Army. Other AOCs, outside of LLs 1-4, are not included in this Interim ROD.)

Figure 2 shows the location of LLs 1-4 along the southeastern side of RVAAP. Figures 3 through 6 show the layout of buildings (and former buildings) and walkways at each of these four load lines.

B. SITE HISTORY AND ENFORCEMENT ACTIVITIES

Industrial operations at RVAAP primarily consisted of 12 munitions assembly facilities referred to as “load lines.” LLs 1-4 were used between 1941 and 1971 to melt and load trinitrotoluene (TNT) and Composition B (a mixture of TNT and cyclotrimethylenetrinitramine (RDX)) into large-caliber shells. The operations of the load lines produced explosive dust, spills, and vapors that collected on the floors and walls of each building. Periodically the floors and

walls would be cleaned with water and steam. The liquid, containing TNT and Composition B, was known as “pink water” for its characteristic color.

Various industrial operations associated with the munitions loading process and munitions rehabilitation activities were also conducted during the operation of LLs 1-4. As a result of these operational activities, soils, sediment and other media became contaminated with explosives.

RVAAP has been inactive since 1992. The only activity still being carried out from the wartime era is the infrequent demolition of unexploded ordnance found at the Site. The Army has completed the salvage activities and demolition of buildings at LL 1 and has begun these activities at LLs 2-4.

In 1951, soils contaminated with accumulated explosives were removed from LL 1 and replaced with clean fill. No other remedial actions, except salvage and building demolition activities, have been conducted at LLs 1-4 to date.

The results of site investigations for LLs 1-4 are presented in the Phase II Remedial Investigation (RI) reports that were finalized between March and June 2004 (SAIC, 2004; Shaw, 2004a, 2004b, 2004c). The results of a small supplemental investigation activity conducted at LLs 1-4 were presented in the Focused Feasibility Study (FFS) completed in May 2005 (Shaw, 2005a).

No violations have been cited under Federal or State environmental regulations or statues for LLs 1-4. No CERCLA enforcement activities have been issued nor lawsuits filed pertaining to clean-up of LLs 1-4.

C. COMMUNITY PARTICIPATION

The Proposed Plan for the Remediation of Soils at LLs 1-4 at RVAAP was released to the public in July 2005 (Shaw, 2005b). This document and other project related documents were made available to the public in the Administrative Record maintained at RVAAP in Ravenna, Ohio and in the two Information Repositories at Reed Memorial Library in Ravenna, Ohio and Newton Falls Public Library in Newton Falls, Ohio. The notice of availability for the Proposed Plan was published in the *Warren Tribune*, *Akron Beacon Journal*, and *Record Courier*. A 30-day public comment period was held from July 12, 2005 through August 10, 2005. In addition, a special public meeting was held on August 1, 2005. At this meeting, representatives from Shaw Environmental, Inc., the contractor for the Army for this task, provided information and answered questions about soil contamination at LLs 1-4 at RVAAP and the Preferred Alternative for remediation. A transcript of the public meeting is available to the public and has been included in the Administrative Record file and Information Repositories. Responses to the verbal and written comments received at this meeting and during the public comment period are included in the Responsiveness Summary, which is Part III of this Interim ROD.

The Army considered public input from the public meeting on the Proposed Plan in selecting the remedial alternative to be used for surface and subsurface soils and dry sediment at LLs 1-4 at RVAAP.

The Army established a Restoration Advisory Board (RAB) in 1996 to promote community involvement in the DoD environmental clean-up activities and allow the public to review and

discuss the progress with decision makers. Quarterly meetings are open to the public. A Community Relations Plan, available in the Administrative Record file, was prepared in September 2003 to establish processes to keep the public informed of activities at RVAAP (USACE, 2003). Additionally, the Army established an internet website for RVAAP which is accessible to the public at www.rvaap.org. Through this community relations program, the Army and Ohio EPA have interacted with the public through news releases, public meetings, reading materials, direct mailings, the internet website, and receiving and responding to public comments.

D. SCOPE AND ROLE OF RESPONSE ACTION

The overall program goal of the IRP is to clean up previously contaminated lands to an acceptable level of risk at RVAAP as resources and mission requirements allow, with primary emphasis on those areas that may impact human health and the environment. RVAAP includes 51 AOCs, several of which are complete. Based on sampling results conducted during a Relative Risk Site Evaluation in 1996 by the U.S. Army Center for Health Promotion and Preventative Medicine, 11 of the AOCs were identified as high priority, including LLs 1-4 (USACE, 1998). The Army will complete the required clean-up at LLs 1-4 so that these areas can be turned over to the OHARNG for training activities. The specific activities addressed by this Interim ROD include the remediation of surface and subsurface soils and dry sediment that are currently exposed with concentrations of COCs exceeding the clean-up goals established for LLs 1-4. Thus, the remedy described in this document does not address other potentially contaminated media in LLs 1-4 at RVAAP. The remedial action described in this Interim ROD is consistent with the stated future action(s) to be performed at RVAAP. Other COC-impacted media at LLs 1-4 and other AOCs at RVAAP will be managed as separate actions by the Army and will be considered under separate RODs.

This Interim ROD addresses the contaminated surface and subsurface soils and dry sediment at LLs 1-4 at RVAAP. The contamination present at LLs 1-4 at RVAAP poses a potential risk to human health because the COC concentrations exceed the site-specific clean-up goals. Implementation of the remedy described in this Interim ROD will address a principal threat at the site through removal and off-site disposal of contaminated soils.

E. NATURE AND EXTENT OF CONTAMINATION

This summary of the nature and extent of contaminated surface and subsurface soils and dry sediment is based on the RIs for LLs 1-4 (SAIC, 2004; Shaw, 2004a, 2004b, 2004c). Contamination of other media and other AOCs are known to be present at RVAAP; however, those media and AOCs are being addressed separately from this Interim ROD.

Evaluation of data collected for LLs 1-4 during the Phase I and II RIs shows that historical operations have resulted in contamination of surface and subsurface soils and dry sediment primarily in the vicinity of former production buildings, and in some settling tanks and drainage ditches near those buildings. Operations produced explosive dust, spills, and vapors that collected on the floors and walls of buildings. Periodically the floors and walls would be cleaned with water and steam. The wash water containing contaminants either infiltrated into the soils around the buildings, drained into the network of storm sewers, or was directed by surface flow through channels to surface water. COCs identified in soil at LLs 1-4 at RVAAP are presented in Table 2. The COCs include inorganics, explosives, polychlorinated biphenyls (PCBs) and

semivolatile organic compounds (SVOCs). Based on evaluations conducted during the RIs, explosives are mobile in water and can leach from the soils. Inorganics, PCBs and polynuclear aromatic hydrocarbons (PAHs) are not expected to readily leach from soils. Contamination varied considerably within each load line by type and frequency of contaminant detected, concentration and depth, but was generally consistent with expected contaminant levels that were predicted based on historical usage of the buildings. Based on the RI data, LL1 is the most contaminated (i.e., widest variety of contaminants detected, highest frequency of detection, and highest concentrations) and LL 4 is the least contaminated of the four load lines.

The soil and sediment contamination detected at LLs 1-4 is generally surficial in nature, between 0 and 4 feet below ground surface (bgs). In isolated areas, the contamination may extend to 6 feet bgs. The likelihood of migration is minimal for inorganics, PCBs and SVOCs identified as COCs. Explosives may leach from soils via infiltration. Areas of soil at LLs 1-4 with concentrations that exceed the clean-up goals (Section H) are shown in Figures 7 through 10, respectively. The estimated volumes of surface and subsurface soils and dry sediment with concentrations of COCs exceeding the clean-up goals at each load line are summarized in Section I.2.3.

Human and environmental receptors may be exposed to COCs in soil through inhalation, ingestion or direct contact. However, the potential for human exposure to contaminants migrating from RVAAP is mitigated by inactivity at RVAAP, the lack of permanent residents on RVAAP and the low population density on adjacent private properties.

Table 2. COCs in Soil for National Guard Trainee at LLs 1-4 [a]

Chemical	COC [b]			
	LL 1	LL 2	LL 3	LL 4
Inorganics				
Aluminum		X	X	X
Antimony		X		
Arsenic	X	X	X	X
Barium			X	
Cadmium			X	
Chromium, hexavalent		X		
Manganese	X	X	X	X
Explosives				
2,4,6-TNT	X	X	X	
RDX	X	X		
PCBs				
Aroclor-1254	X	X	X	X
SVOCs				
Benz(a)anthracene	X			
Benzo(a)pyrene	X	X	X	
Benzo(b)fluoranthene	X			
Dibenz(a,h)anthracene	X			

[a] Soil 0 to 4 feet bgs is used for National Guard Trainee. Surface soils refers to the interval from 0 to 1 feet bgs and subsurface soil is greater than 1 foot bgs.

[b] COCs are those contaminants that have an Incremental Lifetime Cancer Risk (ILCR) greater than 10^{-6} and/or a Hazard Index (HI) greater than 1 for the given land use scenario.

X – Chemical is a COC for at least one area at this load line.

F. CURRENT AND REASONABLY ANTICIPATED FUTURE LAND USES

RVAAP is located in a rural area, is not accessible to the general public, and is not near any major industrial or developed areas. The majority of surrounding land is woodland or farm acreage with the remainder being residential. Land and some existing facilities in non-AOC areas at RVAAP are used by the OHARNG for training purposes under an operating license issued by NGB. LLs 1-4 are not currently used for purposes other than seasonal deer hunting events. The planned future land use for LLs 1-4 is for National Guard mounted training (no digging). Mounted training refers to training on vehicles only, for example, in a tank maneuver course. Vehicles could potentially disturb earth up to a depth of 4 feet; however, National Guard Trainees would be restricted from manual digging in these areas.

G. SUMMARY OF SITE RISKS

The baseline risk assessment estimates what risks LLs 1-4 poses to both human and ecological receptors if no action were taken. It provides the basis for taking action and identifies the contaminants and exposure pathways that need to be addressed by the remedial action. This section of the Interim ROD summarizes the results of the baseline risk assessment for LLs 1-4, specifically for surface and subsurface soils and dry sediment, as presented in detail in the following documents located in the Administrative Record and Information Repositories:

- *Phase II Remedial Investigation Report for Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, SAIC, March 2004, human health risk Section 6 and ecological risk Section 7.
- *Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, Shaw, May 2004, human health risk Section 6 and ecological risk Section 7.
- *Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, Shaw, June 2004, human health risk Section 6 and ecological risk Section 7.
- *Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, Shaw, June 2004, human health risk Section 6 and ecological risk Section 7.
- *Supplemental Baseline Human Health Risk Assessment for Load Line 1 Alternative Receptors at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, Shaw, July 2004.
- *Proposed Remedial Goal Options for Soil at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*, Shaw, September 2004.

G.1 Human Health Risk Assessment

The human health risk assessments presented in the RIs for each of the four load lines include the identification of chemicals of potential concern (COPCs), exposure assessment, toxicity assessment, and risk characterization which identified COCs.

The objectives of the exposure assessment were to estimate the magnitude, frequency, and duration of reasonable maximum human exposures to COPCs. The exposure pathways from soil and sediment for the National Guard receptors include ingestion, dermal contact, and inhalation of vapor and dust. Exposure parameters are based on USEPA guidance in accordance with the facility-wide risk assessment manual as detailed in the RIs.

The purpose of the toxicity assessment is to provide the toxicity data to evaluate the potential for COPCs to cause adverse health effects in exposed individuals. The toxicity assessment in the RIs used established USEPA toxicity tables (*Health Effects Assessment Summary Tables* and *Integrated Risk Information System Database*).

The output from the exposure assessment was used in conjunction with the output of the toxicity assessment in the risk characterization to identify COCs for surface and subsurface soil and dry sediment at LLs 1-4. A COC summary is presented in Table 2 in Section E.

G.2 Ecological Risk Assessment

LLs 1-4 contain sufficient terrestrial and aquatic (surface water and sediment) habitat to support various classes of ecological receptors, such as vegetation, small and large mammals, and birds. Due to the presence of suitable habitat and observed receptors, a screening ecological risk assessment (SERA) was performed to identify chemicals of potential ecological concern (COPECs). Following the SERA, a Level III baseline ecological risk assessment (BERA) was performed for LLs 2-4 to identify site-specific chemicals of ecological concern (COECs).

G.3 Basis for Action Statement

Results of the risk assessment for LLs 1-4 at RVAAP indicate that exposure to shallow soil and dry sediment under current and reasonably anticipated future land use scenarios may result in unacceptable risks to human receptors, unless remediation is undertaken to reach established clean-up goals. The response action selected in this Interim ROD is necessary to protect public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

Because the majority of COECs are co-located with human health COCs, remedial activities implemented to address human health COCs will serve to reduce the concentrations and number of COECs in soil to which ecological receptors are exposed, resulting in lowered ecological risk. Based on the expected impact to site conditions at LLs 1-4 from remediation associated with achieving human health clean-up goals and proposed vehicular training activities (e.g., soil compaction, vegetation damage, etc.), ecologically based clean-up goals have been determined to be unnecessary.

H. REMEDIAL ACTION OBJECTIVES

Pursuant to CERCLA, the RVAAP Remedial Action Objective (RAO) was developed by considering the COCs, associated media, potential exposure pathways and receptors, and applicable or relevant and appropriate requirements (ARARs). The RAO for surface and subsurface soils and dry sediment at LLs 1-4 is to prevent ingestion, inhalation, or direct contact with COCs exceeding the identified clean-up goals.

Clean-up goals are the maximum allowable concentrations which are protective of human health and the environment. Clean-up goals for surface and subsurface soils and dry sediment at LLs 1-4 at RVAAP were determined based on risk-based and site-specific considerations, including background concentrations, duration of reasonable maximum human exposures, and reasonably anticipated future land use (National Guard mounted training, no digging). The resulting clean-up goals for the National Guard Trainee for soil at LLs 1-4 are presented in

Table 3. Attainment of the RAO will address potential risks to human and ecological receptors identified in the risk assessment through removal of surface and subsurface soil and dry sediment with concentrations of COCs exceeding clean-up goals.

Table 3. Clean-up Goals for the National Guard Trainee for Soil at LLs 1-4

COC	Clean-up Goals (mg/kg)
Inorganics	
Aluminum	34,942
Antimony	2,458
Arsenic	31
Barium	3,483
Cadmium	109
Chromium, hexavalent	16
Manganese (surface soils)	1,800
Manganese (subsurface soils)	3,030
Lead	1,995
Explosives	
2,4,6-TNT	1,646
RDX	838
PCBs	
Aroclor-1254	35
SVOCs	
Benz(a)anthracene	105
Benzo(a)pyrene	10
Benzo(b)fluoranthene	105
Dibenz(a,h)anthracene	10

mg/kg – milligram per kilogram

[a] Soil 0 to 4 feet bgs is used for National Guard Trainee. Surface soils refers to the interval from 0 to 1 feet bgs and subsurface soil is greater than 1 foot bgs.

[b] Clean-up Goals are based on an ILCR greater than 10^{-5} and/or a HI greater than 1 for the given land use scenario.

The calculated risk-based clean-up goal for manganese in soil was 351 mg/kg which is below both the RVAAP-specific background (1,450 mg/kg for surface soil and 3,030 mg/kg for subsurface soil) and established USEPA Region 9 Preliminary Remediation Goal (PRG; 1,800 mg/kg) concentrations. Although the site-specific risk-based calculations are the usual CERCLA clean-up goals, it is below background for manganese. Therefore, the PRG was used for manganese in surface soils and the background was used for manganese in subsurface soils as shown in Table 3.

Additionally, the clean-up goal for lead in soil is the USEPA Region 9 PRG of 1,995 mg/kg.

I. DESCRIPTION OF ALTERNATIVES

The FFS was prepared to develop and evaluate remedial alternatives for surface and subsurface soils and dry sediment at LLs 1-4 based on the RI results. Three remedial

alternatives were developed in the FFS for surface and subsurface soils and dry sediment that are potentially viable for the contaminants and conditions at LLs 1-4: No Action, Excavation and On-Site Capping, and Excavation and Off-Site Disposal. The technologies used in the remedial alternatives were selected for their ability to remove or reduce COC concentrations in surface and subsurface soils and dry sediment to meet clean-up goals, support the future land use of National Guard mounted training (no digging), leave residual structures in place (e.g., building foundations and underground utilities), and accommodate the shallow depth to bedrock in many areas of LLs 1-4 at RVAAP.

I.1 Description of Remedy Components

This section includes a description of the various components of the three remedial alternative identified in the FFS including treatment, containment (or storage), O&M and monitoring components.

Alternative SDS1, No Action, was developed and evaluated to provide a baseline for comparison of the other alternatives evaluated as required under CERCLA. Under this alternative, there would be no further action taken for surface and subsurface soils and dry sediment at LLs 1-4 at RVAAP.

- *Treatment Components*
  No treatment technologies are incorporated under Alternative SDS1.
- *Containment (or Storage) Components*
  No containment components are incorporated under Alternative SDS1.
- *Institutional Control Components*
  No institutional controls are incorporated in Alternative SDS1.
- *O&M*
  No O&M activities are required under Alternative SDS1.
- *Monitoring*
  No monitoring is required in Alternative SDS1.

Alternative SDS2, Excavation and On-Site Capping, would involve the excavation of discrete areas of contaminated surface and subsurface soils and dry sediment with concentrations of COCs exceeding clean-up goals at LLs 1-4 at RVAAP. Soils with COC concentrations exceeding TSCA and/or RCRA criteria would be disposed of off-site. The remaining material would be consolidated on an impermeable liner and under an impermeable cap located on-site. Clean soil would be used for backfill to grade.

- *Treatment Components*
  No treatment technologies are incorporated under Alternative SDS2.
- *Containment (or Storage) Components*
  Alternative SDS2 would require the engineering and construction of an impermeable liner and cap at a selected location on-site. Approximately 14,567 cubic yards (cy) of contaminated soil (*in situ*), less the volume of TSCA or RCRA qualifying contaminated soils which is yet to be determined, would be stored under the on-site cap. The excavated soil would be stored temporarily in stock piles on-site pending characterization. Alternative SDS2 uses the existing containment features provided by building foundations and concrete slabs to prevent exposure to or migration of any potential contaminants

- *Institutional Control Components*
  The location for the on-site capped stockpile would be selected such that it would not interfere with future land use, to the extent possible. The need for and type of land use controls will be determined in future RODs for the site; thus, land use controls are not a component of Alternative SDS2 as presented in this Interim ROD.
- *O&M*
  The integrity of the cap would need to be inspected, maintained, and repaired (as necessary) indefinitely and intrusive activities would be prohibited as part of SDS2. The concrete slabs and building foundations that remain in place will be inspected periodically to assess their integrity until removed.
- *Monitoring*
  Long-term groundwater monitoring would be required to ensure the potential remedy does not impact groundwater. Five year reviews are required until such a time as LLs 1-4 allow for unrestricted access.

Alternative SDS3, Excavation and Off-Site Disposal, would involve the excavation of discrete areas of contaminated surface and subsurface soils and dry sediment with concentrations of COCs exceeding clean-up goals at LLs 1-4 at RVAAP. Soils would be disposed of off-site at a disposal facility permitted or licensed to receive the specific materials being shipped. Clean soil would be used for backfill to grade.

- *Treatment Components*
  No treatment technologies are incorporated under Alternative SDS3.
- *Containment (or Storage) Components*
  Approximately 14,567 cy of contaminated soil (*in situ*) will be disposed of off-site at a permitted facility. The final extent and volume of excavated soil will be based upon confirmatory sampling performed as the excavation proceeds. The excavated soil would be stored temporarily in stock piles on-site pending characterization. Alternative SDS3 uses the existing containment features provided by building foundations and concrete slabs to prevent exposure to or migration of any potential contaminants.
- *Institutional Control Components*
  The need for and type of land use controls will be determined in future RODs for the site; thus, land use controls are not a component of Alternative SDS3 as presented in this Interim ROD.
- *O&M*
  No O&M activities are required under Alternative SDS3. The concrete slabs and building foundations that remain in place will be inspected periodically to assess their integrity, and maintained and repaired as necessary, until removed.
- *Monitoring*
  Long-term groundwater monitoring would be required to ensure the selected remedy does not impact groundwater. Five year reviews are required until such a time as LLs 1-4 allow for unrestricted access.

I.2 Common Elements and Distinguishing Features of Each Alternative

The common elements and distinguishing features unique to each response option are discussed in the following sections and include key ARARs, long-term reliability, quantity of waste, estimated timeframe, costs and use of presumptive remedies or innovative technologies.

I.2.1 ARARs

There are no chemical-specific ARARs. The clean-up goals will be used for determining the extent of excavations. These are identified in Table 3 in Section H above. The action- and location-specific ARARs are varied and numerous for each alternative; thus, the ARARs are identified for the Selected Remedy in Attachment 1.

I.2.2 Long-term Reliability of Remedy

The long-term reliability of Alternative SDS1 (No Action) is not acceptable. Contaminants remaining in soils could become accessible to various receptors including the public. Alternatives SDS2 (Excavation and On-Site Capping) and SDS3 (Excavation and Off-Site Disposal), which both involve excavation of contaminated soils, are considered to be very reliable over the long-term; however, Alternative SDS2 is subject to long-term maintenance of the cap integrity.

I.2.3 Quantity of Untreated Waste and Treatment Residuals to be Disposed Off-site or Managed On-site, and Degree of Hazard Remaining in such Material

The estimated volumes of surface and subsurface soils and dry sediment with concentrations of COCs exceeding the clean-up goals at each load line are summarized in Table 4. Under Alternative SDS1 (No Action), the contaminated soil would remain in place. Under Alternatives SDS2 (Excavation and On-Site Capping) and SDS3 (Excavation and Off-Site Disposal), the total volume of soil above the clean-up goals in LLs 1-4 is estimated to be 14,567 cy (*in situ*). Under Alternative SDS2 (Excavation and On-Site Capping), this material would be excavated and disposed of off-site or contained under a cap without treatment. The volume of soil that will exceed RCRA or TSCA criteria and require off-site disposal will be determined in the field during remediation as each stockpile of excavated material is characterized. Thus, the quantity of contaminated soil that will remain on site under the cap can not be determined at this time. Under Alternative SDS3 (Excavation and Off-Site Disposal), the entire volume would be excavated and disposed of off-site without treatment. The final volume will vary in the field during remediation as the proposed excavation areas will be confirmed with sampling in the field and soil tends to increase in volume when it is excavated.

Table 4. Estimated Volume of Soil and Dry Sediment for Remediation

Load Line	Volume Manganese (cy)	Volume Arsenic (cy)	Volume others* (cy)	Estimated Total Volume (cy)
LL 1	4,838	795	1,507	7,140
LL 2	757	730	823	2,310
LL 3	2,212	45	1,590	3,847
LL 4	551	1	718	1,270
TOTAL	**8,358**	**1,571**	**4,638**	**14,567**

* 'Others' includes inorganic COCs other than manganese or arsenic, PCBs, explosives and SVOCs.

The types of waste generated during remediation are expected to be non-hazardous, RCRA, or TSCA.

I.2.4 Estimated Times

Alternative SDS2 (Excavation and On-Site Capping) will require more time for remedial design than Alternative SDS3 (Excavation and Off-Site Disposal). Estimated time to implement Alternative SDS2, which includes excavation of soil and cap construction, is approximately 1 year. Estimated time to implement Alternative SDS3, which includes excavation of soil and disposal activities, is approximately 6 months. Alternative SDS2 will also require maintenance of the cap integrity indefinitely.

I.2.5 Costs

Table 5 summarizes the major cost components for each alternative: Capital, O&M and Present Worth Total. The Present Worth O&M Cost represents a total, discounted O&M cost estimated for the duration of the expected time period of operations, not an annual O&M cost. The O&M Time Period is the number of years over which the remedy cost estimate is projected. Per the USEPA Feasibility Study (FS) guidance, the cost estimate for Alternative SDS2 assumes a 30-year performance period for ongoing actions such as monitoring and maintenance, although the cap will likely require monitoring indefinitely. In addition, the recommended 7% discount rate was used to determine the present worth costs for each alternative.

Table 5. Comparative Estimated Cost of Alternatives

Alternative	Capital Cost	Present Worth O&M Cost	O&M Time Period	Total Present Worth Cost
SDS1 No Action	$0	$0	NA	$0
SDS2 Excavation and On-Site Capping	$5,715,552	$1,114,056	30	$6,829,608
SDS3 Excavation and Off-Site Disposal	$4,656,320	$133,313	5	$4,789,633

I.2.6 Use of Presumptive Remedies or Innovative Technologies

None of the alternatives utilize presumptive remedies or innovative technologies as components.

J. COMPARATIVE ANALYSIS OF ALTERNATIVES

The Army, in consultation with the Ohio EPA, selected the preferred alternative by comparing the advantages and disadvantages of each of the three alternatives using the nine CERCLA evaluation criteria established by USEPA in Section 300.430(d)(9)(iii) of the National Contingency Plan (NCP). The detailed comparative analysis of the three alternatives is in the FFS; a summary of this comparison is provided in the following text and in Table 6.

Table 6. Comparative Evaluation of Alternatives SDS1 through SDS3

Criteria	Alternative SDS1 No Action	Alternative SDS2 Excavation and On-Site Capping	Alternative SDS3 Excavation and Off-Site Disposal
Overall Protectiveness of Human Health and the Environment	No	Yes	Yes
Compliance with ARARs	NA	Yes	Yes
Long-term Effectiveness and Permanence	No	Yes	Yes
Short-term Effectiveness Time to implement[1]	No NA	Yes 1 year	Yes 6 months
Reduction in Toxicity, Mobility, or Volume Through Treatment	No	No	No
Implementability	Yes	Yes	Yes
Present Worth Cost	$0	$6.8 million	$4.8 million
State Acceptance	No	No	Yes
Community Acceptance	No	Yes	Yes

1 Time to implement remedial action is after the remedial design period and does not include post-construction monitoring.

J.1 Threshold Criteria (must be met)

The two threshold criteria, or those criteria that must be met for an alternative to be considered for final selection, are Overall Protection of Human Health and the Environment and Compliance with ARARs.

J.1.1 Overall Protection of Human Health and the Environment

Overall protection of human health and the environment addresses whether each alternative provides adequate protection of human health and the environment and describes how risks posed through each exposure pathway are eliminated, reduced, or controlled, through treatment, engineering controls, and/or institutional controls.

Alternative SDS1 (No Action) will not reduce the short- or long-term risks for human or environmental receptors from potential exposure to the COCs and is, thus, not protective.

Alternatives SDS2 (Excavation and On-Site Capping) and SDS3 (Excavation and Off-Site Disposal) provide long-term protection of human health by removing the source of contamination from potential human exposure through ingestion, inhalation or contact. These two alternatives also eliminate the potential for migration of COCs from the impacted soils and dry sediments and therefore, protect environmental receptors from potential exposure to COC-impacted media. Removing surface and subsurface soils and dry sediment with concentrations of COCs exceeding clean-up goals will reduce the toxicity, potential for migration, and volume of the COCs and protect National Guard Trainee receptors in the long-term. While both alternatives result in land use restricted to National Guard mounted training (no digging), Alternative SDS2 requires the capped area to be off-limits to vehicular traffic. Short-term exposure risks for on-site workers will be mitigated through the use of best management practices (BMPs), Occupational Safety and Health Administration (OSHA) training and the use of appropriate personal protective equipment.

J.1.2 Compliance with ARARs

CERCLA Section 121 specifies that remedial actions must comply with requirements or standards under federal or more stringent state environmental laws that are "applicable or relevant and appropriate to the hazardous substances or particular circumstances at the site."

Compliance with ARARs addresses whether a remedy will meet all of the ARARs related to the hazardous substances at the site and the circumstances of their release. ARARs are Federal and State environmental laws and promulgated regulations identified for remediation of surface and subsurface soils and dry sediment at LLs 1-4 at RVAAP.

Alternatives SDS2 (Excavation and On-Site Capping) and SDS3 (Excavation and Off-Site Disposal) comply with ARARs.

J.2 Primary Balancing Criteria (identifies major trade-offs among alternatives)

The five balancing criteria, or those criteria that identify the major benefits and risks of each alternative, are Long-Term Effectiveness and Permanence; Short-Term Effectiveness and Environmental Impacts; Reduction in Toxicity, Mobility, or Volume through Treatment; Implementability and Cost.

J.2.1 Long-Term Effectiveness and Permanence

Long-term effectiveness and permanence refers to expected residual risk and the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up goals have been met. This criterion includes the consideration of residual risk that will remain onsite following remediation and the adequacy and reliability of controls.

Alternative SDS1 (No Action) is neither effective nor permanent in the long-term.

Alternative SDS3 (Excavation and Off-Site Disposal) would afford the highest degree of long-term effectiveness and permanence. Alternative SDS3 would provide for removal of COCs that exceed acceptable risk levels. The alternative would reduce risk to levels in accordance

with the RAO and could be implemented in approximately six months. Five year reviews are required until such a time as LLs 1-4 allow for unrestricted access.

The long-term effectiveness and permanence of Alternative SDS2 (Excavation and On-Site Capping) would be less reliable because contaminated soil would remain on-site and long-term controls would be necessary to prevent disturbance to the cap. Alternative SDS2 would require about twice the time to implement than SDS3 (Excavation and Off-Site Disposal). Long-term maintenance of the cap and five-year reviews are required until such a time as LLs 1-4 allow for unrestricted access.

J.2.2 Reduction in Toxicity, Mobility, or Volume through Treatment

Reduction of toxicity, mobility, or volume through treatment refers to the anticipated performance of the treatment technologies that may be included as part of a remedy.

None of the remedial alternatives include treatment as a principal element. Alternative SDS1 (No Action) does not reduce the toxicity, mobility or volume of COCs in surface and subsurface soils and dry sediment at LLs 1-4. Alternative SDS3 (Excavation and Off-Site Disposal) will permanently reduce the toxicity, potential for migration and volume of COCs in surface and subsurface soils and dry sediment at LLs 1-4 through removal and not treatment. Alternative SDS2 (Excavation and On-Site Capping) would reduce the mobility of COCs by preventing infiltration of precipitation through removal and capping. This alternative does not reduce the toxicity or volume of COCs in the surface and subsurface soils and dry sediment at LLs 1-4.

J.2.3 Short-Term Effectiveness and Environmental Impacts

Short-term effectiveness addresses the period of time needed to implement the remedy and any adverse impacts that may be posed to workers, the community and the environment during construction and operation of the remedy until clean-up goals are achieved.

Alternative SDS1 (No Action) is not effective in the short-term.

Alternatives SDS2 (Excavation and On-Site Capping) and SDS3 (Excavation and Off-Site Disposal) would be completed in approximately one year and six months, respectively. During this time, there would be potential risks to construction workers during excavation, primarily associated with equipment movement and exposure to contaminated dust. However, air monitoring and engineering controls would control the potential for exposure. Workers would be required to wear appropriate levels of protection to avoid exposure during excavation activities. Alternative SDS2 has additional on-site risks associated with cap construction. Under both alternatives, contaminated soil would be transported on public roads during the construction period for off-site disposal. Appropriate dust control measures would be implemented to mitigate the risk of exposure to the community. Alternative SDS2 has a lower risk of potential community exposure as a smaller volume of soil will be transported off-site. Following appropriate U.S. Department of Transportation (DOT), State and local shipping requirements for transportation-related activities would minimize the risks associated with waste transportation.

J.2.4 Implementability

Implementability addresses the technical and administrative feasibility of a remedy from design through construction and operation. Factors such as availability of services and materials, administrative feasibility, and coordination with other governmental entities are also considered.

Each of the three alternatives are easily implemented. Materials and services needed for implementation are readily commercially available. Alternative SDS2 (Excavation and On-Site Capping) would require the designation of a location on-site for the cap. Alternative SDS3 (Excavation and Off-Site Disposal), and to a lesser extent Alternative SDS2, would require coordination with the local disposal facilities. Logistical consideration would be addressed in design of the overall site remedy.

J.2.5 Cost

The estimated present worth costs for the alternatives, not including Alternative SDS1 (No Action), range from $4.8 million for Alternative SDS3 to $6.8 million for Alternative SDS2. Present worth costs were estimated using a discount rate of 7%. Cost summaries can be found in Table 5 as referenced in Section I.2.5.

J.3 Modifying Criteria (formally evaluated after the comment period)

The two modifying criteria, or those criteria that can impact the details and potential selection of each alternative, are State and Community Acceptance.

J.3.1 State Acceptance

State acceptance was evaluated formally after the public comment period on the Proposed Plan. Ohio EPA does not believe that Alternative SDS1 (No Action) provides adequate protection of human health and the environment. Ohio EPA has expressed its support for Alternative SDS3 (Excavation and Off-Site Disposal). Ohio EPA does not support Alternative SDS2 because it is not consistent with the planned future land use.

J.3.2 Community Acceptance

Community acceptance was evaluated formally after the public comment period on the Proposed Plan. The community did not consider Alternative SDS1 (No Action) to be adequately protective. During the public comment period, the community voiced few objections to Alternative SDS3 (Excavation and Off-Site Disposal) as indicated in Part III of this Interim ROD, Responsiveness Summary. Comments focused primarily on clarifying the extent of contamination, describing waste transport logistics, and clarifying the justification for remedial technology evaluation.

K. PRINCIPAL THREAT WASTES

There are no principal threat wastes identified for this project.

L. THE SELECTED REMEDY

Alternative SDS3 (Excavation and Off-Site Disposal) has been selected for implementation at LLs 1-4 at RVAAP. This remedy is consistent with the planned future land use of National Guard mounted training, no digging.

L.1 Summary of the Rationale for the Selected Remedy

The selected remedy meets the threshold criteria and provides the best overall balance of tradeoffs in terms of the five balancing criteria:

- Long-term effectiveness and permanence;
- Reduction of toxicity, mobility, and volume;
- Short-term effectiveness;
- Implementability; and
- Cost.

The selected remedy addresses State and community concerns by removing contaminated surface and subsurface soils and dry sediment from LLs 1- 4 at RVAAP.

L.2 Description of the Selected Remedy

The selected remedy would involve the excavation of contaminated surface and subsurface soils and dry sediment from discrete areas and permanent disposal in a RCRA-permitted landfill as a non-hazardous, hazardous or TSCA waste, depending on levels and type of contamination. Following excavation of the contaminated surface and subsurface soils and dry sediment and receipt of laboratory confirmatory soil sample results indicating that material with concentrations of COCs exceeding clean-up goals had been removed, clean backfill would be placed in excavated areas, and the AOCs would be restored to pre-excavation topography. "Clean" backfill consists of on- or off-site soil that has passed the chemical and physical requirements in accordance with the RVAAP facility-wide plans. This alternative would support the planned future land use (i.e., National Guard mounted training, no digging). The time to achieve the RAO would be approximately six-months.

This alternative includes the following components:

- Excavation of discrete areas of contaminated surface and subsurface soils and dry sediment with concentrations of contaminants exceeding clean-up goals;
- Temporary on-site storage via stockpiling for characterization;
- Off-site disposal of soils at a permitted landfill and, as needed, disposal at a TSCA and/or RCRA permitted landfill;
- Replacement of excavated material with clean compacted backfill;
- Groundwater monitoring to ensure the remedy did not impact groundwater;
- Maintenance of building slabs and foundations; and
- Five year reviews in accordance with CERCLA 121(c) and 300.430(f)(4)(ii).

The areas to be excavated within LLs 1-4 were delineated based on available data included in the RI reports and additional field confirmation sampling activities conducted in November 2004. These areas were identified in the FFS and Proposed Plan. The estimated volume of soil for excavation at each load line is presented in Table 4 as referenced in Section I.2.3. Removal work will begin with demarcation of the areas of soil exceeding clean-up goals. The perimeter of the area to be excavated would be delineated with flagging and enclosed with

temporary fencing or another barrier to limit access. A sign would be posted at the entrance to each AOC listing the hazards present at the AOC and a telephone number of someone to contact to gain access to the AOC. Prior to breaking ground for remedial removal activities, the demarcated areas will be screened in accordance with the Army's Munitions and Explosives of Concern Support plan (USACE, 2004).

Excavation will begin in the area of the highest COC concentrations detected and move outward from the assumed source location. This will serve to remove the most grossly impacted soils first to minimize the generation of hazardous wastes. Once the "hot spot" areas are removed, further excavation will be guided by field test kits. Confirmatory samples for laboratory analysis would be taken from the sidewalls and bottom of the completed excavations to verify that the contaminated soil above clean-up goals was removed. If analysis results indicate that contamination above clean-up goals remains in the ground, additional soil would be excavated. Confirmatory samples would be taken from the extended excavation, and the process repeated as necessary until the soil to remain in place meets the RAO. The excavated areas will be backfilled with clean fill. "Clean" backfill consists of on- or off-site soil that has passed the chemical and physical requirements in accordance with the RVAAP facility-wide plans.

Site preparation would include, as required based on the local site topography, constructing temporary diversion ditches to minimize surface run-on into the excavations, installing silt fence and staked hay bales to minimize transport of soil in run-off, constructing temporary staging areas for soils, equipment laydown areas, and establishing decontamination areas at the AOCs. Similar measures would be taken to avoid erosion of contaminated soils or ponding of water in the open excavations. Environmental protection barriers expected to be used in the completion of this alternative include BMPs such as haybales, silt fencing, and polyethylene sheeting and liners for temporary stockpiling of soils. Inspection of these barriers will occur regularly during construction to ensure that their intended use has not been compromised during the completion of field activities. The existing concrete slabs and foundations that will remain at the facility after building demolition may be considered environmental protection barriers as they may provide a barrier for infiltration to potentially impacted soils beneath the slabs. Concrete slabs will be inspected on a periodic basis to ensure that no additional cracks caused by soil remediation activities are created. Maintenance to the slabs will be conducted as necessary.

Excavated soils will be stored on-site temporarily in piles prior to transporting to disposal facilities. Piles would be staged on top of a polyethylene liner and covered with the same. The cover would be secured to prevent wind damage to the cover and stockpile. Stormwater runoff would be collected for treatment or off-site disposal. The stockpiled soils will be sampled and characterized. Soil removed from small excavations will be stockpiled. Soil from large excavations may be characterized and loaded out directly. Shipments of contaminated soils and dry sediments will comply with Federal, State, and local rules, laws and regulations. In addition to the identified ARARs (Attachment 1) for the Selected Remedy, the Army will comply with requirements applicable to off-site actions, such as RCRA hazardous waste transportation requirements under Ohio Administrative Code (OAC) 3745-52-20 to OAC 3745-52-33, and off-site treatment prior to land disposal under RCRA's land disposal restrictions under OAC 3745-270, including alternative land disposal restriction treatment standards for contaminated soil under OAC 3745-270-49.

Excavated contaminated surface and subsurface soils and dry sediment could require special handling and disposal at a RCRA Subtitle C hazardous waste landfill; however, disposal

characterization samples would be analyzed prior to disposal. It is expected that the majority of the soils containing metals do not exceed the toxicity characteristic leaching procedure (TCLP) limits, and therefore do not require stabilization prior to off-site shipment. Off-site disposal for such soils would be at a permitted solid waste landfill. Hazardous soils would likely be disposed of at a Toxic Substances Control Act (TSCA) and/or Resource Conservation and Recovery Act (RCRA) permitted hazardous waste landfill.

Off-site disposal facilities will be selected based on waste characterization data collected from representative piles of removed material. The disposal facilities accepting soils with metals contamination, will also accept soils with explosives, PCBs, SVOCs, and metals contamination, eliminating the need to reduce concentrations prior to shipment through other remedial measures. Several off-site disposal facilities accepting these wastes are located within 200 miles of RVAAP.

Excavation and off-site disposal will remove the contaminants above the identified clean-up goals from the AOCs so there will be no treatment residuals. The contaminated surface and subsurface soils and dry sediment will be transported to the off-site disposal facilities in a manner that reduces potential risks to human health. Once the soils are excavated, long-term maintenance is not required.

All construction equipment and tools that come into contact with contaminated or potentially contaminated media would be decontaminated prior to being used for AOC restoration activities or being moved out of the controlled area. A temporary decontamination pad capable of collecting wash water including overspray would be assembled, if not currently in existence. Equipment and tools would be thoroughly cleaned with a steam cleaner to remove all visible soil and mud. The decontamination water would be collected in portable polytanks. Soil residue would be placed in temporary storage piles and managed as described above for excavated soils.

The wastewater stored in portable polytanks would be tested for the full suite of constituents (i.e., volatile organic compounds (VOCs), SVOCs, PCBs, pesticides, explosives, propellants and unfiltered target analyte list (TAL) metals) prior to making disposal determinations.

Excavation and off-site disposal would not impact implementation of potential future remedial actions in the load line area.

In addition, the risk of contamination to groundwater and surface water within LLs 1-4 is expected to be minimal during construction due to the implementation of control measures and management procedures. During removal activities, BMPs will be implemented to minimize surface water runoff, dust, and deposition of the excavated material. Such practices include the following:

- Using haybales and silt fence downgradient of the excavation ahead of wetlands;
- Using of sprayed water and polyethylene covers to minimize dust generated from excavated materials;
- Washing truck and vehicle tires prior to leaving the load lines to minimize tracking of soils to other areas; and,
- Monitoring dust generation at the excavation and at the perimeter.

For the selected remedy, groundwater monitoring will be performed for five years at select existing wells in LLs 1-4 to monitor for potential impacts to groundwater from remedy

implementation. Groundwater monitoring data will supplement data from the Facility-Wide Groundwater Monitoring Program. Groundwater samples will be collected semi-annually for the first two years after remedy implementation. The sampling frequency thereafter will be based on the laboratory results. Groundwater samples will be submitted to an environmental chemistry laboratory for analysis of the full suite of constituents (i.e., VOCs, SVOCs, PCBs, pesticides, explosives, propellants and TAL metals). Findings will be evaluated in the context of the facility-wide groundwater monitoring program and any action will be determined by the Army, with approval by Ohio EPA.

In addition, the concrete slabs and building foundations that remain in place after remediation will be inspected periodically to ensure their integrity has not been compromised allowing infiltration to potentially contaminated soils underneath. The remedial action will be subjected to five-year reviews as part of the CERCLA process to assure that human health and the environment are being protected.

L.3 Summary of the Estimated Remedy Costs

Total present worth costs for the selected remedy (Alternative SDS3) are estimated at $4.8 million. As summarized in Table 5, the estimated capital cost is $4,656,320 and the estimated present worth O&M cost is $133,313 (assuming 5 years of operation and using a 7% discount rate). Costs are based on excavation and off-site disposal of surface and subsurface soils and dry sediment that are currently exposed with concentrations of COCs exceeding clean-up goals.

These estimates assume that LLs 1-4 at RVAAP are remediated to the clean-up goals established for land use for National Guard mounted training (no digging). The estimated time to implement the selected remedy is approximately six months after completion of remedial design, which is estimated to require an additional six months.

The cost estimate is based on the best available information regarding the anticipated scope of the selected remedy. It is conservatively assumed that this is an order-of-magnitude engineering cost estimate that is expected to be within –30 to +50% of the actual project cost.

L.4 Expected Outcomes of the Selected Remedy

The selected remedy will provide a portion of the basis for planned future land use of National Guard mounted training (no digging). Table 3 provides a summary of the clean-up goals to be achieved for surface and subsurface soils and dry sediment at LLs 1-4 at the end of the construction phase.

No negative socioeconomic and community revitalization impacts are expected from this remedial action. Positive impacts are expected from the excavation and removal of soils exceeding the clean-up goals.

Residual risks to future receptors after implementation of this remedial action are within the CERCLA risk range for acceptable risks. Although removing the contaminated soils will benefit potential ecological receptors, no significant environmental or ecological benefits are expected as a result of this remedial action.

M. STATUTORY DETERMINATIONS

The selected remedy satisfies the statutory requirements of CERCLA §121 and the NCP, as described below.

M.1 Protection of Human Health and the Environment

Human exposure to site COCs will be eliminated or controlled to levels that are protective through excavation and off-site disposal of surface and subsurface soils and dry sediment at LLs 1-4. The estimated outcome would also include compliance with the clean-up goals listed in Table 3 and the ARARs listed in Attachment 1.

M.2 Compliance with ARARs

The selected remedy will comply with the action- and location-specific ARARs listed in Attachment 1.

M.3 Cost-Effectiveness

The selected remedy meets the statutory requirement for a cost-effective remedy. Cost effectiveness is concerned with the reasonableness of the relationship between the effectiveness afforded by each alternative and its costs compared to other available options. Alternatives SDS1 and SDS2 are not considered to be cost-effective because they do not provide a long-term effective solution to the unacceptable risks presented by the presence of contaminants at the site. Alternative SDS3 is considered to be cost-effective. Table 7 provides the cost-effectiveness matrix to demonstrate the cost-effectiveness of the selected remedy against the other alternatives evaluated. These components are also included in more summary form in the comparative analysis in Table 6.

Table 7. Matrix of Cost and Effectiveness Data for LLs 1-4 at RVAAP

Relevant Considerations for Cost-Effectiveness Determination

- Contamination in soil and dry sediment occurs in numerous discrete areas throughout the load line areas, primarily around former processing buildings. Total *in situ* volume of material contaminated above restricted use clean-up goals is approximately 14,567 cy.
- Baseline risk for potential current and future uses of the site in the absence of existing controls is not acceptable.
- Site is located in rural area, is not accessible to the general public, and is not near any major industrial or developed areas. The majority of surrounding land is woodland or farm acreage with the remainder being residential.

Alternative (box is shaded if cost-effective)	Total Present Worth Cost	Incremental Cost	Long-term Effectiveness and Permanence	Reduction of Toxicity, Mobility, and Volume through Treatment	Short-Term Effectiveness
SDS1 - No Action	$0	—	No reduction in long-term risk. Baseline risks unacceptable.	No treatment included.	No short-term risks to workers or the communities from taking an action.
SDS2 – Excavation and On-Site Capping	$6,829,608	—	Effectively reduces long-term risk to acceptable levels via excavation and capping of contaminated soil and dry sediment provided integrity of cap can be maintained over the long-term.	No treatment included. Reductions in mobility, not toxicity or volume, provided the cap integrity is maintained.	Short-term risks to workers and the public due to excavation of soils. Highest short-term risks are risks due to construction of the cap and transportation activities; short-term risks due to contaminated soils are acceptable.
SDS3 - Excavation and Off-Site Disposal	$4,789,633	—	Effectively reduces long-term risk to acceptable levels via excavation and off-site disposal of contaminated soil and dry sediment.	No treatment included. Permanent reductions via off-site disposal.	Short-term risks to workers and the public due to excavation of soils. Highest short-term risks are risks due to transportation activities; short-term risks due to contaminated soils are acceptable.

Cost-Effectiveness Summary: Alternatives SDS1 and SDS2 are not considered to be cost-effective because they do not provide a long-term effective solution to the unacceptable risks presented by the presence of contaminants at the site. Alternative SDS3 is considered to be cost-effective.

M.4 Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

The selected remedy represents the maximum extent to which permanent solutions and treatment are practicable for soil and dry sediment that are currently exposed at LLs 1-4. The selected remedy represents the best balance of tradeoffs between the alternatives because it provides a permanent solution for these media, and cost-effectively remediates surface and subsurface soils and dry sediment at LLs 1-4. By removing soils above clean-up goals, the selected remedy provides for a portion of the basis for planned future use of National Guard mounted training (no digging). The selected remedy is cost-effective because the contaminated material is removed from the site eliminating the potential for future migration of COCs to other media and eliminating the need for long-term monitoring.

M.5 Preference for Treatment as a Principal Element

The selected remedy uses permanent solutions to the maximum extent practicable. The remedy does not satisfy the statutory preference for treatment. The treatment technologies evaluated in the early stages of the FFS were found to be technically infeasible and cost prohibitive for implementation at LLs 1-4 at RVAAP.

M.6 Five-Year Review Requirements

Five-year reviews will be conducted in compliance with CERCLA Section 121(c) and the NCP Section 300.430(f)(4)(ii). Five year reviews are required until such a time as LLs 1-4 allow for unrestricted access.

N. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan for LLs 1-4 at RVAAP was released for public comment in July 2005. The Proposed Plan identified Alternative SDS3, Excavation and Off-site Disposal, as the Preferred Alternative for surface and subsurface soils and dry sediment at LLs 1-4. After the public comment period, it was determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary or appropriate.

PART III. RESPONSIVENESS SUMMARY

A. OVERVIEW

In July 2005, the Army released the *Proposed Plan for the Remediation of Soils at Load Lines 1 through 4 at the Ravenna Army Ammunition Plant* for public comment. A 30-day public comment period was held between July 12, 2005 and August 10, 2005. The Army hosted a public meeting on August 1, 2005 to present the preferred alternative and take questions and comments from the public for the record. Several oral and written comments were received on the remedial alternatives evaluated in the Proposed Plan, and are addressed under Section III.C.

The preferred alternative for soils and dry sediments at LLs 1-4 at RVAAP that was proposed by the Army in the Proposed Plan, and presented during the public meeting was Alternative SDS3 (Excavation and Off-Site Disposal). During the public meeting, Ohio EPA concurred with the preferred alternative. This alternative includes the excavation of contaminated soil and the off-site disposal. Contaminated soil includes surface and subsurface soils and dry sediment that contain concentrations of COCs above the clean-up goals established in the FFS and Proposed Plan.

Based on comments received, the community voiced few objections to Alternative SDS3 (Excavation and Off-Site Disposal). Alternative SDS3 will be selected as the remedial action for soils at LLs 1-4 at RVAAP in this Interim ROD.

B. BACKGROUND ON COMMUNITY INVOLVEMENT AND CONCERNS

Recent community relations efforts at RVAAP through the RAB have been effective due to continued and open communication. Final project related documents (e.g., RIs, FFS, Proposed Plan, etc.) have been made available to the public in the Administrative Record and the two Information Repositories.

B.1 Community Profile

The 2000 Census lists the total populations of Portage and Trumbull Counties as 152,061 and 225,116, respectively. Population centers closest to RVAAP are Ravenna, with a population of 11,771, and Newton Falls, with a population of 5,002.

B.2 Chronology of Community Involvement

Significant community involvement developments and relevant technical milestones at RVAAP related to LLs 1-4 are highlighted below. As best as can be reconstructed, items are listed chronologically within the year they occurred.

1996

- The Army established a RAB to promote community involvement in the DoD environmental clean-up activities and allow the public to review and discuss the progress with decision makers. The RAB meets a minimum of four times during the year and meetings are open to the public.

- Information Repositories established at the Reed Memorial Library in Ravenna, Ohio and the Newton Falls Public Library in Newton Falls, Ohio.

2003

- The Army releases the Community Relations Plan for RVAAP in September.

2004

- Project web site goes online at www.rvaap.org.

2005

- Public meeting held on August 1 on the Proposed Plan for the Remediation of Soils at LLs1-4; public comment period held from July 12 through August 10.

C. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

Comments were received verbally during the public meeting or in writing during the 30-day public comment period.

C.1 Oral Comments from Public Meeting

Oral comments received during the public meeting are grouped together in the following general topic categories: Groundwater Monitoring, Groundwater Monitoring Quality Assurance/Quality Control (QAQC), Remediation Technologies, Contaminants, Excavation, Dust Control, Transportation and Disposal, Media to be Remediated, Extent of Contamination, and Comment Process. The transcript from the meeting was incorporated into the Administrative Record and Information Repositories. Each comment was combined with others, as appropriate, and paraphrased for presentation in this section. Similarly, the responses provided at the public meeting were revised for presentation in this section to address the newly formatted comment.

1. *Groundwater Monitoring*
   Comment: One commenter asked how the time frame of five years was determined for the groundwater monitoring portion of the proposed remedy and if that could be extended. The commenter also asked what would happen if the results of monitoring indicated that residual contamination from the soil had leached into groundwater.

   Response: The groundwater monitoring program identified in the Proposed Plan is solely for monitoring potential impacts of the proposed remedial action on groundwater. The five-year period was determined to be an appropriate duration to monitor for such impacts. It is separate from other groundwater monitoring programs that may be ongoing or implemented in the future at RVAAP. Extensions to the term of groundwater monitoring established for impacts from implementation of the soil remedy would be decided by the Army as conditions warrant.

2. *Groundwater Monitoring*
   Comment: One commenter asked if groundwater monitoring would be conducted during remedial activities that disturb the soil and what would happen if concentrations of contaminants in groundwater varied. The commenter also asked if groundwater monitoring wells would be warranted off-site.

Response: Groundwater monitoring is proposed to be conducted after the excavation activities are complete, not during the action. If variations (i.e., increases) in contaminant concentrations in groundwater are observed, additional groundwater samples could be collected to confirm the initial results and an investigation could be conducted to identify potential additional or continuing sources of contaminants. The need for off-site monitoring wells will be determined by the Army as conditions warrant.

3. *Groundwater Monitoring QA/QC*

Comment: One commenter asked if third-party certification of the groundwater results or collection of split samples would be performed. A second commenter asked for clarification on which laboratory or laboratories would receive the samples.

Response: Ohio EPA will collect split samples. The split samples and the contractor's samples will not be analyzed by the same laboratory. Ohio EPA will submit samples to one of their contract laboratories which are certified and adhere to USEPA methodologies and the Army laboratory guidance.

4. *Remediation Technologies*

Comment: One commenter asked for clarification as to what other remedial technologies were considered, such as bioremediation, aerobic and anaerobic pathways; constructed wetlands remediation; gravel bed systems for explosively impacted soils; *in situ* vitrification or "GeoMelt," bioslurry, aerobic and anaerobic materials, chemical, biological treatment, fungal-based bioremediation and phytoremediation. The commenter presented statistics and identified other sites where these technologies had been successfully implemented. The commenter also asked why bioremediation could not be implemented prior to the 2006 start date for the proposed remedy with the goal of reducing the total volume of soil requiring further remediation.

Response: Numerous technologies, including some of those identified by the commenter, were evaluated and are presented in the FFS. However, many of the bioremediation technologies were eliminated from consideration because they are not effective for addressing metals, predominant contaminants of the LLs 1-4 soils. In addition, combining several technologies to address a mix of contaminants increases the overall cost and increases the implementation time period. Despite the theoretical simplicity of these bioremediation technologies, implementation of any remedy at RVAAP must go through the approved regulatory process (e.g., feasibility study, proposed plan, public comment, record of decision, remedial design, etc.) prior to being implemented. At this point, it is unlikely that any other alternative could be implemented more quickly than the proposed remedy.

5. *Remediation Technologies*

Comment: One commenter asked if phytoremediation or bioremediation technologies could be implemented after the proposed remedy to address residual contamination in the soil.

Response: The removal of soil contaminated above the established cleanup goals in preparation for land use by the National Guard at LLs 1-4 will not impede additional remediation of soil or other media that could be implemented in the future. Phytoremediation and bioremediation technologies could be considered as part of those remedies through the regulatory process. For LLs 1-4, the plants would be an interference as the Guard would not be able to move vehicles in these areas because it could destroy the plants. And the implementation of bioremediation would only be non-interfering if the

nutrients that feed the bacteria could be manually applied without the need for distribution piping or dosing equipment.

6. *Remediation Technologies*
Comment: One commenter asked for clarification as to why the no action alternative is required to be considered in the alternatives evaluation.

Response: The CERCLA regulations require that a no action alternative be evaluated in the FFS. The no action alternative serves as a baseline for comparison to the other remedial options. Consideration of this alternative identifies the worst case scenario and highlights what the impacts are or could be from the current conditions at the site.

7. *Contaminants*
Comment: One commenter asked if the manganese and arsenic identified at the site were naturally occurring compounds.

Response: The majority of the manganese is likely naturally occurring as the only documented history of use of manganese at LLs 1-4 is the fine amounts used in shell fabrication. The arsenic is also likely naturally occurring as historical records indicate it was not used for either herbicide or pesticide treatments.

8. *Contaminants*
Comment: One commenter asked if Arochlor-1260, a PCB, was detected on site at concentrations above any established limits. The commenter indicated that information was available on the presence of the compound and would like to submit it for review. A second commenter asked for clarification as to the source of PCBs, extent of PCB contamination, and why PCB-1254 was included in the Proposed Plan but PCB-1260 was not.

Response: PCB-1260 was detected in one soil sample collected from LL 1. PCB-1260 was detected more frequently in soil samples collected in LLs 2-4 during the Phase I and Phase II RIs. The maximum concentrations detected by laboratory analysis in surface soil samples as reported in the RIs are summarized below. The RI reports are available in the Administrative Record and Information Repositories. The maximum concentration of PCB-1260 does not exceed the clean-up goal for the National Guard Trainee of 35 mg/kg which was used in the feasibility study to identify soils that require remediation. There were detections of PCB-1254 in soil samples collected from LLs 1-4 which did exceed this goal and, thus, PCB-1254 is included in the Proposed Plan. Most of the PCB detections in soil samples were surficial (0 to 4 feet below ground surface) in nature. The source of the PCBs in soil was likely from a release of transformer oil, or similar, or something else related to operations at the load lines, such as allowing paint chips to collect on the ground during repainting activities.

Load Line	Sample Matrix	PCB-1260 (mg/kg)
LL1	Surface Soil	0.68
LL2	Surface Soil	6
LL3	Surface Soil	1.4
LL4	Surface Soil	28

9. *Contaminants*

Comment: One commenter asked if hexavalent chromium was detected on site and at what concentrations. The commenter also asked if this compound was being addressed by the proposed remediation.

Response: Hexavalent chromium was detected in soil samples collected from LLs 1-4 at concentrations exceeding the clean-up goal. The areas from which those samples were collected will be addressed by the proposed remediation.

10. *Excavation*

Comment: One commenter asked for clarification as to what depth interval of soil was to be removed under the proposed remedy. A second commenter asked for clarification on the term surficial.

Response: The proposed remedy will excavate soils that exhibit contaminant concentrations exceeding the clean-up goals. While the actual depth of each excavation area will be determined in the field based on confirmation sampling results, soil will likely be removed to depths between 2 and 4 feet in most areas..

11. *Dust Control*

Comment: One commenter asked what would be done to control dust during remediation.

Response: Dust will be suppressed through the use of vehicles that spray a mist of potable water on the area to prevent dust from becoming airborne.

12. *Transportation and Disposal*

Comment: One commenter asked how the excavated material was going to be transported to the disposal facilities. A second commenter asked for clarification on the placarding of the transport vehicles and the firm that would be responsible for the transportation.

Response: Excavated material will be transferred by trailer truck with a watertight bed with a capacity of approximately 20 cubic yards. The likely transportation routes from RVAAP will be along main roads and includes following Route 5 either westward to Route 76 or eastward to Route 80. Vehicles transporting wastes from RVAAP will be placarded in accordance with DOT requirements. Several potential transporter subcontractors have been identified; however, final selection will occur in the remedial design phase.

13. *Transportation and Disposal*

Comment: Several commenters asked for the names and locations of the likely disposal facilities.

Response: The potential disposal facility for the nonhazardous material is the Republic Landfill in East Sparta. The potential disposal facilities for hazardous material include Environmental Quality in Michigan and Model City near Buffalo, New York. The facilities accept wastes based on material characterization profiles.

14. *Media to be Remediated*

Comment: One commenter indicated that a significant infrastructure exists at the load lines including the concrete aprons of buildings and walkways, steam lines and other buried infrastructure which may be contaminated with explosives. The commenter asked if these media, including potential explosive materials, will be addressed by any future remediation.

Response: The remediation of infrastructure at LLs 1-4 is not included in the scope of the proposed remedy for soils at LLs 1-4. The Army will address these media, if necessary, as separate investigation and remediation activities in the future.

15. Media to be Remediated

Comment: One commenter indicated that pink water was released into some of the rivers during operations at the load lines. The commenter asked what sediment or surface water sampling has been or is planned to be performed to identify explosives or metals contamination.

Response: The proposed plan does not address wet sediment or surface water. However, the Army has compiled extensive data over the years from surface water and sediment samples collected from the waterbodies, waterways and streams at RVAAP. The remediation of these media, if necessary, will be addressed separately, and is a planned agenda item for the September 26, 2005 RAB meeting.

16. Extent of Contamination

Comment: One commenter asked how the areas of soil designated for remediation were determined, specifically, what type of sampling was used and how many samples were collected. The commenter also inquired as to the confidence level in the delineation of areas proposed for remediation, specifically around the buildings.

Response: Sampling was performed using a combination of discrete and multi-incremental methodologies. The sampling performed for the RIs was part of a comprehensive sampling program developed by the Army in conjunction with the Ohio EPA and utilized primarily the discrete sampling methodology. An estimated 2,200 samples were collected in LLs 1-4 during investigations to date. The sampling locations for the Phase I RI program were primarily based on historical records, visual inspections, and knowledge of the process. After reviewing the results, a Phase II RI program was conducted to confirm results or complete the data gaps. In November 2004, smaller scale sampling program was performed, as presented in the FFS, to further delineate proposed areas for remediation. A significant portion of the samples were collected from locations around the buildings.

17. Comment Process

Comment: One commenter requested clarification on the deadline for submittal of public comments and the logistics for submitting comments via mail. The commenter also asked how the responses would be provided.

Response: The deadline for the 30-day public comment period was August 10, 2005. Comments could have been submitted via regular mail, it was not necessary to send them as certified, with a postmark date no later than August 10, 2005. Each written comment will be responded to individually and included in the Responsiveness Summary as part of the Interim ROD which will be incorporated into the Administrative Record, Information Repositories and the RVAAP website. An announcement will be made at the RAB meeting when it is available for public viewing.

C.2 Written Comments

Written comments received during the public comment period are grouped together in the following general topic categories: Contaminants, Transportation, Disposal, Remediation

Technologies, and Comment Process. Each comment was reformatted, where appropriate, for presentation in this section. Each comment is followed by a response.

1. *Contaminants*

   Comment: One commenter asked what the results were for Arochlor-1260, a PCB, in the investigation and the highest readings.

   Response: PCB-1260 was detected in one soil sample collected from LL 1. PCB-1260 was detected more frequently in samples collected in LLs 2-4 during the Phase I and Phase II RIs. The maximum concentrations detected by laboratory analysis in surface soil samples as reported in the RIs are summarized below. The RI reports are available in the Administrative Record and Information Repositories.

Load Line	Sample Matrix	PCB-1260 (mg/kg)
LL1	Surface Soil	0.68
LL2	Surface Soil	6
LL3	Surface Soil	1.4
LL4	Surface Soil	28

2. *Transportation*

   Comment: One commenter inquired as to how much of the truck traffic created will travel on State Route 225 through Paris Township. The commenter stated that Route 225 is very narrow, hilly, and has narrow berms and deep ditches and that this type of increased traffic will be a hazard for Paris residents and those who must use the road every day.

   Response: The final truck route will depend on which disposal facility will be accepting the excavated material from the site. However, it will be one of two proposed routes from RVAAP either westward along Route 5 towards Ravenna to Route 76 or along eastward along Route 5 toward Newton Falls to Route 80. Route 225 is not a proposed truck route at this time. The current construction on Route 5 which has a section of the road closed to thru traffic (south of RVAAP) is expected to be completed prior to initiation of remediation. If Route 5 is closed at the time of transportation, alternate routes will be selected. Should Route 225 be designated for use, drivers will be made aware of the conditions and traffic requirements (i.e., posted speed limit, etc.) on Route 225 such that they will be safe and courteous.

3. *Disposal*

   Comment: One commenter expressed concern over transporting contaminated materials from RVAAP to other areas via the following message: ”My first concern is, of course, the health of our environment, which includes every living thing there-in. Included would be the routes to be taken to move our contamination to other areas. Why would we inflict our problem on millions of other living things? Then too, suppose there is an accident on the highways over which the contaminated materials are being transported, thus spreading the contamination further? I feel we should cover it up, cap it on site, and let sleeping dogs lie.”

   Response: The alternative for capping the contaminated soil was considered in the FFS. However, this alternative is not compatible with the planned future land use as the capped area is off limits to vehicular access. In addition, the capped area would require monitoring indefinitely to ensure the cap maintains its integrity in perpetuity. By transporting the

contaminated soil to a designated disposal facility that is already designed to handle the waste stream and designated to monitor indefinitely, the Army assures that the remedy is protective of human health and the environment. During the execution of any off-site disposal activities, the Army will implement a program that will minimize the potential for exposure to off-site residents and other potential receptors along the proposed truck route to ensure the waste is transported safely and efficiently.

4. *Remediation Technologies*

Comment: One commenter asked if it made sense to try to reduce contamination at the site by bioremediation (explosive residue) and phytoremediation (metals) for the year prior to implementation of Alternative SDS3: Excavation and off-site Disposal, if it is not scheduled to begin until sometime in 2006. The commenter also asked whether these methodologies could be expanded to include all potentially impacted sites. The commenter stated that excellent results (greater than 95% reduction) have occurred at IAAP, MAAP, TCAAP, Umatilla Army Depot as well as other sites, both military and industrial.

Response: The start of Alternative SDS3 in 2006 is scheduled following completion of the required legal processes and document filings for implementing any remedy at the site. Any bioremediation or phytoremediation technology would have to undergo the same processes and would not be able to be implemented much earlier than the excavation and off-site disposal alternative. These remediation technologies could be implemented at other potentially impacted sites if the type and combination of contaminants, soil type, and cost were conducive to their application.

5. *Remediation Technologies*

Comment: One commenter asked if bioremediation and phytoremediation could be applied to the excavated and non-excavated areas after completion of Alternative SDS3. The commenter stated that considering the use proposed for these areas by the Guard, plants and chemically eating bacteria would cause no interference with Guard activities and would cost very little. The commenter stated that such actions would go a long way in showing the public the Army's sincerity in a complete restoration of RVAAP. The commenter also expressed concern regarding any residual contamination that could affect the Guard directly considering the job they do and that the Army owes them the safest possible training areas.

Response: The removal of soil contaminated above the established cleanup goals in preparation for land use by the National Guard at LLs 1-4 will not impede additional remediation of soil or other media that could be implemented in the future. Phytoremediation and bioremediation technologies could be considered as part of those remedies through the regulatory process. Actually, the plants would be an interference as the Guard would not be able to move vehicles in these areas because it could destroy the plants. And the implementation of bioremediation would only be non-interfering if the nutrients that feed the bacteria could be manually applied without the need for distribution piping or dosing equipment.

6. *Comment Process*

Comment: One commenter requested a 90-day extension to the initial 30-day public comment period through the following statement: "The three plans for soil remediation of soils at LL 1, 2, 3 + 4 were prepared by Shaw Environmental Inc. for the DoD under contract #DACA45-03-D-0026, Task Order 0001, dated September 25, 2003. However, the public comment period is from July 12 to August 1, 2005. An informative meeting was held on August 1, 2005. This effectively limits public comment to 9 days. Because of the rural and

small town population of the area most likely to be affected by events at RVAAP and the difficulty of communication with such a dispersed area would you consider extending the public comment period to 90 days and improving the communications with that public? If so, would the government and contractors consider expanding comment periods and informative meeting in the future?"

Response: The required 30-day public comment period began on the date of issuance of the Proposed Plan, July 12, 2005, as published in three local newspapers. The 30-day period ended August 10, 2005. The public meeting was held in the middle of that 30-day public comment period to give the public a chance to review the Proposed Plan, and other documents in the Administrative Record or Information Repositories, prior to the public meeting. All comments relating to the Proposed Plan were received within the 30 day comment period. While the Army would have extended the comment period an additional 30 days, no additional comments were received. In accordance with regulations, future documents released for public comment will have 30-days and an extension of that 30-days can be granted if requested by the public. However, this request must be made individually for each document that is released for public comment.

D. TECHNICAL AND LEGAL ISSUES

There were no technical or legal issues raised during the public comment period with the exception of one general question concerning a request for an extension of the initial 30-day public comment period. The commenter indicated that 30 days was generally insufficient time for a rural community to be notified of and expected to respond to the issuance of the Proposed Plan. CERCLA's implementing regulation (the National Contingency Plan (NCP)) provides for a 30- day public comment period on Proposed Plans at 40 CFR 300.430(f)(3)(i)(C)). The Army is conducting its response consistent with CERCLA and the NCP. The Army may grant a 30-day extension to the public comment period if warranted based on the revelation of new information during the initial 30 days. However, this extension request was based on the perceived notion that the public was not given adequate response time. The extension was not granted because the request was not based on a technical concern regarding the remedy.

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REFERENCES

1. Ohio EPA (Ohio Environmental Protection Agency), 1998. *ARARs*. DERR-00-RR-001. July 30, 1998.

2. Ohio EPA, 2004a. Personal communication with USACE, Shaw and SAIC at RGO Planning Meeting in Dublin, Ohio, June 18, 2004.

3. SAIC (Science Applications International Corporation), 2004. *Phase II Remedial Investigation Report for Load Line 1 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. March 2004.

4. Shaw (Shaw Environmental, Inc.), 2004a. *Phase II Remedial Investigation Report for Load Line 2 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. May 2004.

5. Shaw, 2004b. *Phase II Remedial Investigation Report for Load Line 3 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. June 2004.

6. Shaw, 2004c. *Phase II Remedial Investigation Report for Load Line 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. June 2004.

7. Shaw, 2004d. *Supplemental Baseline Human Health Risk Assessment for Load Line 1 Alternative Receptors at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. July 2004.

8. Shaw, 2004e. *Proposed Remedial Goal Options for Soil at Load Lines 1, 2, 3, and 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. September 2004.

9. Shaw, 2005a. *Final Focused Feasibility Study for the Remediation of Soil at Load Lines 1 through 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. May 2005.

10. Shaw, 2005b. *Proposed Plan for the Remediation of Soils at Load Lines 1 through 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. July 2005.

11. USACE (United States Army Corps of Engineers), 1998. *Phase I Remedial Investigation Report for High-Priority Areas of Concern at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. DACA62-94-D-0029, D.O. Nos. 0010 and 0022, Final, February 1998.

12. USACE, 2001. *Phase II Remedial Investigation Report for the Winklepeck Burning Grounds at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. DACA62-94-D-0029, D.O. 0060, Final, April 2001.

13. USACE, 2003. *Ravenna Army Ammunition Plant, Ravenna, Ohio, Community Relations Plan*. September 2003.

14. USACE, 2004. Munitions and Explosives of Concern (MEC) Support During Hazardous, Toxic, and Radioactive Waste (HTRW) and Construction Activities, EP 75-1-2. August 1, 2004.

15. US EPA, 1995. *Land Use in the CERCLA Remedy Selection Process*. OSWER Directive 9355.7-04. May 1995.

16. Ohio EPA, 2004b. *Ravenna Army Ammunition Plant - Director's Final Findings and Orders.* June 10, 2004.

ATTACHMENTS

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Attachment 1. Description of ARARs

Action	Requirements	Prerequisite	Citation(s)
Surface Waters and Wetlands	All waters of the state shall be free of suspended solids, floating debris, oil, scum, or toxic substances from human activity that create a nuisance, cause degradation, or adversely affect aquatic life. There may be no degradation of water quality that results in violation of the applicable water quality criteria or the impairment of existing uses. Wetlands-designated uses shall be maintained and protected such that degradation through direct, indirect, or cumulative impacts do not result in wetland use or function.	Applicable to activities at LLs 1-4 that may impact waters of the state (connected drainageways) or wetlands, including isolated wetlands.	OAC 3745-1-04 OAC 3745-1-51 OAC 3745-1-54(B)(1)
General Construction Standards-Site Preparation and Excavation			
Activities Resulting in the Emission of Particulate Matter, Dusts, Fumes, Gas, Mists, Smoke, etc. From a Hazardous Waste Facility	No owner/operator of a hazardous waste facility shall cause or allow the emission of any particulate matter, dusts, gas, fumes, mists, smoke, vapor, or odorous substances that interferes with the enjoyment of life or property by persons living or working in the vicinity of the facility. Any such action is considered a public nuisance.	Applicable to soil excavation activities at LLs 1-4	ORC 3734.02(I) OAC 3745-15-07(A)
Activities Causing Fugitive Dust Emissions	Persons engaged in construction activities shall take reasonable precautions to prevent particulate matter from becoming airborne; reasonable precautions include, but are not limited to, the following: • the use of water or chemicals for control of dust during construction operations or clearing of land; and • the application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces, which can create airborne dusts. No person shall cause, or allow, fugitive dust to be emitted in such a manner that visible emissions are produced beyond the property line.	Applicable to fugitive emissions from demolition of existing buildings or structures, construction operations, grading of roads, or the clearing of land. Applicable to pre-construction clearing activities and excavation activities.	OAC 3745-17-08(B)

Construction Activities Causing Storm Water Runoff (e.g., clearing, grading, and excavation)	Construction activities disturbing more than 1 acre must develop and implement a storm water pollution prevention plan incorporating best management practices (including sediment and erosion controls, vegetative controls, and structural controls) in accordance with the requirements of the Ohio EPA General Permit for Construction Activities (Permit ORC 000002).	Applicable to stormwater discharges from land disturbances from a construction activity involving more than 1 acre.	40 CFR 122.26 OAC 3745-38-06
REMOVAL OF CONTAMINATED SOILS			
Waste Generation, Characterization, Segregation, and Storage-Excavated Soils and Buried Wastes, Sludge, Surface Features, Debris, and Secondary Wastes			
Generation and Characterization of Solid Waste *(all primary and secondary wastes)*	The generator must determine if the material is a solid waste, as defined in 40 *CFR* 261.2 and 40 *CFR* 261.4(a). if the material is a solid waste, the generator must determine if the solid waste is a hazardous waste by:	Applicable to generation of a solid waste as defined in 40 *CFR* 261.2 and that is not excluded under 40 *CFR* 261.4(a).	40 CFR 262.11(a)(b)(c) OAC 3745-52-11(A)(B)(C)(D)
	• determining if the waste is listed under 40 *CFR* Part 261; or • determining if the waste exhibits characteristics by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used; and • determining if the waste is excluded under 40 *CFR* Parts 261, 262, 266, 268, and 273	Applicable to the generation and characterization of hazardous-contaminated soil and hazardous debris resulting from excavation. Process history indicates that soils were contaminated with K047 pink/red water from TNT operations. Applicable to the generation and characterization of hazardous-contaminated soil and hazardous debris resulting from excavation. Site data indicate that soils contain metals at concentrations that exceed 20 times the TC limit and may exhibit the characteristics D008. Applicable to generation of decontamination wastewater.	40 CFR 262.11(a)(b)(c) OAC 3745-52-11(A)(B)(C)(D) 40 CFR 262.II(a)(b)(c) OAC 3745-52-11(A)(B)(C)(D)
	The generator must determine if the waste is restricted from land disposal under 40 *CFR* 268 *et seq.* by testing in accordance with prescribed methods or use of generator knowledge of waste.	Applicable to the generation and characterization of hazardous-contaminated soil and hazardous debris resulting from excavation. Applicable to generation of decontamination wastewater.	40 CFR 268.7 OAC 3745-270-07

	The generator must determine each EPA Hazardous Waste Number (Waste Code) to determine the applicable treatment standards under 40 CFR 268.40, Subpart D.	Applicable to the generation and characterization of hazardous-contaminated soil and hazardous debris resulting from excavation. Applicable to generation of decontamination wastewater.	40 CFR 268.9(a) OAC 3745-270-07 OAC 3745-270-09
	The generator must determine the underlying hazardous constituents [as defined in 40 CFR 268.2(i)] in the waste.	Applicable to the generation and characterization of RCRA characteristic hazardous waste (except D00l non-wastewaters treated by combustion, recovery of organics, or polymerization. See 268.42, Table l) and to hazardous-contaminated soils for their subsequent storage, treatment, or disposal.	40 CFR 268.9(a) OAC 3745-270-09
Accumulation of Hazardous Debris from Excavation and Screening. It is Assumed that any Debris Resulting from Excavation and Screening will be Accumulated for < 90 Days	A generator may accumulate for up to 90 days or conduct treatment of hazardous wastes in containers without an Ohio EPA permit. Generators that accumulate for 90 days or conduct on-site treatment of hazardous waste in containers must comply with the personnel training, preparedness and prevention requirements, and contingency plan requirements of 40 *CFR* 265.16; 40 *CFR* 265, Subpart C; and 40 *CFR* 265, Subpart D, respectively. Personal training and contingency plan requirements would appear to be administrative in nature. Arguably some of the components/goals of the contingency plan such as: (1) to minimize the hazards to human health or environment from fire, explosion or sudden release of hazardous waste or hazardous constituents, or (2) presence of an emergency coordinator on site, could be viewed as substantive. If determined to be substantive, these provisions should be cited as ARAR; however, the plans, details or implementation steps should be included in the CERCLA documentation for the site (i.e., remedial design documents).	Applicable to 90-day accumulation of debris from excavation and screening if such debris contains listed wastes or exhibits a characteristic.	40 CFR 262.34(a)(4) OAC 3745-52-34(A)(4) OAC 3745-66-70 to 66-77
	Containers must be marked with the date upon which period of accumulation began and with the words "Hazardous Waste."	Applicable to 90-day accumulation of debris from excavation and screening if such debris contains listed wastes or exhibits a characteristic.	40 CFR 262.34 (a)(2)(3) OAC 3745-52-34 (A)(2)(3)

	Containers holding hazardous wastes must be kept closed except to add or remove wastes and must not be managed in a manner that would cause them to leak.	Applicable to 90-day accumulation of debris from excavation and screening if such debris contains listed wastes or exhibits a characteristic.	40 CFR 264.171 40 CFR 264.172 40 CFR 264.173 40 CFR 264.176 40 CFR 264.17 OAC 3745-52-34(A)(1)
	Containers of hazardous waste must be maintained in good condition and comparable with the waste stored therein. Containers holding ignitable or reactive wastes must be separated from potential ignition sources and located 50 feet from the property boundary.		
Placement of hazardous contaminated soil in a staging pile	In 1998, USEPA created a new unit for the temporary management of remediation wastes known as the staging pile. The staging pile is an accumulation of solid, non-flowing remediation wastes that may be used for storage of those wastes for two years. The requirements for staging piles include the performance criteria of 40 CFR 264.554(d). These standards require that: the staging pile must be designed to prevent or minimize releases of hazardous waste or hazardous constituents into the environment, the staging pile must be designed to minimize cross-media transfer as necessary to protect human health and the environment (by using liners, run-off/run-on controls as appropriate) The staging pile requirements also contain closure requirements (separate provisions for staging piles located in previously contaminated areas and those located in previously uncontaminated areas)	Applicable to storage of hazardous-contaminated soils in staging piles. Potentially relevant and appropriate if excavated soils are determined to not contain listed wastes or exhibit the TC soils.	40 CFR 264.554 OAC 3745-57-74

Attachment 1. Description of ARARs

Abbreviations:

CFR	Code of Federal Regulations
ORC	Ohio Revised Code
TC	toxicity characteristic

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Attachment 2. Glossary of Terms

Administrative Record: This is a collection of documents (including plans, correspondence and reports) generated during site investigation and remedial activities. Information in the Administrative Record is used to select the recommended alternative and is available for public review.

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

Capital Cost: This includes costs associated with construction, treatment equipment, site preparation, services, transportation, disposal, health and safety, installation and start-up, administration, legal support, engineering, and design associated with remedial alternatives.

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

Chemical of Concern (COC): Site-specific chemical substance that potentially poses significant human health and/or ecological risks. COCs are typically further evaluated for remedial action.

Feasibility Study (FS): This CERCLA document reviews the COCs at a site, and evaluates multiple remedial technologies for use at the site. It finally identified the most feasible remedial action alternatives. A Focused Feasibility Study (FFS) is a FS that evaluates remedial alternatives for a specific portion of the site.

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

National Priorities List (NPL): A list of sites that are qualified to receive expenditures of CERCLA funds.

Operation and Maintenance (O&M) Cost: Annual post-construction cost necessary to ensure the continued effectiveness of a remedial action.

Present Worth Cost: Used to evaluate expenditures that occur over different time periods by discounting all future costs to a common base year. This allows the cost of the remedial alternatives to be compared on the basis of a single figure representing the amount of money that would be sufficient to cover capital and O&M costs associated with each remedial alternative over its planned life.

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

Record of Decision (ROD): This legal record is signed by the US Army and Ohio EPA. It provides 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. A ROD is considered interim when it

addresses only specific portions of an overall site and will be part of a final ROD in the future.

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

Resource Conservation and Recovery Act (RCRA): A congressional act that addresses the handling of hazardous waste at facilities currently operating and those yet to be constructed.

Responsiveness Summary: A part of the ROD in which the US Army documents and responds to written and oral comments received from the public about the Proposed Plan.

Toxic Substances Control Act (TSCA): This federal law is intended to protect the public and the environment from exposure to numerous chemical substances and mixtures. It regulates the importation, manufacture and distribution of chemicals in the U.S. PCBs are regulated under this legislation.

FIGURES

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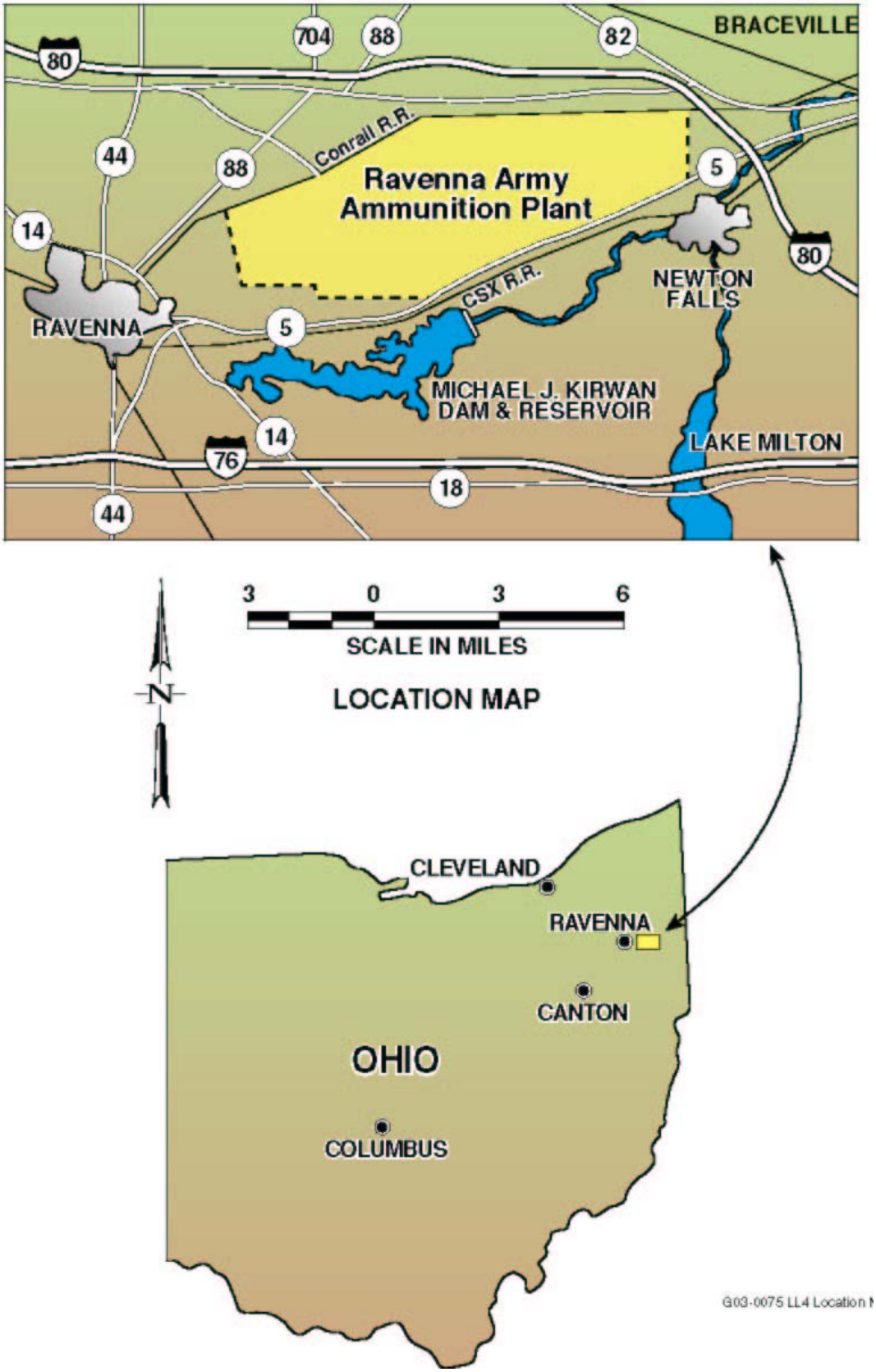
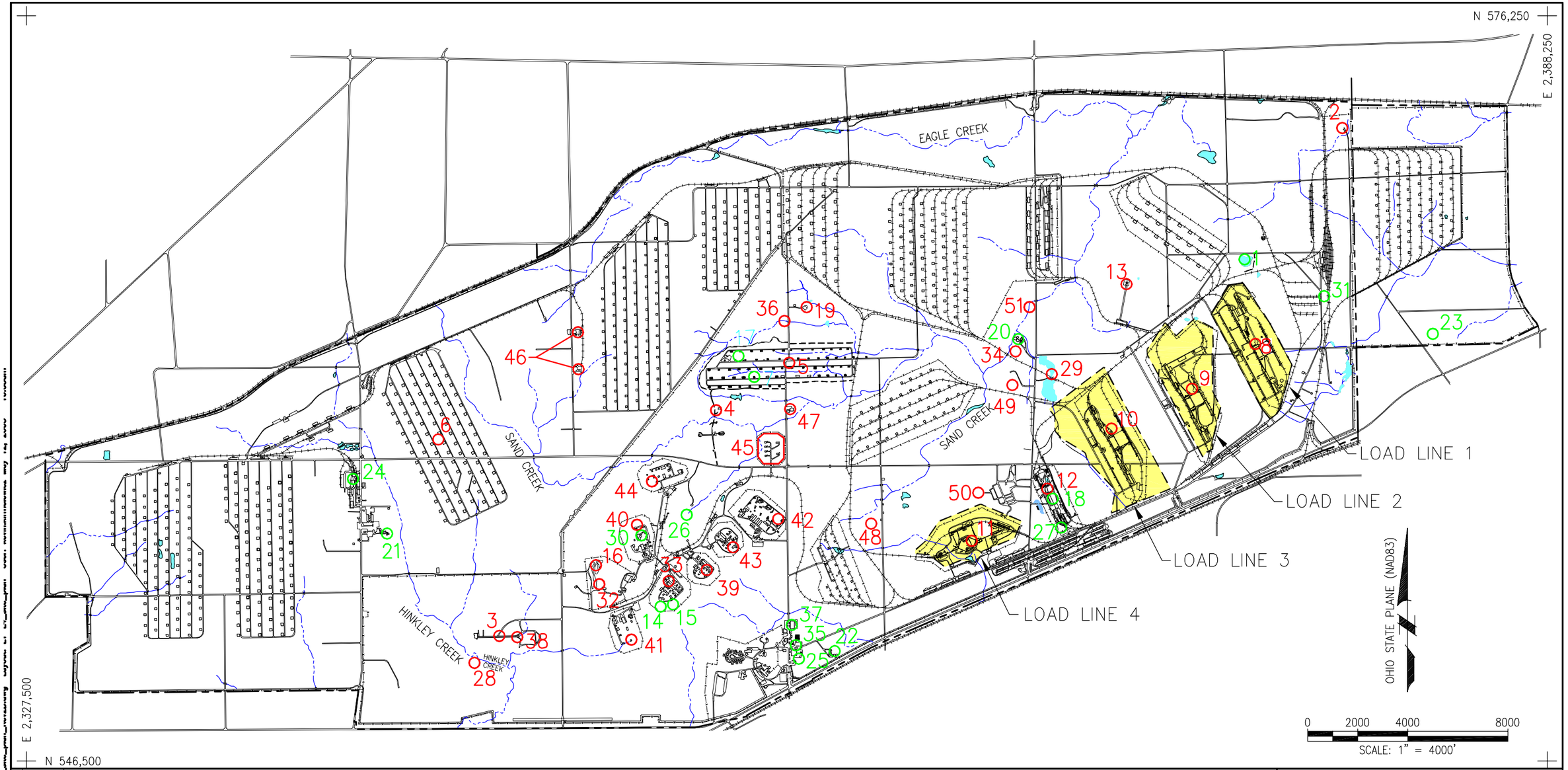


Figure 1-1 – Site Locus Map



Legend

1 ..... RAMSDELL QUARRY LANDFILL
2 ..... ERIE BURNING GROUNDS
3 ..... DEMOLITIONS AREA #1
4 ..... DEMOLITIONS AREA #2
5 ..... WINKLEPECK BURNING GROUNDS
6 ..... C BLOCK QUARRY
7 ..... BUILDING 1601 HAZARDOUS WASTE STORAGE
8 ..... LOAD LINE 1 AND DILUTION/SETTLING POND
9 ..... LOAD LINE 2 AND DILUTION/SETTLING POND
10 ..... LOAD LINE 3 AND DILUTION/SETTLING POND
11 ..... LOAD LINE 4 AND DILUTION/SETTLING POND
12 ..... LOAD LINE 12 AND DILUTION/SETTLING POND
13 ..... BUILDING 1200 AND DILUTION/SETTLING POND
14 ..... LOAD LINE 6, EVAPORATION UNIT
15 ..... LOAD LINE 6, TREATMENT PLANT
16 ..... QUARRY LANDFILL/FORMER FUZE AND BOOSTER BURNING PITS
17 ..... DEACTIVATION FURNACE
18 ..... LOAD LINE 12 PINK WASTEWATER TREATMENT
19 ..... LANDFILL NORTH OF WINKLEPECK BURNING GROUND
20 ..... SAND CREEK SEWAGE TREATMENT PLANT
21 ..... DEPOT SEWAGE TREATMENT PLANT
22 ..... GEORGE ROAD SEWAGE TREATMENT PLANT
23 ..... UNIT TRAINING SITE WASTE OIL TANK
24 ..... RESERVE UNIT MAINTENANCE AREA WASTE OIL TANK
25 ..... BUILDING 1034 MOTOR POOL WASTE OIL TANK
26 ..... FUZE BOOSTER AREA SETTLING TANKS
27 ..... BUILDING 854 PCB STORAGE
28 ..... MUSTARD AGENT BURIAL SITE
29 ..... UPPER AND LOWER COBB'S POND COMPLEX
30 ..... LOAD LINE 7 PINK WASTEWATER TREATMENT PLANT
31 ..... ORE PILE RETENTION POND
32 ..... 40- AND 60-MM FIRING RANGE
33 ..... FIRESTONE TEST FACILITY
34 ..... SAND CREEK DISPOSAL ROAD LANDFILL
35 ..... BUILDING 1037 LAUNDRY WASTEWATER SUMP
36 ..... PISTOL RANGE
37 ..... PESTICIDE STORAGE BUILDING T-4452
38 ..... NACA TEST AREA
39 ..... LOAD LINE 5/FUZE LINE 1
40 ..... LOAD LINE 7/BOOSTER LINE 1
41 ..... LOAD LINE 8/BOOSTER LINE 2
42 ..... LOAD LINE 9/DETONATOR LINE
43 ..... LOAD LINE 10/PERCUSSION ELEMENT
44 ..... LOAD LINE 11/ARTILLERY PRIMER
45 ..... WET STORAGE AREA
46 ..... BUILDINGS F-15 AND F-16
47 ..... BUILDING T-5301 DECONTAMINATION
48 ..... ANCHOR TEST AREA
49 ..... CENTRAL BURN PITS
50 ..... ATLAS SCRAP YARD
51 ..... DUMP ALONG PARIS-WINDHAM ROAD

FENCE LINE
PROPERTY BOUNDARY
STREAM OR CREEK
BUILDING
ASPHALT ROAD
RAILROAD TRACKS
POND
SURVEY CONTROL POINT
AOC BOUNDARY
AOC UNDER IRP/JMC USE AREAS
CERCLA
RCRA
OTHER REGULATORY
SWAMP

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
P.H. / S.D.	REV. 2 / 05/12/05	LL1-4_site_plan_Rev2B

Figure 2. RVAAP Facility Map

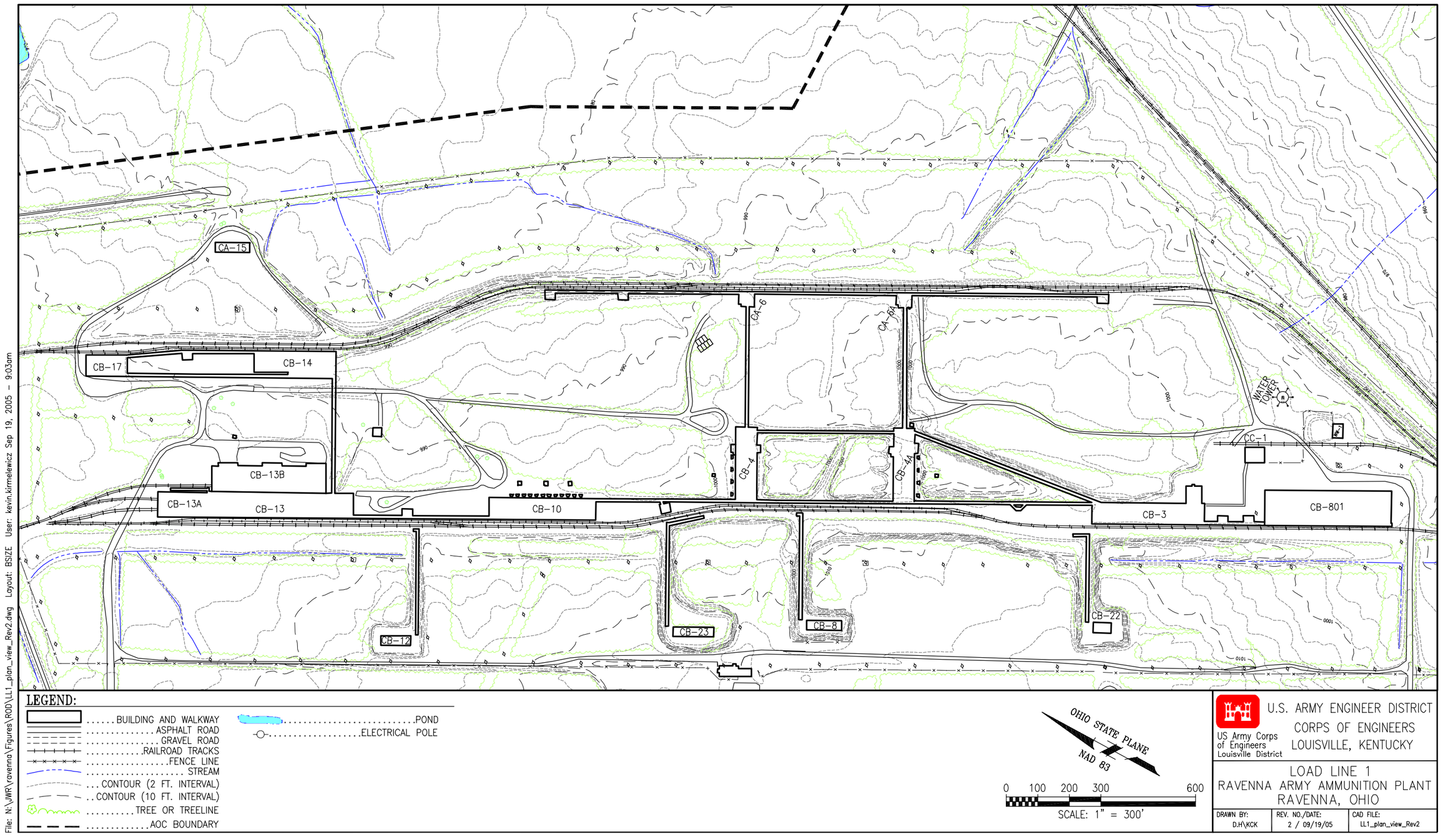


Figure 3. Load Line 1 Plan View

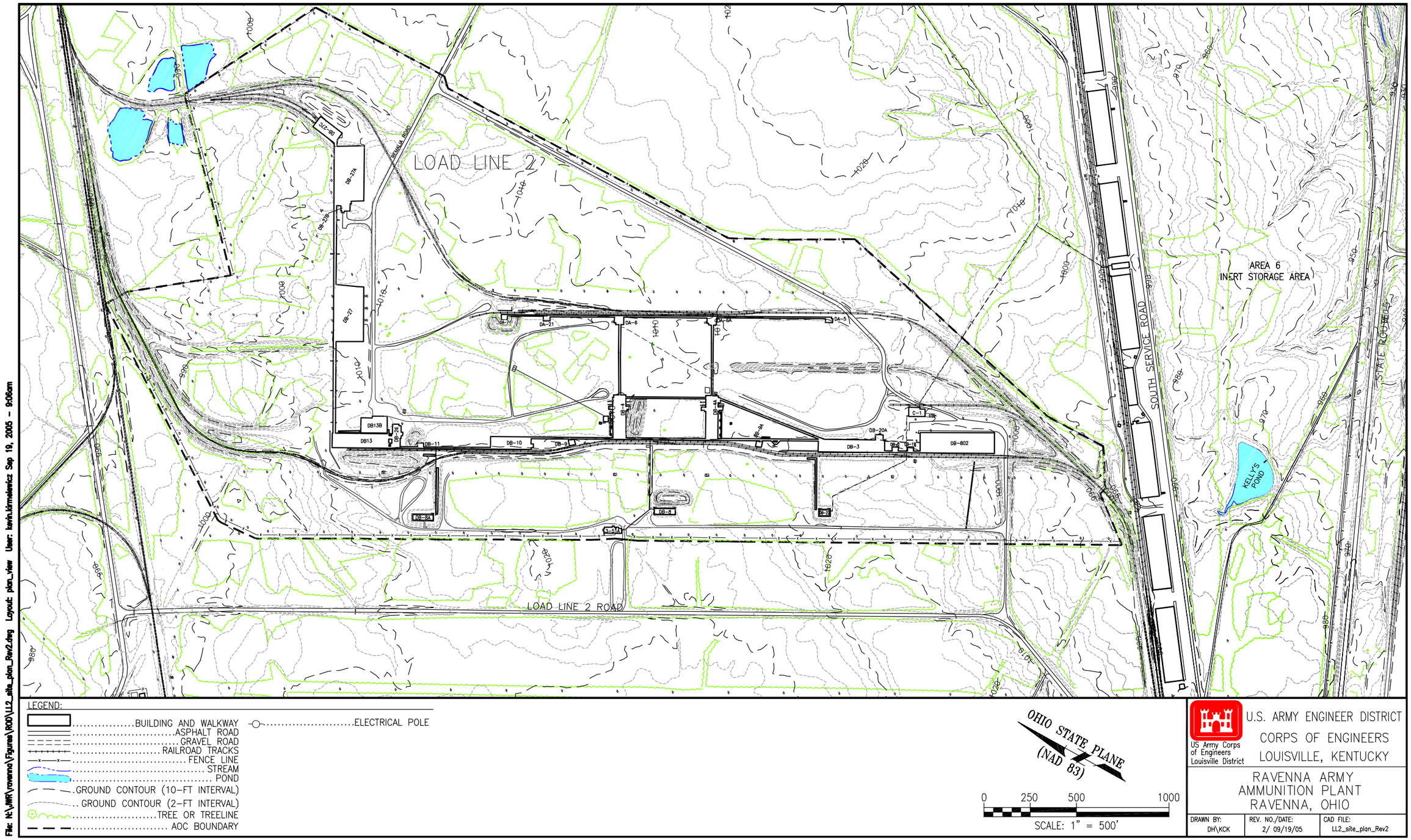


Figure 4. Load Line 2 Plan View

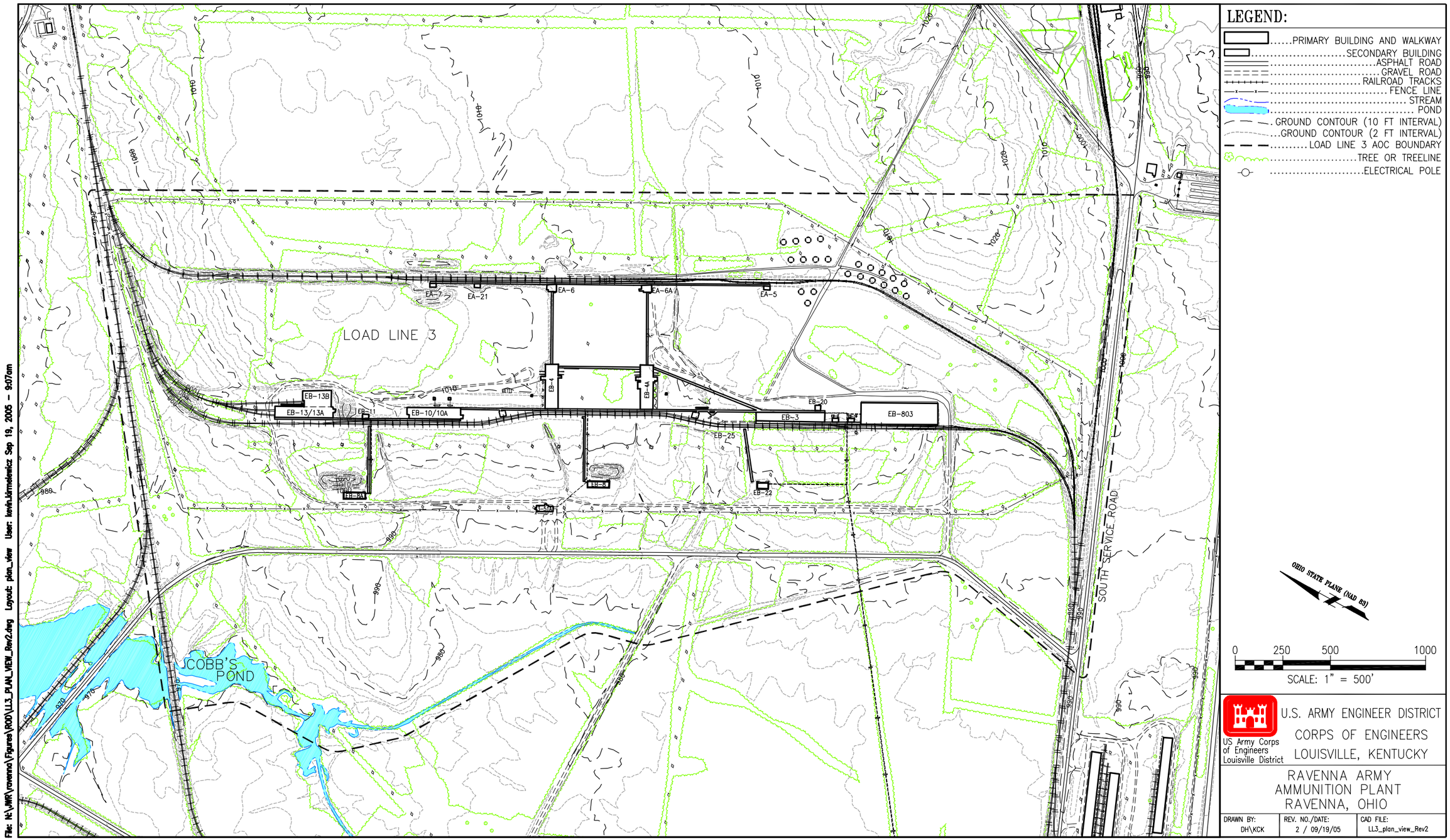


Figure 5. Load Line 3 Plan View

LOAD LINE 4

AREA B

INERT STORAGE

SOUTH SERVICE ROAD

STATE ROUTE 5

G-1A G-1 G-2 G-3 G-4 G-5 G-6 G-8 G-9 G-10 G-12 G-12A G-13 G-14 G-15 G-16 G-17 G-18 G-19 G-19A G-20 G-6A

PF-8

SWAMP

TOWER

LEGEND:

- PRIMARY BUILDING AND WALKWAY
- ASPHALT ROAD
- GRAVEL ROAD
- RAILROAD TRACKS
- FENCE LINE
- STREAM
- POND
- GROUND CONTOUR (10 FT INTERVAL)
- GROUND CONTOUR (2 FT INTERVAL)
- TREE OR TREELINE
- LOAD LINE 4 AOC BOUNDARY
- PARSHALL FLUME
- ELECTRICAL POLE

0 200 400 800

SCALE: 1" = 400'

OHIO STATE PLANE (NAD 83)

US Army Corps of Engineers Louisville District

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
LOUISVILLE, KENTUCKY

RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
DH\KCK	2 / 09/19/05	LL4_site_plan_Rev2

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Figure 6. Load Line 4 Plan View

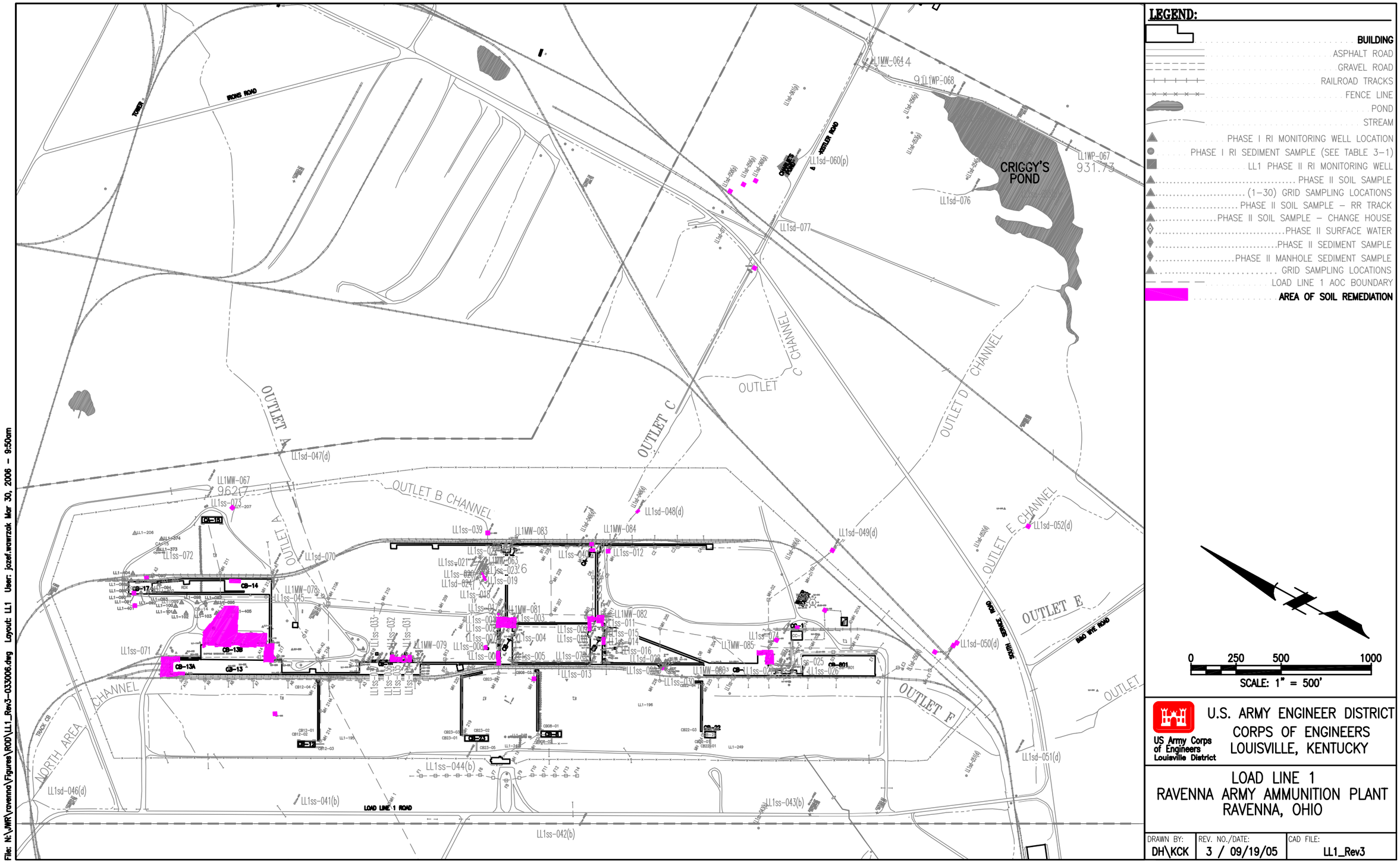

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Figure 7. Load Line 1 - Approximate Areas of Soil Remediation

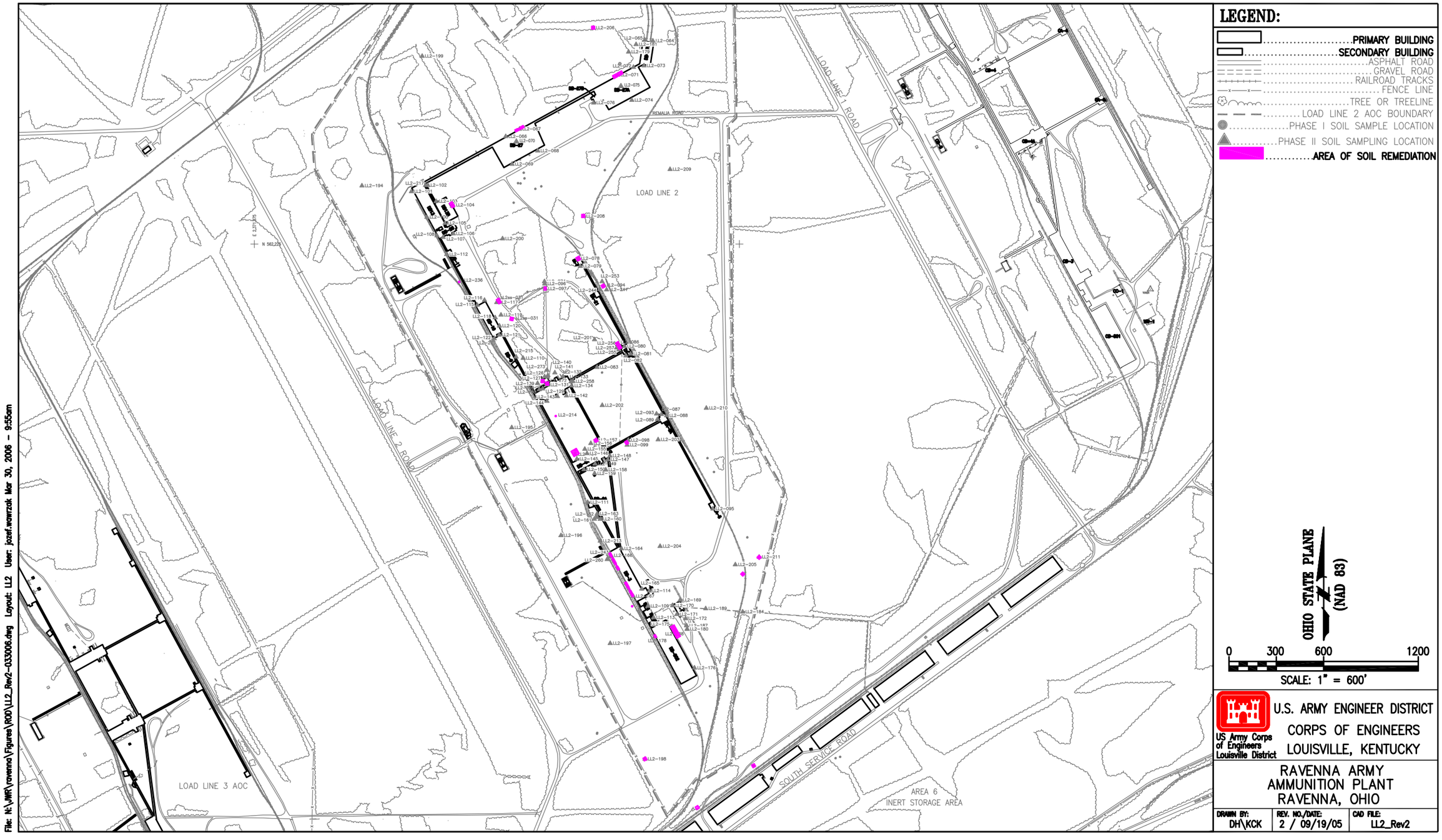

Figure 8. Load Line 2 - Approximate Areas of Soil Remediation

Figure 9. Load Line 3 - Approximate Areas of Soil Remediation

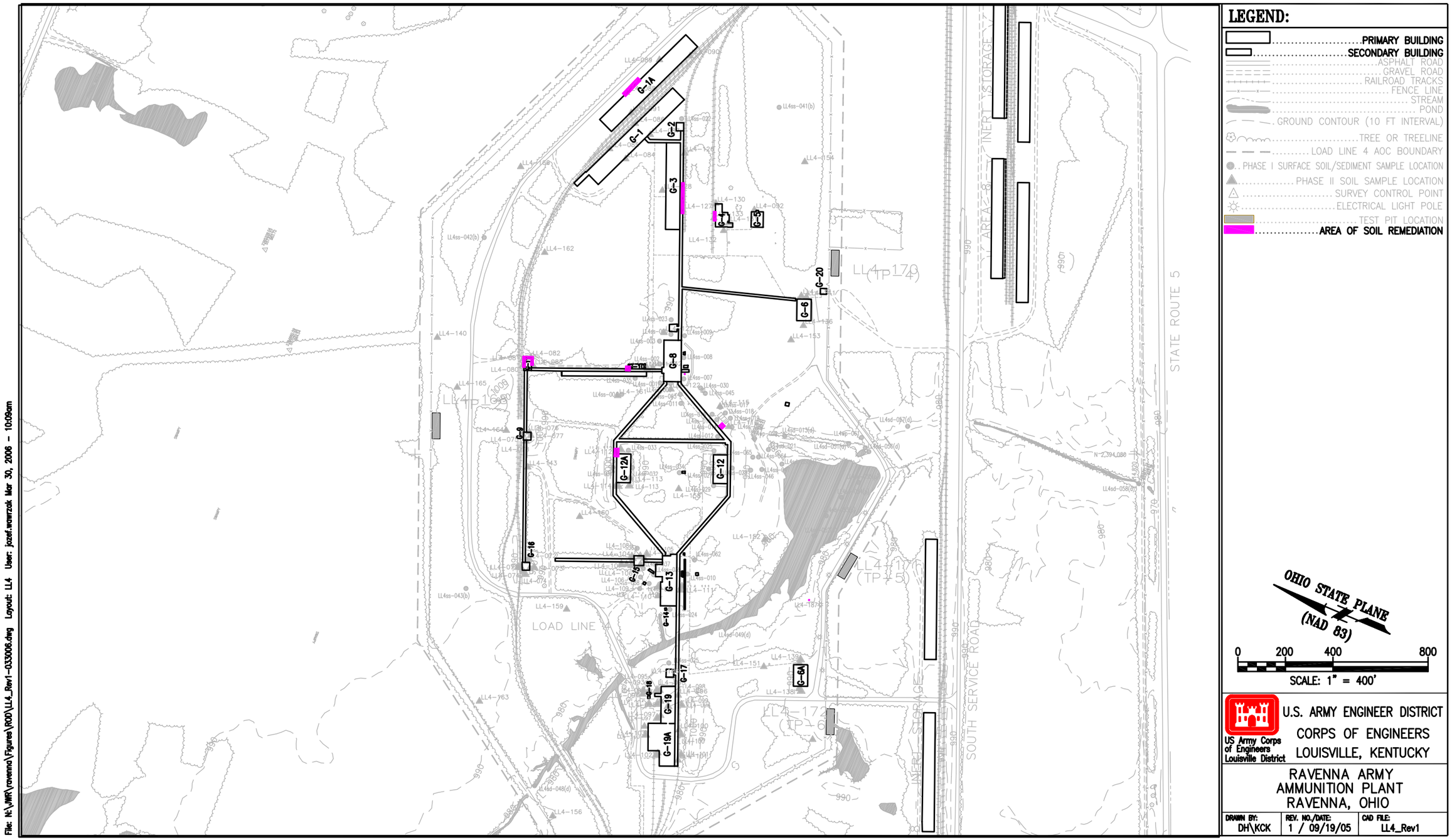

Figure 10. Load Line 4 - Approximate Areas of Soil Remediation

Comment Response Table
Draft Final, Record of Decision for the Remediation of Soils at Load Lines 1 Through 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio, April 2006

Cmt. No.	Comment	Recommendation	Response
	Ohio EPA (Eileen Mohr, Bonnie Buthker)		
1	The Response to Comment (RTC) for comment # 102 parallels the language that was used in the RTC document for the draft version of the Winklepeck Burning Grounds (WBG) ROD. During a conference call between representatives from Ohio EPA, Ohio Army National Guard (OHARNG), Ravenna Army Ammunition Plant (RVAAP), US Army Corps of Engineers (USACE) and the US Army Environmental Center (USAEC) on June 06, 2006, there was no agreement reached among the stakeholders as to the proposed language. However, the Army made a commitment to provide the following: specific WBG Remedial Design (RD) and Property Management Plan (PMP) language to compare with the requirements of the Uniform Environmental Covenant Act. The above-reference verbiage is schedule to be received at Ohio EPA by June 23, 2006. Until the Ohio EPA receives and reviews this language, this issue cannot be resolved. Once this is resolved, it is expected that the agreed-upon language will be able to be applied to Load Lines 1-4. (This comment impacts several sections of the draft ROD, as the language for RTC#102 appears in a number of places.)		As agreed by Army and Ohio EPA, the ROD was revised to be an 'interim' document by removing language regarding land use controls and UECA. This new Interim ROD addresses only those soils and dry sediments currently exposed at LLs 1-4. The Army and Ohio EPA will develop agreeable LUC and UECA language for the final ROD for LLs 1-4 which will be prepared to address the remaining contaminated media at the Site by the Army under a different contract vehicle.
2	The remedy that is detailed in this ROD, although not explicitly stated, represents an		Comment noted. Soil under the existing slabs is not addressed under the scope of

Cmt. No.	Comment	Recommendation	Response
	interim remedy as it solely applies to exposed dry sediments and soils and defers a final remedy of this Area of Concern (AOC) to a future time when slabs will be removed. There remains the issue of potentially-contaminated soils existing under the slabs and within the foundation walls that are currently acting as a temporary engineering control and which would retain the same function in this proposed ROD. Under this proposed ROD, the slabs would need to be inspected on a periodic basis, and repaired as needed, to ensure continued protectiveness. However, the issue remains as to how to deal with the potentially contaminated soils that exist under the slabs, once this "temporary cap" is removed. Prior to the slabs and foundations being removed, the Ohio EPA will require a workplan that details such items as to (not all inclusive): how the slabs/foundations will be removed; what environmental controls will be put into place to minimize the potential spread of contamination; and, detailed soil sampling protocols, numbers of samples, constituents to be analyzed, comparison to established clean-up levels (and if there are new potential constituents of concern, new clean-up levels would need to be generated for those compounds), etc.. Depending upon the analytical results, a Focused Feasability Study (FFS) may be required and remedies evaluated that would achieve the Remedial Action Objective (RAO), and be consistent with		work under Shaw's FPRI contract and would be addressed by the Army at a later date.

Comment Response Table
Draft Final, Record of Decision for the Remediation of Soils at Load Lines 1 Through 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio, April 2006

Cmt. No.	Comment	Recommendation	Response
	the proposed OHARNG usage of the property. The deferred final remedy would then need to be documented in either a new ROD or a ROD amendment.		
3	On page 3, there should be an indication (with respect to the authorizing signatures) that the signature of the Director, Ohio EPA represents support agency acceptance of the remedy.		The following sentence was added ahead of the Ohio EPA signature: "Signature of the Director, Ohio EPA represents support agency acceptance of the remedy."
4	On page 10, line 4, please change "an" to "and."		The text was revised as suggested.
5	On page 25, lines 31-33, revise the text to read: "Findings will be evaluated in the context of the facility-wide groundwater monitoring program and any action will be determined by the US Army, with approval by Ohio EPA."		The text was revised as suggested.
6	The text in section I.2.1 is acceptable. However, on page 23, lines 29-32, delete the existing text and add in the following: "All shipments of contaminated soils and dry sediments will comply with federal, state, and local rules, laws and regulations."		The text was revised as suggested.
7	In section K, please provide additional text that defines what is meant by a principle threat waste.		The following text was added to Section K to define Principle threat waste: "Principal threat wastes, as defined by USEPA, are those source materials considered to be highly toxic or highly mobile that generally cannot be reliably contained, or would present a significant risk to human health or

Cmt. No.	Comment	Recommendation	Response
			the environment should exposure occur. Given the planned future land use for LLs 1-4 for National Guard mounted training (no digging), principal threat wastes at LLs 1-4 would be those media posing a potential risk of 10^{-3} or greater. This risk level is determined as several orders of magnitude greater than the acceptable risk level for the planned future land use considered to develop clean-up goals." Also refer to Comment No. 24.
	Army (Karen Colmie, John Jent, JoAnn Watson, Creighton Wilson)		
8	Title: Isn't this a Draft Final document? Acronyms: BRACO should be BRACD for BRAC Division; please check on whether DoT is needed because I don't remember seeing it in acronym form, only spelled out.		1. The April 2006 ROD was a Draft Final version. 2. BRACO was changed to BRACD throughout the document. 3. DOT is both spelled out and used in acronym form in the document.
9	Page 1, part 1. A.: Please include the Army Environmental Database for Restoration numbers for these 4 AOCs: RVAAP-08, RVAAP-09, RVAAP-10, and RVAAP-11.		The text was revised as suggested.
10	Page 2, lines 5-7: Please revise as recommended.	• Implementation of land use controls for LLs 1-4;	The LUC bullet was removed. Refer to Response to Comment No. 1.
11	Page 5, part II A: A Please correct BRACO to BRACD. B 2nd para, Please change 21,419 to 21,683.	Please make this change throughout the document.	1. BRACO was changed to BRACD throughout the document. 2. The site acreage was revised as suggested.

Comment Response Table
Draft Final, Record of Decision for the Remediation of Soils at Load Lines 1 Through 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio, April 2006

Cmt. No.	Comment	Recommendation	Response
12	Page 7, line 6: Please delete Area of Concern.		The text was revised as suggested.
13	Page 8, line 2: Please add, and depth, but was generally consistent with expected contaminant levels that were predicted based on historical usage of the buildings.		The text was revised as suggested.
14	Page 8, line 22: Please consider using the suggested clarification to explain the 0-4 feet bgs usage. Same comment is applicable to table 3 on page 11.	The National Guard Trainee could be exposed to soils from 0-4 feet bgs so data from this soil interval is used in the risk assessments.	The footnotes were not changed as suggested as they were revised to their current language in earlier drafts per Ohio EPA comments.
15	Page 10, lines 37-39: Please see requested change in RAO language.	The RAO for surface and subsurface soils and dry sediment at LLs 1-4 is to prevent exposure of the National Guard Trainee to contaminants in soils exceeding the identified clean up goals extending to a maximum depth of four feet below ground surface.	The existing RAO text is consistent with that presented in the FFS.
16	Page 11, Table 3 and text on lines 20-21: Table 2 does not contain lead as a COC. Why is it included on the table with established cleanup goals? Army does not clean up to a Region 9 PRG; those numbers are used for screening purposes only. If lead is not a COC, there should be no cleanup goal for it. If it is a COC, a calculated clean up goal must be established.		As described in Section 2.1.5 of the Focused Feasibility Study (May 2005), lead is not a COC for the target receptor, National Guard Trainee (NGT), because the exposure frequency for this receptor is close to the biological half-life of lead; therefore, no risk-based clean-up criterion could be calculated. The criterion can not be calculated because the estimated exposure duration for a NGT is 39 days based on the training schedule presented by Army. In order to calculate a risk-based clean-up criterion in the lead uptake model, the minimum exposure duration must be at least 90 days for impact to human health.

Cmt. No.	Comment	Recommendation	Response
			Consequently, when using the 39 day input, a risk-based standard of infinity (∞) is derived. Based on site concentrations, Ohio EPA would not accept a position of no clean-up criterion for lead since its presence is not naturally occurring. As a result, the Region 9 PRG was accepted by Ohio EPA, the Army, and Shaw as a suitable clean-up standard as a substitute for the output of the lead uptake model for the target receptor. This information is presented in previous CERCLA documents related to the site.
17	Suggest deleting the title line of I.1, line 9 on page 12. There was confusion by some USAEC reviewers as to what it meant and it could be deleted without altering follow on text.	Text would then appear as: I. 1 Alternative SDS1 Renumbering would be needed.	The organization of headings follows the ROD guidance. Instead of changing the headings and renumbering, an introductory sentence was added below the heading of Section I.1 to clarify the contents of the section and better guide the reader.
18	Page 12, lines 18, 42 and page 14, line 19: Please use the term Land Use Controls rather than Institutional Controls. Page 12, line 43 thru page 13, line 42 and page 14, line 20 thru page 15, line 14: USAEC has drafted new language to meet the substantive requirements of the Ohio UECA. Ohio and Army are discussing the acceptability of this language. It is provided for information/discussion purposes only at this time.	The US Army and OHARNG will implement and maintain various LUCs to prohibit unauthorized access and land use in order to protect human receptors. LUCs for these site(s) may include random security patrols, on-site fencing and warning markers/signs, military personnel safety training, and localized administrative directives and instructions. LUCs, including use restrictions, may also be incorporated into deed and contract documents if the site property is conveyed in the future to a non-federal person or entity.	The LUC language was removed from the document entirely. Refer to Response to Comment No. 1.

Comment Response Table
Draft Final, Record of Decision for the Remediation of Soils at Load Lines 1 Through 4 at the Ravenna Army Ammunition Plant, Ravenna, Ohio, April 2006

Cmt. No.	Comment	Recommendation	Response
19	Page 14, Line 15: After --- permitted facility. Please add, The final extent and volume of excavated soil will be based upon confirmatory sampling done as the excavation proceeds.		The text was revised as suggested.
20	Page 15, A Lines 32 -33: Please make the following change: "…thus, the ARARs are identified for the Selected Remedy in Attachment1." B Line 31: please add, --- Section H above. C Line 45: Please add, The estimated volumes ---.		The text was revised as suggested.
21	Table 4: For the heading of the last column, please change to Estimated Total Volume.		The text was revised as suggested.
22	Page 18, lines 20-page 19, line 4: USAEC has drafted new language to meet the substantive requirements of the Ohio UECA. Ohio and Army are discussing the acceptability of this language. It is provided for information/discussion purposes only at this time.	Alternative SDS2 and SDS3 would provide a high level of protectiveness to human health because soil containing contaminants above the risk based cleanup levels would be removed and disposed of off-site and land use controls would be established and maintained by the US Army and OHARNG to abate the long-term potential risk from human exposure. Various types of LUCs will reduce the potential for residual contamination exposure to future users by controlling the future use and activities on this military training site, including the restriction of activities that would disturb or excavate on-site soils. Alternative SDS2 will require prohibition of vehicular traffic over the	The LUC language was removed from the document entirely. Refer to Response to Comment No. 1.

Cmt. No.	Comment	Recommendation	Response
		capped area to ensure protectiveness.	
23	Page 19, lines 34-38: USAEC has drafted new language to meet the substantive requirements of the Ohio UECA. Ohio and Army are discussing the acceptability of this language. It is provided for information/discussion purposes only at this time.	Alternative 2 is protective for the National Guard Trainee because contaminated soil is removed to below the risk based cleanup levels for this land use designation. The long-term effectiveness of this alternative can be adequately and reliably addressed by LUCs which prohibit unauthorized access and land use inconsistent with the purpose of military training, including unauthorized soil disturbance or excavation. Because soils may remain on-site at concentrations that do not allow for unrestricted land use, site reviews would be conducted once every 5 years to evaluate current and anticipated land use as well as to ensure that LUCs remain effective.	The LUC language was removed from the document entirely. Refer to Response to Comment No. 1.
24	Page 21, line 28: Please change the statement to "Principal threat wastes are not present in surface and subsurface soils and dry sediments."	The original comment was that the term PTW was not applicable to the soils at LLs 1-4. This is because PTW is not present. PTW is a media that produces a risk of 10-3 or greater. There are none at LLs 1-4.	The text was revised as suggested. Also refer to Comment No. 7.
25	Page 22, lines 27-29: USAEC has drafted new language to meet the substantive requirements of the Ohio UECA. Ohio and Army are discussing the acceptability of this language. It is provided for information/discussion purposes only at this time.	This alternative includes the following components: … Implementation of land use controls for LLs 1-4 consistent with purpose of National Guard mounted training …	The LUC bullet was removed. Refer to Response to Comment No. 1.
26	Additional text needs to be inserted regarding the transportation of hazardous	Place on page 23, line 32: In addition to the identified ARARs, the US Army will	The text was revised as suggested.

Cmt. No.	Comment	Recommendation	Response
	waste offsite. That information is not considered an ARAR and was deleted from the ARAR table but Army agreed to its placement in the text. See suggested text and point of insertion .	comply with requirements applicable to off-site actions, such as RCRA hazardous waste transportation requirements under OAC 3745-52-20 to OAC 3745-52-33, and off-site treatment prior to land disposal under RCRA's land disposal restrictions under OAC 3745-270, including alternative land disposal restriction treatment standards for contaminated soil under OAC 3745-270-49.	
27	Page 24, line 19 to page 25, line 12: USAEC has drafted new language to meet the substantive requirements of the Ohio UECA. Ohio and Army are discussing the acceptability of this language. It is provided for information/discussion purposes only at this time.	Under this selected remedy, Land Use Controls (LUCs) will be implemented to prohibit unauthorized access and land use inconsistent with the purpose of military training [mounted], including unauthorized soil disturbance or excavation. LUCs are expected to be maintained until the concentration of hazardous substances in the soil are reduced to levels that allow for unlimited use and unrestricted exposure. The site map at Figure 2 shows the approximate Load Line boundary where the LUC objectives will be applied and maintained. This map will be further refined in the remedial design. If this site is subsequently remediated to allow more uses or unrestricted use, the ROD may be changed to modify or remove LUCs as part of the remedy. CERCLA 121(c) 5-year reviews will be conducted to assess the long-term effectiveness of the remedy, including LUCs until this site is subsequently remediated to allow more uses or unrestricted use.	The LUC language was removed from the document entirely. Refer to Response to Comment No. 1.

Cmt. No.	Comment	Recommendation	Response
		The remedial design will include a LUC component describing the details of LUC implementation and maintenance, including periodic inspections. The US Army is responsible for implementation, maintenance, periodic reporting, and enforcement of LUCs in accordance with the remedial design. Although the US Army may transfer these responsibilities to the OHARNG or another party by contract, property transfer or license or permit agreement, or through other means, the US Army remains responsible for remedy integrity to include (1) CERCLA 121(c) 5-year reviews; (2) notification of the appropriate regulators and/or local government representatives of any known LUC deficiencies or violations; (3) provision of access to the property to conduct any necessary response; (4) the ability to change, modify, or terminate LUCs and any related deed or lease provisions; and (5) assurance that the LUC objectives are met to maintain remedy protectiveness. If the US Army or OHARNG determines that there is non-compliance with a LUC, the US Army or OHARNG will address the effectiveness of the LUC, including any required notifications and corrective measures. The US Army or OHARNG will seek Ohio EPA concurrence prior to a land use change that is inconsistent with the LUC objectives, the use assumptions of the remedy, or results in the termination of LUCs. As a condition of property transfer,	

Cmt. No.	Comment	Recommendation	Response
		lease, or license, the US Army may require the transferee or lessee in cooperation with other stakeholders to assume responsibility for various implementation actions. Third-party LUC responsibility will be incorporated into pertinent contractual, property, and remedial documentation, such as a purchase agreement, deed, lease, license, or permit and a remedial design addendum. To the extent permitted by law, a transfer deed shall require the LUCs imposed as part of a CERCLA remedy to run with the land and bind all property owners and users. If the US Army intends to transfer ownership of any site, the US Army may, if federal and/or state law allows, upon transfer of fee title, grant the state an environmental covenant or easement that would allow the state to enforce LUC terms and conditions against the transferee(s), as well as subsequent property owner(s) or user(s) or their contractors, tenants, lessees, or other parties. This covenant will be incorporated, by reference, in the transfer deed and will run with the land in accordance with state realty law. This state enforcement right would supplement, not replace, the US Army's right and responsibility to enforce the LUCs.	
28	Page 26, lines 33-34 and line 40 through page 27, line 35: Delete the text referring to LUCs. USAEC has drafted new language to meet the substantive	The selected remedy is protective of human health and the environment. The contaminated soil will be removed to risk based cleanup levels for the Range	The LUC language was removed from the document entirely. Refer to Response to Comment No. 1.

Cmt. No.	Comment	Recommendation	Response
	requirements of the Ohio UECA. Ohio and Army are discussing the acceptability of this language. It is provided for information/discussion purposes only at this time. It is suggested the language provided be inserted into section M. 1 Protection of Human Health and the Environment.	Maintenance Soldier land use. Various types of LUCs, such as fences, warning markers, safety training, and localized directives, will reduce the potential for residual contamination exposure to future users by controlling the future use and activities on this military training site, including the restriction of activities that would disturb or excavate on-site soils. The present low risks to ecological receptors will be further reduced by the removal of the contaminated soil.	
29	Page 29 line 13: Please add the new language drafted to meet the substantive requirements of the Ohio UECA. Ohio and Army are discussing the acceptability of this language. It is provided for information/discussion purposes only at this time.	The long-term effectiveness of this remedy can be adequately and reliably addressed by LUCs which prohibit unauthorized access and land use inconsistent with the purpose of military training [mounted], including unauthorized soil disturbance or excavation. Because soils may remain on-site at concentrations that do not allow for unrestricted land use, site reviews would be conducted once every 5 years to evaluate current and anticipated land use as well as to ensure that LUCs remain effective.	The LUC language was removed from the document entirely. Refer to Response to Comment No. 1.
30	Additional text needs to be inserted regarding the transportation of haz waste offsite. That information is not considered an ARAR and was deleted from the ARAR table but Army agreed to its placement in the text. See suggested text and point of insertion.	Place on page 23, line 32: All shipments of contaminated soils and dry sediments will comply with local, state and federal transportation requirements.	The text was revised as suggested under Comment No. 6.

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	RTLS-Environmental		
31	There is a new, approved description with updated facility acreage that can be utilized in appropriate sections of the ROD.	When the RVAAP Installation Restoration Program (IRP) began in 1989, the RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by the OHARNG over a two year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683.289 acres. As of February 2006, a total of 20,403 acres of the former 21,683 acre RVAAP have been transferred to the National Guard Bureau and subsequently licensed to the OHARNG for use as a military training site. The current RVAAP consists of 1,280 acres scattered throughout the OHARNG Ravenna Training and Logistics Site (RTLS). The RTLS is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 kilometers (3 miles) east northeast of the city of Ravenna and approximately 1.6 kilometers (1 mile) northwest of the city of Newton Falls. The RVAAP portions of the property are solely located within Portage County. The RTLS/RVAAP is a parcel of property approximately 17.7 kilometers (11 miles) long and 5.6 kilometers (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 (see Figures 1-1 and 1-2). The RTLS is surrounded by several communities:	The new, approved description is noted and is part of the record by inclusion in this response to comments table.

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		Windham on the north; Garrettsville 9.6 kilometers (6 miles) to the northwest; Newton Falls 1.6 kilometers (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 kilometers (3 miles) to the south. When the RVAAP was operational the RTLS did not exist and the entire 21,683-acre parcel was a government-owned, contractor-operated industrial facility. The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP and therefore references to the RVAAP in this document are considered to be inclusive of the historical extent of the RVAAP, which is inclusive of the combined acreages of the current RTLS and RVAAP, unless otherwise specifically stated.	
32	Pg. 23, Lines 9-23	This section does not mention reseeding or re-establishing vegetation with an approved mix. If applicable, please add in a statement indicating that the disturbed areas will be reseeded and/or vegetation will be re-established.	The best management practices for earth disturbance, including vegetative stabilization, are covered by the inclusion of General Construction Standards in the ARARs table, specifically, “Construction Activities Causing Storm Water Runoff.”
33	In multiple sections of the report it is indicated that LUCs will include but are not limited to “limit land use to National Guard mounted training (no digging), prohibit residential use, prohibit soil disturbance in designated restricted areas, and restrict public access to LL1-4.” Regarding prohibiting soil disturbance in designated restricted areas: This area will	Further clarification is needed.	The LUC language was removed from the document entirely. Refer to Response to Comment No. 1.

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	be utilized as a tracked vehicle maneuver area and soil may be disturbed up to four feet. Also, the OHARNG has no intention of maintaining the perimeter fences around the load lines to permanently restrict entrance. If certain small designated areas need to be fenced within the load lines than the OHARNG will have to maneuver around these areas. However, it is our intention to utilize as much area as possible within the load lines for our designated use. Please indicate or provide more detail as to what is meant by "designated restricted areas." Also, in regards to "restrict public access": These areas may be utilized for hunting and trapping as part of natural resources management activities. The NG Trainee scenario should cover the hunter/trapper scenario/exposure. Will hunting and trapping be permitted in LL1-4? Please explain what is meant by "restrict public access to LL1-4."		