Final

Site Characterization and Focused Feasibility Study Work Plan for the RVAAP-51 Dump along Paris-Windham Road

Ravenna Army Ammunition Plant
8451 State Route 5
Ravenna, Ohio 44266

Contract No. W912QR0-08-D-008
Delivery Order No. 0014

Prepared for:

US Army Corps of Engineers®

United Sates Army Corps of Engineers
Louisville District
600 Martin Luther King, Jr. Place
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14. ABSTRACT

This Work Plan presents historical data for the Dump Along Paris-Windham Road and outlines the planned approach to prepare a Site Characterization and Focused Feasibility Study Report.

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Final

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Volume One – Main Report and Attachment
Version 1.0

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Science Applications International Corporation (SAIC) has completed the Final Site Characterization and Focused Feasibility Study Work Plan for the RVAAP-51 Dump along Paris-Windham Road at the Ravenna Army Ammunition Plant, Ravenna, Ohio. Notice is hereby given that an independent technical review has been conducted that is appropriate to the level of risk and complexity inherent in the project. During the independent technical review, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of data quality objectives; technical assumptions; methods, procedures, and materials to be used; the appropriateness of data used and level of data obtained; and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing USACE policy.

W. Kevin Jago — 8/4/10

Kevin Jago — Date
Study/Design Team Leader

Jill Kovalchik — 8/4//10

Jill Kovalchik — Date
Independent Technical Review Team Leader

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

Internal SAIC Independent Technical Review comments are recorded on a Document Review Record per SAIC quality assurance procedure QAAP 3.1. This Document Review Record is maintained in the project file. Changes to the report addressing the comments have been verified by the Study/Design Team Leader. As noted above, all concerns resulting from independent technical review of the project have been considered.

Tad Fox — 8/5/10

Tad Fox Principal w/ A-E firm — Date

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Site Characterization and Focused Feasibility Study Work Plan for the RVAAP-51 Dump along Paris-Windham Road
Ravenna Army Ammunition Plant
Ravenna, Ohio

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Ohio EPA-NEDO = Ohio Environmental Protection Agency-Northeast District Office
OHARNG = Ohio Army National Guard
NGB = National Guard Bureau
REIMS = Ravenna Environmental Information Management System
RVAAP = Ravenna Army Ammunition Plant
SAIC = Science Applications International Corporation
USACE = United States Army Corps of Engineers
USAEC = United States Army Environmental Command

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ACRONYMS AND ABBREVIATIONS

ACM	Asbestos-Containing Material
AOC	Area of Concern
C&D	Construction and Demolition
Camp Ravenna	Camp Ravenna Joint Military Training Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Constituent of Concern
COPC	Constituent of Potential Concern
CSM	Conceptual Site Model
CUG	Cleanup Goal
DFFO	Director's Final Findings and Orders
EPC	Exposure Point Concentration
FFS	Focused Feasibility Study
FWHHRAM	Facility-Wide Human Health Risk Assessor Manual
GSSL	Generic Soil Screening Level
HQ	Hazard Quotient
IRP	Installation Restoration Program
MI	Multi-Increment
NGB	National Guard Bureau
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
PCB	Polychlorinated Biphenyl
PRG	Preliminary Remediation Goal
RA	Removal Action
RAO	Remedial Action Objective
RD	Remedial Design
RRSE	Relative Risk Site Evaluation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SC	Site Characterization
SDZ	Surface Danger Zone
SVOC	Semi-Volatile Organic Compound
T&E	Threatened and Endangered
TAL	Target Analyte List
TNT	2,4,6-trinitrotoluene
UCL	Upper Confidence Limit
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compound
WOE	Weight-of-Evidence
WP	Work Plan

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1.0 INTRODUCTION

Science Applications International Corporation (SAIC) has been contracted by the U.S. Army Corps of Engineers (USACE), Louisville District to provide environmental services to perform a Site Characterization and Focused Feasibility Study (SC/FFS) for the Dump Along Paris-Windham Road (RVAAP-51) at the Ravenna Army Ammunition Plant (RVAAP), Ravenna, Ohio. This work is being conducted under Contract W912QR0-08-D-0008, Delivery Order 0014 issued by the USACE, Louisville District on June 16, 2009. In addition, planning and performance of all elements of this work will be in accordance with the requirements of the Ohio Environmental Protection Agency (Ohio EPA) Director's Final Findings and Orders (DFFO) dated June 10, 2004 (Ohio EPA 2004).

1.1 OBJECTIVES

A limited "Remedial Design/Removal Action" (RD/RA), as titled by the U.S. Army Base Re-alignment and Closure Division (BRAC-D), was performed in 2003 to remove unconsolidated surface debris and some subsurface debris, including asbestos-containing material (ACM) (transite), from the Dump Along Paris-Windham Road (MKM 2004). The Ohio EPA commented that the Draft limited "RD/RA" report was to be considered as an Interim Removal Action, so not to be construed as a final remedy. The limited "RD/RA" terminology has been retained in this Work Plan to be consistent with historical documents; however, the limited "RD/RA" was, in fact, an interim action.

Completion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process is required in order to obtain a final remedy for soil and dry sediment. Assessment of the adequacy of existing site characterization data, evaluation of human health and ecological risks, and determination of the need for additional remedial actions are necessary to proceed with the CERCLA process. The limited "RD/RA" did not fully evaluate the nature and extent of contamination and data gaps potentially requiring further investigation. Also, the limited "RD/RA" did not identify constituents of potential concern (COPCs) or constituents of concern (COCs) for risk evaluation. Therefore, the SC/FFS will complete these tasks and evaluate remedial alternatives in accordance with the CERCLA process.

The objective of this project is to perform a SC/FFS for the Dump Along Paris-Windham Road utilizing existing analytical data, human health and ecological risk assessment information, and remedy evaluation to achieve the Remedial Action Objective (RAO) consistent with the Ohio Army National Guard's (OHARNG) proposed use of the property.

1.2 REGULATORY STATUS

The 2003 limited "RD/RA" included excavation of contaminated soil and transite, and a protective soil and vegetation cover was placed over the excavated portions of the area of concern (AOC). Based on results of the limited "RD/RA" confirmatory sampling effort (MKM 2004), several semi-volatile organic compounds (SVOCs), aluminum, arsenic, and manganese were found to be present

above U.S. Environmental Protection Agency (USEPA) Region 9 Residential Preliminary Remediation Goals (PRGs) or RVAAP facility-wide background values within the AOC limits and in dry sediment in a drainage swale at the base of the dump toe slope within the neighboring Sand Creek floodplain. Additionally, in order to avoid potentially undermining the structure of Paris-Windham Road, residual fragments of transite were left in place along the slope of the southern half of the AOC. These fragments were subsequently covered in place during restoration operations. The limited "RD/RA" recommended a risk assessment be performed using existing data to verify limited "RD/RA" activities were sufficient enough to allow for regulatory site close out (MKM 2004).

In accordance with CERCLA, a residential receptor will be addressed in the risk evaluation as a comparative baseline to other likely future land use scenarios and risk receptors (Section 6.1). However, a remedial alternative based on residential land use will not be evaluated in the FFS due to the following factors:

- A portion of the AOC is located within a floodplain, which precludes residential land use;
- The physical characteristics of the majority of the AOC (e.g., approximately 45-degree slope in the AOC) preclude residential construction; and
- The location of Paris-Windham Road immediately adjacent to the AOC and wastes remaining in place preclude residential land use.

Similarly, a remedial alternative based on unrestricted OHARNG land use will not be evaluated in the FFS for the same reasons as a residential land use scenario. Land use controls and training restrictions are anticipated as part of the final AOC due to AOC characteristics and the presence of residual transite, which makes unrestricted use of the AOC impractical.

2.0 SCOPE

2.1 WORK PLAN APPROACH

This Work Plan (WP) presents the existing limited "RD/RA" data and provides a conceptual site model (CSM) incorporating site characteristics, the most likely foreseeable future land use, and evaluation of potential human and ecological receptors and exposure pathways. This WP further provides the framework and methodologies that will be used in the SC/FFS to:

1. Evaluate existing data to identify COPCs, COCs, and potential data gaps requiring further investigation;

2. Identify remedial action objectives based on projected land use and exposure assumptions;

3. Conduct risk management evaluation and determine the need for any additional remedial actions; and

4. Evaluate and recommend a remedial alternative.

The WP scope and key assumptions are presented in Section 2.0. A summary of the background information for the AOC is provided in Section 3.0. The historical data are summarized along with the limited "RD/RA" screening results in Section 4.0. Section 5.0 provides a CSM. The human health and ecological risk evaluation methodologies that will be used to assess AOC conditions are provided in Section 6.0. Section 7.0 provides a summary along with a proposed outline for the SC/FFS. Reference information is provided in Section 8.0.

2.2 KEY ASSUMPTIONS

Key assumptions used in the development of this WP and for the preparation of the SC/FFS include the following:

- The SC/FFS will evaluate all potential exposure pathways identified in the CSM. Groundwater data does not exist for the vicinity of the AOC. Therefore, a qualitative evaluation will be performed during the SC/FFS with respect to potential impacts of residual soil contaminants to groundwater quality (e.g., screening of soil data against EPA Generic Soil Screening Levels [GSSLs], evaluation of topography and potential groundwater flow directions, review of surface water data in the adjacent Sand Creek to determine if any discernable effects related to groundwater discharge are observed).

- Sediment and surface water samples were collected from an intermittent drainage swale adjacent to the active dump area. Because this drainage is intermittent, sediment is considered dry and will be treated as surface soil in the risk evaluation included in the SC/FFS.

- Previously collected data at the conclusion of the limited "RD/RA" were of good quality; however, the data screening processes employed in the limited "RD/RA" (MKM 2004) were not in conformance with current RVAAP protocols. As described in Section 6.1, COPCs and COCs will be developed in the SC/FFS Report using current data screening processes (e.g., frequency of detection and essential human nutrient data screens) and draft facility-wide cleanup goals (CUGs) following the processes outlined in the *Final U.S. Army Corps of Engineers Ravenna Army Ammunition Plant (RVAAP) Position Paper for the Application and Use of Facility-Wide Human Health Cleanup Goals, June 2009* (USACE 2009).

3.0 BACKGROUND INFORMATION

3.1 FACILITY BACKGROUND INFORMATION

When the RVAAP Installation Restoration Program (IRP) began in 1989, RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by OHARNG over a 2-year period (2002 and 2003) and the 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 has been transferred to the National Guard Bureau (NGB) and subsequently licensed to OHARNG for use as a military training site (Camp Ravenna Joint Military Training Center). These transferred portions are now referred to as Camp Ravenna. The current RVAAP consists of 1,280 acres in various parcels throughout Camp Ravenna.

Camp Ravenna is in northeastern Ohio within Portage and Trumbull Counties, approximately 4.8 km (3 miles) east-northeast of the City of Ravenna and approximately 1.6 km (1 mile) northwest of the City of Newton Falls. The RVAAP portions of the property are solely located within Portage County. Camp Ravenna/RVAAP is a parcel of property approximately 17.7 km (11 miles) long and 5.6 km (3.5 miles) wide bounded by State Route 5, the Michael J. Kirwan Reservoir, and the CSX System Railroad on the south; Garret, McCormick, and Berry roads on the west; the Norfolk Southern Railroad on the north; and State Route 534 on the east. Camp Ravenna is surrounded by several communities: Windham on the north; Garrettsville 9.6 km (6 miles) to the northwest; Newton Falls 1.6 km (1 mile) to the southeast; Charlestown to the southwest; and Wayland 4.8 km (3 miles) to the south.

The entire 21,683-acre parcel was an industrial facility that was government-owned, contractor-operated when the RVAAP was operational (Camp Ravenna did not exist at that time). The RVAAP IRP encompasses investigation and cleanup of past activities over the entire 21,683 acres of the former RVAAP. References to RVAAP in this document are considered to be inclusive of the historical extent of RVAAP, which is inclusive of the combined acreages of the current Camp Ravenna and RVAAP, unless otherwise specifically stated.

Industrial operations at the former RVAAP consisted of 12 munitions-assembly facilities referred to as “load lines.” Load Lines 1 through 4 were used to melt and load 2,4,6-trinitrotoluene (TNT) and Composition B into large-caliber shells and bombs. The operations on the load lines produced explosive dust, spills, and vapors that collected on the floors and walls of each building. Periodically, the floors and walls were cleaned with water and steam. Following cleaning, the waste water, containing TNT and Composition B, was known as “pink water” for its characteristic color. Pink water was collected in concrete holding tanks, filtered, and pumped into unlined ditches for transport to earthen settling ponds. Load Lines 5 through 11 were used to manufacture fuzes, primers, and boosters. Potential contaminants in these load lines include lead compounds, mercury compounds,

and explosives. Load Line 12 was used from 1946 to 1949 to produce ammonium nitrate for explosives and fertilizers, and portions of the AOC were later used for weapons demilitarization.

In 1950, the facility was placed on standby status and operations were limited to renovation, demilitarization, and normal maintenance of equipment, along with storage of munitions. Production activities were resumed from July 1954 to October 1957 and again from May 1968 to August 1972. In addition to production missions, various demilitarization activities were conducted at facilities constructed at Load Lines 1, 2, 3, and 12. Demilitarization activities included disassembly of munitions and explosives melt-out and recovery operations using hot water and steam processes. Periodic demilitarization of various munitions continued through 1992.

In addition to production and demilitarization activities at the load lines, other facilities at RVAAP include AOCs that were used for the burning, demolition, and testing of munitions. These burning and demolition grounds consist of large parcels of open space or abandoned quarries. Potential contaminants at these AOCs include explosives, propellants, metals, and waste oils. Other types of AOCs present at RVAAP include landfills, an aircraft fuel tank testing facility, and various general industrial support and maintenance facilities.

3.2 RVAAP-51 DUMP ALONG PARIS-WINDHAM ROAD BACKGROUND AND DESCRIPTION

The Dump Along Paris-Windham Road is located along a steep embankment on the west side of Paris-Windham Road in the east-central portion of the facility between the intersections of Paris-Windham Road and Remalia Road approximately 100 feet east of Sand Creek (Figure 3-1). The AOC was used as an open dump for a variety of miscellaneous construction and demolition (C&D) type materials including transite roofing and siding (ACM), lab bottles and drums, concrete, brick, glass, scrap metal, fencing, and wood debris. There are no records indicating the quantities of materials dumped at the AOC, or the dates of operation. The dump is approximately 400 feet long by 20 feet wide and slopes east to west away from Paris-Windham Road. The slope face ranges from 40 to 60 degrees from horizontal. There are no structures or dwellings on the AOC. Surface water runoff follows the topography and flows in a westerly direction, entering Sand Creek. The Sand Creek flood plain occupies the land between the dump and Sand Creek.

Preliminary site assessments found the AOC overgrown with mature trees and ground-level vegetation. Large, co-mingled piles of surface debris were most evident in the southern portion of the AOC, while individual items and small debris piles scattered throughout the northern boundary.

3.3 PREVIOUS INVESTIGATIONS AND ACTIVITIES

3.3.1 Relative Risk Site Evaluation

The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) conducted a Relative Risk Site Evaluation (RRSE) for Newly Added Sites at the RVAAP in 1998 (Hazardous and Medical Waste Study No. 37-EF-5360-99, 19-23 October 1998). From the 13 AOCs that were

evaluated, five were classified as high priority AOCs. The Dump Along Paris-Windham Road (RVAAP 51) was one of these five AOCs. The RRSE identified surface soil and sediments to be potential media for contaminant migration at the Dump Along Paris-Windham Road due to the lack of any physical barriers (e.g., fencing) and proximity to Sand Creek. Samples were collected and analyzed for SVOCs, explosives, and metals. The study found the AOC contained C&D debris, including ACM (transite roofing and siding) and inorganic contaminants. The RRSE identified potential human and ecological receptors for surface soil and sediment contamination and assumed complete exposure pathways because there were no access controls (e.g., fence) in place. As a result, the RRSE for this AOC was scored as "High."

3.3.2 Limited "RD/RA" Activities

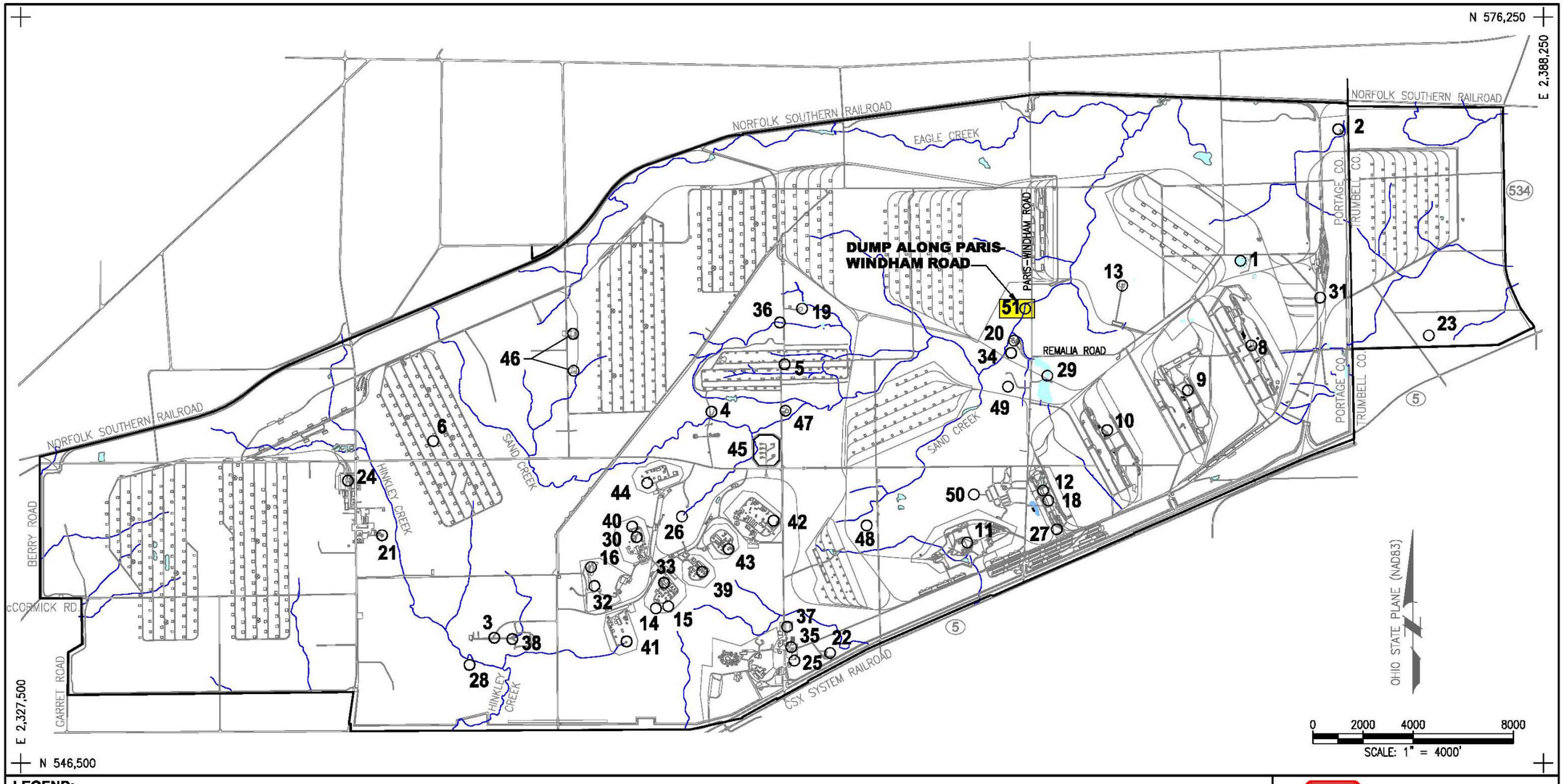
The 2003 limited "RD/RA" activities are summarized in the *Final Report for Remedial Design/Remedial Action at Paris-Windham Road Dump* (MKM 2004). The limited "RD/RA" was conducted in accordance with CERCLA to mitigate risk related to potential contact with exposed waste materials. The limited "RD/RA" was not intended to be a final remedy and, as noted in Section 1.2, the U.S. Army planned for future evaluation of the need for additional characterization and remedial actions under a SC/FFS and the completion of the CERCLA process.

On April 19, 2003, the limited "RD/RA" was initiated at the Dump Along Paris-Windham Road. Removal and confirmation sampling activities were concluded on April 28, 2003. Initial site preparation and mobilization activities included an ordnance and explosive survey. The limited "RD/RA" removal activities consisted of removing all existing unconsolidated surface debris, limited removal of subsurface debris, transportation and disposal of debris, performing confirmation sampling and site restoration (Photograph 3-1). A combined total of 300.66 tons of surface soil material and subsurface transite debris was removed from the AOC. During the surface debris removal operations, subsurface pockets of buried transite debris were exposed at several different locations at the AOC. Although removal of subsurface debris was not included in the original limited "RD/RA" scope, the subsurface transite was removed. However, because removing the material may have potentially undermined Paris-Windham Road, residual fragments of transite were left in place in the southern portion of the AOC.

Prior to site restoration, a total of 10 confirmation samples were collected within the limits of the AOC to evaluate the success of the limited "RD/RA" (Figure 3-2). Additionally, six co-located sediment/surface water samples were collected from a drainage swale at the base of the toe slope and within the neighboring floodplain to characterize impacts associated with runoff. Two contingency samples were later collected (September and October 2003) and analyzed. Sampling results are summarized in Section 4.0.

Following collection and review of confirmatory and contingency samples, the excavation area was restored to grade using a combination of clean, hard fill and approved soil backfill in November 2003. Approximately 480 tons of non-contaminated concrete demolition material of various sizes obtained from the approved stockpile at Load Line 6 was used to create a layer of clean, hard fill for stability,

followed by approximately two feet (277 tons) of soil backfill material for cover (Photograph 3-2). The area was seeded and mulched (Photograph 3-3). Site reconnaissance data from a walkover conducted by SAIC in August 2009 shows extensive healthy re-vegetation of the area covered with clean soil backfill material. A view of the current conditions is provided on Photograph 3-4.



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
13 ..... BUILDING 1200 AND DILUTION/SETTLING POND
14 ..... LOAD LINE 6, EVAPORATION UNIT
15 ..... LOAD LINE 6, TREATMENT PLANT
16 ..... QUARRY LANDFILL/FORMER FUZE & 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 ..... LOAD LINE 6/FIRESTONE TEST FACILITY
34 ..... SAND CREEK DISPOSAL ROAD LANDFILL
35 ..... 1037 BUILDING-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

US Army Corps of Engineers Louisville District

SAIC From Science to Solutions

DUMP ALONG PARIS-WINDHAM ROAD
RAVENNA ARMY AMMUNITION PLANT
RAVENNA, OHIO

DRAWN BY:	REV. NO./DATE:	CAD FILE:
P. HOLM	REV.0/08-10-09	08042/DWGS/H43PARISW_SITE-02

Figure 3-1. Location of Dump Along Paris-Windham Road within RVAAP/Camp Ravenna

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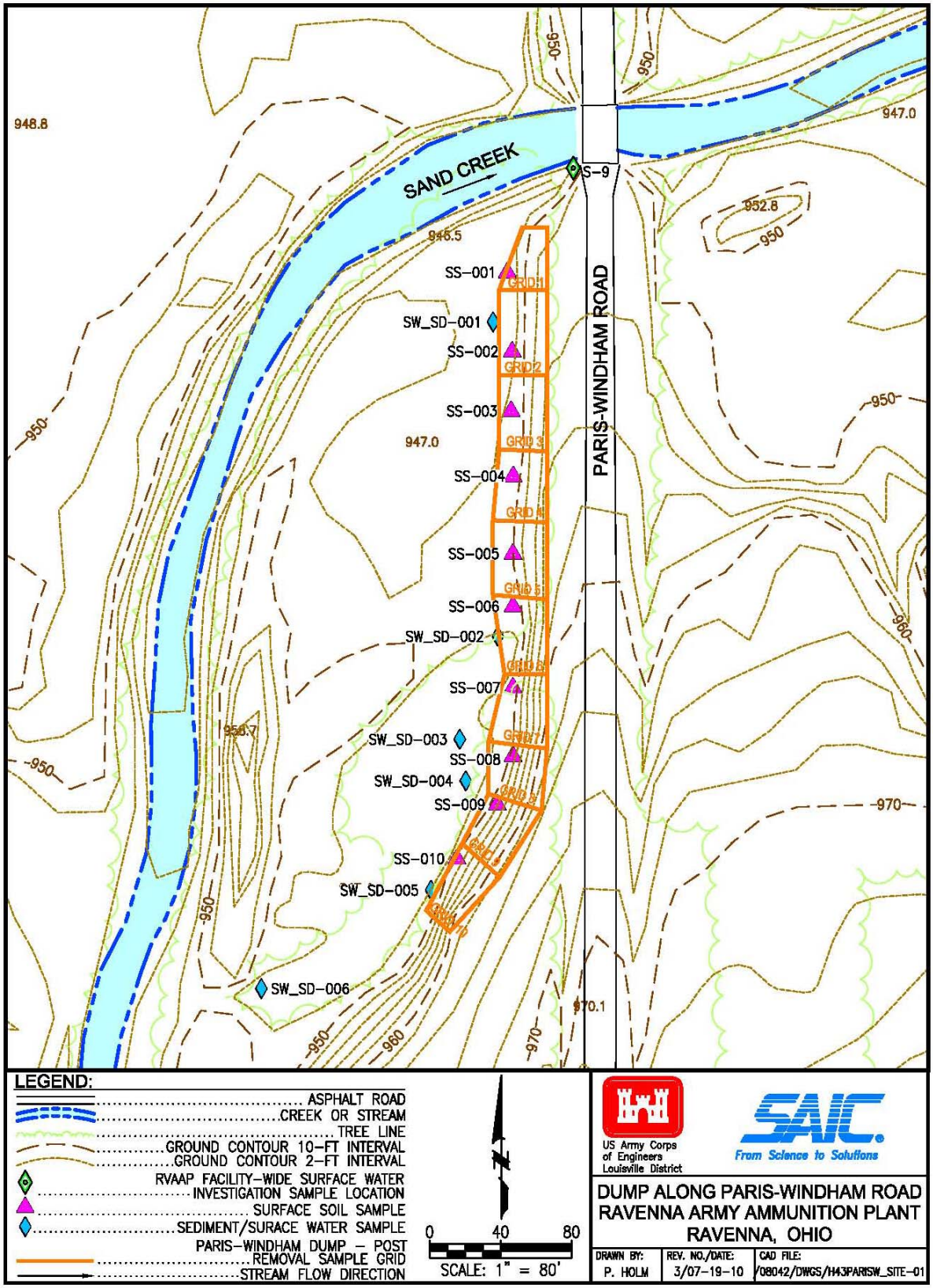

Figure 3-2. Sample Location Map

Photograph 3-1. Debris Removal Activities Near Grid #4 and Grid #5, April 2003

Photograph 3-2. Installation of Two-foot Soil Backfill Cover During Restoration Activities, November 2003

Photograph 3-3. Site Conditions at the Completion of Site Restoration Activities, November 2003

Photograph 3-4. Southern Portion of the AOC Near the Drainage Swale, August 2009

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4.0 DATA SUMMARY

4.1 LIMITED "RD/RA" DATA SUMMARY

Upon completion of the surface debris removal operations, and prior to application of the soil cover, confirmation and contingency samples were collected to evaluate the success of the limited "RD/RA" and provide data for future evaluation of a final remedy. The dump area was divided into 10 equally-sized grids to facilitate collection of discrete and multi-incremental soil samples (Figure 3-2).

Confirmation sampling activities included collecting one discrete shallow (0-1 ft) soil sample from each of the 10 grids measuring approximately 40 feet by 20 feet. Additionally, six confirmatory sediment and surface water samples were collected, one at each of the co-located sites. Five of these sites (SW_SD 2 through 6) were located within the adjacent Sand Creek floodplain in an intermittent drainage swale between the dump and Sand Creek. One sample location (SW_SD 1) was located on the north end of the AOC outside the waterway (Figure 3-2). The 2003 limited "RD/RA" did not differentiate whether the sediment samples were considered wet sediment or dry sediment. Therefore, conditions of the AOC were evaluated, inclusive of a field survey, and a determination of the sediment type (wet or dry per RVAAP standards) was performed as part of the CSM (Section 5.0).

Confirmation samples were analyzed for target analyte list (TAL) metals and asbestos. In addition, ten percent of the samples were analyzed for a full suite of parameters including explosives, SVOCs, cyanide, volatile organic compounds (VOCs), propellants, and pesticides/polychlorinated biphenyls (PCBs), and asbestos. Full-suite analyses were performed on samples collected from Grid 9 and sediment/surface water sampling location SW_SD-004 (Figure 3-2).

The results indicated elevated concentrations (i.e., above 2001 USEPA Region 9 Residential PRGs) of arsenic in the soil, sediment and surface water. Elevated concentrations of SVOCs were also detected in the soil and sediment (Grid location 9 and sediment location 4). These constituents included benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluroanthene, dibenzo(a,h)anthracene, indeno(1,2,3-cd) pyrene, and PCB-1254 at grid location 9. At sediment location SW_SD-004, only benzo(a)pyrene was detected above PRGs. No SVOCs were detected above detection limits in the surface water sample. Asbestos fibers were not detected in any of the samples collected.

Based on the results, two contingency multi-increment (MI) samples were collected. On September 30, 2003, an MI sample at grid location 9 consisting of 10 random shallow soil aliquots was collected and analyzed for SVOCs only. A second contingency sample, collected on October 30, 2003 and consisting of 40 random (4 from each grid) shallow soil aliquots, was collected to evaluate the extent of the SVOC contamination over the entire AOC. The results of the contingency sampling effort verified that elevated levels of SVOCs including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluroanthene, indeno(1,2,3-cd) pyrene, and dibenzo(a,h)anthracene, were present in the soil .

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5.0 CONCEPTUAL SITE MODEL

5.1 PRIMARY SOURCE AND MIGRATION PATHWAY

Figure 5-1 illustrates a preliminary CSM for the Dump Along Paris-Windham Road. The primary source of any contamination was the residual dump material. However, following the 2003 removal action, clean hard fill (i.e., non-contaminated concrete demolition material of various sizes obtained from the approved stockpile at Load Line 6) and a layer of Ohio Environmental Protection Agency (Ohio EPA)-approved clean soil backfill (obtained from Patrick Excavating on Route 5) were placed on top of the ten excavated grids, and the area was re-vegetated. The fill and cover included approximately 760 tons of material with a minimum thickness of 2 feet (MKM 2004). This area is about 30 feet wide by 400 feet long (approximately 0.3 acres) in size (Figure 3-2). Therefore, the primary migration pathway is surface water runoff.

5.2 SECONDARY SOURCES

A long, narrow drainage swale exists down slope of the gridded area where confirmatory surface water and sediment samples were taken in late April 2003. Based on the limited "RD/RA" report, clean backfill soil was not placed in the drainage swale following the removal action (Figure 3.2). The drainage swale is estimated to be 15 feet wide x 400 feet long (approximately 0.15 acres). In the swale, surface water only occurs during occasional storms or overflow conditions from nearby Sand Creek. During a walkover conducted by SAIC in August 2009, the sediment in the drainage swale had a high moisture content, but no standing water was observed. Sand Creek flows northward about 400 feet west of the gridded area and comes as close as 40 feet at the northern end of the AOC. Based on conditions of the AOC, sediment in the drainage swale is considered dry sediment because of the ephemeral surface water. Therefore, there are three secondary sources at the AOC (Figure 5-1): 1) surface water in the drainage swale; 2) dry sediment in the drainage swale; and 3) subsurface soil and debris under the layers of clean hard fill and soil back fill placed during the limited "RD/RA".

5.3 POTENTIAL RECEPTORS

Potential human and ecological receptors have been identified for the Dump Along Paris-Windham Road, and these are shown on Figure 5-1 as part of the complete CSM. Human and ecological receptors and associated exposure pathways are detailed in Section 6. Section 6.1 discusses the future land uses, exposure pathways, and the selection of representative human receptors included in the CSM. Section 6.2 discusses selection of representative ecological receptors and evaluation of ecological risk weight-of-evidence (WOE).

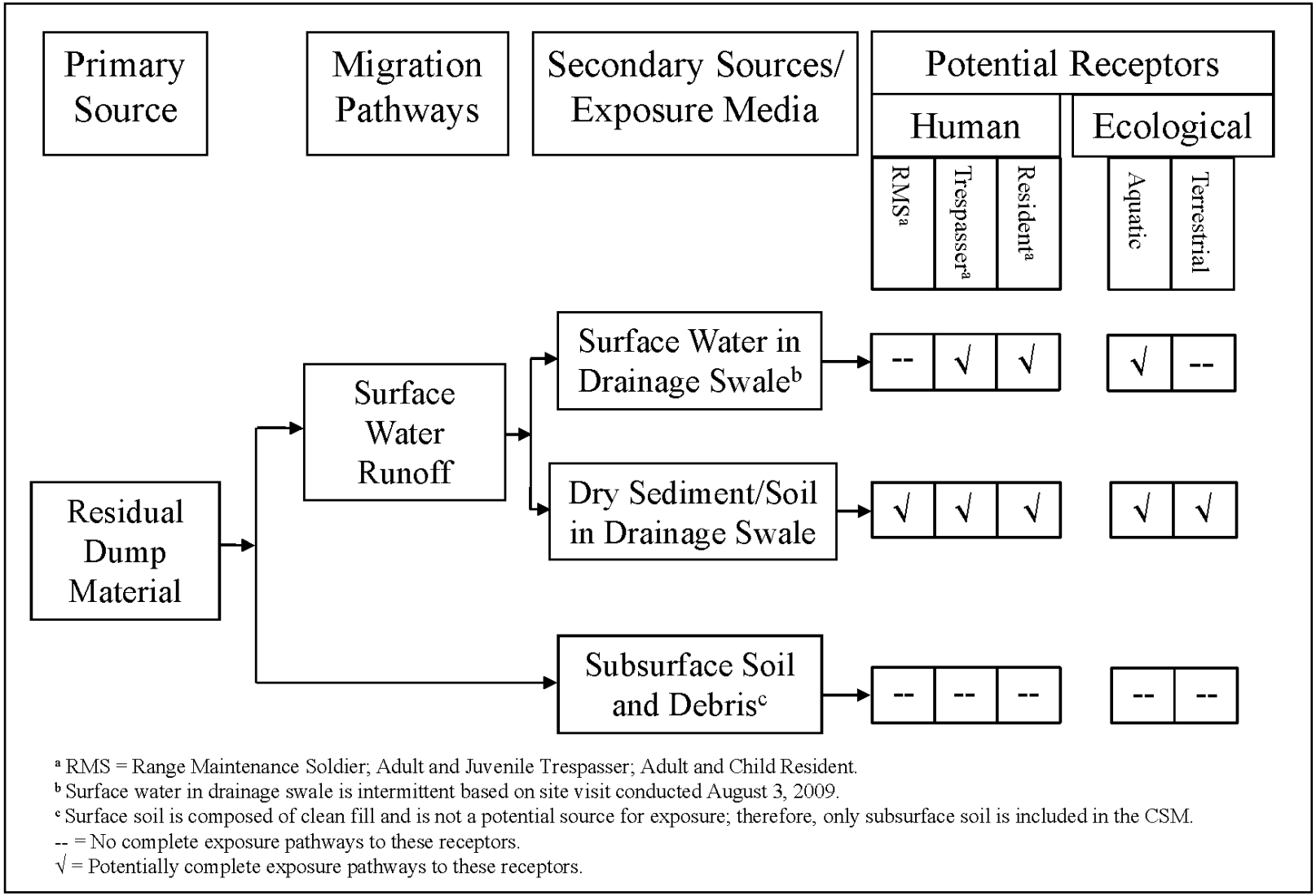

Figure 5-1. Preliminary Conceptual Site Model for Dump Along Paris-Windham Road (RVAAP-51)

6.0 RISK EVALUATION METHODS

This section of the WP is based on the CSM (Section 5.0) and describes the methods that will be used to prepare the human (Section 6.1) and the ecological (Section 6.2) risk evaluations in the SC/FFS.

6.1 HUMAN HEALTH RISK MANAGEMENT EVALUATION

The human health risk management evaluation in the SC/FFS will consist of the following three steps:

1. Evaluate representative site-specific receptors and exposure media;

2. Identify COCs using appropriate RVAAP risk-based, facility-wide CUGs and background values; and

3. Identify the specific facility-wide CUGs that are applicable for the FFS. Evaluate nature and extent of COCs.

6.1.1 Identification of Representative Site-Specific Receptors

The following information was considered when identifying representative receptors for the Dump Along Paris-Windham Road that will be evaluated in the SC/FFS:

- No specific development project is currently identified for this AOC.

- Utilities are located on the east side of Paris-Windham Road due to the presence of transite on the west side of the road in this area.

- The area is not fenced and does not have any additional security beyond those in place for the entire facility.

- The dump area is small, and located on a steep slope starting at the berm to the west of Paris-Windham Road, with a flood plain at the bottom.

No range construction activities will be conducted within the area of the Dump along Paris-Windham Road. Activity on the AOC will consist of occasional foot traffic associated with minor maintenance activities (e.g., mowing and control of vegetation), and road maintenance (e.g., mowing along road berm, road surface repairs/patching). This land use is best represented by the Range Maintenance Solider receptor. Because this area does not have elevated security measures, trespassers may visit the site. Therefore, representative receptors that will be evaluated in the SC/FFS are the Range Maintenance Soldier and Adult and Juvenile Trespassers. The National Guard Trainee is not considered an appropriate receptor for this area because the AOC is a small area on a steep road berm and is not suitable for training use. The topography of the area (i.e., steep slope and flood plain)

precludes residential development; however, in addition to the site-specific receptors, a residential receptor will also be included as a comparative baseline in accordance with CERCLA and for evaluation of potential future unrestricted use. The Resident Farmer Adult and Child receptors developed specific to RVAAP will be evaluated as outlined in the Facility-Wide Human Health Risk Assessor Manual (FWHHRAM) Amendment 1 (USACE 2005a). Application of these receptor scenarios to the Paris-Windham AOC is described in more detail as follows:

- Range Maintenance Soldier – This receptor represents OHARNG personnel who may occasionally visit the AOC in connection with any adjacent range areas or for other routine or occasional monitoring of the area. This receptor is assumed to contact shallow surface soil (including dry sediment).

- Adult and Juvenile Trespassers – These receptors are assumed to contact shallow surface soil (including dry sediment) and surface water in the drainage conveyance at the base of the slope of the dump site.

- Resident Farmer (Adult and Child) – These receptors are generally assumed to contact shallow surface soil (including dry sediment), subsurface soil, and surface water. This AOC is located on a steep embankment, is bordered by a flood plain and a road, and is not suitable for residential use (e.g., a house cannot be built directly on the AOC). However, for evaluation of a residential scenario, it is assumed that a residence could be built across the road from the AOC with a yard that encompasses the road and hillside. Based on this scenario, the residential receptors are assumed to contact shallow surface soil (including dry sediment) and intermittent surface water in the drainage conveyance at the base of the toe slope of the dump site. Exposure to subsurface soil is not included because the foundation of a house would have to be located outside the AOC.

6.1.2 Identification of Constituents of Concern

As part of the risk management evaluation in the SC/FFS, COCs will be defined by comparison of limited "RD/RA" sample results to RVAAP facility-wide CUGs as described in the USACE Position Paper on Human Health CUGs (USACE 2009). The facility-wide CUGs are established in the *Draft Facility-Wide Human Health Cleanup Goals Report for the RVAAP* (USACE 2008), herein referred to as the Draft CUG Report. The Draft CUG Report identified facility-wide CUGs by media for each chemical for various receptors and risk levels. The determination of COCs will consist of the following screening process:

- Identify those shallow surface soil/dry sediment and surface water facility-wide CUGs that apply for Resident Farmer (Adult and Child) Receptors and the appropriate receptors for the Dump Along Paris-Windham Road (i.e., the Range Maintenance Soldier and Juvenile and Adult Trespasser) at a target cancer risk of 1.0E-05 and target hazard quotient (HQ) of 1.0 for all shallow surface soil/dry sediment COCs (including dry sediment).

- Include both cancer-based and noncancer-based facility-wide CUGs, and report critical effect and target organ for each of the non carcinogen-based, facility-wide CUGs.

- Compare the exposure point concentration (EPC) for each COPC to the appropriate facility-wide CUG. The EPC will be either the 95% upper confidence limit (UCL) of the mean, or the maximum value detected, depending upon whichever value is the lowest.

- For noncarcinogens, sum the ratios of the EPC to the facility-wide CUG for all chemicals that affect similar target organs.

- For carcinogens, sum the ratios of the EPC to the facility-wide CUG for all carcinogens.

Because the drainage swale (evaluated as shallow surface soil/dry sediment) is very small (approximately 0.15 acres), EPCs for shallow surface soil/dry sediment and surface water will be calculated for a single exposure unit using all of the data previously collected. A constituent will be identified as a COC if one of the following occurs:

1. The EPC exceeds the most stringent facility-wide CUG for the Resident Farmer (Adult and Child), or any of the OHARNG planned future use receptors (Range Maintenance Soldier and Juvenile and Adult Trespasser); or

2. The constituent contributes significantly (i.e., a least 10%) to a Sum of Ratios greater than 1.0.

It is assumed that the presence of concentrations at or less than the background value indicates the absence of contamination. Therefore, if the facility-wide, CUG-based screening criterion for an inorganic chemical is less than background, the background value will be used as the screening criterion. Because the Draft CUG Report includes facility-wide CUGs for all chemicals identified above 2001 EPA Region 9 PRGs in shallow surface soil/dry sediment and surface water at the Dump Along Paris-Windham Road, no additional AOC-specific CUG development will be required. The draft facility-wide CUGs are subject to change as the Draft CUG Report is reviewed and finalized by RVAAP stakeholders. Therefore, revised or additional data comparisons for risk management decisions may be required at a later point in the CERCLA process.

6.1.3 Identify Cleanup Goals for the Focused Feasibility Study

In accordance with the Final USACE Position Paper for the application and use of facility-wide CUGs (USACE 2009), the facility-wide CUGs established in the Draft CUG Report are the remediation levels for the designated end user for any COCs identified for the Dump Along Paris-Windham Road unless there are additive effects to be considered. In some circumstances, there may be a risk management analysis approach [e.g., WOE] that may allow the COC to be re-assessed.

6.1.4 Nature and Extent

The limited "RD/RA" did not fully evaluate the nature and extent of contamination and data gaps potentially requiring further investigation. Also, the limited "RD/RA" did not identify constituents of potential concern (COPCs) or constituents of concern (COCs) for risk evaluation. Therefore, the SC/FFS will include an evaluation of contaminant nature and extent based on existing data. The evaluation will assess the distribution of any identified COCs to determine where exceedances of facility-wide CUGs occur, and if those exceedances are clustered or isolated. This information will establish causal relationships and determine whether contaminant migration has occurred from source materials to other media (e.g., shallow surface soil/dry sediment and surface water in the drainage swale).

6.2 ECOLOGICAL RISK EVALUATION AND WEIGHT-OF-EVIDENCE

The ecological risk evaluation will consist of a WOE approach rather than a mathematical or quantitative risk assessment. As shown in the CSM (Figure 5-1) and as described in the human health assessment method (Section 6.1), only one exposure pathway is assumed to be open in this small area (0.3 acre).

The WOE assessment will address potential chemical exposure from uncovered sediment or soil and intermittent surface water in the drainage swale, and will consist of using four elements:

1. Facts about ecological resources [e.g., streams, wetlands and threatened and endangered (T&E)] species habitats will be assembled and noted.

2. The land use for human health assessment will be used in the ecological WOE.

3. Site characteristics such as slope, soil cover, and vegetative cover will be collected based on previously reported conditions (MKM 2004) and an August 2009 site reconnaissance by SAIC.

4. The likelihood of surface water conveyance of contaminants from the AOC to nearby habitats will be ascertained. One of the principal sources of information will be the *Facility-Wide Biological and Water Quality Study* (USACE 2005b) – specifically, multiple data from the sampling station (S-9) as shown on Figure 3-2. The S-9 sampling station is immediately downstream of the Paris-Windham Dump at the Paris-Windham Road bridge (approximately 50 feet north of the AOC). Because of the availability of recent, quantitative water quality data from Sand Creek, hydraulic modeling to evaluate potential for contaminant transport via surface water from the drainage swale to the creek is not planned.

The ecological WOE protocol includes the compilation of existing data about ecological resources from Army and OHARNG sources, such as streams, wetlands and T&E species habitats. Existing chemical data collected following the limited "RD/RA" will also be evaluated as part of the ecological WOE. Photographs of current site conditions and habitats will be taken to supplement

photographs published in the MKM report (MKM 2004). This information, along with the WOE elements, will be used to reach a risk management decision about the ecological resources at the AOC.

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7.0 SUMMARY

Based on results of the limited "RD/RA" confirmatory sampling effort, three metal compounds and several SVOCs were found to be present above screening criteria used at that time (background and 2001 USEPA Region 9 PRGs) in soil within the dump limits and in dry sediment in a drainage swale. In order to avoid potentially undermining the structure of Paris-Windham Road, residual fragments of transite were left in place along the slope of the southern half of the AOC. These fragments were subsequently covered in place during site restoration operations. The limited "RD/RA" recommended that a risk assessment be performed using the existing data to verify that limited "RD/RA" activities were sufficient to allow for CERCLA remedy (MKM 2004).

After evaluation of the CSM (Section 5.0), it was determined that the potential open exposure pathways for both human and ecological receptors are shallow surface soil/dry sediment and surface water within the drainage swale. Surface soil within the AOC is not a potential source of exposure because, following the 2003 limited "RD/RA", clean hard fill for stability and a layer of clean soil backfill material were placed on top of the ten excavated grids (approximately 760 tons of material to a depth of 2 feet) and the area was re-vegetated (MKM 2004). Asbestos was not detected in samples collected after the limited "RD/RA"; however, residual pieces of transite were left in place. Residual transite will be qualitatively evaluated in the SC/FFS with respect to the potential for human exposure (e.g., form of asbestos and friability, mitigating effect of the soil/vegetation cover placed over the dump following the limited "RD/RA").

The SC/FFS will summarize and evaluate all previously collected data. Human health and ecological risk management evaluation in the SC/FFS will be completed as described in this WP. If no human health COCs are identified in the SC/FFS and the ecological WOE indicates no actions are needed to protect ecological resources, the SC/FFS will recommend no further action at the AOC. If COCs are identified for remediation, the SC/FFS will screen appropriate remedial process options for shallow surface soil/dry sediment and remedial alternatives will be developed and evaluated in accordance with CERCLA guidance. Based on the remedial alternative evaluation, a recommended alternative for soil and dry sediment will be made in the FFS. The SC/FFS will compare concentrations of COPCs to USEPA Generic Soil Screening Levels to determine if any chemicals may have a potential to leach to groundwater, and will make recommendations as needed for further consideration under a future groundwater action.

The proposed outline for the SC/FFS is as follows:

- Executive Summary
- Section 1.0: Introduction
- Section 2.0: Background Information
- Section 3.0: Summary of Historical Data and Occurrence and Distribution of Contamination
- Section 4.0: Human Health Risk Evaluation and Ecological Weight-of-Evidence
- Section 5.0: Remedial Action Objectives

- Section 6.0: Applicable or Relevant And Appropriate Requirements
- Section 7.0: Technology Types and Process Options
- Section 8.0: Development of Remedial Alternatives
- Section 9.0: Analysis of Remedial Alternatives
- Section 10.0: Agency Coordination and Public Involvement
- Section 11.0: Conclusions
- Section 12.0: References

8.0 REFERENCES

MKM (MKM Engineers, Inc.) 2004. *Final Report for Remedial Design/Removal Action Plan for Paris-Windham Road Dump*. March 2004.

Ohio Army National Guard (OHARNG) 2008. Land Use Summary Table, personal communication from Katie Elgin OHARNG. August 14, 2009.

Ohio EPA (Ohio Environmental Protection Agency) 2004. *Director's Final Findings and Orders in the matter of U.S. Department of the Army, Ravenna Army Ammunition Plant*. June 2004.

USACE (United States Army Corps of Engineers) 2005a. *Ravenna Army Ammunition Plant Facility-wide Human Health Risk Assessor Manual, Amendment 1,* U.S. Army Corps of Engineers, Louisville District, 01 November 2005.

USACE (United States Army Corps of Engineers) 2005b. *Facility-wide Biological and Water Quality Study 2003 at the Ravenna Army Ammunition Plant.* November 2005.

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USACE 2009. *Final United States Army Corps of Engineers Ravenna Army Ammunition Plant (RVAAP) Position Paper for the Application and Use of Facility-Wide Human Health Cleanup Goals.* June 2009.

U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) 1998. *Relative Risk Site Evaluation for Newly Added Sites at the Ravenna Army Ammunition Plant, Ravenna, Ohio*. Hazardous and Medical Waste Study No. 37-EF-5360-99. October 1998.

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DRAFT SITE CHARACTERIZATION AND FOCUSED FEASIBILITY STUDY WORK PLAN
FOR RVAAP-51 DUMP ALONG PARIS-WINDHAM ROAD
AT THE RAVENNA ARMY AMMUNITION PLANT, RAVENNA, OHIO
COMMENT RESPONSE TABLE – ADDITIONAL COMMENT RESPONSE MEETING (CRM) CHANGES
REV. 2, 7-JUNE-2010
(ADDITIONAL OR REVISED TEXT CHANGES FROM CRM ARE INDICATED BY BLUE BOLDED TEXT)

Comment Number	Page or Sheet	New Page or Sheet	Comment	Recommendation	Response
Ohio EPA, DERR – NEDO (Todd Fisher and Eileen Mohr)					
O-1	Document Distribution Pg.	Document Distribution Pg.	Bonnie Buthker has accepted another position within the Ohio EPA and is no longer working on RVAAP.	Please remove Bonnie Buthker, Ohio EPA-NEDO from the distribution table.	Agree. Bonnie Buthker, Ohio EPA-SWDO has been removed from the distribution list
O-2	Document Distribution Pg.	Document Distribution Pg.	The Southwest District office (SWDO) is no longer providing review support on RVAAP documents.	Please remove "Ohio EPA-SWDO = Ohio Environmental Protection Agency – Southwest District Office" from the footnote of the distribution table.	Agree. Ohio EPA-SWDO has been removed as footnote on the distribution table.
O-3	Page 1-1, line 13	Pg 1-1	The text states that a "Remedial Design/Removal Action (RD/RA) was conducted in 2003 to remove unconsolidated surface debris…" Calling this action an RD/RA was implemented by the Army in order to secure funding for this project. It was really, in essence, an Interim Removal Action (IRA).	Please add the word "limited" before "Remedial Design/Removal Action". Also, please keep "Remedial Design/Removal Action" in quotations in the text.	Clarification. Rather than keeping "Remedial Design/Removal Action" or the acronym "RD/RA" in quotations throughout the text, we propose the following. Consistent with Ohio EPA comment #3 to the Draft RD/RA Report, the SC/FFS Work Plan, Section 1.1, 1st paragraph has been revised as follows: A "Remedial Design/Remedial Action" (RD/RA), as titled by the U.S. Army Base Re-alignment and Closure Division

O-3 (Cont'd)					(BRAC-D), was performed in 2003 to remove…(MKM 2004). The Ohio EPA commented that the Draft RD/RA was to be considered as an Interim Removal Action, so not to be construed as a final remedy. The RD/RA terminology has been retained in this Work Plan to be consistent with historical documents; however, the RD/RA was, in fact, an interim action. Completion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process is required in order to obtain a final remedy for soil and dry sediment." **Per the 23-February-2010 comment response meeting, the term "limited" will be used globally and "RD/RA" will be in quotes. The proposed text insert has been been modified as follows:** A limited "Remedial Design/Removal Action" (RD/RA), as titled by the U.S. Army Base Re-alignment and Closure Division (BRAC-D), was performed in 2003 to remove…(MKM 2004). The Ohio EPA commented that the Draft limited "RD/RA" report was to be considered as an Interim Removal Action, so not to be construed as a final remedy. The limited "RD/RA" terminology has been retained in this Work Plan to be consistent with

O-3 (Cont'd)					historical documents; however, the limited "RD/RA" was, in fact, an interim action. Completion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process is required in order to obtain a final remedy for soil and dry sediment."
O-4	Page 1-1, Line 15	Pg 1-1	See Ohio EPA comment above.	Add the following sentences before the word "completion": "The RD/RA was conducted by the Base Re-Alignment and Closure Division (BRACD). Although defined as an RD/RA, it was , in fact, an interim removal action and was not intended to be a final remedy."	Please reference response to Ohio EPA comment **O-4**. **Per the 23-February-2010 comment response meeting, the response above should reference comment O-3 rather than comment O-4.**

O-5	Page 1-1, Lines 24-27	Pg 1-1	The objective of the project does not mention identifying potential data gaps.	Please include "identify potential data gaps" as an objective.	Clarification. Section 1.1 Objectives, notes that the limited "RD/RA" did not evaluate the nature and extent of contamination and did not identify COPCs or COCs for risk evaluation. Therefore, the SC/FFS will complete these tasks. Consistent with the objective, Section 1.1, 1st paragraph, has been revised to state: "The RD/RA did not evaluate the nature and extent of contamination and there may be data gaps potentially requiring further investigation. Also, the limited "RD/RA" did not identify constituents of potential concern (COPCs) or constituents of concern (COCs) for risk evaluation. Therefore, the SC/FFS will complete these tasks and evaluate remedial alternatives in accordance with the CERCLA process." **Per the 23-February-2010 comment response meeting, the proposed text insert above has been revised to state:** "The limited "RD/RA" did not fully evaluate the nature and extent of contamination and data gaps potentially requiring further investigation. Also, the limited "RD/RA" did not identify constituents of potential concern (COPCs) or constituents of concern

O-5 (Cont'd)					(COCs) for risk evaluation. Therefore, the SC/FFS will complete these tasks and evaluate remedial alternatives in accordance with the CERCLA process."
O-6	Page 1-2 Lines 4-13	Pg 1-2 Pg 6-1 Pg 6-2	Although it won't be residential, is there any consideration to look at a RD/RA from a residential standpoint for unrestricted OHARNG usage?	Please provide comment.	**Discussion requested.** As noted in Section 1.2, a residential land use scenario would be included in the risk evaluation. However, development and evaluation of a remedial alternative to attain residential cleanup goals was considered as impractical by the Army and OHARNG, given that site conditions preclude unrestricted use and the AOC lies within a designated surface danger zone (SDZ) for a small arms range complex. **Per the 23-February-2010 comment response meeting, reference to unrestricted OHARNG usage has been added at the end of Section 1.2, 2nd paragraph as follows:** "Similarly, a remedial alternative based on unrestricted Ohio Army National Guard (OHARNG) land use will not be evaluated in the FFS for the same reasons as a residential land use scenario. Land use controls and training restrictions are anticipated as part of the final AOC due to AOC characteristics and the presence of residual transite, which makes unrestricted use of the AOC impractical."

O-6 (Cont'd)					**Also, per the 23-February-2010 comment response meeting, reference to the surface danger zone (SDZ) will be removed from the Work Plan as this OHARNG designation may change. Section 6.1.1, 1st paragraph, bullet 1 has been revised as follows:** "~~This area is designated as the surface danger zone (SDZ) for a small arms range complex…(OHANRG 2008).~~" **Section 6.1.1, 2nd paragraph, has been revised as follows:** "~~The SDZ is defined as the safety zone for the range based on the chance of a ricochet from the range. No impact from the range is anticipated in the area, and n~~No range construction activities will be conducted ~~in~~ within ~~this~~ the area of the Dump along Paris-Windham Road. Activity on the AOC ~~site~~ will consist of minor foot traffic associated with ~~monitoring the SDZ,~~ ~~-~~minor ~~range~~ maintenance activities, (e.g., mowing and control of vegetation), and road maintenance (e.g., mowing along road berm, road surface repairs/patching)…The National Guard Trainee is not considered an appropriate receptor for this area because the AOC ~~is within the SDZ for a small arms range complex, and because it~~ is a small area on a steep road berm and is not suitable for training use. The topography of …"

O-6 (Cont'd)					**Section 6.1.1, 2nd paragraph, second bullet has been revised as follows:** " Range Maintenance Soldier – This receptor represents OHANRG personnel who may occasionally visit the ~~site~~ AOC in connection with ~~its status as part of the SDZ for the adjacent range,~~ any adjacent range areas, or for routine or occasional monitoring of the area. This receptor is assumed to contact shallow surface soil (including dry sediment)."
O-7	Page 2-1, Lines 4-13	Pg 2-1	There is no mention of identifying potential data gaps	Please add identify potential data gaps to the numbered list.	Clarification. Section 1.1 Objectives, notes that the limited "RD/RA" did not evaluate the nature and extent of contamination and did not identify COPCs or COCs for risk evaluation. Therefore, the SC/FFS will complete these tasks. Consistent with the objective, Section 2.1, bullet No. 1, has been revised to state: "Evaluate existing data to identify COPCs and COCs and any data gaps potentially requiring further investigation;" **Per the 23-February-2010 comment response meeting, the response has been editorially revised as follows:**

O-7 (Cont'd)					"Evaluate existing data to identify COPCs and COCs and potential data gaps requiring further investigation"
O-8	Page 2-1, Lines 28-30	Pg 2-1	The text states "groundwater data does not exist for the vicinity of the AOC" and " groundwater will be excluded as a potential exposure pathway, and will be addressed by the US Army under a future decision for the RVAAP Facility-Wide Groundwater AOC (RVAAP-68)."	What mechanism or assurance will require this area to be addressed under the FWGW program? Why not drill a few well specific to this AOC? Please provide further justification as to why GW will not be investigated.	**Discussion requested.** **Per the 23-February-2010 comment response meeting, the first bullet of Section 2.2 has been revised to state:** "The SC/FFS will evaluate all potential exposure pathways identified in the CSM. Groundwater data does not exist for the vicinity of the AOC. ~~Therefore, groundwater will be excluded as a potential exposure pathway, and will addressed by the U.S. Army under a future decision for the RVAAP Facility-Wide Groundwater AOC (RVAAP-68).~~ Therefore, a qualitative evaluation will be performed in the SC/FFS with respect to potential impacts of residual soil contaminants on groundwater quality (e.g., screening of soil data against EPA Generic Soil Screening Levels [GSSLs], evaluation of topography and potential groundwater flow directions, review of surface water data in the adjacent Sand Creek to determine if any discernable effects related to groundwater discharge are observed)."

O-9	Page 3-3, Lines 28-30	Pg 3-3	The text states that "small fragments of transite were left in place in the southern portion of the AOC." How are "small fragments" defined?	Please provide clarification.	**Discussion requested.** SAIC searched available references on the RVAAP website, including the limited "RD/RA" Report and could not find dimension data for the transite left in place. Section 3.8 of the limited "RD/RA" Report references that small pieces were left along the slope of the southern ½ of the site and that the Akron Air Quality Management District and the OEPA-NEDO were notified of the residual pieces left in place (page 3-4, line 31). This notification letter may provide an estimate of the size and volume of the transite siding left in place, but is not available to SAIC. **Per the 23-February-2010 comment response meeting, references to "small" pieces of transite will be removed throughout the Work Plan. Specifically, text on Page 3-3, Section 3.3.2, 2nd paragraph, last sentence will be revised as follows:** "However, because removing the material may have potentially undermined Paris-Windham Road, ~~small~~ residual fragments of transite were left in place."

O-10	Page 3-7, Figure 3-2	Pg 3-7	There is no discussion of the Ecological Sample in the text preceding this figure.	Please add a discussion in the text or remove ecological sample location from the figure.	Agree. The ecological sample location has been removed from the figure. **Per the 23-February-2010 comment response meeting, Figure 3-2 will be retained in the Work Plan and Facility-Wide Surface Water Investigation sample station S-9 will be retained on the figure. However, the legend of Figure 3-2 has been revised to indicate that station S-9 is a RVAAP Facility-Wide Surface Water Investigation sample station.**
O-11	Page 5-2 Figure 5-1	Pg 5-2 Figure 5-1	The vertical text under the column heading “Potential Receptors” is illegible.	Please correct figure.	Agree. The vertical text has been corrected to make the heading text legible. The text now reads RMS, Trespasser, Resident, Aquatic, and Terrestrial.

O-12	Page 5-2 Figure 5-1	Figure 5-1 Pg 6-2 Pg 6-3 Pg 7-1	The drainage swale during the August 2009 walkover contained no standing water. However, water may be present during other times of the year and not observed .	Please change pathway to show potential complete exposure pathway to receptors.	**Discussion requested.** While the drainage swale periodically contains water, visual surveys during the limited "RD/RA" and again in 2009 did not indicate it was a flowing stream or perennial surface water impoundment. Based on the conceptual model, the Work Plan proposes to address sediment in the drainage swale as dry sediment based on the recent RVAAP definition for dry sediment. Clarification is requested if the swale is to be addressed as a surface water conveyance (e.g., surface water with wet sediment). **Per the 23-February-2010 comment response meeting, surface water within the drainage swale at the toe of the AOC will not be eliminated in the Work Plan. Rather, the Work Plan will indicate intermittent surface water (and underlying sediment, classified as dry sediment) will be evaluated in the SC/FFS as a receptor with respect to exposures and potential runoff impacts to Sand Creek. The following text changes have been made:**

O-12 (Cont'd)					**Figure 5-1 has been revised to remove footnote "b" for surface water in the drainage swale and show that it is a potentially complete exposure pathway for the Adult and Juvenile Trespassers, Resident Farmer (adult and child); as well as aquatic ecological receptors.** **Section 6.1.1, 2nd paragraph, bullets 2 and 3 have been revised to indicate that the Adult and Juvenile Trespassers and Resident Farmer, (adult and child) receptors include exposure to surface water (see attached text changes at end of the CRT).** **Section 6.1.2, 1st paragraph, bullet 1 has been revised to include surface water, as well as surface soil/dry sediment as follows:** "Identify those shallow surface soil/dry sediment and surface water facility-wide CUGs that apply…" **Section 6.1.2, 2nd paragraph, 1st sentence has been revised to state:** "Because the drainage swale…, EPCs for shallow surface soil/dry sediment and surface water will be calculated for a single exposure unit using all of the ~~sediment~~ data previously collected."

O-12 (Cont'd)					**Section 6.1.2, 3rd paragraph, 3rd sentence, has been revised to state:** "Because the Draft CUG Report includes facility-wide CUGs for all chemicals identified above 2001 EPA Region 9 PRGs in shallow surface soil/dry sediment and surface water ~~and dry sediment~~ at the Dump Along Paris-Windham Road, no additional CUG development will be required." **Section 7.0, 2nd paragraph has been revised to state:** "After evaluation of the CSM (Section 5.0), it was determined that the ~~only~~ potential open exposure ~~pathway~~ pathways for both human and ecological receptors ~~is~~ are shallow surface soil/dry sediment and surface water within the drainage swale.
O-13	Page 5-2 Figure 5-1	Pg 5-2 Figure 5-1	Is the footnote "b" based on the August 2009 visit?	Please update table to reflect the date(s) that the swale was observed.	Agree. The date of the site visit, August 3, 2009, has been added to the footnote.
O-14	Page 6-1 Line 23	Pg 6-1	The bullet states that "no specific development project is identified for this AOC."	Please add the word "currently" between the words "is" and "indentified."	Agree. Sentence has been modified to state: "No specific development project is currently identified for this AOC."

O-15	Page 6-2 Lines 13-27	Pg 6-2	The receptors have a potential to have direct contact to surface water.	Please add surface water to each receptor scenario.	**Discussion requested.** See response to comment O-12. **Per the 23-February-2010 comment response meeting, surface water within the drainage swale at the toe of the AOC will not be eliminated in the Work Plan. Reference response to comment O-12 for changes to Section 6.1.1, 2nd paragraph, bullets 1 through 3.**
O-16	Page 6-3,4 Section 6.1.2	Pg 6-2 Pg 6-3	This section contains no evaluation of surface water COCs	Please evaluate surface water COCs and provide this information in the text.	**Discussion requested.** See response to comment O-12. **Per the 23-February-2010 comment response meeting, surface water within the drainage swale at the toe of the AOC will not be eliminated in the Work Plan. Reference response to comment O-12 for changes to:** **Section 6.1.2, 1st paragraph, bullet 1.** **Section 6.1.2, 2nd paragraph, 1st sentence.** **Section 6.1.2, 3rd paragraph, 3rd sentence.**

O-17	Page 6-4 Section 6.1.4 Lines 3-9	Pg 6-4	The text states that the "SC/FFS will include an evaluation of contaminant nature and extent based on existing data."	Please clarify whether or not we have a good handle on nature and extent of contamination before we proceed further. Either we have or have not determined nature and extent. Please explain why the determination of nature and extent is a risk management decision.	**Discussion requested.** The current approach was to address data screening and evaluation of contaminant nature and extent in the SC/FFS. **Per the 23-February-2010 comment response meeting, Section 6.1.4 has been revised consistent with the response to comment O-5. The section has been revised to state:** "The limited "RD/RA" did not fully evaluate the nature and extent of contamination and data gaps potentially requiring further investigation. Also, the limited "RD/RA" did not identify constituents of potential concern (COPCs) or constituents of concern (COCs) for risk evaluation. Therefore, ~~T~~the SC/FFS will include an evaluation of contaminant nature and extent based on existing data. The evaluation…materials to other media (e.g., shallow surface soil/dry sediment and surface water in the drainage swale). ~~The nature and extent evaluation will ultimately be considered in the risk management decisions for the appropriate final remedial response.~~"

O-18	Page 6-4 Section 6.1.4 Lines 27-29	Pg 5-2 Pg 3-7 Pg 6-4	The text states that "the likelihood of surface water conveyance of contaminants from AOC to nearby habitats will be ascertained. One of the principal sources of information will be the Facility-Wide Biological and Water Quality Study (USACE 2005b) ." How many data points are being used from the FW SW report? Will there be any hydraulic modeling? How will wetlands be determined?	Please provide clarification.	**Discussion requested.** One station was sampled for multiple lines of evidence during the *Facility-Wide Biological and Water Quality Study* (USACE 2005). This station (S-9) will be used. These multiple data from this station indicate that Sand Creek is healthy. The S-9 sampling station is immediately downstream of the Paris-Windham Dump at the Paris-Windham Road bridge crossing (approximately 50 feet north of the AOC). Part of the ecological WOE protocol includes compilation of existing data about ecological resources from OHARNG, such as streams, wetlands and threatened and endangered (T & E) species habitats. Sand Creek is expected to be identified as a quality ecological resource. However, it is not expected that the drainage swale will be identified as an aquatic habitat (see response to Ohio EPA comment O-12). Further discussion is requested on the need for hydraulic modeling and wetland delineation for the specific purpose of the SC/FFS. **Per the 23-February-2010 comment response meeting, surface water within the drainage swale at the toe of the AOC will not be eliminated in the Work Plan. Reference response to comment O-12 for Chapter 5.0 and Figure 5-1 changes.**

O-18 (Cont'd)					**Also reference comment O-10 for changes to Figure 3-2.** **In addition, Section 6.2, 2nd paragraph, bullet 4, as well as the 3rd paragraph have been revised as shown in the text changes attached to the end of this CRT.**
O-19	Page 7-1 Lines 5-6	Pg 7-1	The text states that "residual small fragments of transite were left in place." What was the size of these fragments (range)?	Please make the appropriate changes to the text.	**Discussion requested.** Please see response to Ohio EPA comment O-9. **Per the 23-February-2010 comment response meeting, the text of Section 7.0, page 7-1, 1st paragraph, second sentence, will be revised as follows:** "In order to avoid potentially undermining the structure of Paris-Windham Road, residual fragments ~~small~~ of transite were left in place along the slope of the southern half of the AOC."
O-20	Page 7-1 Lines 11-12	Pg 7-1	Surface water pathway has been omitted.	Please add surface water pathway.	**Discussion requested.** See response to comment O-12. **Per the 23-February-2010 comment response meeting, surface water within the drainage swale at the toe of the AOC will not be eliminated in the Work Plan. Reference response to comment O-12 for changes to Section 7.0, 2nd paragraph.**

O-21	Page 7-1 Lines 16-18	Pg 7-1	The text states that "transite should not be considered further as it is not exposed and the surface soil/ subsurface soil pathway has been determined to be incomplete." Transite may now be exposed at the surface from erosion and /or frost heave.	Recommend sampling for asbestos.	**Discussion requested.** This recommendation may be included in the SC/FFS Report (see responses to Ohio EPA comments O-5 and O-7). The current approach was to address data screening and evaluation of contaminant nature and extent in the SC/FFS. **Per the 23-February-2010 comment response meeting, the potential for exposures to residual transite will be qualitatively evaluated in the SC/FFS (e.g., form and friability, presence of soil and vegetation cover over ACM). Sampling for asbestos would be a separate activity by the Army; however, the SC/FFS would utilize these data. Section 7.0, 2nd paragraph, last two sentences have been revised as follows:** " ~~T~~ransite should not be considered further as it is not exposed and the surface soil/ subsurface soil pathway has been determined to be incomplete.~~"~~ Asbestos was not detected in samples collected after the limited "RD/RA"; however, residual pieces of transite were left in place. Residual transite will be qualitatively evaluated in the SC/FFS with respect to the potential for human exposure (e.g., form of asbestos and friability, mitigating effect of the soil/vegetation cover placed over the dump following the limited "RD/RA"). ~~Furthermore, asbestos was not detected in any of the sampling results.~~

O-22	Page 7-1 Lines 33-41	Pg 7-1	It is unclear whether a summary of all data collected will be included in the SC/FSS.	Recommend including a summary of all data in Section 3.0.	**Discussion requested.** The current approach was to address data screening (all previously collected data) and evaluation of contaminant nature and extent in the SC/FFS. **Per the 23-February-2010 comment response meeting, the text of Section 7.0, page 7-1, 3rd paragraph, will have the following first sentence added:** "The SC/FFS will summarize and evaluate all previously collected data. Human health and ecological risk management evaluation in the SC/FFS will be completed as described in the work plan…." **Paragraph 4, 3rd bullet will be revised to state:** "Section 3.0: Summary of Historical Data and Occurrence and Distribution of Contamination"

OHARNG, Camp Ravenna (Katie Elgin)					
CR-1	Page 6-2 Line 41 and Page 6-3 Line 17	Pg 6-2 Pg 6-3	References the Security Guard Maintenance Worker. Should this be changed to Range Maintenance Soldier? I think this may be a carry over from the preliminary draft document.		Agree. The text will be corrected to reference the Range Maintenance Solider as a receptor instead of a Security Guard Maintenance Worker: "…(i.e., ~~Security Guard/Maintenance Worker~~ Range Maintenance Soldier and Juvenile and Adult Trespasser)"
Additional Team Comment, 23-February-2010 comment response meeting					
General	**Section 8.0**	N/A			**Per the 23-February-2010 comment response meeting, the text of Section 8.0 and Figure 8-1 (project schedule) have been removed from the work plan.**

Proposed text changes in response to Comment O-12, Section 6.1.1, 2nd paragraph (bullets 2 and 3 revised to indicate that the Adult and Juvenile Trespassers and Resident Farmer, (adult and child) receptors include exposure to surface water):

Bullet 2

Adult and Juvenile Trespassers – These receptors are assumed to contact shallow surface soil (including dry sediment) and surface water in the drainage conveyance at the base of the slope of the dump site.

Bullet 3

Resident Farmer (Adult and Child) – These receptors are generally assumed to contact shallow surface soil (including dry sediment), subsurface soil, and surface water. This AOC…Based on this scenario, the residential receptors are assumed to contact shallow surface soil (including dry sediment) ~~only~~ and intermittent surface water in the drainage conveyance at the base of the toe slope of the dump site. Exposure to subsurface soil is not included because the foundation of a house would have to be located outside the AOC."

Proposed text changes in response to Comment O-18, Section 6.2, 2nd paragraph, bullet 4:

"The WOE assessment will ~~only~~ address potential chemical exposure from uncovered sediment or soil and intermittent surface water in the drainage swale, and will consist of four elements:…

4. The likelihood of surface water conveyance of contaminants from the ACO to nearby habitats will be ascertained. One of the principal sources of information will be the *Facility-Wide Biological and Water Quality Study* (USACE 2005b); specifically, multiple data from sampling station (S-9) as shown on Figure 3-2. The S-9 sampling station is immediately downstream of the Paris-Windham Dump at the Paris-Windham Road bridge (approximately 50 feet north of the AOC). Because of the availability of recent, quantitative water quality data from Sand Creek, hydraulic modeling to evaluate potential for contaminant transport via surface water from the drainage swale to the creek is not planned."
"

Proposed text changes in response to Comment O-18, Section 6.2, 3rd paragraph:

"The ecological WOE protocol includes compilation of existing data about ecological resources from Army and OHARNG sources, such as streams, wetlands and threatened and endangered (T & E) species habitats. Existing chemical data collected following the limited "RD/RA" will also be evaluated as part of the ecological WOE. Photographs of current site conditions…"