Final

Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds

Ravenna Army Ammunition Plant
Ravenna, Ohio

June 26, 2009

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

Prepared for:

United States Army Corps of Engineers
Louisville District

Prepared by:

SAIC Engineering of Ohio, Inc.
8866 Commons Boulevard, Suite 201
Twinsburg, Ohio 44087

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SAIC Engineering of Ohio, Inc.
8866 Commons Blvd.
Twinsburg, OH 44087

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USACE - Louisville District
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600 Martin Luther King Jr. Place
P.O. Box 50
Louisville, Kentucky 40202-0059

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14. ABSTRACT

This remedial design presents the plan and procedures for the removal of contaminated sediment within the drainage ditch at RVAAP-16 Fuze and Booster Quarry Landfill/Ponds. This is part of the CERCLA requirements to achieve remedy for soil and dry sediment at the AOC.

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CONTRACTOR STATEMENT OF INDEPENDENT TECHNICAL REVIEW

Science Applications International Corporation (SAIC) has completed the Final Remedial Design for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds 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.

Tia Rutledge — 6/25/09

Tia Rutledge
Study/Design Team Leader

Jed Thomas — 6/25/09

Jed Thomas, P.E.
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.

Jeff Dick — 06/25/09

Jeff Dick
Principal w/ A-E firm

Final
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RVAAP-16 Fuze and Booster Quarry Landfill/Ponds

Volume One - Main Report and Attachments
Version 1.0

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Ohio EPA-NEDO = Ohio Environmental Protection Agency-Northeast District Office
Ohio EPA-SWDO = Ohio Environmental Protection Agency-Southwest District Office
OHARNG = Ohio Army National Guard
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

AASHTO	American Association of State Highway and Transportation Officials
AOC	Area of Concern
APE	Area of Potential Effect
ARAR	Applicable and Relevant or Appropriate Requirements
BGS	Below Ground Surface
BMP	Best Management Practice
Camp Ravenna	Camp Ravenna Joint Military Training Center
CFR	*Code of Federal Regulations*
COC	Chemical of Concern
COR	Contract Officer Representative
CQAP	Construction Quality Assurance Plan
DFFO	Director's Final Findings and Orders
DOD	Department of Defense
DOT	Department of Transportation
EPC	Exposure Point Concentration
ESS	Explosives Safety Submission
FBQ	Fuze and Booster Quarry Landfill/Ponds
FS	Feasibility Study
FSA	Field Staging Area
GSA	U.S. General Services Administration
ICRMP	Integrated Cultural Resources Management Plan
IDW	Investigation-Derived Waste
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
MEC	Munitions and Explosives of Concern
mg/kg	milligrams per kilogram
MI	Multi-Increment
mph	Miles per Hour
MRS	Munitions Response Site
NCR	Non-Conformance Report
NGB	National Guard Bureau
NPDES	National Pollutant Discharge Elimination System
NW	Nationwide
OAC	Ohio Administrative Code
OHARNG	Ohio Army National Guard
Ohio EPA	Ohio Environmental Protection Agency
OHPO	Ohio Historic Preservation Office
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PBC	Performance Based Contract
PCN	Pre-construction Notification

ACRONYMS AND ABBREVIATIONS (CONTINUED)

PCB	Polychlorinated Biphenyl
PP	Proposed Plan
PPE	Personal Protective Equipment
QA	Quality Assurance
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Protection Plan
QC	Quality Control
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI	Remedial Investigation
ROD	Record of Decision
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SAP	Sampling and Analysis Plan
SHP	Safety and Health Plan
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SVOC	Semivolatile Organic Compound
TCLP	Toxicity Characteristic Leaching Procedure
TSD	Treatment, Storage, or Disposal
USACE	U.S. Army Corps of Engineers
USACHPPM	U.S. Army Center for Health Promotion and Preventive Medicine
USEPA	U.S. Environmental Protection Agency
UXO	Unexploded Ordnance
VOC	Volatile Organic Compound

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 in support of six (6) high priority areas of concern (AOCs) at the Ravenna Army Ammunition Plant (RVAAP) in Ravenna, Ohio. This Remedial Design (RD) describes the implementation process for the selected remedy at the Fuze and Booster Quarry Landfill/Ponds (FBQ) as stated in the *Record of Decision for Soil and Dry Sediment at the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2007a).

This work is being performed under a Performance- Based Contract (PBC) in accordance with U.S. General Services Administration (GSA) Environmental Advisory Services Contract GS-10-F-0076J. In addition, planning and performance of all work elements is being conducted 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 PURPOSE

The purpose of this RD is to detail implementation of the selected remedial action alternative specified in the *Record of Decision for Soil and Dry Sediment at the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16) at the Ravenna Army Ammunition Plant, Ravenna, Ohio* (USACE 2007a). This record of decision (ROD) specifies what is required to be addressed to remove chemical contamination in soil and dry sediment at FBQ that exceed cleanup goals for the most reasonably anticipated land use (National Guard Trainee) and the Resident Subsistence Farmer. As the dry sediment in a drainage ditch was the only area requiring remediation for soil and dry sediment at FBQ to achieve goals for the anticipated land use, the media addressed throughout this RD will be referred to as dry sediment.

Specific elements of the remedial action described in this RD are as follows:

- Remove and dispose contaminated dry sediment at FBQ;
- Dry sediment transportation and disposal activities;
- Confirm risk-based cleanup goals for dry sediment have been attained; and
- Restore excavated areas to neighboring or original contours and conditions.

1.2 SCOPE

The overall program goal of the Installation Restoration Program (IRP) is to clean up previously contaminated land at RVAAP to an acceptable level of risk as resources and mission requirements allow. FBQ is an AOC at RVAAP. This RD addresses the remediation of dry sediment at this AOC and does not address other potentially-contaminated media.

Dry sediment is considered unconsolidated inorganic and organic material on the surface of the ground that occasionally may be covered with water, usually following a precipitation event. Dry sediments are not covered with water for extended periods and typically are dry within seven days. Dry sediments do not function as permanent habitat for aquatic organisms although they may serve as a natural medium for the growth of terrestrial organisms. These sediments are essentially soil that due to its location may be covered with water occasionally. The selected remedy is consistent with the stated future action(s) to be performed at RVAAP.

The scope of this RD is to present a plan to excavate and dispose dry sediment containing contaminant concentrations exceeding cleanup goals as specified in the ROD for FBQ. Since the development and approval of the ROD, a high resolution land survey was performed in the ditch line requiring removal. This survey, with subsequent volume modeling, presented an estimated volume requiring removal of 102 cubic yards, as opposed to the 68 cubic yards estimated in the ROD. Table 1-1 summarizes the most recent estimated quantities of dry sediment that will be removed from FBQ.

Table 1-1. Estimated Removal Quantities for Dry Sediment

Area of Concern	Volume		Mass
	(ft^3)	(yd^3)	(tons)
Fuze and Booster Quarry Landfill/Ponds	2,760	102	163

Confirmation sampling will be conducted to ensure all contaminated material exceeding remedial cleanup goals has been removed. Any additional dry sediment found to have contaminants above cleanup goals will be excavated and confirmation sampling will be performed until cleanup goals are attained. Excavated areas will be restored according to this RD.

Remedial activities will be implemented by USACE/SAIC and its subcontractors. SAIC (under contract with the USACE) is responsible for the excavation, characterization, and disposal of impacted dry sediment. Implementation of these activities will meet the requirements of the Facility-wide Sampling and Analysis Plan (SAP) (USACE 2001a), the Facility-wide Safety and Health Plan (SHP) (USACE 2001b), and this RD.

1.3 FACILITY DESCRIPTION

When the RVAAP IRP began in 1989, RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by Ohio Army National Guard (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.

The current RVAAP consists of 1,280 acres scattered throughout the OHARNG Camp Ravenna Joint Military Training Center, herein referred to as 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 (Figures 1-1 and 1-2). 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.

When RVAAP was operational, Camp Ravenna 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. 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.

1.4 FUZE AND BOOSTER QUARRY LANDFILL/PONDS DESCRIPTION AND HISTORY

FBQ encompasses approximately 45 acres in the south-central part of RVAAP. FBQ operated from 1945 until 1993. The western part of the AOC contains 11 small, shallow settling basins, and an abandoned rock quarry is located in the eastern portion. The RVAAP-16 AOC was expanded in 1998 to include two debris piles and three settling ponds.

Reportedly, the quarry was used for open burning and as a landfill before 1976. The debris resulting from these activities was reportedly removed during construction of three settling ponds (quarry ponds) in 1976. These quarry ponds, up to 20 to 30 ft deep and separated by earthen berms, were constructed to receive spent brine regenerate, groundwater iron oxide filtrant, and sand filtration backwash water discharge from one of the RVAAP water plants. The discharge was regulated under a National Pollutant Discharge Elimination System (NPDES) permit and continued until 1993.

1.5 ANTICIPATED FUTURE LAND USE

The U.S. Army intends to transfer FBQ to the NGB once remedial actions are complete. The NGB will subsequently license the land to OHARNG for military training use. OHARNG has established future land use (mounted training, no digging) for FBQ based on anticipated training mission and utilization of Camp Ravenna. This land use includes operation of wheeled and tracked vehicles.

1.6 PREVIOUS ACTIVITIES

1.6.1 Relative Risk Site Evaluation

A relative risk site evaluation was performed by the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM). The results of the relative risk site evaluation provided the U.S. Army with qualitative and quantitative data to score sites, which provided the U.S. Army with a basis for prioritizing cleanups and allocating funds. The scores can be "High," "Medium," or "Low."

The Relative Risk Site Evaluation (USACHPPM 1996) assessed sediment and surface water samples from each of the three quarry ponds. Groundwater and soil samples were not collected. The samples that were collected were analyzed for metals and explosives. The evaluation concluded that there was no evidence of contaminant migration from the unlined quarry ponds at FBQ. The evaluation gave FBQ a final score of "High."

1.6.2 Phase I/Phase II Remedial Investigation

The Phase I/Phase II Remedial Investigation (RI) (USACE 2005a) was performed to determine the extent of contamination in affected media (e.g., soils, sediments, surface water, and groundwater). Arsenic and manganese were identified as chemicals of concern (COCs) in soil and dry sediment for the National Guard Trainee at FBQ. Calculated risks from these two metals are primarily associated with the very high dust loading factor and inhalation rate assumed for the National Guard Trainee. The exposure point concentrations (EPCs) for arsenic and manganese in soil are less than surface soil background values. The arsenic and manganese EPCs in dry sediment in the drainage ditch were greater than dry sediment background values.

The Phase I/Phase II RI did not determine the lateral and vertical extent of soil and dry sediment contamination.

1.6.3 Supplemental Phase II Remedial Investigation

In response to the recommendation in the Phase I/Phase II RI report, a Supplemental Phase II RI was conducted. Implementation of the Supplemental Phase II RI (USACE 2005b) was completed to fill additional data needs regarding the extent of contamination in affected soil media following the Phase I/II RI. The primary objective of the Supplemental Phase II RI was to provide an updated assessment of the nature and extent of soil contamination, and potential risks to receptors at FBQ at RVAAP. The sampling at FBQ defined the nature and extent of explosive and inorganic compounds detected during the previous Phase I/Phase II RI and to evaluate potential risks to receptors in support of the FS.

The extent of explosive contamination was defined to below reporting limits in surface and subsurface soils at FBQ. Only one explosive, nitrobenzene was detected in the discrete samples, however all detections of nitrobenzene were below reporting limits. The extent of manganese was defined in the Supplemental Phase II RI. The Supplemental Phase II RI results had inorganics above

background concentrations in the perimeter samples collected; however, no substantial data gaps have been identified following completion of the Supplemental Phase II RI. Results of the Supplemental Phase II RI are presented in the FBQ FS (USACE 2006).

1.6.4 Feasibility Study

Preliminary cleanup goals for soil and dry sediment were developed in the FBQ FS (USACE 2006) to support the remedial alternative selection process for soil remediation at FBQ. A summary of the preliminary cleanup goals for the COCs identified for evaluation of remedial alternatives is provided below and in Table 1-2 for the National Guard Trainee and Resident Subsistence Farmer land use.

Table 1-2. Summary of Soil and Dry Sediment COCs and Feasibility Study Preliminary Cleanup Goals

COC	Soil Preliminary Cleanup Goal (mg/kg)	Dry Sediment Preliminary Cleanup Goal[a] (mg/kg)
Representative Land Use[c]		
Manganese	--	1950
Residential Land Use (Resident Subsistence Farmer)		
Antimony	--	31[b]
Lead	--	400[b]
Manganese	--	2900
Mercury	--	23[b]
2,4,6-Trinitrotoluene	--	--

-- = Chemical is not a COC for evaluation of remedial alternatives in the Feasibility Study (FS) for this medium.
COC = Constituent of concern
[a]Preliminary cleanup goals are the same for soil and dry sediments.
[b]COC at Quarry Ponds. Sediment is wet at this exposure unit (EU).
[c]Representative land use is mounted training, no digging for the National Guard Trainee

Remedial alternatives were assembled for impacted soils and dry sediment at FBQ. The remedial alternatives were constructed by combining general response actions, technology types, and process options retained from the screening processes described in the previous section. Remedial alternatives assured adequate protection of human health and the environment, achieved Remedial Action Objectives (RAOs), met Applicable and Relevant or Appropriate Requirements (ARARs), and permanently and significantly reduced the volume, toxicity, and/or mobility of COCs.

The recommended remedial alternative for FBQ, as presented in the FS, was Excavation of Soil/Dry Sediment with Offsite Disposal ~ National Guard Trainee Land Use. This alternative removes dry sediment in the drainage ditch at FBQ that exceeds preliminary cleanup goals for the anticipated future land use (National Guard Trainee). Figure 1-3 presents features of FBQ, along with the FS modeled extents of contamination in the drainage ditch, where it was anticipated that the removal extents of the dry sediment in the drainage ditch will be excavated to 1.0 ft below ground surface (BGS) to achieve the remedial action cleanup goals.

1.6.5 Community Involvement and Regulatory Approval

The FBQ Proposed Plan (PP) for soil and dry sediment (USACE 2007b) was presented to the public on April 4, 2007. A 30-day public comment period was conducted until May 3, 2007. A public meeting was held presenting the recommended alternative on April 10, 2007 in Newton Falls, Ohio. Comments were collected and incorporated into a ROD.

The FBQ ROD (USACE 2007a) documented the selected remedial action alternative to excavate and dispose dry sediment from the drainage ditch until the remedial action cleanup goal (presented in Section 3 of this RD) was achieved. The ROD includes a Responsiveness Summary addressing public comments received during the public comment period and public meeting. The ROD was signed by the Director of the Ohio EPA on January 28, 2008.

1.7 REMEDIAL DESIGN ORGANIZATION

This RD is comprised of a work plan, design drawings, and specifications. The work plan is organized as follows:

- Section 2: Presents the project organization and coordination;
- Section 3: Outlines the remedial action objectives and cleanup goals;
- Section 4: Describes the dry sediment characterization sampling;
- Section 5: Discusses construction mobilization and site preparation;
- Section 6: Describes dry sediment removal activities;
- Section 7: Presents the confirmation sampling procedure;
- Section 8: Summarizes site restoration activities;
- Section 9: Discusses waste characterization and disposal activities;
- Section 10: Presents the Construction Quality Assurance Plan (CQAP);
- Section 11: Summarizes the reporting requirements and project schedule;
- Section 12: Lists the references used in the document; and
- Attachments:
    A. Site Safety and Health Plan
    B. Design Drawings
    C. Construction Activity Forms and Checklist

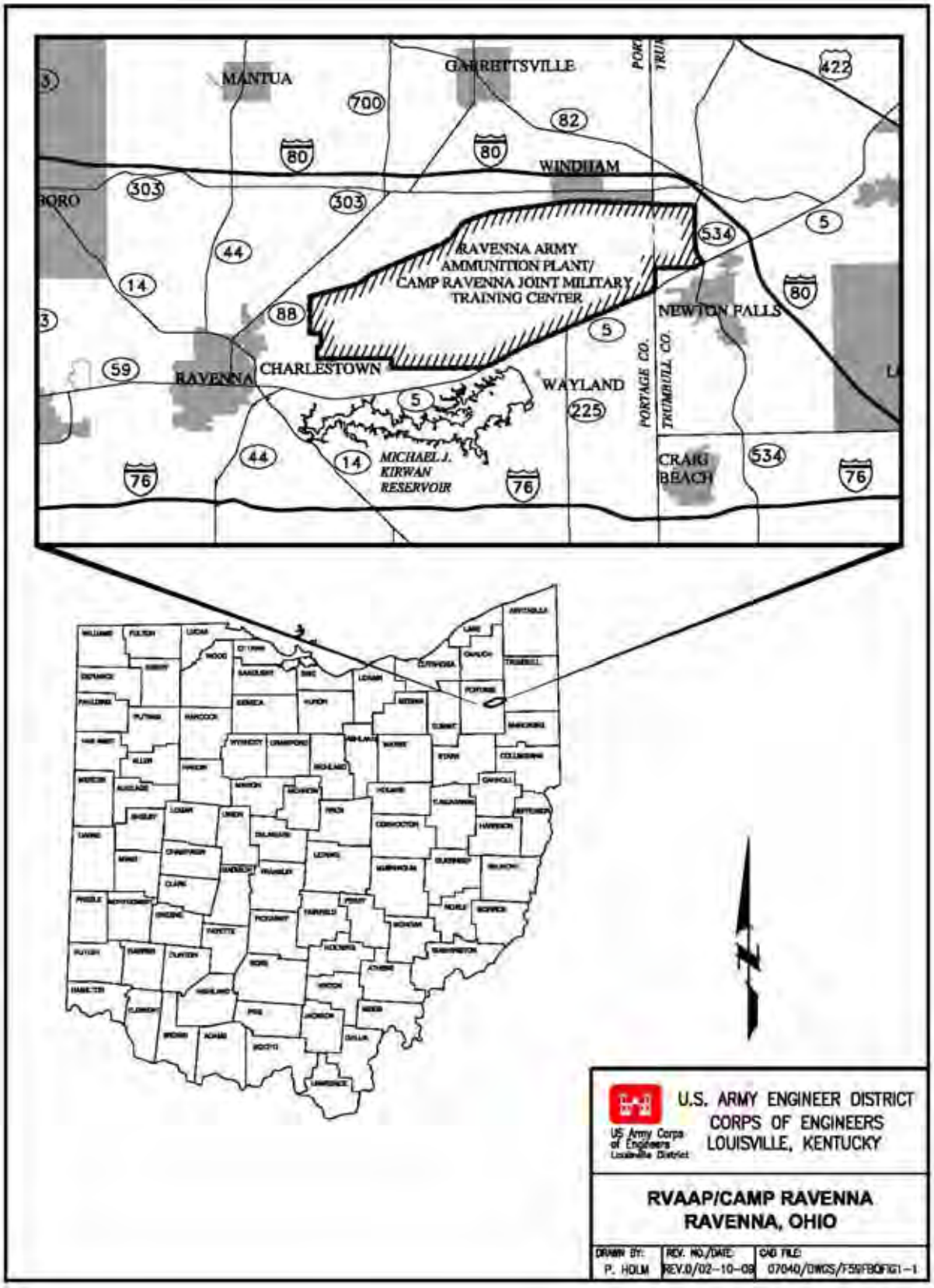

Figure 1-1. General Location and Orientation of RVAAP/Camp Ravenna

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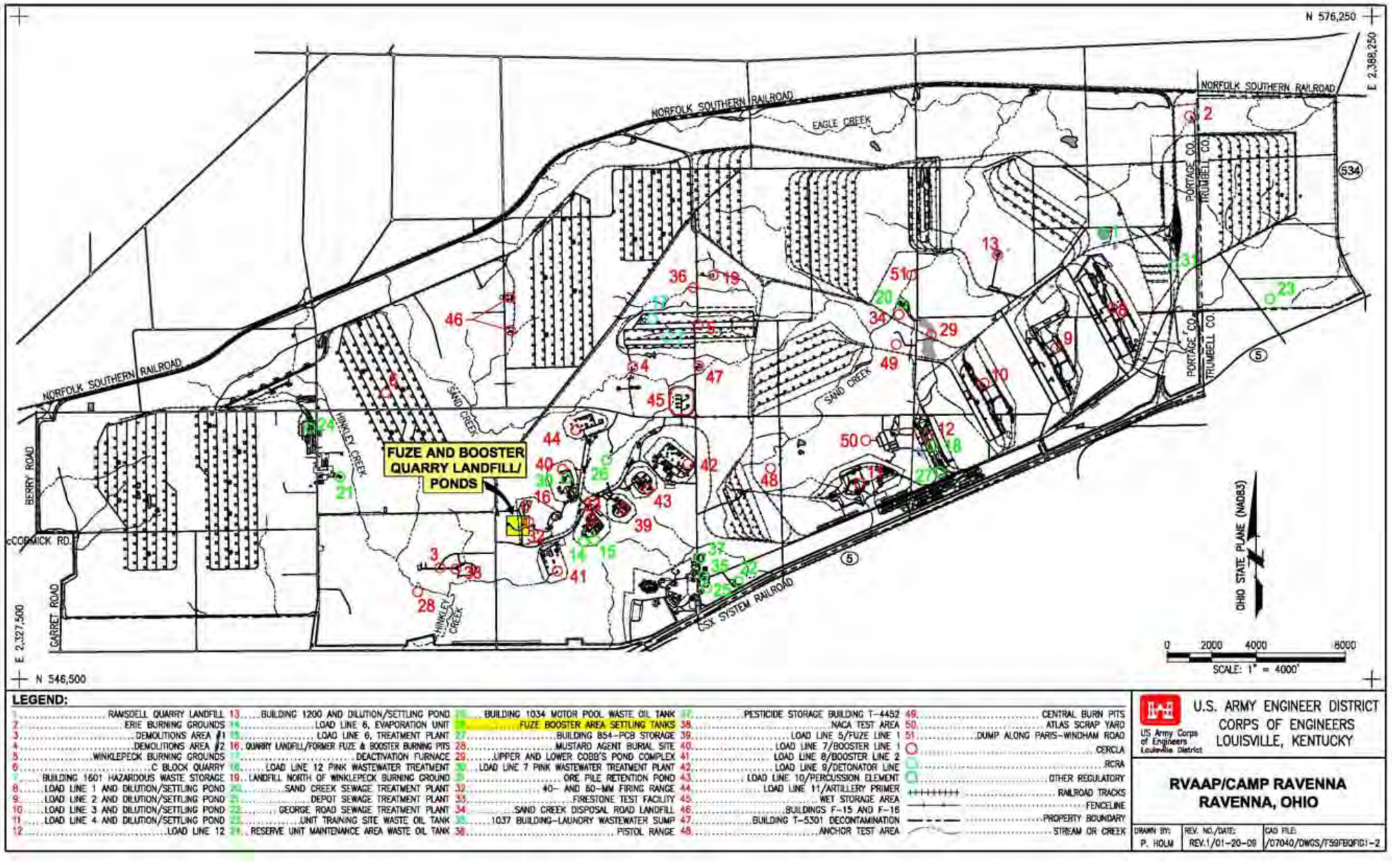

Figure 1-2. RVAAP/Camp Ravenna Installation Map

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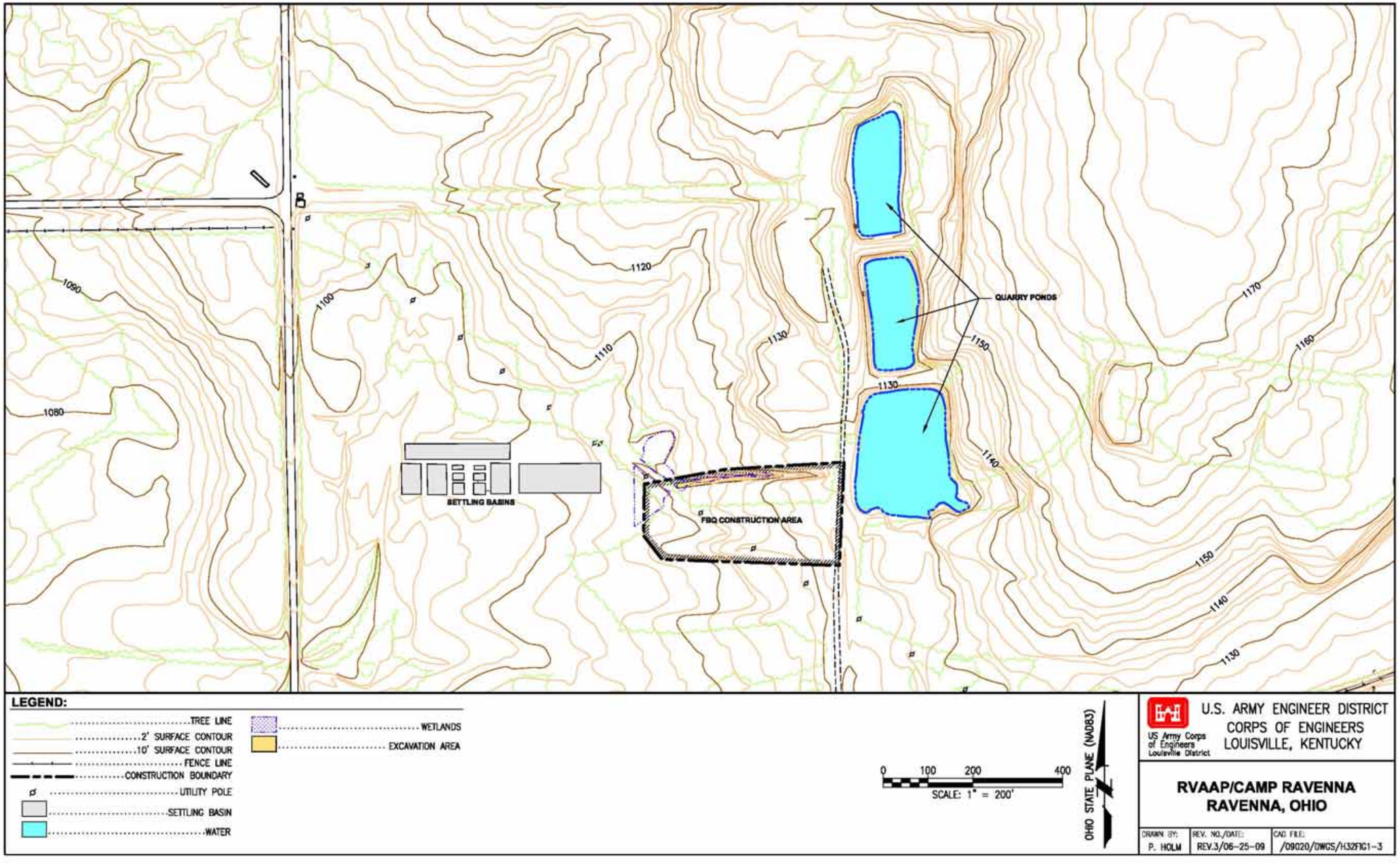

Figure 1-3. Features of Fuze and Booster Quarry Landfill/Ponds

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2.0 PROJECT ORGANIZATION AND COORDINATION

This section presents the project organization and describes project team coordination. This section describes the roles and responsibilities of personnel that will coordinate the implementation of this RD. This section also describes monthly reporting and participation in weekly contractor meetings at RVAAP by SAIC.

2.1 PROJECT ORGANIZATION

The U.S. Army is the lead agency for this remedial action and is responsible for its implementation. The USACE, Louisville District has implementation and technical oversight responsibility on behalf of the U.S. Army. Ohio EPA is the regulatory authority governing work on this remedial action. SAIC is the primary contractor responsible for implementing this RD. SAIC will select and procure a qualified remedial subcontractor to excavate, transport, and dispose of contaminated dry sediment. An organizational chart for implementation of the RD is presented in Figure 2-1. Below is a summary of key personnel responsibilities.

2.1.1 USACE Contract Officer Representative

The USACE Contract Officer Representative (COR) duties include overseeing SAIC to ensure work is completed in accordance with the contract and this RD. The USACE COR also coordinates responses for any unexpected materials encountered.

2.1.2 RVAAP Facility Manager

The RVAAP Facility Manager is responsible to sign waste profiles, manifests, and necessary permits. The RVAAP Facility Manager will also assist in the coordination between SAIC and the RVAAP Operations and Maintenance Contractor (Vista Sciences).

2.1.3 Ohio EPA Project Coordinator

The Ohio EPA Project Coordinator will oversee the U.S. Army and its implementation contractor (SAIC) to ensure work is completed in accordance with the RD and that all activities meet regulatory requirements. The Ohio EPA Project Coordinator will be informed of project schedule and implementation deviations.

2.1.4 SAIC Project Manager

The SAIC Project Manager administers the management, implementation, and quality of this RD and remedial action. The Project Manager provides oversight to ensure all contractual requirements are properly satisfied. This individual ensures all project goals and objectives are met in a high-quality and timely manner. The Project Manager is responsible for tracking project schedule and informing

the USACE COR and Ohio EPA Project Coordinator of any deviations to the project schedule. The Project Manager provides the Ohio EPA Project Coordinator: 1) notification of project implementation, and 2) information regarding any quality assurance and non-conformance issues for this remedial action.

2.1.5 SAIC Technical Manager

The SAIC Technical Manager manages the technical performance and quality of the remedial action. The SAIC Technical Manager oversees the SAIC Construction Manager in meeting project goals and objectives in a high quality and timely manner and reports to the SAIC Project Manager. In coordination with the SAIC Construction Manager and the SAIC Quality Assurance/Quality Control (QA/QC) Officer, the SAIC Technical Manager addresses issues including identification of non-conformances and confirmation of achieving cleanup goals. Dependant upon the project complexity and effort required, the SAIC Technical Manager and SAIC Construction Manager may be the same person.

2.1.6 SAIC Quality Assurance/Quality Control Officer

The SAIC QA/QC Officer coordinates with the SAIC Construction Manager to ensure the requirements of the RD CQAP and Facility-wide Quality Assurance Project Plan (QAPP) are achieved and ensures inspections are performed in accordance with both plans.

The SAIC QA/QC Officer also provides quality control of sampling and sample handling (including sample custody, field testing, and coordinating QA/QC of the laboratory) and ensures the required submittals are on-time and of high quality. The SAIC QA/QC Officer is responsible for reviewing and approving variances during field activities before work continues; approving, evaluating, and documenting the disposition of Non-Conformance Reports (NCR); and designing and supervising the implementation of audit/surveillance plans. The SAIC QA/QC Officer reports directly to the SAIC Project Manager and informs the SAIC Project Manager and SAIC Construction Manager of all information and decisions.

2.1.7 SAIC Health and Safety Manager

The SAIC Health and Safety Manager establishes health and safety policies and procedures supporting project and office activities, and verifies safe work practices and conditions. The SAIC Health and Safety Manager ensures these policies are, at a minimum, in accordance with the Facility-wide SHP (USACE 2001b). The SAIC Health and Safety Manager reports directly to the SAIC Project Manager and will inform the SAIC Technical Manager and SAIC Construction Manager of all information and decisions reported.

2.1.8 SAIC Construction Manager

The SAIC Construction Manager is responsible for project control and implementation of remedial activities in accordance with this RD. The SAIC Construction Manager is responsible for subcontractor oversight, adherence to QA/QC field procedures and the Site Safety and Health Plan (SSHP), coordination with RVAAP personnel and the USACE COR, management of any investigative-derived waste (IDW), field documentation, and preparation of field change orders, if required. Should separate construction and technical management positions be necessary, the SAIC Construction Manager will report directly to the SAIC Technical Manager.

2.1.9 Subcontractor Construction Supervisor

The Subcontractor Construction Supervisor implements specific contracted components of this RD. The Subcontractor Construction Supervisor is responsible for the proper performance of specified remedial activities in accordance with this RD, adherence to QA/QC field procedures and the CQAP, implementation of the SSHP, coordination of field personnel activities, and field documentation. The Subcontractor Construction Supervisor reports directly to the SAIC Construction Manager.

2.1.10 Subcontractor Site Safety and Health Officer

The Subcontractor Site Safety and Health Officer (SSHO) is responsible for implementation and adherence of the SSHP. The SSHO will verify and approve specified health and safety procedures outlined in the SSHP adequately protect on-site personnel during field activities. The SSHO will ensure that health and safety procedure are modified to meet changing needs, if required. The SSHO will ensure all on-site personnel (including visitors) strictly adhere to the SSHP throughout the field activities conducted for the duration of the project. The SSHO reports to the Subcontractor Construction Supervisor and the SAIC Construction Manager.

2.1.11 MEC Avoidance Subcontractor

The ditch requiring removal under this RD was not included in the Proposed New MRS Footprint Boundary in the *Site Inspection Report for Munitions Response Sites under the Military Munitions Response Program* (E2M 2008). However, a Munitions and Explosives of Concern (MEC) Avoidance Subcontractor is responsible for ensuring that MEC either is avoided during remedial activities or that appropriate measures are taken if MEC is encountered. The USACE, Huntsville Environmental and Munitions Center of Expertise, Military Munitions Division, will review this RD to determine the qualifications and number of unexploded ordnance (UXO)-qualified person(s) required on site to serve as the MEC Avoidance Subcontractor. At this time, it is assumed that a UXO Technician II will be used. The UXO Technician II must have a safety backup person available, but the backup person does not have to be UXO-qualified.

2.2 MONTHLY REPORTS

A summary of field activities for this remedial action will be included in monthly reports issued per the *Project Management Plan for the Six High Priority Areas of Concern* (SAIC 2005). The monthly reports will include a status and summary of project activities.

2.3 WEEKLY CONTRACTOR MEETING

SAIC will participate in the RVAAP weekly coordination meetings from one week prior to and for the duration of removal activities. The Subcontractor may participate in these meetings on an as-needed basis. These weekly coordination meetings are typically held Monday mornings in RVAAP Building 1037.

2.4 BI-WEEKLY TELECONFERENCES

SAIC will participate in bi-weekly teleconferences with the Ohio EPA and the U.S. Army per the *Project Management Plan for the Six High Priority Areas of Concern* (SAIC 2005). SAIC will communicate the progress of remedial actions at this meeting.

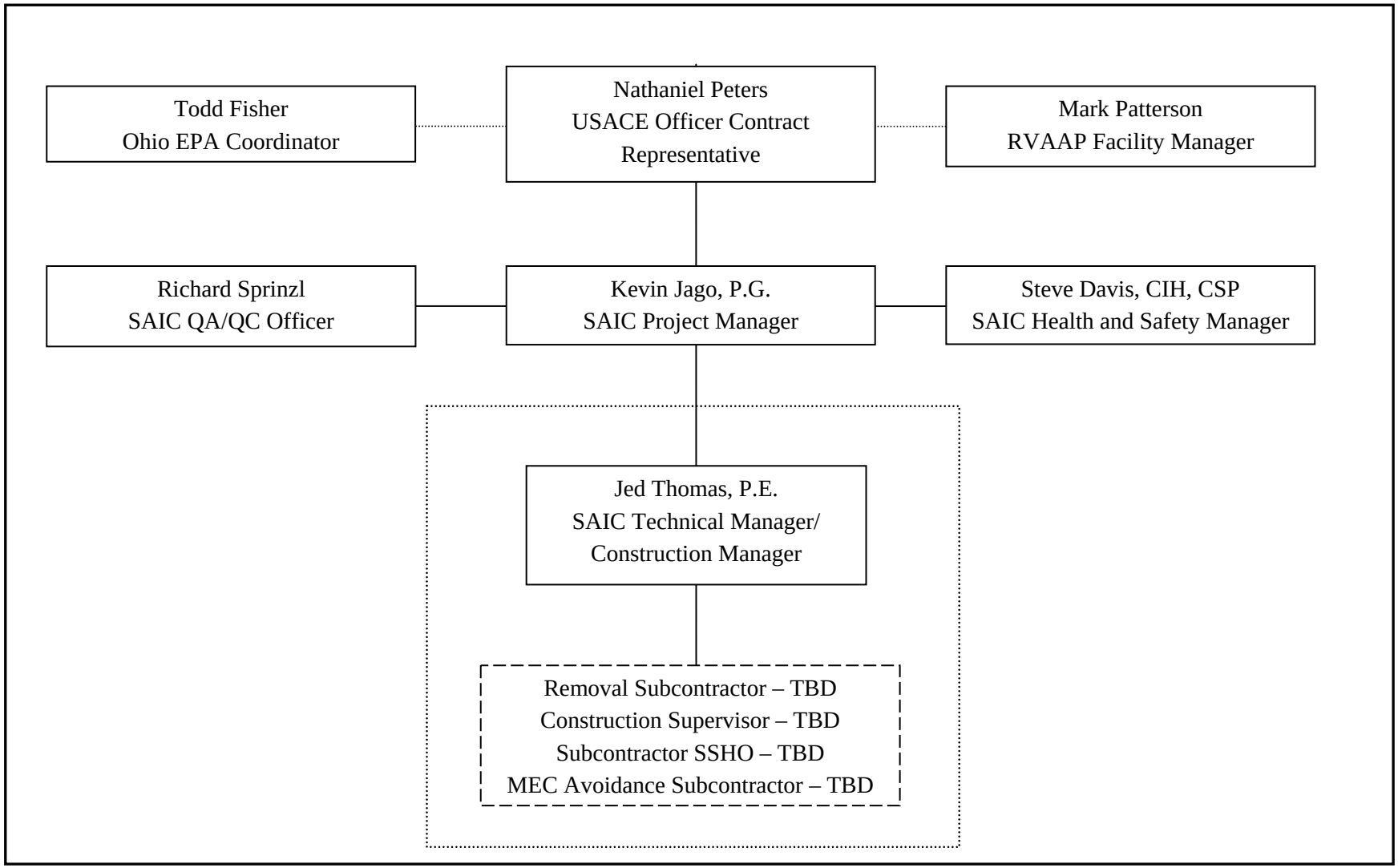

Figure 2-1. Organizational Chart for Implementation of the Remedial Design

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3.0 REMEDIAL ACTION OBJECTIVES AND CLEANUP GOALS

This section describes the RAOs and cleanup goals for the selected remedy. RAOs specify the requirements the remedial action must fulfill to protect human health and the environment under current and reasonably anticipated future use scenarios. The cleanup goals are the contaminant concentrations required to achieve the RAOs.

3.1 REMEDIAL ACTION OBJECTIVE

The RAO for FBQ is to prevent National Guard Trainee exposure to contaminants in soil and dry sediment that exceed cleanup goals to a depth of 4 ft BGS. The selected remedy will address soil and dry sediment to a depth of 4 ft BGS because potential disturbance of soil to that depth is possible under the National Guard Trainee future land use.

3.2 REMEDIAL ACTION CLEANUP GOAL

The manganese EPC in the drainage ditch is 4,100 mg/kg, which exceeded both background and the cleanup goal for the National Guard Trainee (1,950 mg/kg) and the Resident Subsistence Farmer (2,900 mg/kg). Based on the risk evaluation, dry sediment within the drainage ditch is required for remediation to achieve National Guard Trainee cleanup goals. Table 3-1 presents the cleanup goal for FBQ, where the cleanup goal for manganese is the background concentration of this metal.

Table 3-1. COC and Cleanup Goal for a National Guard Trainee for Dry Sediment at FBQ[a]

COC[b]	Cleanup Goal (mg/kg)
Manganese	1,950[c]

[a]Dry sediment from the ditch.
[b]Total carcinogenic risk to a National Guard Trainee from contaminants in the ditch was calculated as 7.3E-06. The chemical hazard index was 12, which exceeds the target value of 1.
[c]Cleanup goal for the National Guard Trainee is more stringent than the cleanup goal for Resident Subsistence Farmer (2,900 mg/kg)
COC = Constituent of concern.
FBQ = Fuze and Booster Quarry Landfill/Ponds.

Although future land use at FBQ is not anticipated to include unrestricted land use, the selected remedy achieves cleanup goals for the Resident Subsistence Farmer. Land use controls with respect to chemical contamination in soil or dry sediment will not be required when this remedial action cleanup goal is achieved.

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4.0 DRY SEDIMENT CHARACTERIZATION SAMPLING

This section describes the process to characterize the dry sediment within the excavation areas at FBQ for waste disposal facility acceptance criteria. The characterization sampling will provide data to determine whether excavated dry sediment will be disposed as nonhazardous or hazardous waste. Based on samples collected during the Phase I/Phase II RI, the dry sediment is assumed to be nonhazardous waste for purposes of this RD. However, the characterization sample results will provide the Subcontractor data to generate a waste profile.

The characterization sampling is comprised of two components:

1. Sample collection and analyses; and
2. Characterization and classification of the contaminated dry sediment.

These components are described below.

4.1 CHARACTERIZATION SAMPLE COLLECTION

Prior to mobilization and excavation activities, SAIC field personnel will collect characterization samples from both Multi-Increment (MI) Sample Area #1 and MI Sample Area #2. These two areas are shown in Attachment B - Drawing C-5. One composite and one discrete sample will be collected from each MI sample area for offsite laboratory analysis.

Procedures for sampling are presented in the sections below, as well as Sections 4.4 and 4.5 of the Facility-wide SAP (USACE 2001a). The trowel/spoon method will be used to collect dry sediment samples. These samples will be collected from the surface of the drainage ditch (depth of 0 to 0.5 ft BGS). The sampling will be accomplished using a decontaminated scoop (or equivalent). This instrument will be used to manually dig into the subsurface material to the required depth designated for the sampling location.

4.1.1 Multi-Increment Sampling for Characterization

A MI sample, a combined sample of multiple aliquot samples collected from random points, will be collected within MI Sample Area #1 and MI Sample Area #2. Each MI Sample will be analyzed for total manganese, toxicity characteristic leaching procedure (TCLP) metals, TCLP semivolatile organic compounds (SVOCs), TCLP Pesticides, TCLP Herbicides, Reactive Cyanide, Reactive Sulfide, and polychlorinated biphenyls (PCBs). Additional parameters may be required from the disposal facility.

Each MI sample will consist of no less than 30 aliquot samples, which will provide a 95% statistical confidence level. Each aliquot sample will be collected with a decontaminated Teflon scoop and consist of approximately equal volume. The aliquot samples will be collected randomly from the

surface of the drainage ditch. Any point on the surface within the boundary of the MI sample area is a possible sample location, and each point has an equal chance of being selected.

All aliquots samples collected from each MI sample area will be placed in a container for transport to an approved off-site laboratory. As part of the MI sample process, each MI sample is dried, sieved, and finely ground by the offsite laboratory and then analyzed for the specified constituent.

4.1.2 Discrete Sampling for Characterization

A discrete sample will be collected from the middle of each MI sample area. The dry sediment sample will be directly packed into a sample jar and sealed. These samples will be analyzed for the TCLP Volatile Organic Compounds (VOCs). Each sample will have a unique Sample Identification Number. The discrete sample will be collected to minimize volatilization during the sample collection process. This sample will not undergo the drying, sieving, and grounding that were specified for non-volatile constituent analyses.

4.2 CHARACTERIZATION SAMPLE IDENTIFICATION

Specific sample identifying information that will be used during the project is presented in Figure 4-1. The characterization samples collected will be considered dry sediment samples. Samples will be identified sequentially using the identification number system consistent with the remedial investigations. If a sample is not collected or is reassigned to a different location, a specific reason and notation will be noted in the project field books.

Sample Station Location Identification: XXXmm-NNN(n)-####-tt

XXX = Area Designator
FBQ = Fuze and Booster Quarry Landfill/Ponds

mm = Sample Location Type
SD = Sediment Sample Location

NNN = Sequential Sample Location Number
Unique, sequential number for each sample location beginning with Phase I RI stations and extending into any subsequent investigative phases (i.e., 001 – 999)

(n) = Special Identifier
Optional use (as needed) to identify special sample matrices or sample location characteristics
M = Multi-increment Sample

= Sequential Sample Identification Number
Unique, sequential number for each sample beginning with Phase I RI locations and extending into any subsequent investigative phases (i.e., 0001 – 9999)

tt = Sample Type
SD = Sediment

Figure 4-1. Sample Identification System

Table 4-1 presents the baseline sample identification listing. The results of TCLP analyses will be compared against the maximum concentrations of contaminants for toxicity characteristic in 40 *Code of Federal Regulations (CFR)* 261.24 and Ohio Administrative Code (OAC) 3745-51-24. Detected concentrations for reactive cyanide, reactive sulfide, will be evaluated to determine whether the dry sediment may be characterized as hazardous or regulated waste. Detected PCBs in the samples may characterize the dry sediment as special waste.

Table 4-1. Sample Identification for Waste Characterization Sampling

Location	Station	Sample ID	Mn, Total	TCLP[a] (VOCs)	TCLP (SVOCs, Metals, Pest, Herb)	Reactive Cyanide, Sulfide, and PCBs
MI Sample Area #1	FBQ-201	FBQsd-201-0517M-SD	1	0	1	1
MI Sample Area #1	FBQ-201	FBQsd-201-0518-SD	0	1	0	0
MI Sample Area #2	FBQ-200	FBQsd-200-0515M-SD	1	0	1	1
MI Sample Area #2	FBQ-200	FBQsd-200-0516-SD	0	1	0	0

Additional parameters (i.e., paint filter test) may be required by the waste disposal facility. The waste disposal facility has not been selected at the time of this design.

[a] Samples analyzed for VOCs will be collected as a discrete sample and will not undergo laboratory MI Processing (particle size reduction)

FBQ = Fuze and Booster Quarry Landfill/Ponds.
Herb = Herbicides.
MI = Multi-increment.
Mn = Manganese.
PCB = polychlorinated biphenyl.
Pest = Pesticides.
SVOC = semivolatile organic compound.
TCLP = toxicity characteristic leaching procedure.
VOC = volatile organic compound.

The sampling and analysis requirement are summarized in Table 4-2. This table presents the anticipated sample numbers, Quality Assurance (QA) sample frequencies, and field Quality Control (QC) frequencies.

Table 4-2. Sampling and Analytical Requirements

Parameter	Methods	Field Samples	Field Duplicate Samples	Site Source Water	Sampler Rinsates	Trip Blanks	Total A-E Samples	USACE QA Split Samples	USACE Trip Blanks
TCLP (Metals, Pesticides, Herbicides, SVOCs)	SW-846 1311/6010B	2	0	0	0	0	2	0	0
Manganese, Total	SW-846 6010B/7471								
Reactive Cyanide	SW-846 7.3.3								
Reactive Sulfide	SW-846 7.3.4								
PCBs	SW-846 8082/3540								
TCLP (VOCs)[a]	SW-846 1311/6010B	2	0	0	0	0	2	0	0

Additional parameters (i.e., paint filter test) may be required by the waste disposal facility. The waste disposal facility has not been selected at the time of this design.

[a] Samples analyzed for VOCs will be collected as a discrete sample and will not undergo laboratory MI Processing (particle size reduction).

Project Quantitation Levels will be in accordance with the Facility-wide Sampling and Analysis Plan (USACE 2001a).

A-E = Architect-Engineer

PCB = polychlorinated biphenyl

QA = Quality Assurance

SVOC = semivolatile organic compound

TCLP = toxicity characteristic leaching procedure

USACE = U.S. Army Corps of Engineers

VOC = volatile organic compound

5.0 CONSTRUCTION MOBILIZATION

This section describes construction mobilization and site preparation activities required to implement this RD. Design drawings (Attachment B) detailing remedial action requirements are referenced as appropriate throughout this section.

The remedial Subcontractor responsible for implementing construction activities will prepare an addendum to the SSHP (Attachment A) in accordance with USACE and Occupational Safety and Health Administration (OSHA) guidelines. SAIC will review the SSHP Addendum to start the remedial activities. The final SSHP Addendum will be distributed to the U.S. Army, Ohio EPA, and OHARNG.

5.1 PERMIT AND NOTIFICATION REQUIREMENTS

Based on review of applicable requirements, the following permits and notifications are required for the remedial action:

- Notification and approval of remedial action by the U.S. Fish and Wildlife Service;
- Statement that there are no known historical properties to the State of Ohio Historic Preservation Office;
- Notifications to the Ohio EPA; and
- Wetlands Permit Requirements.

SAIC and the subcontractors are responsible for meeting all permitting requirements per the State of Ohio and the federal government. All signatory documentation (e.g., permits and manifests) will be obtained through RVAAP or USACE representatives.

5.1.1 Endangered Species Protection

Section (h) *Endangered species protection* of 40 *CFR* 6.302 prohibits federal agencies from jeopardizing threatened or endangered species or adversely modifying habitats essential to their survival. The U.S. Fish and Wildlife Service office in Reynoldsburg, Ohio will be informed of the remedial activities prior to mobilization. The notification will state that implementation of this RD will have no impact on federally-endangered or threatened species. The U.S. Fish and Wildlife Service must approve the remedial activities prior to any implementation.

A site-wide Indiana bat survey was conducted at Camp Ravenna in January 2005 and was documented in the *Training Site-Wide Survey for the Indiana Bat (Myotis sodalis) at the Ravenna Training and Logistics Site Portage and Trumbull Counties, Ohio, Final Report* (ESI 2005). The survey identified six species of bats at RVAAP but did not identify any Indiana bats.

OHARNG has also completed extensive flora and fauna surveys which have included surveying the Mitchell satyr butterfly (federally endangered), northern monkshood (federally threatened), and eastern massasauga (federal candidate). No federally listed species have been identified at Camp Ravenna.

5.1.2 Protection of Historic Properties

The FBQ area and the AOC are located within an area identified on the disturbance map in the OHARNG Integrated Cultural Resources Management Plan (ICRMP) as being highly disturbed by past construction activity. The disturbance in such areas is considered so great that any historic properties, if present, would have been destroyed or disturbed to the degree that they have lost historic integrity and have no value as historic properties. The Area of Potential Effect (APE) for the remediation activities consists of the previously-constructed drainage ditch and the immediate vicinity and is within the previously disturbed area.

Based on the past disturbance history of the APE, it is has been determined that there is no potential for the remedial action to impact historic properties. A letter outlining the remedial action and the determination of no affect on historic properties will be sent to the Ohio Historic Preservation Office (OHPO) for their review and concurrence. Implementation of the remedial action will not take place until the OHPO has reviewed and concurred with the determination.

With any ground disturbing activity there is always the potential of an inadvertent discovery of human remains or funerary objects. If such items are encountered during the remedial action, excavation will immediately stop and the OHARNG Cultural Resources Manager, USACE COR, SAIC Project Manager, and RVAAP Facility Manager will be notified. Standard Operation Procedure #6 in the OHARNG ICRMP will be implemented. Excavation will not resume until the site has been released by the OHARNG Cultural Resources Manager.

5.1.3 Ohio EPA Requirements

The total area of construction within the FBQ is estimated to be 0.6 acres, which is below the 1 acre threshold requiring coverage under the NPDES Construction Storm Water Permit No. OHC000002. However, best management practices (BMPs), such as silt fence and construction entrance/exit, will be employed during implementation of this RD.

USACE/SAIC will notify Ohio EPA of the following:

- Initiation of construction activities (minimum 7 days prior);
- Selected disposal facility (minimum 5 days prior to shipping material off-site);
- Disposal options for collected storm water (if any) upon receipt of sample results; and
- Initiation of confirmation samples (minimum 2 days prior).

5.1.4 Wetland Permit Requirements

A wetlands and other waters delineation was conducted by EnviroScience, Inc. in November 2008. Results of this delineation are documents in *The Wetlands and Other Waters Delineation Report for the Remedial Actions at Ramsdell Quarry Landfill, Load Line 12, and Fuze and Booster Quarry Landfill/Ponds* (EnviroScience 2008). The ditch requiring remediation was categorized in the report as an intermittent channel and determined to be a jurisdictional wetland. This report was submitted to the USACE-Pittsburgh District for Jurisdictional Determination. If USACE-Pittsburgh District determines the wetland is considered jurisdictional, the wetlands fall under Federal Regulations. Per Federal Regulation, Nationwide (NW) Permit #38, wetlands impacted by Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) activities are exempt from the requirement for a pre-construction notification (PCN) and permit. Delineated wetlands within FBQ are depicted on Attachment B-Drawing C-3.

5.2 SITE PREPARATION

This section describes the site preparation activities that will be performed by the Subcontractor prior to beginning construction activities at the site. Site preparation activities consist of several elements designed to maximize access to the site and prevent migration of dry sediment during construction, including:

- Utility survey and clearance;
- Establishing site controls and site access;
- Setting up construction support facilities;
- Vegetation clearing; and
- Establishing vehicle access routes.

5.2.1 Utility Clearance

The Subcontractor will notify SAIC and the RVAAP Facility Manager a minimum of 28 calendar days prior to initiating remedial activities to allow sufficient time for a utility survey to be conducted by appropriate RVAAP personnel. Any identified utilities (underground and aboveground) will be maintained as determined by RVAAP Facility Manager.

In the event an unmarked utility is discovered during remedial activities, all work will stop immediately and the RVAAP Facility Manager, USACE COR, and SAIC Project Manager will be notified immediately. RVAAP personnel will determine the disposition of the discovered utility. RVAAP personnel and SAIC will collaborate on any necessary actions in order to continue remedial activities. If the discovery of an unmarked utility results in a change to this RD's scope, objectives, or schedule, SAIC will notify the USACE COR and Ohio EPA Project Coordinator for concurrence on proposed revisions and/or corrective actions.

5.2.2 MEC Clearance

The ditch requiring removal under this RD was not included in the Proposed New MRS Footprint Boundary in the *Site Inspection Report for Munitions Response Sites under the Military Munitions Response Program* (E2M 2008). However, to ensure MEC will not pose a safety or health threat, a MEC Avoidance Subcontractor will be onsite during mobilization and remedial activities.

Prior to remedial activities, the MEC Avoidance Subcontractor will be responsible for a MEC survey of areas at FBQ that will be remediated and used to stage equipment to perform the remedial action. The MEC Avoidance Subcontractor will identify items suspected of being MEC, and will contact the Subcontractor SSHO and SAIC Construction Manager upon discovery of MEC. The SAIC Construction Manager will contact the SAIC Project Manager, the USACE COR, and the RVAAP Facility Manager. In the event that MEC is identified in the area, activities will cease until the Subcontractor takes active measures for removing the MEC.

5.2.3 Site Control and Access

The RVAAP Facility Manager will grant site access and the Subcontractor will control the site during remedial activities. The project site will be controlled at ingress and egress points. Site controls will include:

- Controlling access to the project site by signage, requiring visitors to sign-in, and putting caution tape around the excavation area;

- Erecting signs at location indicated on Attachment B-Drawings C-6 to expedite deliveries, maintain traffic flow, promote safety, and prevent interference with other RVAAP/Camp Ravenna operations; and

- Adhering to RVAAP traffic rules.

The Subcontractor will comply with all Ohio and RVAAP traffic rules. The Subcontractor will not exceed the posted speed limits of 35 miles per hour (mph) during daylight hours and 25 mph at night while on RVAAP main roads. A speed limit of 10 mph on the project access road will be maintained. At no time will the RVAAP main roads be blocked by the Subcontractor during remediation activities. Traffic flow must be accessible on at least half of the roadway width at all times. Approval, prior to starting any activity that will obstruct traffic flow, will be obtained from Camp Ravenna, the RVAAP Facility Manager, and SAIC Construction Manager.

The use of two-way radios and cell phones is permitted at RVAAP. The SAIC Construction Manager will coordinate with RVAAP security to ensure contact with Post 1 is maintained at all times.

5.2.3.1 Facility Access Protocol

All personnel and vehicles must enter RVAAP through the main entrance (8451 State Route 5, Ravenna, Ohio 44266) and are subject to search and inspection. Weapons, lighters (or similar fire starters), and alcoholic beverages are prohibited within RVAAP; prohibited items may be left with security while onsite. Security personnel will confiscate prohibited items discovered during inspections.

SAIC will submit a roster of all personnel and subcontractors who will be working at RVAAP to the RVAAP Operations and Maintenance Contractor in advance of field work. This roster will be maintained and submitted to the RVAAP Operations and Maintenance Contractor on a weekly basis. All personnel approved to enter RVAAP must present government issued identification (e.g., driver's license, passport) at the entrance. Upon entry and exit to RVAAP, each person is required to sign a roster annotating the time of day and the area they are working at or visiting.

5.2.3.2 Site Access Protocol

All supervisors, workers, and site visitors entering the construction area must provide training records specified in Table 4-1 of the SSHP prior to entry of the construction area and/or exclusion zones. Site visitors arriving throughout the day must: 1) undergo a briefing by the SAIC Construction Manager and Subcontractor SSHO; and 2) provide necessary training records and documentation prior to approaching or entering the exclusion zone. All site visitors must be approved by the SAIC Construction Manager and Subcontractor SSHO to enter the construction area and/or exclusion zones.

5.2.4 Construction Support Facilities

Construction support facilities for this RD will include:

- Sanitary facilities;
- Equipment staging area;
- Rock Construction Entrance;
- Frac tank storage area; and
- Equipment movement area.

Locations for these facilities are annotated on Appendix B-Drawing C-4.

5.2.5 Fueling Areas

Fueling activities will be required to take place at the Equipment Staging Area (Attachment B-Drawing C-4). All necessary control measures and spill equipment will be established and maintained, as specified in Section 10.4.1.

5.2.6 Vegetation Clearing

Clearing and grubbing will be required to facilitate equipment access and dry sediment removal at FBQ (Attachment B-Drawing C-3). Clearing and grubbing will primarily involve felling and tree removal located on and around the excavation areas. Tree stumps and associated roots within the limits of excavation that need to be removed will be disposed with the impacted dry sediment.

5.2.7 Vehicle Access Routes

5.2.7.1 Equipment Movement Area and Frac Storage Tank Area

The Subcontractor will install the equipment movement area and Frac Storage Tank area in accordance with specifications on Attachment B-Drawing C-4 to facilitate loading and movement of on-road haul trucks. If the area is muddy or if the ground surface is significantly uneven, a layer of the earth will be cut away using heavy equipment. Once the surface is leveled, geotextile fabric will be placed over the ground surface and two 6-in courses of crushed stone (American Association of State Highway and Transportation Officials [AASHTO] No. 2). Each course will be graded and compacted. The Subcontractor will maintain (e.g., ensure it is free of mud) and repair (e.g., add additional stone) these areas for the duration of the project .

5.2.7.2 Rock Construction Entrance

The rock construction entrance will be constructed in accordance with specifications on Attachment B-Drawing C-4. Crushed stone (AASHTO No. 2) will be placed to facilitate the ingress/egress of on-road haul trucks. The Subcontractor will maintain and repair the rock construction entrance throughout the project and ensure it is free of mud.

5.2.7.3 Access Road

FBQ may be accessed from an unimproved road located off of Fuze & Booster Road (Attachment B-Drawing C-4).The Subcontractor will maintain and repair the access road to allow equipment to traverse safely and efficiently. Dust suppression measures (e.g., wetting) will be employed if visible dust is generated by equipment. Additional crushed stone may be required to further improve the access road.

5.3 STORM WATER POLLUTION PREVENTION

5.3.1 Storm Water Control Best Management Practices

The Subcontractor will install storm water controls prior to initiating remedial activities in accordance with this section of the RD and as detailed on Attachment B-Drawing C-4. BMPs will be employed to protect the excavation area from storm water run-on and run-off. Erosion and sedimentation

controls will include both non-structural BMPs and structural BMPs. Non-structural BMPs to be employed at the project site include:

- Minimizing disturbance;
- Phasing of construction operations; and
- Maintaining good housekeeping practices.

Structural BMPs to be employed at the site include:

- Closing flow gate at the southern quarry pond;
- Installing sandbag dams upstream and downstream of excavation area and collecting the water;
- Diverting upstream drainage ditch water around the excavation area (via pumping);
- Installing silt fencing; and
- Installing a straw check dam within the drainage ditch downgradient of the excavation area.

To further minimize the potential for erosion and sediment run-off, no work will be performed during periods of inclement weather, as determined by the SAIC Construction Manager. The excavation areas will be opened and covered as quickly as possible during construction activities.

5.3.1.1 Flow Gate from Southern Pond

The southern most quarry pond on FBQ has a flow gate immediately off the FBQ Access Road. The flow gate is at the northwest corner of the pond. If the flow gate is still operational and may impact flow to the drainage ditch, RVAAP personnel will close the flow gate prior to construction activities. The Subcontractor will monitor the water level in the southern quarry pond to determine if there is a need to remove water from the pond, as the one discharge point will be shut off. If necessary, the water will be pumped from the southern quarry pond to the middle quarry pond.

5.3.1.2 Drainage Ditch Water Diversion

Drainage ditch water flows from east to west. As shown in Attachment B-Drawing C-4, sandbags will be placed immediately to the east of the excavation area. As water accumulates against the sandbags, water will be pumped around the excavation area. This storm water will not be considered contact water, as the water will not contact excavated/disturbed areas along the ditch that will be disposed. If the excavation extent expands to the east the sandbags will be relocated accordingly.

5.3.1.3 Silt Fencing

The Subcontractor will install silt fencing, as specified in Attachment B-Drawing C-4. In general, silt fencing will be installed downgradient of all areas where soil will be disturbed. The silt fence will undergo inspections in accordance with Section 10.4.2.

5.3.2 Excavation Water Management

Excavation water is considered any water that accumulates in the excavation area and comes into contact with dry sediment containing contaminants above the remedial cleanup goal. The Subcontractor will be responsible for pumping excavation water to a temporary water storage tank (Frac tank) located near the excavation area. The Subcontractor will also be responsible for sampling and disposing the excavation water in accordance with Section 9.2.6 of this RD.

5.3.3 Non-Contact Storm Water Management

Storm water that accumulates at the construction site during excavation activities that does not contact contaminated dry sediment may be discharged over the ground surface so it does not create construction difficulties. This non-contact storm water may be discharged through a sediment bag to remove uncontaminated sediment that may accumulate in storm water. An instance in which non-contact water would accumulate at the site would be water that accumulates on the covered excavation area during a storm event.

5.3.4 Erosion Control Schedule

Erosion/sedimentation control features will remain in place until completion of site restoration activities as determined by the SAIC Construction Manager and approved by Ohio EPA. Inspection of storm water controls will be performed by the Subcontractor on a daily basis during construction activities. After site restoration has been completed, inspection of storm water controls will be performed once every two weeks until re-vegetation achieves 70 percent land coverage at which time the erosion controls measures can be removed, as specified in Section 8.6. The Subcontractor will also inspect the storm water controls within 24 hours of any rain event greater than 0.5 inches. For rain events lasting longer than 24 hours, the Subcontractor will inspect storm water controls at least every 24 hours of the event and within 24 hours of the event ending. These inspections will be performed in accordance with the CQAP in Section 10 of this RD.

5.4 DUST AND WIND CONTROLS

All excavations, access roads, and all other work areas within the project boundaries will be maintained free from soil that could cause a hazard or nuisance. Dust generation activities may occur during material excavation, handling, and transportation. Dust control will be maintained by keeping traffic on improved roads, maintaining the posted speed limit, and applying water as required. The Subcontractor will employ water spraying/misting for dust control if airborne dust is observed. Water used for dust control will be clean (e.g., obtained from RVAAP sources with approval of the RVAAP Facility Manager or potable water obtained from an off-site source). The use of additives will not be permitted.

During instances of high winds resulting in excessive dust, additional dust control measures or work stoppage may be required. The Subcontractor SSHO will be responsible for visual dust monitoring.

At a minimum, visually monitoring of fugitive dust emissions will be conducted daily during representatively normal operating conditions.

5.5 GOOD HOUSEKEEPING

Good housekeeping practices are designed to maintain a clean and orderly work environment. Good housekeeping measures will include at a minimum:

- Regular pickup and disposal of garbage and waste material;
- Daily equipment and material inspections for leaks and/or conditions that could potential lead to a discharge of a petroleum product, chemical or waste;
- Perform preventative maintenance on equipment to ensure it is in proper operation and to detect potential leaks before they occur; and
- Ensure that spill cleanup procedures outlined in Section 12.1.2 of the Facility-wide SHP (USACE 2001b) are understood by employees, contractors, and/or subcontractors, and establish storage areas are away from streams and water bodies. The storage area will also be away from direct traffic routes to prevent accidental spills.

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6.0 DRY SEDIMENT REMOVAL ACTIVITIES

This section describes the remedial activities to be performed in support of this RD:

- Land survey;
- MEC Avoidance;
- Excavation of contaminated dry sediment;
- Storm water controls; and
- Equipment decontamination.

Design Drawings (Attachment B) detailing remedial action requirements for the performance of dry sediment removal and associated activities are referenced as appropriate throughout this section.

If any unsafe or unexpected site condition or material (e.g., MEC) is encountered during any phase of the remedial activities, work will stop immediately and the SAIC Project Manager, USACE COR, and the RVAAP Facility Manager will be notified immediately. The condition will be assessed and a joint determination will be made regarding continuation of remedial activities. Work will not resume until approval has been granted by the USACE COR. If the discovery results in a change to the scope, objectives, or schedule of this RD, SAIC will notify the USACE COR and the Ohio EPA Project Coordinator for concurrence on proposed revisions and/or corrective actions.

6.1 LAND SURVEY

Prior to the start of excavation activities, a surveyor will establish the initial horizontal limits of excavation by land survey for each removal area. The excavation limits will be demarcated in accordance with Attachment B-Drawing C-5.

6.2 MEC AVOIDANCE

The ditch requiring removal under this RD was not included in the Proposed New MRS Footprint Boundary (E2M 2008). MEC encounters are not anticipated during the implementation of this remedial action. However, to ensure MEC will not pose a safety or health threat, a MEC Avoidance Subcontractor will be onsite during mobilization and remedial activities.

The MEC Avoidance Subcontractor (U.S. Army and/or Department of Defense [DOD] certified UXO-Technician II) will perform a clearance of the areas to be disturbed during the remedial action. The MEC Avoidance Subcontractor will provide personnel and equipment specifically trained in MEC identification, explosive items, and/or ordnance. Prior to and during excavation activities, the on-site MEC Avoidance Subcontractor will be responsible for inspecting excavation areas for the presence of MEC, identifying items suspected of being MEC, and contacting the Subcontractor SSHO and SAIC Construction Manager of the discovery of MEC. The SAIC Construction Manager will contact the SAIC Project Manager, the USACE COR, and the RVAAP Facility Manager. In the

event that MEC is identified in the area, activities will cease until the Subcontractor takes active measures (e.g., develop an explosives safety submission (ESS) and coordinate removal with the RVAAP Facility Manager) for removing the MEC.

6.3 EXCAVATION

This section describes the excavation activities for the removal of dry sediment within the limits of excavation. The limit of excavation for FBQ is presented in Attachment B-Drawing C-5. The limits of excavation are based on visual observations of the extent of the ditches and a topographic survey conducted of FBQ. The current estimated ex situ volume of dry sediment in the FBQ removal areas is approximately 102 cubic yards.

6.3.1 General Sequence of Excavation

The general sequence of excavation is as follows:

1. A land survey will be performed to establish the MI sample areas;

2. Excavation of dry sediment from drainage ditch and stockpiling at the eastern portion of the excavation area (as presented on Attachment B-Drawing C-5);

3. On-road haul trucks will be positioned adjacent to dry sediment stockpile along the access road with the excavation area on plastic sheeting extending on either side of the truck;

4. Excavated dry sediment will be directly loaded from the staging area into on-road haul trucks;

5. Confirmation samples will be collected upon completion of excavation activities (Section 7.0);

6. A land survey will be conducted to verify the final extent of the excavation;

7. Grading and backfill will occur upon approval from the SAIC Construction Site Manager; and

8. The site will be restored in accordance with Section 8 and Attachment B-Drawing C-7.

6.3.2 Excavation Activities

Excavation activities will be performed to minimize the handling of materials. Excavation activities will include:

- Dewater excavation area (if necessary);
- Excavation of impacted dry sediment within the defined extent;
- Stockpiling of impacted dry sediment at the eastern portion of the excavation area; and
- Loading of dry sediment into haul trucks for transfer to disposal facility.

Excavation shoring and/or sloping are not anticipated to be necessary. A Excavation Competent Person, as defined by OSHA, will be on site to ensure the ground surface is stable enough for the removal activities. If the ground surface is not stable, shoring and/or sloping will be performed. The excavation areas will be covered at the end of each work day. Impermeable covers will be used by the Subcontractor to cover exposed dry sediment at the end of a work day, including dry sediment that has been placed in the staging area. The impermeable covers will be secured with sand bags or equivalent at the end of each work day and during periods of inclement weather.

Equipment will be staged or operated from non-contaminated areas only. The Subcontractor will ensure heavy equipment does not enter the excavation area. It is anticipated only the excavator bucket will require decontamination. Decontamination of the bucket will be conducted in accordance with Section 6.4 of this RD. If it is determined that excavation equipment will need to enter the open excavation, the excavation equipment will be decontaminated in accordance with Section 6.4 of this RD.

During the loading process, care will be taken to not overfill the trucks or spill dry sediment on the ground. The haul trucks will be positioned over plastic sheeting to contain any dry sediment spilled during loading. Trucks will be inspected for dry sediment on the exterior of the truck bed. Dry sediment will be brushed off and captured prior to trucks exiting the loading area. All truck loads will be covered while en route to the disposal facility. On-road haul trucks transporting hazardous waste shall be lined as required by the disposal facility along with any other specific requirements (e.g., placarding, etc.).

Confirmation samples will be collected prior to restoration of open excavations (Section 7). The excavation areas will be restored in accordance with Section 8 of this RD upon approval from the SAIC Construction Manager.

No suspect or unexpected materials, such as drums or cylinders, are anticipated during excavation activities. If unexpected site condition or material is encountered during any phase of the remedial activities, work will stop immediately and be reassessed in accordance with procedures outlined in the SSHP (Attachment A).

6.3.3 Dry Sediment Staging Area

The excavated dry sediment will be placed at the eastern portion of the excavation area in the drainage ditch until trucks are available for loading. This staging area is the furthest upstream portion of the ditch area that requires excavation. The ground surface in the staging area will be scraped after

all dry sediment is loaded. This area will be included in the MI confirmation sample area, and sampled in accordance with Section 7 of this RD.

6.4 DECONTAMINATION

Contact with contaminated dry sediment will be actively minimized. The Subcontractor will implement measures to prevent the tracking of material from the excavation. Equipment used to excavate contaminated dry sediment will be decontaminated prior to contact with other materials and prior to demobilization off-site. Equipment that comes into contact with contaminated dry sediment will be decontaminated as follows:

- The excavator bucket will be placed over the last haul truck and washed with a pressure washer. Limited amounts of liquids (e.g., less than 30 gallons) will be used for decontamination activities performed over haul trucks. The Subcontractor will ensure free water is not present in the haul truck and there are no liquids escaping the truck bed. The Subcontractor will not use any liquid for decontamination that could potentially change the chemical profile of the contaminated dry sediment (e.g., addition of solvents or pH).

- Other excavation equipment used during the excavation activities will be placed within a bermed area lined with plastic sheeting as described below.

- All loose dry sediment will be removed using a stiff-bristle brush or other device to dislodge visible dry sediment.

- Steam clean equipment using potable water.

- Allow equipment to air dry as long as possible.

- Place equipment on clean plastic if immediate use is anticipated, or wrap in plastic to prevent contamination if longer-term storage is required.

- Loose dry sediment and wash water will be mixed and placed into a haul truck for disposal (decontamination liquids will consist of less than 30 gallons per truck and will not change the chemical profile of the waste).

At the end of each day and during periods of non-operation (e.g., weekends) the excavator bucket will be wrapped with 6-mil (minimum thickness) low density polyethylene sheeting and bound using duct tape and/or wire in sufficient manner to prevent exposure to weather elements.

Prior to release of construction equipment from the site, the SSHO, or designee, will visually inspect (and document) construction equipment with specific attention to:

- Tires and wheels or tracks (as applicable);
- Undercarriage (e.g., frame, axles);
- Exterior surfaces (including steps, running boards);
- Engine compartment; and
- Operator compartment.

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7.0 CONFIRMATION SAMPLING

This section describes the process to confirm that the remedial activities met the established cleanup goal. The purpose of the confirmation sampling is to provide data to confirm the remedial activities discussed in the previous sections attained the cleanup goals. Confirmation sampling consists of two components:

1. Sample collection and analyses; and
2. Evaluation/comparison against the cleanup goals.

7.1 CONFIRMATION SAMPLE COLLECTION

At the completion of the excavation activities described in Section 6.3, the FBQ excavation area will be divided into two equal areas (MI Sample Area #1 and #2) and one MI sample will be collected per area within the excavation footprint, as shown in Attachment B-Drawing C-5. The aliquots collected in the designated MI sample area will be randomly collected, processed, and analyzed as discussed in Section 4.1.1.

7.2 CONFIRMATION SAMPLING PROCEDURES

All the dry sediment collected during the MI sampling for each MI Sample Area will be composited into a single sample and sent to an approved off-site laboratory. The sample will be dried, sieved, and finely for specified non-volatile constituent analyses. Sample grinding and analyses will be conducted at the off-site laboratory.

Figure 4-1 presents the sample identifying information that will be used. The confirmation samples collected will be considered surface soil samples. Samples will be identified sequentially using the identification number system consistent with the remedial investigations. If a sample is not collected or is reassigned to a different location, a specific reason and notation will be noted in the project field books.

Table 7-1 presents the baseline sample identification listing. Analytical results for manganese will be compared against the cleanup goals.

Table 7-1. Sample Identification for the FBQ Confirmation Sampling

Location	Station	Sample ID	Manganese
MI Sample Area #1	FBQ-201	FBQss-201M-####-SO	1
MI Sample Area #2	FBQ-200	FBQss-200M-####-SO	1

- Sequential Sample Identification Number to be identified prior to remedial action activities

The sampling and analysis requirement are summarized in Table 7-2, as well as the anticipated sample quantities and methods. Project Quantitation Levels (chemical concentration precision levels) will be in accordance with the Facility-wide Sampling and Analysis Plan (USACE 2001a).

Table 7-2. Sampling and Analytical Requirements

Parameter	Methods	Field Samples[a]	Field Duplicate Samples	Site Source Water[b]	Sampler Rinsates	Trip Blanks	Total A-E Samples	USACE QA Split Samples	USACE Trip Blanks
Manganese	SW-846 6010B	2	1	0	0	0	3	0	0

[a]Matrix spike/matrix spike duplicate samples will be collected at a rate of 10% of total samples.
[b]Source waters = one potable water source and one American Society for Testing and Materials water supply lot for the project.
A-E = Architect-Engineer
QA = Quality Assurance
USACE = U.S. Army Corps of Engineers

7.3 CONFIRMATION OF CLEANUP GOAL

The cleanup goal concentration for manganese at FBQ is 1,950 mg/kg. The results of the confirmation samples will be compared to the cleanup goal. If the confirmation sample results exceed the cleanup goal, the following steps will take place:

1. Excavation of the ditch at that specific MI sample area will be expanded to an extent prescribed by the SAIC Construction Manager; and

2. Confirmation sample(s) will be collected. It will be at the discretion of the SAIC Construction Manager to determine if multiple confirmation samples will be collected from the additional excavation area. The SAIC Construction Supervisor will create spacing for the sample areas and document which areas are represented by specific MI samples.

Site restoration activities will occur as MI sample areas are confirmed not to exceed cleanup goals. Initiation of restoration activities will commence upon the approval from the SAIC Construction Manager, in conjunction with the USACE COR and Ohio EPA.

8.0 SITE RESTORATION

Site restoration will begin after the analytical results of the confirmation samples confirm remedial action cleanup goals have been achieved. The Subcontractor will restore the site to the required conditions set forth in Appendix B-Drawing C-7. At a minimum, this will include:

- Backfilling (with soil and/or at least one 6-in course of rip rap) to existing grades;
- Grading sidewalls of drainage ditch to prescribed 1:1 1/2 (rise: run) slope;
- Installation of mulch mat and stream/ditch seed mixture on graded/disturbed sidewalls of drainage ditch;
- Removal of stone and geotextile at the equipment movement area;
- Grading and re-vegetation of disturbed construction support areas;
- Installation of straw check dam in drainage ditch; and
- Removal of construction erosion controls.

8.1 RE-GRADING AND BACKFILL

The excavation area will be backfilled and graded to match the existing drainage pattern. It is anticipated the excavation area will require backfill and need be re-graded to match neighboring and/or original elevations. As well, it is anticipated that the side walls of the drainage ditch will need to be cleaned and sloped. At minimum, one 6-in course of rip rap will be used as backfill in the excavated drainage ditch to bring it to its existing elevation. Clean soil removed from the sidewalls for proper sloping may be placed, as needed, under the rip rap course as backfill material. Attachment B-Drawing C-7 presents the contour specified for site restoration.

Where necessary, ruts and depressions at the equipment movement area and construction support areas will be re-graded. The Subcontractor will use approved backfill material for site restoration activities. If the backfill material will not support re-vegetation (e.g., clayey soil), a minimum of 4 inches of vegetative cover (top soil) will be placed over the backfill material to support vegetative growth in all areas requiring re-vegetation.

The Subcontractor will identify a source of backfill. Per Ohio EPA guidance, one MI sample will be collected for every 4,000 cubic yards of backfill or vegetative cover used. This quantity of backfill or vegetative cover must come from the same source or an additional sample must be collected. The samples will be analyzed for the parameters identified in Table 8-1. The backfill and vegetative cover must be approved by Ohio EPA and, at a minimum, be at or below the Facility-wide background values shown in Table 8-2. Project Quantitation Levels will be in accordance with the Facility-wide SAP (USACE 2001a).

Table 8-1. Borrow Source Sampling Analytical Requirements and Backfill

Parameter	Methods
VOCs, TCL	SW-846 5030/8260B
SVOCs, TCL	SW-846 3540/8270C
Pesticides, TCL	SW-846 3540/8081A
PCBs	SW-846 3540/8082
Explosives	SW-846 3540/8330
Nitro-glycerine	SW-846 3540/8330
Nitro-guanadine	SW-846 3540/8330 Modified
Nitrocellulose	MCAWW353.2 Modified
Metals, TAL	SW-846 6010B/6010A/7471
pH	SW-846 9040/9045

PCB = polychlorinated biphenyl.
SVOC = semivolatile organic compound.
TAL = target analyte list.
TCL = target compound list.
VOC = volatile organic compound.

Table 8-2. RVAAP Facility-wide Background Criteria for Surface Soils

Parameter	Background Criteria (mg/kg)	Parameter	Background Criteria (mg/kg)	Parameter	Background Criteria (mg/kg)
Cyanide	0	Chromium	17.4	Nickel	21.1
Aluminum	17,700	Cobalt	10.4	Potassium	927
Antimony	0.96	Copper	17.7	Selenium	104
Arsenic	15.4	Iron	23,100	Silver	0
Barium	88.4	Lead	26.1	Sodium	123
Beryllium	0.88	Magnesium	3,030	Thallium	0
Cadmium	0	Manganese	1,450	Vanadium	31.1
Calcium	15,800	Mercury	0.036	Zinc	61.8

mg/kg = milligrams per kilogram.

8.2 REMOVAL OF PLACED STONE

Any stone placed on the existing access roads through FBQ will not require removal. Stone will be removed from the 12’ by 90’ portion of the Equipment Moving Area, as shown in Attachment B-Drawing C-7. The stone will not require disposal, as it will be spread onto the existing access roads. The stone from the remaining areas of the Equipment Movement Area, Equipment Staging Area, and Frac Tank Area will be left in place. The Subcontractor will grade the access roads as necessary and all disturbed areas after the stone is removed. Seed and straw mulch will be placed to re-establish grass cover in disturbed areas.

8.3 REMOVAL OF ROCK CONSTRUCTION ENTRANCES/EXITS

The rock construction entrance at FBQ will remain in place. The stone will not require disposal, as it will be spread onto the existing access roads.

8.4 FINAL GRADING

Final grading will be performed to match surrounding elevations, prevent ponding of water, and prevent erosion (Attachment B-Drawing C-7). The final grade of the excavation area, as well as, all areas disturbed during remedial activities will be approved by the SAIC Construction Manager.

8.5 RE-VEGETATION

All disturbed areas must be seeded within seven days following excavation, backfilling, and final grading activities. The wetland areas shown in Attachment B-Drawing C-3 and the disturbed side walls of the drainage ditch shall be seeded with the mixture presented in Table 8-3. The walls of the drainage ditch shall be covered with erosion control matting (e.g., mulch mat) instead of straw.

Table 8-3. Full-Sun Stream/Ditch Seed Mixture for RVAAP/Camp Ravenna

Seed Type	Mixture %
Shallow/Lurid Sedge *(Carex lurida)*	10.0%
Blunt broom sedge *(Carex scoparia)*	10.0%
Fox sedge *(Carex vulpinoidea)*	20.0%
Riparian Wild Rye *(Elymus riparius)*	20.0%
Soft rush *(Juncus effuses)*	10.0%
Rice cutgrass *(Leersia oryzoides)*	5.0%
Great/Soft-stemmed Bulrush *(Schoenoplectus tabernaemontani)*	2.0%
Dark green bulrush *(Scirpus atrovirens)*	8.0%
Woolgrass *(Scirpus cyperinus)*	9.0%
Steeplebush *(Spiraea tomentosa)*	5.0%
Swamp milkweed *(Asclepias incarnate)*	0.5%
Blue Vervain *(Verbena hastate)*	0.5%
Specifications: Broadcast at 15lbs/acre Mulch with a minimum of 3 bales of straw per 1,000 square feet.	

The Subcontractor will use a Camp Ravenna-approved “open area” seed mixture for permanent cover for construction areas disturbed during field activities. Table 8-4 presents the seed mixture and application specifications. Fertilizer and lime are not needed for seeding with native seed mixes.

Table 8-4. "Open Area" Seed Mixture for RVAAP/Camp Ravenna

Seed Type	Mixture %
Nodding Wild Rye (*Elymus Canadensis*)	23.5%
Virginia wild rye (*Elymus virginicus*)	25%
Little Bluestem (*Schizachyrium scoparium*)	22%
Partridge Pea (*Chamaecrista fasciculate*)	18.75%
Thin-leaved Coneflower (*Rudbeckia triloba*)	7.75%
Brown fox sedge (*Carex vulpinoidea*)	1.5%
Black-eyed Susan (*Rudbeckia hirta*)	1.5%
Specifications: Broadcast @ 18 lbs/acre, drilled at 12 lbs/acre Mulch with a minimum of 3 bales of straw per 1,000 square feet.	

Other effective mulch/protective materials may be used, to include specialized seeding products/technologies, such as seed impregnated fiber matting. Any product/technology used for the seeding of the drainage ditch will meet the seeding requirements presented in Tables 8-3 and 8-4.

8.6 REMOVAL OF EROSION CONTROLS

At the completion of the excavation the subcontractor will install a straw check dam in the drainage ditch down gradient of the western dewatering berm to prevent sediment transport to downgradient wetlands. At that point, both dewatering berms may be removed. The check dam will remain in place until grass coverage on the sidewalls of the drainage ditch is at least 70 percent established. Other existing erosion control measures shall remain in place until the grass is established with a density of at least 70 percent coverage in all disturbed construction areas, in accordance with Ohio Rainwater and Land Development guidance. Once SAIC confirms that at least 70 percent coverage has been achieved, the Subcontractor is responsible to remove and dispose all erosion controls measures at that time.

9.0 WASTE CHARACTERIZATION AND DISPOSAL

This section describes characterization, transportation, and waste disposal activities that will be performed in support of implementing this RD. Waste includes remedial waste (e.g., excavated dry sediment, excavation water) and any IDW generated during sampling activities. All waste will be properly handled, labeled, characterized, and managed in accordance with Section 7.0 of the Facility-wide SAP, Federal and State of Ohio Large-quantity hazardous waste generator requirements, and RVAAP's Installation Hazardous Waste Management Plan. All waste will be appropriately accounted for as soon as possible and prior to conclusion of the project. Any shipment of solid waste or hazardous waste off-site will comply with all appropriate federal and state laws.

9.1 WASTE STREAM IDENTIFICATION

Waste generated during remedial activities will be managed to prevent the potential release of contamination. The following types of waste may be generated:

- Vegetation;
- Excavated dry sediment;
- Decontamination fluids from sampling activities;
- Sanitary waste;
- Personal protection equipment (PPE) and contact waste (e.g., plastic tarps, ground cloths);
- Excavation water –storm water/groundwater in direct contact with impacted dry sediment; and
- Decontamination fluids generated during the decontamination of excavation equipment.

No dry sediment IDW is anticipated during the collection of dry sediment characterization samples. The entire volume of dry sediment collected for these samples will be shipped to the laboratory. The laboratory will be responsible for the ultimate disposition of remaining dry sediment.

In general, proper waste minimization procedures will be employed to limit the volume of waste generated. These procedures will include:

- Re-use of materials that do not require decontamination;
- Minimization of the volume of decontamination fluids;
- Minimization of contact with potentially contaminated materials;
- Minimization of foot and vehicle traffic through potentially contaminated areas; and
- Utilization of good housekeeping practices.

9.2 WASTE STREAM MANAGEMENT

Table 9-1 presents and discusses each potential waste streams for this RD. Characteristics for each waste stream include: the point of generation, on-site staging and processing, characterization requirements, and method of final disposition.

Table 9-1. Waste Characterization & Disposal

Waste Stream Identification	Point of Generation	On-Site Staging and Processing	Characterization Requirements	Final Disposition
Surface Vegetation (Trees and Shrubs)	In area of excavation vegetation will be cut to a height of not greater than three inches above the ground surface.	Trees greater than four inches in diameter will be cut and stacked neatly at the AOC away from remedial activities. Trees less than four inches in diameter shall be cut into manageable pieces and chipped. Wood chips not used for absorbent material will be spread over the AOC by the Subcontractor.	No characterization required.	Roots and root balls within the excavation foot print and wood chips used on-site for absorbent material will be considered potentially contaminated material and disposed with excavated dry sediment.
Excavated Dry Sediment	Dry sediment will be generated during the excavation and remedial activities at FBQ.	Excavated dry sediment will be directly loaded into on-road haul trucks. Truck beds will be lined as required by state, Federal Department of Transportation (DOT), or disposal facility requirements.	Characterization sampling of dry sediment will be performed prior to mobilization and excavation activities. Samples will be analyzed for TCLP to determine classification of wastes (hazardous, non-hazardous).	Excavated dry sediment will be removed from the AOC by a licensed waste disposal contractor and disposed at an approved disposal facility permitted by the state of Ohio to accept the waste.
Decontamination Fluids (Sampling Activities)	In the event that disposable plastic scoops can not be used during sampling, stainless-steel spoon and bowls will be used to collect samples. These tools require decontamination between samples resulting in the generation of fluids.	Due to the anticipated small quantity generated, all IDW liquid will be combined and contained in a labeled DOT approved 55-gal closed-top drum.	One representative sample will be collected and characterized in accordance with Section 7.4 of the Facility-wide SAP	Removed from the AOC by a licensed waste disposal contractor and disposed at an approved disposal facility permitted to accept the waste.

Table 9-2. Waste Characterization & Disposal (continued)

Waste Stream Identification	Point of Generation	On-Site Staging and Processing	Characterization Requirements	Final Disposition
Sanitary Waste Non-contraminated (i.e. garbage, paper waste, silt fence, and non-indigenous solids)	Primarily generated by personnel working at the site during remedial activities.	Collected daily in plastic-lined trash cans and moved to a designated area as specified in Section 7.3 of the Facility-wide SAP	No characterization required.	Disposed in a licensed solid waste disposal facility in accordance with local, state and federal regulations.
PPE (gloves, boot covers) and Contact Waste (plastic sheeting)	Generated by the site workers on a daily basis.	PPE that comes into contact with hazardous material requires temporary disposal in 55-gallon drums and ultimate disposal at a permitted hazardous waste facility. PPE that does not come into contact with hazardous material will be collected in trash bags and disposed of daily in an RVAAP or project specific dumpster.	Characterized in accordance with Section 7.4 of the Facility-wide SAP. Generally, PPE will be characterized for disposal based upon the dry sediment it was in contact with.	PPE will be disposed of in accordance with Section 7.5 of the Facility-wide SAP (USACE 2001a). It will be disposed of as either sanitary waste or as a permitted hazardous waste in a permitted hazardous waste facility.
Excavation Water	Potentially generated in excavation area during rain events.	Accumulated excavation water will be pumped into a temporary water storage tank. Minimal quantities are anticipated given; the nominal footprint and depth of the excavation area, and the excavation footprint will be covered during inactivity.	If characterization sampling results of dry sediment indicate low concentrations of analytes, Ohio EPA may waive characterization sampling of excavation water. Should characterization sampling of excavation water be required; excavation water will be analyzed for parameters presented in Table 1-1 of Facility-wide SAP QAPP (USACE	The Ohio EPA Project Coordinator will determine method of disposal from the following three choices: (1) land application (according to land application guidelines) [a]; (2) sanitary sewer disposal [b], or (3) discharge to a suitable waste disposal facility with approval from RVAAP/SAIC. Sediment collected in the bottom of the tank will be disposed of as excavated dry sediment.

Table 9-2. Waste Characterization & Disposal (continued)

Waste Stream Identification	Point of Generation	On-Site Staging and Processing	Characterization Requirements	Final Disposition
			2001a) [c].	
Decontamination Fluids (Excavation Equipment)	Generated as a result of decontamination of excavation equipment during and after all excavation remedial activities.	Decontamination of excavation equipment will be conducted over the truck bed of the final haul truck upon completion of the final haul excavation activities. The amount of water to be used will be minimized such that water accumulation in the haul truck will not exceed the requirements of the disposal facility or leak during transport. Should there be a requirement for an equipment decontamination pad, water generated from this activity will be collected and stored with excavation water.	No characterization required.	Decon water will be disposed of in the haul truck along with excavated dry sediment.

[a]The guidelines for land application of excavation water are as follows:

- Discharge will only occur in a grassy well vegetated area of the AOC (FBQ) from which it was generated;
- Discharge rates will be kept at a minimum to reduce any ponding or puddling (a spreader bar may be utilized);
- Discharge will not be released directly into surface water (e.g., creeks, ditches, streams); and
- Any accidental release to a surface water body shall be immediately reported to Ohio EPA.

[b]Should sample results be within sewer water pre-treatment standards, results will be submitted to the Portage County Water and Sewer District or other wastewater disposal agency for treatment approval.

[c]The parameters include VOCs, SVOCs, pesticides, PCBs, explosives, nitroquandine, nitrocellulose, polycyclic aromatic hydrocarbons (PAHs), metals (TAL), and cyanide.

9.3 INVESTIGATION-DERIVED WASTE FIELD STAGING

A Field Staging Area (FSA) will be designated at the beginning of field activities and approved by the RVAAP Facility Manager. A centralized FSA will be established for the staging of all drums of IDW. The FSA will be managed according to the requirements of Section 7.3 of the Facility-wide SAP (USACE 2001a). Any excavation water will be containerized in a storage tank staged proximate to the removal areas in the event water accumulates in the excavated area.

Final inventories of IDW will be taken and provided to the RVAAP Facility Manager by the designated IDW coordinator. All non-hazardous liquid waste not transported off of the facility within 30 days following project completion will require secondary containment. Any IDW identified as hazardous through process knowledge or characterization must be staged in the designated RVAAP 90-day hazardous waste storage area and managed in accordance with facility requirements, as described in Section 7.3 of the Facility-wide SAP (USACE 2001a).

9.4 WASTE CONTAINERIZATION AND LABELING

All waste storage containers will be of suitable size, leak proof, and constructed of materials compatible with the materials to be contained. Waste storage containers will be properly labeled prior to placement of material. Hazardous waste will be managed according to relevant Resource Conservation and Recovery Act (RCRA) requirements including, but not limited to, proper marking and labeling, approved containers, storage requirements (the RVAAP designated 90-day storage area), and documented inspections.

The Subcontractor will be responsible for providing new Department of Transportation (DOT) approved containers for the liquid IDW. The Subcontractor will be responsible for the waste characterization, container labeling, transportation and final disposal at a State of Ohio or Federal approved treatment, storage, or disposal (TSD) facility of all decontamination liquids. The RVAAP Facility Manager will sign all waste profiles and waste manifests for the disposal of project IDW to approved disposal facility.

All IDW containers will be labeled prior to placing IDW in them. All IDW containers (drums) will be labeled in accordance with Section 7.2 of the Facility-wide SAP. Each IDW container will be labeled to ensure easy identification and proper management. Prior to placing IDW into a container, a "Pending Analysis" label containing the following information will be affixed to the outside of the container:

- Project name;
- Contents;
- Date waste was first placed into the container;
- Source location(s); and
- Emergency contact name and telephone number.

Drums will be labeled as hazardous material only if known or suspected hazardous waste is encountered during field activities, or when analytical data from sampling activities are received and evaluated. All IDW containers will be closed and stored in the equipment storage area. Liquid IDW containers will be filled to a maximum of 66% container volume and will be placed on spill containment pallets. All IDW containers and pallets will be covered with a weather-proof tarp. All IDW containers will be inspected to ensure no leaks or releases occur during use. An orange construction fence will be installed around the IDW storage area.

Any non-contaminated sanitary trash will be contained separately in plastic-lined standard trash cans with lid. Non-contaminated sanitary trash will disposed offsite through a commercial municipal waste service provider.

9.5 TRANSPORTATION, STORAGE, AND DISPOSAL

The management, transportation, and disposal of all waste streams will be coordinated with RVAAP. All transportation paperwork (manifests or shipping papers) and on-road haul truck placards will be prepared by the Subcontractor Construction Supervisor in accordance with federal, state, and local regulatory requirements, and disposal facility requirements. A draft of the transportation paperwork containing "base" information will be submitted to RVAAP/SAIC for review and approval a minimum of one week prior to shipment of any material. The approved transportation paperwork will then be completed as appropriate by the SAIC Construction Manager in the field during the excavation activities. The RVAAP Facility Manager will be responsible for custody of manifest copies and submittal to Ohio EPA and U.S. Environmental Protection Agency (USEPA) as part of the annual reporting for RVAAP hazardous waste generation and management.

Impacted dry sediment loaded into on-road haul trucks will be transported by licensed waste haulers to RVAAP and SAIC approved licensed off-site disposal facilities. All transportation requirements, including proper labeling and placarding, and weight limits will be followed. All manifests, shipping documents, and disposal facility approval letters will be provided to SAIC and incorporated into the Construction Report.

All other waste types (e.g., IDW, other materials, and excavation water) will be managed by the Subcontractor in compliance with all federal, state and local laws. The RVAAP Facility Manager will sign all waste profiles and waste manifests for the disposal of project wastes at an approved facility. All manifests, shipping documents, and disposal facility approval letters will be provided to SAIC.

10.0 CONSTRUCTION QUALITY ASSURANCE PLAN

This section presents the CQAP. The CQAP describes the inspection procedures and documentation required to ensure excavation, disposal, and restoration activities occur according to the requirements of this RD.

Protocols for reporting test results, certifying compliance with construction requirements, correcting construction deficiencies, and documenting such corrections are provided. This section also addresses the review and documentation requirements necessary to comply with the site restoration details contained herein.

10.1 RESPONSIBILITY AND AUTHORITY

10.1.1 Responsibility

The organizational chart presented in Figure 2-1 outlines the management structure that will be used to implement the excavation and disposal activities in accordance with this RD. Functional responsibilities of key personnel were described in Section 2.1. The assignment of personnel to each position was based on the following:

- Qualifications;
- Experience; and
- Training.

The SAIC QA/QC Officer and SAIC Construction Manager, in coordination with the USACE COR, will ensure the completed remedial activites conforms to the RD, design drawings, specifications, and any necessary permit conditions. The SAIC Project Manager will verify completion of these activities.

The SAIC Construction Manager will monitor excavation, disposal, and site restoration activities. The SAIC Construction Manager or designee will be on-site during work activities to ensure that all components of this RD are fulfilled.

10.1.2 Administration and Operation

The QA/QC organization is administered by the SAIC QA/QC Officer in concert with the SAIC Construction Manager. The SAIC Construction Manager will be supported by the Subcontractor Construction Supervisor and technical staff (engineers, scientists, and technicians) as necessary.

All vendors supplying materials used for site restoration and storm water controls will supply materials from manufacturing facilities with established QC programs. Results of the manufacturer

QC procedures will be submitted to the QA/QC Officer for review, evaluation, and documentation prior to beginning field activities.

10.2 PERSONNEL QUALIFICATIONS

All QA/QC personnel will be properly trained for their job function. The SAIC Construction Manager is key to the inspection and certification program. The SAIC Construction Manager will have demonstrated knowledge of specific construction practices relating to earthwork, regulations and specifications, observation and testing procedures, and documentation procedures. The SAIC Construction Manager will also be experienced in performing similar duties on previous jobs in which comparable construction activities took place.

10.3 DAILY PLANNING BRIEFINGS

At the start of the project, the Subcontractor will participate in a pre-work briefing on objectives, health and safety, proposed deviations, and project schedule with the SAIC Construction Manager.

In addition to daily tailgate safety briefings conducted in accordance with the SSHP, the Subcontractor and SAIC will participate in daily planning briefings to determine the plan of action for the work day. This briefing will include at a minimum the following:

- A discussion of the planned activities for the work day;
- Planned area of excavation;
- Weather considerations;
- Deliveries;
- Transportation schedule;
- Schedule forecast; and
- Issues which would result in an impact to the project.

The USACE COR, RVAAP Facility Manager, or authorized designees will be invited to attend the pre-work briefing and any daily safety or planning briefings.

10.4 INSPECTION ACTIVITIES

Inspections will be completed to verify acceptability of materials, prevent spills, and assess effectiveness of storm water and dust generation controls. The scope and frequency of each type of inspection is described below.

10.4.1 Spill Control

The SAIC Construction Manager will conduct daily inspections to verify spill equipment is maintained and no spills have occurred. During excavation, if any visually or olfactory indicators suggest the presence of potentially impacted dry sediment, the employee will report to the SAIC Construction Manager. The Subcontractor will provide all necessary on-site spill equipment (e.g., granulated clay, absorbent blankets, PPE, shovels, containers). All on-site workers will maintain good housekeeping practices (as discussed in Section 5.5).

10.4.2 Storm Water Control

Prior to construction activities, the Subcontractor will install and inspect all storm water controls (including the collection system for any excavation water encountered) and document proper placement in accordance with the requirements of this RD and associated drawings and specifications. Any water (e.g., groundwater, storm water) in contact with the open excavation will be collected, containerized, sampled, characterized, and managed by the Subcontractor.

All employees will practice due diligence to prevent any damage to the storm water control measures. The Subcontractor will conduct routine walkovers during normal operations to evaluate the integrity of the storm water controls. Any deficiencies will be immediately corrected and documented in the daily report. Inspection of storm water controls will be performed by the Subcontractor on a daily basis. After remedial activities, storm water controls will be inspected bi-weekly, within 24 hours of a storm event (0.5 inches or greater), and at least every 24 hours during extended rain events.

10.4.3 Dust Control

Dust generation activities may occur during excavation, material handling, and equipment movement on paved and unpaved roads. The Subcontractor will minimize dust generation by keeping vehicles on improved roads, maintaining a 10 mph speed limit on the access road, and applying water for dust suppression purposes as required. Water used for dust control will be clean (e.g., obtained from sources with approval of the SAIC Construction Manager or potable water obtained from an off-site source). The use of additives will not be permitted. Engineering controls will be implemented to minimize the potential for dust generation. The Subcontractor SSHO will conduct daily inspections during representatively normal operating conditions, as described in Section 5.4 and the SSHP.

10.4.4 Survey

Upon completion of excavation and disposal activities, the drainage ditch will be surveyed to document the horizontal and vertical extents of the removal activities. SAIC's Ohio licensed surveyor will conduct a survey of excavation extent to be included as as-built drawings in the Construction Report. The horizontal and vertical survey tolerance will be ±0.1 ft.

10.4.5 Site Restoration

Once excavation activities have been completed and approved by the SAIC Construction Manager, in conjunction with the USACE and Ohio EPA, excavations will be backfilled and graded to create the original drainage pattern in the drainage ditch. The Subcontractor will submit data for materials to be brought on site (e.g., backfill, topsoil, etc.) a minimum of 7 days calendar prior to placing materials. USACE/SAIC will review material certifications for the backfill material, vegetative cover, and seed in accordance with Section 8 and Attachment B-Drawing C-7. The Subcontractor will obtain and apply the seeding mixture as prescribed within Section 8.5.

10.5 SPILL RESPONSE

Spills will be responded to as presented in Section 12.1.2 of the Facility-wide Safety and Health Plan and the Camp Ravenna Spill Plan. In the event of a spill or leak, the employee making the discovery will immediately notify the SSHO and the SAIC Construction Manager. These spills can include, but are not limited to, releases of fuels, lubricants, and hydraulic fluids.

The SAIC Construction Manager will ensure the spill is reported to Camp Ravenna Operations and RVAAP Army Staff as well ensure the incident is documented on a Camp Ravenna Spill Incident Reporting Form

10.6 CONFIRMATION REQUIREMENTS

10.6.1 Confirmation Sampling

Confirmation sampling will be performed in accordance with Section 7 of this RD and the Facility-wide SAP (USACE 2001a) to demonstrate achievement of the remedial cleanup goals. Confirmation samples will be analyzed for manganese concentrations at FBQ by an approved offsite analytical laboratory.

10.6.2 Verification of Achievement of Performance Criteria

The SAIC Construction Manager will confirm the results meet the cleanup goals. The USACE COR and Ohio EPA Project Coordinator will be notified of the evaluations and results. If any samples do not meet cleanup goals, the evaluation will include a description of the additional excavation based on the approach described in Section 7.3. Confirmation sampling results will be included in the Construction Report.

10.7 DOCUMENTATION

10.7.1 Field Documentation

This project will include daily inspection and quality summary reports, which will be signed and dated by the SAIC Construction Manager. These reports will be submitted to the SAIC Project Manager.

The daily reports may include:

- Summary of activities performed at the project site;
- Daily Subcontractor Site Inspection activities (e.g., stormwater controls, spill-control barriers, equipment staging/fueling area);
- Weather information;
- Departures from the approved RD;
- Problems encountered during field activities;
- Subcontractor submittals; and/or
- Subcontractor certifications (e.g., health and safety records).

Copies of the construction activity forms, checklists and daily reports are included in Attachment C.

10.7.2 Construction Report

Upon completion of remedial activities, a Construction Report will be prepared by SAIC. The Construction Report will document:

- The project was performed in accordance with this RD (i.e., complied with requirements, technical specifications, construction drawings, and other relevant contract documents), and all applicable regulations, including surface water and air regulations.

- Documentation of any approved variances from the RD (e.g., unforeseen site condition, change in material).

- Corrective actions and achievement of remedial goals.

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11.0 PROJECT SCHEDULE

Figure 11-1 presents the anticipated project schedule.

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Remedial Design Reviews and Approval**	**46 days**	**Fri 6/26/09**	**Mon 8/10/09**	
2	Prepare and Submit Final to Army and Ohio EPA	1 day	Fri 6/26/09	Fri 6/26/09	
3	Army and OH EPA Review and Approval	45 days	Sat 6/27/09	Mon 8/10/09	2
4	**Implement Remedial Action**	**30 days**	**Tue 8/11/09**	**Wed 9/9/09**	
5	Mobilization and Site Preparation	5 days	Tue 8/11/09	Sat 8/15/09	3
6	Excavation, Transportation, and Disposal of Sediment	7 days	Sun 8/16/09	Sat 8/22/09	5
7	Collect Confirmation Samples/Laboratory Analysis	10 days	Sun 8/23/09	Tue 9/1/09	6
8	Ohio EPA Review of Confirmation Samples	4 days	Wed 9/2/09	Sat 9/5/09	7
9	Site Restoration	4 days	Sun 9/6/09	Wed 9/9/09	8
10	**Final Close Out Report**	**250 days**	**Thu 9/10/09**	**Mon 5/17/10**	
11	Prepare and Submit PreDraft to USACE	30 days	Thu 9/10/09	Fri 10/9/09	9
12	Reviews and Approval	220 days	Sat 10/10/09	Mon 5/17/10	11

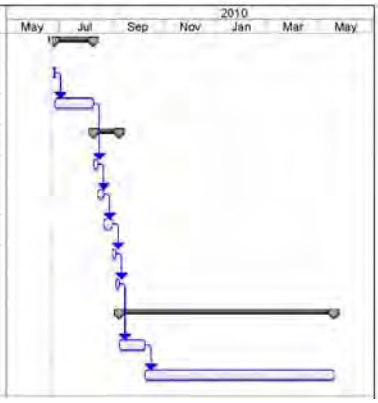

Figure 11-1. Project Schedule

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12.0 REFERENCES

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Attachment A

Final

Site Safety and Health Plan
for the Remedial Design
for the RVAAP-16 Fuze and Booster Quarry Landfill/Ponds

Ravenna Army Ammunition Plant
Ravenna, Ohio

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

Prepared for:
U.S. Army Corps of Engineers
600 Martin Luther King, Jr. Place
Louisville, Kentucky 40202

Prepared by:
SAIC Engineering of Ohio, Inc.
8866 Commons Boulevard, Suite 201
Twinsburg, Ohio 44087

June 26, 2009

APPROVALS

Final
Site Safety and Health Plan
for the
RVAAP-16 Fuze and Booster Quarry Landfill/Ponds Remedial Design
at the
Ravenna Army Ammunition Plant,
Ravenna, Ohio

June 2009

W. Kevin Jago — 06/24/09

Kevin Jago Phone 865-418-4614 — Date
SAIC Project Manager

Stephen L. Davis — June 24, 2009

Stephen Davis, CIH (#4213), CSP (#10044), Phone 865-481-4755 — Date
SAIC Health and Safety Officer

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BRAC-D	Base Realignment and Closure Division
Camp Ravenna	Camp Ravenna Joint Military Training Center
CPR	Cardiopulmonary Resuscitation
EC&HS	Environmental Compliance and Health and Safety
ERA	Ecological Risk Assessment
E&I	Engineering and Infrastructure
FBQ	Fuze and Booster Quarry Landfill/Ponds
FS	Feasibility Study
FSHP	Facility Wide Safety and Health Plan
GOCO	Government-Owned, Contractor-Operated
HAZWOPER	Hazardous Waste Operations and Emergency Response
HHRA	Human Health Risk Assessment
HTRW	Health Requirements for Radioactive Waste
IDW	Investigation-Derived Waste
IRP	Installation Restoration Program
MEC	Munitions and Explosives of Concern
MSDS	Material Safety Data Sheet
NGB	National Guard Bureau
NPDES	National Pollution Discharge Elimination System
OE	Ordnance and Explosives
OEW	Ordnance and Explosive Waste
OHARNG	Ohio Army National Guard
PID	Photoionization Detector
PPE	Personal Protective Equipment
RI	Remedial Investigation
RRSE	Relative Risk Site Evaluation
RVAAP	Ravenna Army Ammunition Plant
SAIC	Science Applications International Corporation
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TBD	To be determined
USACE	U.S. Army Corps of Engineers
UXO	Unexploded Ordnance

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1.0 INTRODUCTION

Science Applications International Corporation's (SAIC) formal policy, stated in the Environmental Compliance and Health and Safety Program manual, is to take every reasonable precaution to protect the health and safety of our employees, the public, and the environment. To this end, the Ravenna Army Ammunition Plant (RVAAP) Facility-Wide Safety and Health Plan (FSHP) (USACE 2001) and this Site Safety and Health Plan (SSHP) Addendum collectively set forth the specific procedures required to protect SAIC and SAIC subcontractor personnel involved in the field activities. These plans are driven by requirements contained in the most current revisions of the U.S. Army Corps of Engineers (USACE) *Safety and Occupational Health Requirements for Radioactive Waste (HTRW)* and *Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92* (USACE 2000), and the USACE *Safety and Health Manual, EM-385-1-1-1* (USACE 2003), which are available online via the USACE web site. SAIC activities are also subject to the requirements of the SAIC Corporate Environmental Compliance and Health and Safety Program and associated procedures. All field personnel are required to comply with the requirements of these programs and plans. In addition, subcontractors are responsible for providing their employees with a safe work place and nothing in these plans relieves such subcontractors of this responsibility. If the requirements of these plans are not sufficient to protect the employees of a subcontractor, that subcontractor is required to supplement this information with work practices and procedures that will ensure the safety of its personnel.

The FSHP addresses program issues and hazards and hazard controls common to the entire installation. This SSHP Addendum to the FSHP serves as the lower tier document addressing the hazards and controls specific to the Remedial Action at the Fuze and Booster Quarry Landfill/Ponds (FBQ). Copies of the FSHP and this SSHP Addendum will be present at the work site during all fieldwork.

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2.0 FACILITY DESCRIPTION AND CONTAMINATION CHARACTERIZATION

2.1 FACILITY DESCRIPTION

When the RVAAP Installation Restoration Program (IRP) began in 1989, RVAAP was identified as a 21,419-acre installation. The property boundary was resurveyed by the Ohio Army National Guard (OHARNG) over a 2-year period (2002 and 2003) and the actual total acreage of the property was found to be 21,683.289 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 (NGB) and subsequently licensed to OHARNG for use as a military training site.

The current RVAAP consists of 1,280 acres scattered throughout the OHARNG Camp Ravenna Joint Military Training Center, herein referred to as 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 (Figures 1-1 and 1-2). 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.

When RVAAP was operational, Camp Ravenna 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. 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.

2.2 FUZE AND BOOSTER QUARRY LANDFILL/PONDS DESCRIPTION

FBQ encompasses approximately 45 acres in the south-central part of RVAAP. FBQ operated from 1945 until 1993. The western part of the AOC contains 11 small, shallow settling basins, and an abandoned rock quarry is located in the eastern portion. The AOC was expanded in 1998 to include two debris piles and three shallow settling ponds. Reportedly, the quarry was used for open burning and as a landfill before 1976. The debris resulting from these operations was reportedly removed during construction of three settling ponds (quarry ponds) in 1976. These quarry ponds, up to 20 to 30 ft deep and separated by earthen berms, were constructed to receive spent brine regenerate and sand filtration backwash water discharge from one of the RVAAP water plants. The discharge was

regulated under a National Pollutant Discharge Elimination System (NPDES) permit and continued until 1993.

2.3 PREVIOUS ACTIVITIES

The *Hazardous and Medical Waste Study No. 37-EF-5360-97, Relative Risk Site Evaluation (RRSE), RVAAP, Ravenna, Ohio, 28 October – 1 November 1996, Volume 1* (USACHPPM 1996) was a limited investigation that sampled surface water and sediment within the Quarry Ponds. The Phase I/Phase II Remedial Investigation (RI) (USACE 2005a) focused on surface water and sediment as the media most likely to be contaminated, but also included gathering data to more clearly define the nature and extent of the contamination at FBQ.

Implementation of the Supplemental Phase II RI (USACE 2005b) was completed in November 2005. Data collected from these remedial investigations was also used to conduct a quantitative baseline human health risk assessment (HHRA), an ecological risk assessment (ERA), and define the nature and extent of contamination at FBQ. The FBQ Feasibility Study (FS) (USACE 2006) incorporated these results into the assessment of FBQ.

2.4 PROJECT SCOPE

The scope of the remedial action at FBQ is to remove dry sediment from a ditch until the concentration of manganese is at or below the remedial cleanup goal of 1,950 mg/kg. To perform the scope outlined in the remedial design, SAIC and subcontractors will perform the following tasks:

- Mobilization (e.g., clearing and grubbing, installing rock construction entrance and equipment movement area, sandbag berms and storm water controls);
- Environmental multi-increment (MI) sampling of dry sediment within the ditch;
- Excavation of dry sediment from the drainage ditch;
- Transportation and disposal of contaminated dry sediment
- Confirmation MI sampling of dry sediment (to be accomplished remotely via excavation bucket or other determined remote sampling method);
- Survey of removal area;
- Site Restoration (e.g., grading, backfilling, compacting, seeding, and installation of storm water controls); and
- Demobilization.

Potential hazards posed by the planned tasks include injury from ordnance and explosives; lifting, and strain hazards associated with operating soil sampling equipment; heavy equipment; noise; excavation; fuel or decontamination solvent fires; chemical exposure; temperature extremes; stinging/biting insects; poisonous plants; and snakes.

The potential for chemical overexposure appears to be very low, based on the nature of planned tasks and review of available data. There is some potential for chemical exposures via the inhalation

pathway during sampling and excavation activities and dermal contact with contaminated dry sediment. Potential airborne exposures will be visually monitored during excavation and sampling activities. Sampling crews will use protective gloves to handle potentially contaminated materials, and, if necessary, the Site Safety and Health Officer (SSHO) will upgrade the required personal protective equipment (PPE) to prevent inhalation and/or dermal contact with potentially contaminated materials. The SSHO will observe all site tasks during daily safety inspections and will use professional judgment and appropriate monitoring results to determine if upgrading PPE is required. A detailed analysis of these hazards and specific appropriate controls is presented in Table 3-2.

This remedial action will be performed in Level D PPE and using chemical-resistant gloves when handling potentially-contaminated materials. If one of several action levels is exceeded or the potential for increased risk becomes apparent during the investigation, protective procedures, including protective clothing, will be upgraded as necessary by the SSHO.

2.5 CONTAMINANTS

Table 2-1 lists constituents of potential concern (COPCs) and their respective maximum concentration detected in dry sediment samples (discrete and multi-increment) during previous remedial investigations. Inclusion in this table indicates the potential to encounter a contaminant during the remedial action activities, but it does not necessarily indicate that the contaminant is present in sufficient quantity to pose a health risk to workers.

Table 2-1. FBQ Maximum Concentrations of Constituents of Potential Concern

Analyte	Units	FBQ Maximum Detect
Miscellaneous		
Chromium, hexavalent	mg/kg	6.8
Metals		
Aluminum	mg/kg	17,200
Antimony	mg/kg	74
Arsenic	mg/kg	27.
Barium	mg/kg	1,070
Beryllium	mg/kg	1.5
Cadmium	mg/kg	4
Chromium	mg/kg	89
Cobalt	mg/kg	37
Copper	mg/kg	559
Lead	mg/kg	887
Manganese	mg/kg	2310
Mercury	mg/kg	1.2
Nickel	mg/kg	85.4
Selenium	mg/kg	7.9
Silver	mg/kg	0.26
Vanadium	mg/kg	36
Zinc	mg/kg	1330
Organics-Explosives		
1,3,5-Trinitrobenzene	mg/kg	1.7
2,4,6-Trinitrotoluene	mg/kg	99
2,4-Dinitrotoluene	mg/kg	0.4
2,6-Dinitrotoluene	mg/kg	1.3
2-Amino-4,6-dinitrotoluene	mg/kg	12
4-Amino-2,6-dinitrotoluene	mg/kg	9.7
Nitrobenzene	mg/kg	0.083
Nitrocellulose	mg/kg	150
RDX	mg/kg	0.33
Organics-Pesticide/PCB		
4,4'-DDE	mg/kg	0.00037
Organics-Semi-Volatile		
Benz(a)anthracene	mg/kg	0.19
Benzo(a)pyrene	mg/kg	0.084
Benzo(b)fluoranthene	mg/kg	0.26
Benzo(k)fluoranthene	mg/kg	0.085
Chrysene	mg/kg	0.37
Di-n-butyl phthalate		0.24
Fluoranthene	mg/kg	0.87
Pyrene	mg/kg	0.64
Organics-Volatile		
Acetone	mg/kg	0.0051
Carbon Disulfide	mg/kg	0.069
Methylene Chloride	mg/kg	0.027
Trichloroethene	mg/kg	0.0049

Data is from *PhaseI/II Remedial Investigation Report of the Fuze and Booster Quarry Landfill/Ponds (RVAAP-16)*. Ravenna Army Ammunition Plant, Ravenna, Ohio. Delivery Order W912QR-05-F-0033, November 2005

Airbone contaminate concentration calculations were conducted using the maximum detected concentration. Results indicated that concentrations were too low to represent an airbone exposure health risk.

3.0 HAZARD/RISK ANALYSIS

The purpose of the task hazard/risk analysis is to identify and assess potential hazards that may be encountered by personnel and to prescribe required controls. Table 3-1, a general checklist of hazards that may be posed by this project, indicates whether a particular major type of hazard is present. If additional tasks or significant hazards are identified during the work, this document will be modified by addendum or field change order to include the additional information.

Table 3-1. Hazards Inventory

Yes	No	Hazard
	X	Confined space entry
	X	Excavation entry (excavations will not be entered)
X		Heavy equipment (drill rigs, backhoe)
X		Fire and explosion (fuels)
X		Electrical shock (utilities and tools)
X		Exposure to chemicals (contaminants and chemical tools)
X		Temperature extremes
X		Biological hazards (poison ivy, Lyme disease, West Nile disease)
	X	Radiation or radioactive contamination
X		Noise (excavation equipment, powered auger, drill rig)
X		Drowning
X		OE (potential to encounter unexploded ordnance)

OE = ordnance and explosives

Specific tasks are as follows:

- Excavating, grading, backfilling and compacting soil, dry sediment, and stone using heavy equipment performed by the subcontractor;
- Remote dry sediment sampling performed by SAIC (potentially utilizing the excavator bucket);
- Vegetation clearing with chainsaws, machetes, and sling blades, as required, performed by the subcontractor;
- Surveying performed by the subcontractor;
- Investigation-derived waste handling and disposition performed by the subcontractor; and
- Equipment decontamination performed by both SAIC and the subcontractor.

3.1 POTENTIAL EXPOSURES

Prior sampling results indicate that the primary contaminants of concern at FBQ are metals. Table 3-2 contains information on the potential contaminants, as well as the reagents and chemicals that will be used for the project. It is important to note that the contaminants listed in Table 3-2 have been detected in a number of locations at RVAAP and might be expected to occur at any former operations area. Exposure to chemical tools, such as corrosive sample preservatives, field laboratory reagents, or flammable fuels, is a possibility and will be controlled through standard safe handling practices.

3.2 TASK-SPECIFIC HAZARD ANALYSIS

Table 3-3 presents task-specific hazards, relevant hazard controls, and required monitoring, if appropriate, for all of the planned tasks.

Table 3-2. Potential Exposures

Chemical[a]	TLV/PEL/STEL/IDLH[b]	Health Effects/ Potential Hazards[c]	Chemical and Physical Properties[c]	Exposure Route(s)[c]
Manganese	TLV/TWA: 0.2 mg/m^3, A4 IDLH: 500 mg/m^3	Hazardous in case of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion.	Solid; properties vary depending upon specific compound	Inhalation Ingestion Contact
Lead	TLV: 0.050 mg/m^3, IDLH: 100 mg/m^3	Hazardous in cases of inhalation and ingestion. Immediate eye irritant	Gray solid; insoluble FP: NA; VP: NA	Inhalation Ingestion Contact
Gasoline (used for fuel)	TLV/TWA: 300 ppm IDLH: Ca N.D.	Potential carcinogen per NIOSH, dizziness, eye irritation, dermatitis.	Liquid with aromatic odor; FP: -45°F; VP: 38-300 mm UEL: 7.6% LEL: 1.4%	Inhalation Ingestion Absorption Contact
Hydrochloric acid (potentially used to preserve water samples or for equipment decontamination)	TLV: 5 ppm ceiling IDLH: 50 ppm	Irritation of eyes, skin, respiratory system .	Liquid; VP: fuming; IP: 12.74 eV; FP: none	Inhalation Ingestion Contact
Liquinox (used for decontamination)	TLV/TWA: None	Inhalation may cause local irritation to mucus membranes.	Yellow odorless liquid (biodegradable cleaner); FP: NA	Inhalation Ingestion
Methanol (potentially used for equipment decontamination)	TLV/TWA: 200 ppm Skin notation IDLH: 6000 ppm	Irritation of eyes, skin, respiratory system; headache; optic nerve damage.	Liquid; VP: 96 mm; IP: 10.84 eV; FP: 52°F UEL: 36% LEL: 6.0 %	Inhalation Absorption Ingestion Contact

[a]The potential chemicals were obtained from the *Ravenna Army Ammunition Plant Phase I Remedial Investigation Report* (USACE 1998).
[b]From 2008 Threshold Limit Values, *American Conference of Governmental Industrial Hygienists.*
[c]From *NIOSH Guide to Chemical Hazards* web site.

A2 = suspected human carcinogen.
A3 = confirmed animal carcinogen with unknown relevance to humans.
A4 = not classifiable as a human carcinogen.
Ca = potential occupational carcinogen.
DNT = dinitrotoluene
FP = flash point
HMX = octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
IDLH = immediately dangerous to life and health
IP = ionization potential
LEL = lower explosive limit
N.D. = IDLH not determined.
NIOSH = National Institute for Occupational Safety and Health.
PEL = permissible exposure limit.
ppm = parts per million
RDX = hexahydro-1,3,5-trinitro-1,3,5-triazine
STEL = short-term exposure limit
TLV = threshold limit value
TWA = time-weighted average
TNT = trinitrotoluene
UEL = upper explosive limit
VP = vapor pressure

Table 3-3. Hazards Analysis

Safety and Health Hazards	Controls	Monitoring Requirements
Civil Surveys and Visual Surveys in Potentially Contaminated Areas		
General safety hazards (moving equipment, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety shoes or boots, and hard hats if overhead hazards are present (see Section 5.0 of the FSHP). Site-specific training, buddy system, proper housekeeping	Daily safety inspections
Contact with OE	Pre-entry screening survey and continuous escort by OE specialist support following requirements of *Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92*. On-site training in ordnance recognition for all field personnel. Withdrawal of all SAIC and subcontractor personnel from immediate area and field marking of suspect area if ordnance or suspected ordnance is discovered	Visual and instrument surveys for ordnance conducted by OE expert personnel
Exposure to chemicals	Nitrile or similar gloves for contact with potentially contaminated material. Gloves will be disposed after single use. Wash face and hands and any other exposed areas prior to taking anything by mouth. Hazardous waste site operations training and medical clearance Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site. MSDSs on-site. All chemical containers labeled to indicate contents and hazard	None
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each workday (see Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Section 9.0 of FSHP)	Visual survey
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 “Vehicle Operation” to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid driver’s licenses by FM
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F.	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
Drowning	When possible, the water in the ditch will be released or pumped to a Frac Tank when accumulation poses a potential drowning hazard. Personal flotation device will be worn when working within 6 feet of water deeper than 3 feet.	The water depth in the ditch will be monitored.

Table 3-3. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Soil Sampling Using Hand Augers or Scoops		
General safety hazards (manual lifting, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety boots, safety glasses, and work gloves for manual work (Section 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping.	Daily site safety inspections
Contact with OE	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel when in areas with potential to encounter OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered. Sampling of stations having known or suspected (i.e., red soil or raw product) explosives >10% (100,000 mg/kg) to be performed by OE technicians following applicable OE safety requirements.	Visual and instrument surveys by OE technicians following requirements of *Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92*
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Stay upwind of any dust-generating activities. Dust suppression techniques (such as wetting area) as required. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for site contaminants and all chemicals used on-site. MSDSs for chemical tools on-site. Chemical containers labeled to indicate contents and hazard.	Visual observations for dust during dry sediment sampling activities.
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F.	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 “Vehicle Operation” to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid driver’s licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 “Manual Lifting” to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (Section 9.0 of FSHP)	Visual survey

Table 3-3. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Drowning	When possible, the water in the ditch will be released or pumped to a Frac Tank when accumulation poses a potential drowning hazard. Personal flotation device will be worn when working within 6 feet of water deeper than 3 feet.	The water depth in the ditch will be monitored.
Vegetation Clearing with Chainsaws, Machetes, and Sling Blades		
General safety hazards (contact with sharp edges, slips, falls)	Level D PPE: long pants, shirts with sleeves, safety boots, safety glasses, plus heavy-duty work gloves and hard hat (see Section 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. Only experienced operators. Personnel operating brush-clearing tools must maintain separation of at least 15 ft. Machetes equipped with lanyard and lanyard looped around wrist. Tools must be inspected daily and taken out of service if damaged. Exclusion zone if there is a potential for entry of unauthorized personnel.	Daily site safety inspections
Chainsaw kickback and related hazards	Chainsaw chaps and face shield as additional PPE. Saws must have automatic chain brake or kickback device. Idle speed adjusted so chain does not move when idling. Only experienced operators may use chainsaw. Saws must not be used to cut above shoulder height. Saws must be held with both hands when operating. Additional requirements at 385-1-1 Section 31.	Daily inspection
Noise (chainsaw)	Hearing protection $\geq$ NRR 25 within 7.6 m (25 ft) of operating chainsaw unless specific monitoring indicates noise exposure of less than 85 dBA.	Daily safety inspections
Fire (fuels)	Fuels stored in safety cans with flame arrestors. Bonding (metal to metal) and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Fire extinguishers in all fuel use areas. Gasoline-powered equipment turned off and allowed to cool for at least 5 min prior to fueling.	Daily safety inspection
Contact with OE	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Escort by OE personnel when in areas with potential to encounter OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered.	Visual and instrument surveys by OE technicians following requirements of *Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92*
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Dust suppression techniques (such as wetting area) as required. Hazardous waste site operations training and medical clearance. Site training must include the hazards and appropriate controls for site contaminants and chemicals to be used or stored on-site. Chemical containers labeled to indicate contents and hazard. Medical clearance for hazardous waste work.	Visual observations for dust during vegetation clearing activities and daily safety inspection

Table 3-3. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F.	Temperature measurements at least twice per day. Pulse rates at the start of each break if wearing impermeable clothing.
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 "Vehicle Operation" to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid driver's licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 "Manual Lifting" to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on boots, pants, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize potential for tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Section 9.0 of FSHP).	Visual survey
Drowning	When possible, the water in the ditch will be released or pumped to a Frac Tank when accumulation poses a potential drowning hazard. Personal flotation device will be worn when working within 6 feet of water deeper than 3 feet.	The water depth in the ditch will be monitored.
Investigation-Derived Waste Handling		
General hazards (lifting equipment, manual lifting, slips)	Level D PPE: long pants, shirts with sleeves, safety glasses, safety shoes or boots, heavy-duty gloves for materials handling, and hard hat if overhead hazards are present (see Section 5.0 of FSHP). Buddy system. Site-specific training. Proper housekeeping. Unnecessary personnel will stay well clear of operating equipment. Functional back-up alarm on fork trucks, Bobcats, trucks, etc. RVAAP O&M contractor /personnel will provide any required fork truck services in the IDW staging area (Building 1036). IDW movement from field sites to Building 1036 will be conducted by the subcontractor using a backhoe equipped with forks and drum dollys. No personnel allowed under lifted loads. Lifts of greater than 50 lbs will be made with two or more personnel or with lifting equipment. Hazardous waste safety training. Compliance with EM 385-1-1 Sections 14 and 16.	Daily safety inspections of operations. Daily inspection of equipment to verify brakes and operating systems are in proper working condition
Contact with OE	On-site training in ordnance recognition for all field personnel. Clearance of sites by OE personnel for intrusive work. Continuous escort by OE personnel if working in areas with potential for OE. Withdrawal of all non-OE personnel if ordnance or suspected ordnance is discovered.	Visual and instrument surveys by OE technicians following requirements of *Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92*

Table 3-3. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site.	Daily safety inspections
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 "Vehicle Operation" to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid drivers licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 "Manual Lifting" to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.
Fire (vehicle fuels and flammable contaminants)	Fuels stored in safety cans with flame arrestors. Bonding (metal to metal) and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Gasoline-powered equipment will be shut down and allowed to cool for 5 min before fueling. Fire extinguishers in all fuel use areas.	Daily safety inspection
Noise	Hearing protection within 7.6 m (25 ft) of any noisy drum moving equipment unless equipment-specific monitoring indicates exposures less than 85 dBA.	Daily safety inspections
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes, West Nile Virus)	PPE (boots, work clothes). Insect repellant on pants, boots, and elsewhere, as necessary, to repel ticks and mosquitoes. Pant legs tucked into boots or otherwise closed to minimize tick entry. Snake chaps if working in overgrown areas. Inspect for ticks during the day and at the end of each workday (see Section 9.0 of FSHP). Avoidance of accumulations of bird or bat droppings (see Section 9.0 of FSHP).	Visual survey
Electric shock	Identification and clearance of overhead utilities. GFCI for all electrical hand tools.	Visual survey of all work areas
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F.	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing
Equipment Decontamination (Hot Water Washing, Soap and Water Washing, HCl, and Methanol Rinse)		
General equipment decontamination hazards (hot water, slips, falls, equipment handling)	Level D PPE plus nitrile or PVC gloves (see Section 5.0 of FSHP). Face shield and Saranax or rain suit when operating steam washer. Site-specific training. Proper housekeeping.	Daily safety inspections
Noise (spray washer)	Hearing protection when washer is operating unless equipment-specific monitoring indicates that exposure is less than 85 dBA.	None
Fire (decontamination solvents and gasoline)	Flammable material stored in original containers or in safety cans with flame arrestors. Fire extinguisher kept near decontamination area.	Daily safety inspection

Table 3-3. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Exposure to chemicals	Level D PPE plus nitrile or equivalent gloves for contact with contaminated material. Wash face and hands prior to taking anything by mouth. Minimal contact. Hazardous waste site operations training and medical clearance. Site training must include hazards and controls for exposure to site contaminants and chemicals used on-site. MSDSs on-site. All chemical containers labeled to indicate contents and hazard.	None
Electric shock	Portable electrical hand tools and equipment must be connected through functional GFCIs.	Verification by FM
Vehicle accidents	Compliance with E&I EC&HS Procedure 110 "Vehicle Operation" to include verification of current drivers licenses, use of seat belts when vehicle is in motion, daily (undocumented) vehicle safety inspection, compliance with applicable laws and regulations, and defensive driving.	Verification of valid drivers licenses by FM
Lifting injuries	Compliance with E&I EC&HS Procedure 150 "Manual Lifting" to limiting individual lifts by SAIC personnel to 50 pounds.	Verification/observation of lifting by SAIC personnel by FM.
Temperature extremes	Administrative controls (see Section 8.0 of FSHP). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (see Section 8.0 of FSHP). Chilled drinks if temperature exceeds 70°F	Temperature measurements at least twice a day. Pulse rates at the start of each break if wearing impermeable clothing
Excavation using Heavy Equipment		
Safety hazards associated with excavation equipment	Excavation subcontractor must have and operate under their specific safety programs, procedures, and practices. Compliance with E&I EC&HS Procedure 160 "Excavation Safety" to include subcontractor competent person, documented review of 160 by SAIC FM, daily inspection of excavation, no personnel in trenches deeper than 5 feet without additional controls per procedure. Level D PPE including hardhat (see Section 5.0). Unnecessary personnel will stay well clear of operating equipment. Functional back-up alarm. Exclusion zone around excavation areas. Only experienced operators will be allowed to operate equipment. Hazardous waste safety training.	Daily safety inspections of operations. Initial and at least weekly inspections of excavation equipment.

Table 3-3. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Contact with unexploded ordnance	Continuous escort by OE personnel during removal activities. On-site training in ordnance recognition for all field personnel. Clearance of sites by UXO subcontractor for intrusive work. Withdrawal of all non-UXO personnel if ordnance or suspected ordnance is discovered.	Visual surveys for ordnance. Instrument surveys by EOD technicians in munitions disposal areas following requirements of *Ordnance and Explosive Waste (OEW) Activities, ER-385-1-92*.
Fire (vehicle fuels and flammable contaminants)	Fuels stored in safety cans with flame arrestors. Bonding and grounding during fuel transfers. Fuel storage areas marked with no smoking or open flames signs. Fire extinguishers in all fuel use areas.	Daily safety inspection. Combustible gas indicator if buried organic material or other source of flammable gas suspected.
Noise	Hearing protection within 7.6 meters (25 feet) of backhoe or similar equipment unless equipment-specific monitoring indicates exposures less than 90 decibels.	Daily safety inspections.
Exposure to chemicals	PPE (Level D) plus nitrile or equivalent gloves for contact with contaminated material. Washing face and hands prior to taking anything by mouth. Dust suppression techniques (such as wetting area) as required. Staying upwind of any dust-generating activities. Work stoppage or increased PPE during periods of high-winds. Minimal contact. Hazard communication training. MSDS for chemical tools on site. Chemical containers labeled to indicate contents and hazard. Medical clearance for hazardous waste work Decontamination of potentially contaminated equipment prior to servicing.	Visual observations for dust during dry sediment removal activities.
Biological hazards (bees, ticks, Lyme disease, histoplasmosis, wasps, snakes)	PPE (boots, work clothes). Insect repellant, as necessary. Pant legs tucked into boots or otherwise closed to minimize tick entry. Inspect for ticks during the day and at the end of each work day (See Section 9.0). Avoidance of accumulations of bird or bat droppings (See Section 9.0).	Visual survey.

Table 3-3. Hazards Analysis (continued)

Safety and Health Hazards	Controls	Monitoring Requirements
Electric shock	Identification and clearance of overhead and underground utilities per E&I EC&HS Procedure 130.	Visual of all work areas.
Temperature extremes	Administrative controls (see Section 8.0). Cooled (shaded) or warmed break area depending on the season. Routine breaks in established break area (See Section 8.0) Chilled drinks if temperature exceeds 70°F.	Temperature measurements at least twice daily. Pulse rates at the start of each break if wearing impermeable clothing.
Drowning	When possible, the water in the ditch will be released or pumped to a Frac Tank when accumulation poses a potential drowning hazard. Personal flotation device will be worn when working within 6 feet of water deeper than 3 feet.	The water depth in the ditch will be monitored.

E&I EC&HS = Engineering & Infrastructure Environmental Compliance & Health and Safety
FM = Field Manager
FSHP = Facility Wide Safety and Health Plan
GFCI = ground-fault circuit interrupter
IDW = investigation-derived waste
MSDS = Material Safety Data Sheet
NRR= Noise Reduction Rating
OE = ordinance and explosives
O&M = operations and maintenance
PID = photoionization detector
PPE = personal protective equipment
EOD = explosive ordinance disposal
PVC = polyvinyl chloride
RVAAP = Ravenna Army Ammunition Plant
SAIC = Science Applications International Corporation
UXO = unexploded ordnance

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4.0 STAFF ORGANIZATION, QUALIFICATIONS, AND RESPONSIBILITIES

This section presents the personnel (and their associated telephone numbers) responsible for site safety and health and emergency response. Table 4-1 identifies the SAIC and subcontractor staff who will fill key roles. See the FSHP for information on the roles and responsibilities of key positions.

Table 4-1. Staff Organization

Position	Name	Phone
SAIC Health and Safety Manager	Steve Davis CIH, CSP	(865)481-4755
SAIC Project Manager	Kevin Jago	(865)481-4614
SAIC Construction Manager	Jed Thomas	(330)405-5802
Subcontractor Construction Supervisor	TBD	
Subcontractor Site Safety and Health Officer[1]	TBD	
MEC Avoidance Subcontractor	TBD	

[1]Subcontractor Site Safety and Health Officer will be SSHO for all removal activities.

CIH= Certified Industrial Hygienist

CSP = Certified Safety Professional

MEC = munitions and explosives of concern

TBD = To be determined

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5.0 TRAINING

Training requirements, from Section 4.0 of the FSHP, are summarized in Table 5-1 and in Table 3-2.

Table 5-1. Training Requirements

Training	Worker	Supervisor	Site Visitor (exclusion zone)
HAZWOPER (40-hr, 3-day OJT)	√	√	√
HAZWOPER Annual Refresher (8 hr)	√	√	√
HAZWOPER Supervisors Training (8 hr)		√	
CPR and First Aid Training	√	√	
General Hazard Communication Training	√	√	√
Respiratory Protection Training (required only if respirators are worn)	√	√	√
Hearing Conservation Training (for workers in hearing conservation program)	√	√	√
Pre-entry Briefing	√	√	√
Site-Specific Hazard Communication (contained in pre-entry briefing)	√	√	√
Safety Briefing (daily and whenever conditions or tasks change)	√	√	√
Equipment-Specific Training (Equipment Operators)	√		

√ = required
HAZWOPER = Hazardous Waste Site Operations and Emergency Response
OJT = on-the-job training
CPR = Cardio Pulmonary Resuscitation

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6.0 PERSONAL PROTECTIVE EQUIPMENT

General guidelines for selection and use of PPE are presented in the FSHP. Specific PPE requirements for this work are presented in the hazard/risk analysis section (Section 2.0).

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7.0 MEDICAL SURVEILLANCE

Medical surveillance requirements are summarized in Table 7-1 and in Table 3-2.

Table 7-1. Medical Surveillance Requirements

Baseline	Routine	Overexposure	Termination
Prior to work assessment	Every 12 months, unless greater frequency is deemed appropriate by attending physician. Not to exceed 2-year interval	Upon developing symptoms or where exposure limits have been exceeded or suspected to have been exceeded	Upon termination or re-assignment

All medical exams shall include (see Section 6.2 of the Facility-Wide Safety and Health Plan):

- medical/work history;
- physical exam by physician;
- audiometry;
- blood screening and blood count;
- chest x-ray, as specified by physician;
- electrocardiogram, as specified by physician;
- spirometry; and
- urinalysis.

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8.0 EXPOSURE MONITORING/AIR SAMPLING PROGRAM

An assessment of airborne chemical concentrations will be performed, as appropriate, to ensure that exposures do not exceed acceptable levels. Action levels, with appropriate responses, have been established for this monitoring. In addition to the specified monitoring, the SSHO may perform or require additional monitoring, such as organic vapor monitoring, or equipment decontamination area or personnel exposure monitoring for specific chemicals. The deployment of monitoring equipment will depend on the activities being conducted and the potential exposures. All personal exposure monitoring records will be maintained in accordance with 29 *Code of Federal Regulations* 1910.20. The minimum monitoring requirements and action levels are presented in Table 8-1.

Most of the field activities are not expected to pose airborne exposure hazards for the following reasons:

- With the exception of sampling equipment decontamination, which will be performed in a well-ventilated building, work will be performed in open areas with natural ventilation; and

- The most probable contaminants (metals) are materials with relatively low vapor pressures and exposure can be controlled through dust suppression techniques.

The SSHO will examine site conditions and will contact the Health and Safety Manager and initiate additional monitoring if there is any indication of potential airborne exposure.

Table 8-1. Monitoring Requirements and Action Limits

Hazard or Measured Parameter	Area	Interval	Limit	Action	Tasks
Visible airborne dust potentially containing metals	All	Continuously	Visible dust	Stop work; use dust suppression techniques such as wetting surface	All
Airborne organics with PID or equivalent	Breathing zone [0.9 m (3 ft) from source or 0.36 m (14 in.)] in front of employee's shoulder	From 1 to 3 ft below ground surface and if site conditions, such as discolored soil or chemical smells, indicate that monitoring is necessary	<5 ppm >5 ppm	Level D Withdraw and evaluate • evaluate need for PPE upgrade • identify contaminants • notify project manager and H&S manager	Excavation with heavy equipment, hand auguring, power augering, and other intrusive work
Noise	All	Any area where there is some doubt about noise levels	85 dBA and any area perceived as noisy	Require the use of hearing protection	Hearing protection will be worn within the exclusion zone, around power augers, or other motorized equipment

H&S = health and safety
PID = photoionization detector
PPE = personal protective equipment
ppm = parts per million

9.0 HEAT/COLD STRESS MONITORING

General requirements for heat/cold stress monitoring are contained in the FSHP.

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10.0 STANDARD OPERATING SAFETY PROCEDURES

Standard operating safety procedures are described in the FSHP. Dust generation activities may occur during material excavation, handling, and transportation. Prior to the start of any ground/soil or dry sediment disturbance activities (e.g., clearing and grubbing, excavating, grading), the area will be misted with water to prevent the generation of dust. The SSHO will monitor all ground disturbance activities to ensure dust is not being generated. In the event that any dust becomes visible, the activity will cease and the area will be misted with water. During instances of high winds resulting in excessive dust, and dust control measures do not prevent the generation of dust, work stoppage and/or additional PPE may be required.

In addition, all access roads, and all other work areas within the project boundaries will be maintained free from soil that could cause a hazard or nuisance. Dust control will be maintained by keeping traffic on improved roads, maintaining the posted speed limit, and applying water as required. The Subcontractor will employ water spraying/misting for dust control if airborne dust is observed. Water used for dust control will be clean (i.e., obtained from RVAAP sources with approval of the RVAAP Facility Manager, or potable water obtained from an off-site source). The use of additives will not be permitted.

The SSHO will be responsible for visual dust monitoring during operating conditions.

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11.0 SITE CONTROL MEASURES

Site control measures are described in the FSHP. No formal site control is expected to be necessary for this work, as the work area is somewhat remote and bystanders are not anticipated. The RVAAP installation is not open to the public, and only authorized personnel are allowed in FBQ. However, an exclusion zone will be established around the excavation as described in Sections 9.7 and 10.1 of the FSHP. If the SSHO determines that a potential exists for unauthorized personnel to approach within 25 ft of a work zone or otherwise be at risk due to proximity, then additional site controls will be established as described in the FSHP.

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12.0 PERSONNEL HYGIENE AND DECONTAMINATION

Personal hygiene and decontamination requirements are described in Section 11.0 of the FSHP (USACE 2001).

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13.0 EMERGENCY PROCEDURES AND EQUIPMENT

Emergency contacts, telephone numbers, directions to the nearest medical facility, and general procedures can be found in the FSHP. Table 13-1 presents the emergency phone numbers available for normal working hours (Monday through Friday, 8:00 am to 4:00 pm). All emergencies onsite will be coordinated first through **Guard Post 1 [(330) 358-2017]** who will coordinate the response. The SAIC field operations manager will remain in charge of all SAIC and subcontractor personnel during emergency activities. The SAIC field office will serve as the assembly point if it becomes necessary to evacuate one or more sampling locations. During mobilization, the SSHO will verify that the emergency information in the FSHP is correct.

Each field team shall have a cellular phone and/or a 2-way radio capable of contacting Guard Post 1 for communications purposes.

During field operations all on-site personnel shall have CPR/first-aid training.

Table 13-1. Emergency Phone Numbers

Position	Phone
RVAAP Guard Post 1 (Police, Fire, Emergency Medical)	 (330) 358-2017
Camp Ravenna Operations/Range Control	(614) 336-6793 or (614) 336-6562
Hospital (Robinson Memorial, Ravenna)	(330) 297-2449/0811
RVAAP Facility Manager Mark Patterson	 Office: (330) 358-7311
RVAAP Operation and Maintenance Contractor Jim McGee, VISTA Sciences	 Office: (330) 358-3005
USACE Tom Chanda	 Office: (502) 315-6868
Ohio EPA, Todd Fisher	Office: (330) 963-1148
SAIC Project Manager, Kevin Jago Jed Thomas	 Office: (865) 481-4614 Office: (330) 405-5802 Cell: (216) 214-2599
SAIC Health and Safety Personnel, Steve Davis CIH, CSP Heather Miller	 Office: (865) 481-4755 Office: (330) 405-5814 Cell (330) 573-8571

RVAAP = Ravenna Army Ammunition Plant
USACE = U.S. Army Corps of Engineers
Ohio EPA = Ohio Environmental Protection Agency
SAIC = Science Applications International Corporation, Inc.
CIH= Certified Industrial Hygienist
CSP = Certified Safety Professional

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14.0 LOGS, REPORTS, AND RECORD KEEPING

Logs, reports, and record keeping requirements are described in the FSHP.

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15.0 REFERENCES

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16.0 FACILITY AND HOSPITAL MAPS

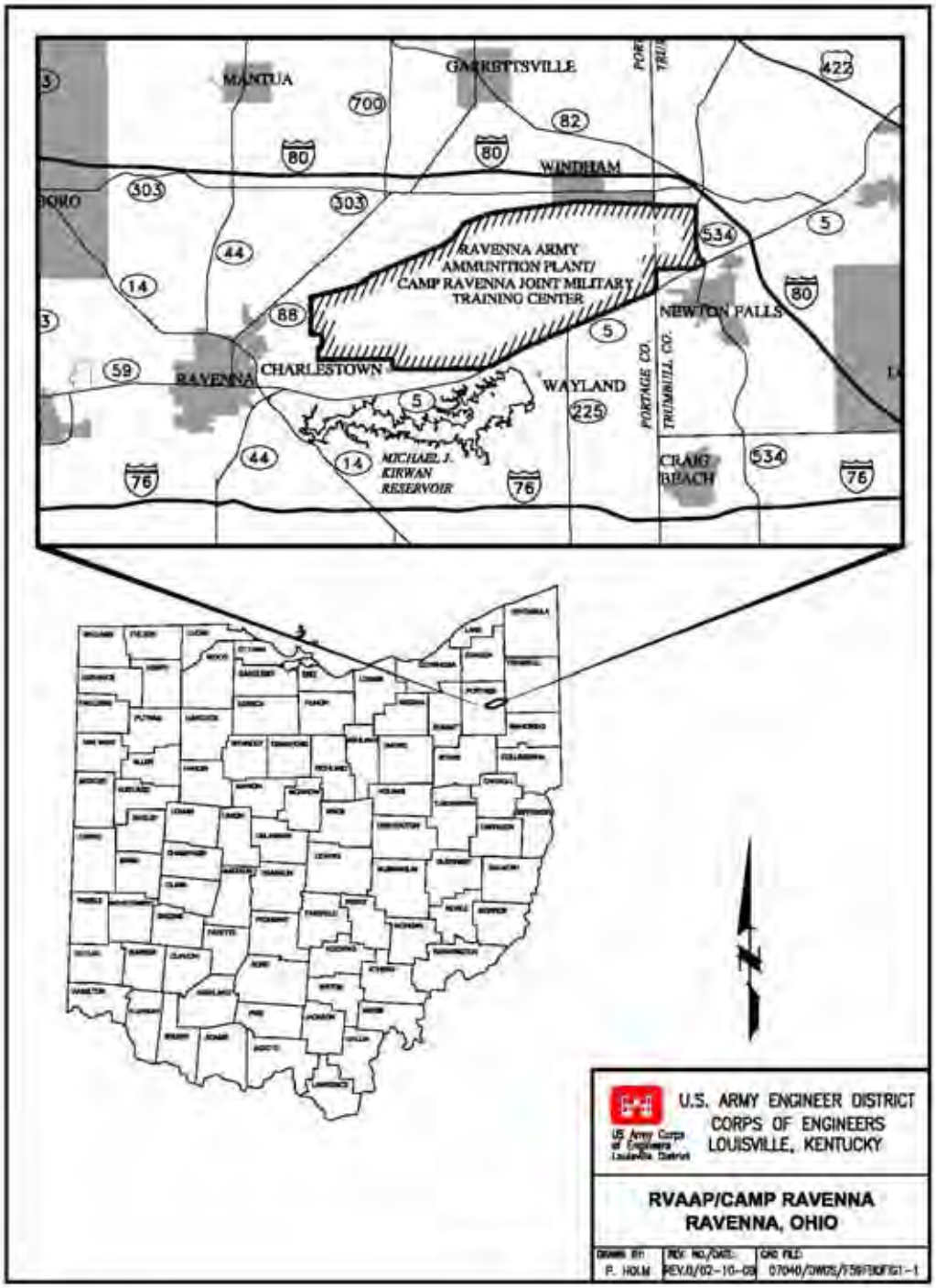

Figure 1. General Location and Orientation of RVAAP/Camp Ravenna

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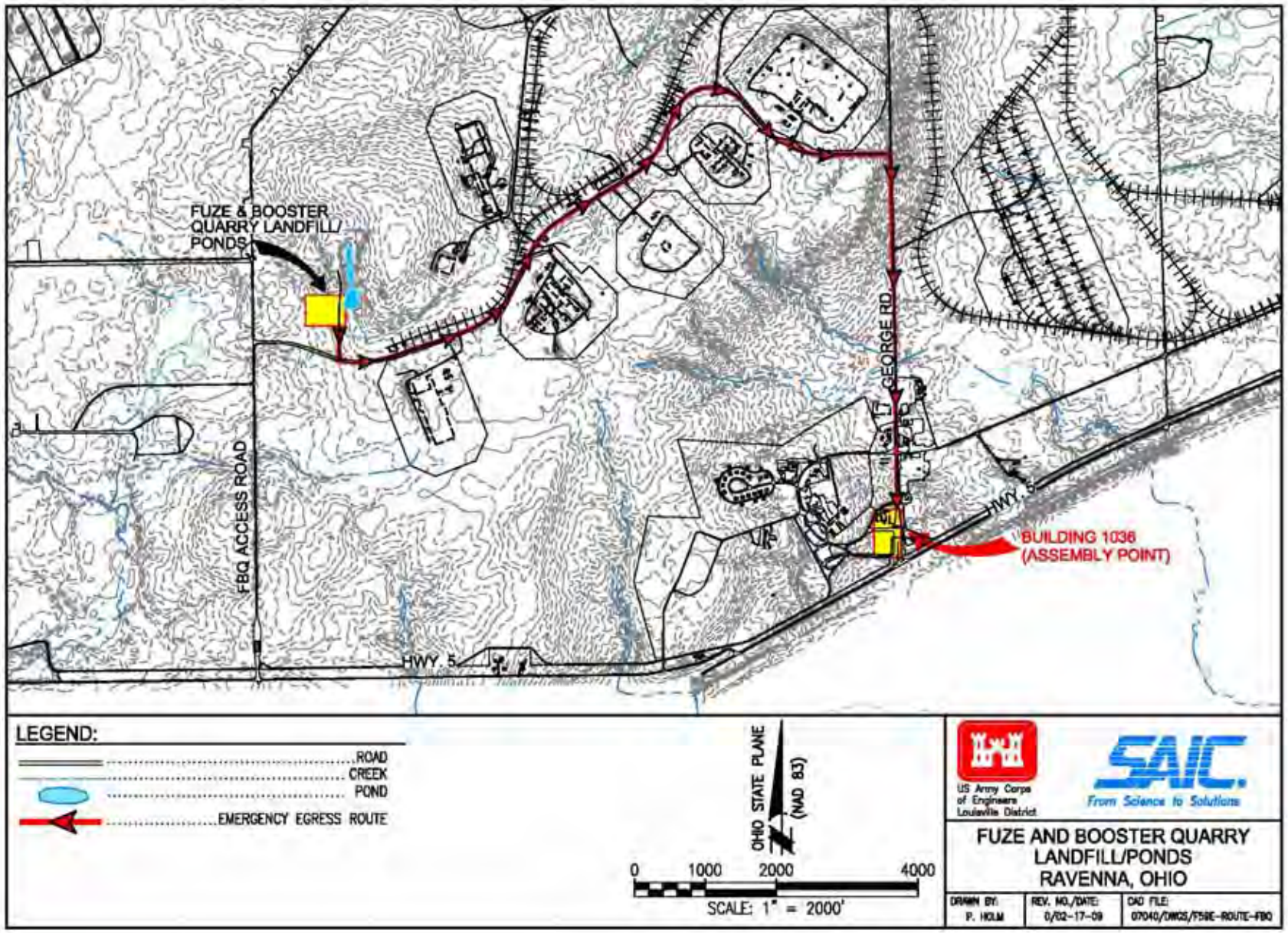

Figure 2. RVAAP/Camp Ravenna Site Map and Egress Route

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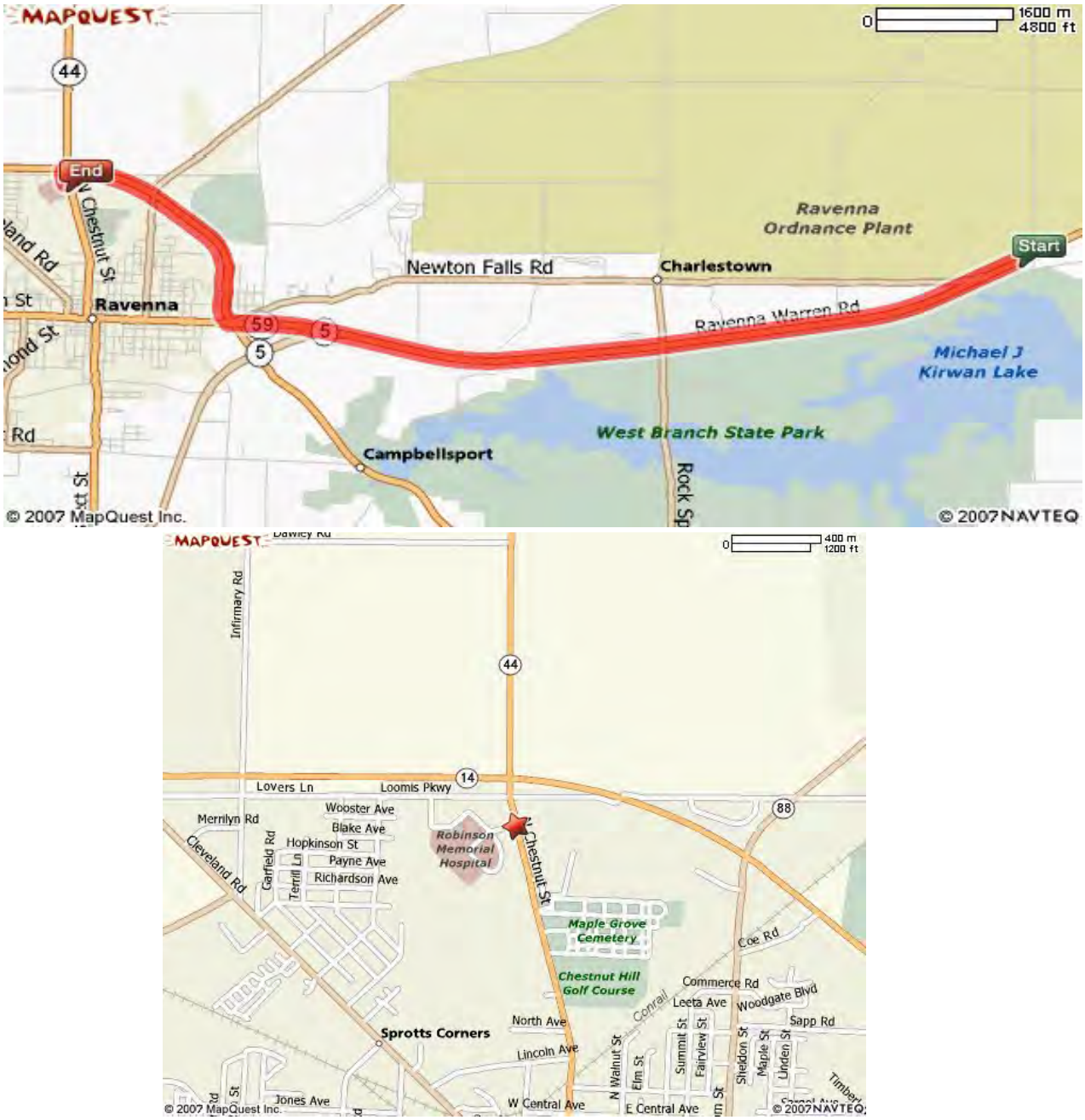

Figure 3. Route Map to Pre-Notified Medical Facility

Robinson Memorial Hospital
6847 N. Chestnut Street
Ravenna, Ohio
(330) 297-0811 or
(330) 297-2448

Directions: West (right) on State Route 5. Keep to right at Y-intersection onto OH-59 West. Turn Right onto OH-14/OH-44 at intersection. Turn Left onto North Chestnut St, just past GE plant. Hospital on right.

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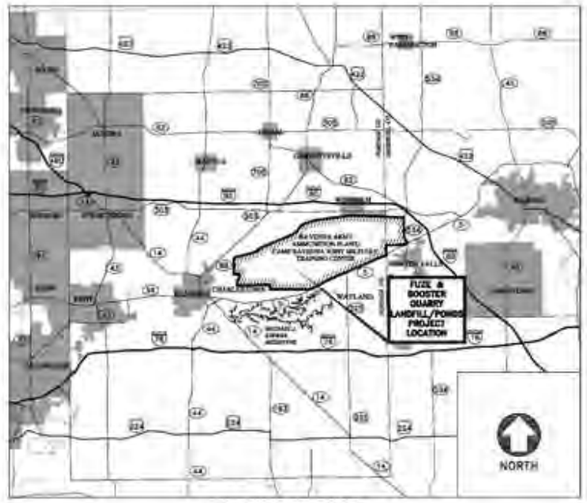
ATTACHMENT B. DRAWINGS

C-1. Title Sheet
C-2. Drawing Index
C-3. Existing Conditions
C-4. Construction Site Plan
C-5. Soil Removal Plan
C-6. Traffic Management Plan
C-7. Site Restoration Plan

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
RAVENNA ARMY AMMUNITION PLANT -
FUZE AND BOOSTER QUARRY LANDFILL/PONDS
REMEDIAL DESIGN

LOCATION MAP
NOT TO SCALE



VICINITY MAP
NOT TO SCALE

THIS REMEDIAL DESIGN ADDRESSES THE EXCAVATION AND OFF-SITE DISPOSAL OF APPROXIMATELY 102 CUBIC YARDS OF CONTAMINATED DRY SEDIMENT (IN SITU) FROM THE DRAINAGE DITCH LOCATED AT THE FUZE AND BOOSTER QUARRY LANDFILL/PONDS AREA OF CONCERN ON THE RAVENNA ARMY AMMUNITION PLANT/CAMP RAVENNA JOINT MILITARY TRAINING CENTER OF RAVENNA, OHIO.

SCOPE OF WORK

US Army Corps of Engineers
Louisville District

U.S. Army Engineer District
Corps of Engineers
Louisville, Kentucky

SAIC
From Science to Solutions

Science Applications International Corp.
Engineering of Ohio, Inc.
Twinsburg, Ohio

FUZE AND BOOSTER QUARRY LANDFILL/PONDS REMEDIAL DESIGN

TITLE SHEET

US Army Corps of Engineers
Ravenna Army Ammunition Plant
Ravenna, Ohio

US Army Corps of Engineers Louisville District

SAIC
From Science to Solutions

C-1

GENERAL NOTES

1. HEREINAFTER, THE TERM "SUBCONTRACTOR" IN THESE DESIGN DRAWINGS SHALL REFER TO THE ENTITIES (I.E., THE SUBCONTRACTOR AND/OR ITS SUBCONTRACTOR(S)) IMPLEMENTING THE FBQ REMEDIAL DESIGN (RD) UNLESS OTHERWISE NOTED.

2. THE SUBCONTRACTOR SHALL COMPLETE ALL ACTIVITIES ASSOCIATED WITH THE PROJECT IN COMPLIANCE WITH APPLICABLE LOCAL, STATE, AND FEDERAL REGULATIONS AND REQUIREMENTS.

3. THE SUBCONTRACTOR SHALL EXECUTE ALL REMEDIAL ACTIVITIES IN ACCORDANCE WITH THE FBQ RD, DRAWINGS, SPECIFICATIONS, AND ATTACHMENTS.

4. THE SUBCONTRACTOR SHALL SUPPLY ALL EQUIPMENT, MATERIALS, AND LABOR TO PERFORM THE CONTRACT REQUIREMENTS INCLUDING ALL WORKER SAFETY EQUIPMENT.

5. THE SUBCONTRACTOR SHALL COMPLY WITH SITE ACCESS PROTOCOLS.

6. ACCESS TO RAVENNA ARMY AMMUNITION PLANT (RVAAP) SHALL BE THROUGH THE MAIN GATE POST 1 LOCATED OFF STATE ROUTE 5. THIS GATE IS GUARDED AND SHALL REQUIRE ADDITIONAL TIME TO GAIN ACCESS. THE SUBCONTRACTOR SHALL BE REQUIRED TO ALLOW FOR DELAYS WITHOUT ADDITIONAL CHARGES TO RVAAP/SAIC.

7. TOPOGRAPHIC MAPPING DATA IS BASED ON SURVEY AND AERIAL PHOTOGRAPH INFORMATION. MINOR DISCREPANCIES BETWEEN DRAWINGS AND ACTUAL FIELD CONDITIONS SHALL NOT BE CAUSE FOR ADDITIONAL PAYMENT. IT IS THE SUBCONTRACTOR'S RESPONSIBILITY TO VERIFY EXISTING CONDITIONS, ELEVATIONS, AND DIMENSIONS PRIOR TO THE START OF CONSTRUCTION AND NOTIFY SAIC OF CONFLICTS.

8. THE SUBCONTRACTOR SHALL INSTALL CONSTRUCTION SIGNS AT THE LOCATIONS INDICATED ON DRAWINGS C-6 PRIOR TO INITIATION OF SITE PREPARATION ACTIVITIES.

9. THE SUBCONTRACTOR SHALL CONTACT THE RVAAP FACILITY MANAGER AT LEAST 28 CALENDAR DAYS PRIOR TO CONSTRUCTION ACTIVITIES TO COORDINATE UTILITY SURVEY AND CLEARANCES. THE IDENTIFICATION AND LOCATION OF UTILITIES ON THESE DRAWINGS IS BASED ON BEST AVAILABLE INFORMATION AT TIME OF PREPARATION AND MAY NOT BE REPRESENTATIVE OF ACTUAL SITE CONDITIONS.

10. STORMWATER CONTROLS SHALL BE INSTALLED PRIOR TO INITIATION OF ANY CONSTRUCTION ACTIVITY THAT MAY CAUSE EROSION OR SEDIMENTATION. STORMWATER CONTROL MEASURES SHALL BE MAINTAINED AND REINSTALLED AS NECESSARY FOR THE DURATION OF CONSTRUCTION AND RESTORATION ACTIVITIES.

11. AT A MINIMUM THE SUBCONTRACTOR SHALL PLACE EROSION CONTROLS WHERE INDICATED ON THE DRAWINGS. ADDITIONAL CONTROLS MAY BE REQUIRED, DEPENDING ON SITE CONDITIONS. EROSION CONTROL MEASURES SHALL MEET ALL FEDERAL AND STATE REQUIREMENTS.

12. THE SUBCONTRACTOR MAY OBTAIN POTABLE WATER FOR CONSTRUCTION PURPOSES FROM EXISTING RVAAP FACILITIES. ANY HOSE CONNECTED TO A FIXED POTABLE WATER SUPPLY MUST BE EQUIPPED WITH BACKFLOW PREVENTION ON THE SUPPLY CONNECTION BEFORE CONNECTING THE HOSE. COORDINATION WITH THE RVAAP/SAIC SHALL BE INITIATED DURING MOBILIZATION IN ORDER TO PROVIDE SUFFICIENT TIME TO OBTAIN ACCESS TO THE IDENTIFIED POTABLE WATER SUPPLY. POTABLE WATER SUPPLIES SHALL NOT BE ACCESSED WITHOUT CONSENT FROM RVAAP/SAIC.

13. IF UNEXPECTED MATERIALS , SUCH AS MEC OR ARCHEOLOGICAL ARTIFACTS ARE DISCOVERED DURING REMEDIAL ACTIVITIES, THE SUBCONTRACTOR SHALL STOP WORK IMMEDIATELY AND NOTIFY RVAAP/SAIC. THE SUBCONTRACTOR SHALL NOT RESUME WORK UNTIL APPROVAL IS GRANTED BY RVAAP/SAIC AND SITE SAFETY AND HEALTH OFFICER.

14. SHOULD THE SUBCONTRACTOR DISCOVER UTILITIES NOT SHOWN ON THE DRAWINGS, EXCAVATION ACTIVITIES SHALL STOP IMMEDIATELY AND THE SUBCONTRACTOR SHALL NOTIFY RVAAP/SAIC. RVAAP/SAIC AND THE SUBCONTRACTOR SHALL DETERMINE THE DISPOSITION OF THE DISCOVERED UTILITY. THE SUBCONTRACTOR SHALL NOT RESUME WORK UNTIL APPROVAL IS GRANTED BY RVAAP/SAIC AND SITE SAFETY AND HEALTH OFFICER.

15. NO WORK SHALL TAKE PLACE DURING INCLEMENT WEATHER (AS DETERMINED BY RVAAP/SAIC) TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT RUNOFF.

16. DURING INSTANCES OF HIGH WINDS, WHICH COULD RESULT IN EXCESSIVE DUST, RVAAP/SAIC RESERVES THE RIGHT TO REQUIRE ADDITIONAL DUST CONTROL OR TO STOP WORK. THE SUBCONTRACTOR SHALL BE REQUIRED TO ALLOW FOR DELAYS WITHOUT ADDITIONAL CHARGES TO SAIC.

17. THE SUBCONTRACTOR SHALL NOT ALLOW HAUL TRUCKS TO TRACK SOIL/MUD ONTO PUBLIC OR RVAAP ROADWAYS. THE SUBCONTRACTOR SHALL INSPECT ALL HAUL TRUCKS WITHIN THE INSPECTION AREA BEFORE RELEASE TO PUBLIC ROADS. SOIL REMOVED FROM HAUL TRUCKS SHALL BE COLLECTED AND DISPOSED OF WITH EXCAVATED DRY SEDIMENT. ALL HAUL TRUCKS SHALL BE COVERED PRIOR TO DEPARTURE FROM THE PROJECT SITE.

18. THE SUBCONTRACTOR IS RESPONSIBLE FOR IMMEDIATELY REMOVING ANY MATERIAL SPILLED ON ROADWAYS OR TRACKED DURING IMPLEMENTATION OF THIS REMEDIAL DESIGN RELATED EQUIPMENT AND TRUCKS. THE SUBCONTRACTOR SHALL NOTIFY SAIC OF ANY OCCURRENCES.

19. THE SUBCONTRACTOR SHALL COORDINATE ALL WASTE MANAGEMENT ACTIVITIES WITH RVAAP/SAIC. WASTE HANDLING AND DISPOSAL ACTIVITIES SHALL BE CONDUCTED IN ACCORDANCE WITH THIS REMEDIAL DESIGN, RVAAP REQUIREMENTS, AND APPLICABLE STATE AND FEDERAL REGULATIONS.

20. ALL EXCAVATED CONTAMINATED DRY SEDIMENT SHALL BE DISPOSED AT A REGULATED LANDFILL APPROVED BY RVAAP/SAIC.

21. ALL HAUL TRUCKS TRAVELING ON PUBLIC ROADS SHALL HAVE A BILL OF LADING OR MANIFEST SIGNED BY THE RVAAP FACILITY MANAGER.

22. THE SUBCONTRACTOR RESPONSIBLE FOR IMPLEMENTING CONSTRUCTION ACTIVITIES SHALL BE REQUIRED TO PREPARE A SITE SPECIFIC HEALTH AND SAFETY PLAN IN ACCORDANCE WITH OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) GUIDELINES. THE PLAN SHOULD BE SUBMITTED FOR REVIEW AT LEAST 20 CALENDAR DAYS PRIOR TO INITIATION OF ANY REMEDIAL ACTION ACTIVITIES. THE PLAN SHALL BE REVIEWED BY SAIC PRIOR TO INITIATION OF ANY REMEDIAL ACTION.

23. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR FOLLOWING ALL RVAAP, FEDERAL, STATE, AND LOCAL SAFETY REQUIREMENTS FOR THE PROTECTION OF ALL PERSONS (INCLUDING EMPLOYEES) AND PROPERTY. IT IS ALSO THE SUBCONTRACTOR'S RESPONSIBILITY TO INITIATE, MAINTAIN, AND SUPERVISE ALL SAFETY REQUIREMENTS, PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK AND IN ACCORDANCE WITH THE FBQ SITE-SAFETY AND HEALTH PLAN (SSHP).

24. ALL SUBCONTRACTOR EMPLOYEES WORKING ON-SITE MUST ATTEND DAILY HEALTH AND SAFETY TAILGATE MEETINGS PRIOR TO THE START OF THE DAY'S CONSTRUCTION ACTIVITIES THAT WILL BE CONDUCTED BY THE SUBCONTRACTOR CONSTRUCTION SUPERVISOR AND THE SUBCONTRACTOR SITE SAFETY AND HEALTH OFFICER.

25. LOCKOUT/TAGOUT PROCEDURES SHALL COMPLY WITH OSHA REQUIREMENTS.

26. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH THE MOST CURRENT EDITION OF THE NATIONAL ELECTRIC CODE.

27. ALL FUEL AND/OR PETROLEUM PRODUCTS (E.G., LUBRICANTS) SHALL BE STORED AT THE EQUIPMENT STAGING AREA WITHIN SECONDARY CONTAINMENT. FUEL STORAGE CONTAINERS WILL BE DOUBLE LEAK-PROOF WITH A REGULATORY STANDARD AMOUNT OF FREE-BOARD. ALL FUEL CONTAINERS AND/OR TANKS WILL BE PROPERLY PLACARDED AND SECURED ACCORDING TO OSHA AND DOT REGULATIONS AND ADEQUATE SPILL CLEAN-UP EQUIPMENT AND MATERIALS WILL BE MAINTAINED AT THE FUEL-STORAGE SITE.

28. ALL STORM WATER CONTROLS AND PUMP EQUIPMENT SHALL BE INSPECTED DAILY AND REPAIRED/REPLACED AS NEEDED.

29. THE PROJECT SITE IS CONSIDERED TO BE THE FUZE AND BOOSTER QUARRY LANDFILL (FBQ) AREA OF CONCERNS (AOC).

30. THE SUBCONTRACTOR WILL PROVIDE ALL NECESSARY ON-SITE SPILL EQUIPMENT (I.E. GRANULATED CLAY, ABSORBENT BLANKETS, PPE, SHOVELS, CONTAINERS). ALL SUBCONTRACTOR EMPLOYEES ON-SITE SHALL BE TRAINED ON PROPER USE OF SPILL EQUIPMENT AND CLEAN-UP OF IMPACTED MATERIAL IN THE EVENT OF A SPILL.

31. REMEDIAL DESIGN WORKPLAN AND SPECIFICATIONS SUPERSEDE DRAWINGS DETAILS IN EVENT OF CONFLICTS.

32. A UXO TECHNICIAN WILL BE ONSITE THROUGHOUT THE REMEDIAL ACTIVITIES. THE UXO TECHNICIAN LEVEL OF QUALIFICATION WILL BE DETERMINED BY USACE. THE UXO TECHNICIAN WILL BE PROVIDED BY THE SUBCONTRACTOR.

33. A SPILL KIT, FIRST AID KIT, AND HEALTH AND SAFETY PLAN (HASP) SHALL BE MAINTAINED ON-SITE BY THE SUBCONTRACTOR DURING CONSTRUCTION ACTIVITIES. THE SUBCONTRACTOR IS RESPONSIBLE TO KEEP THE SPILL KIT AND FIRST AID KIT SUPPLIES AS NECESSARY.

34. PRIOR TO THE START OF DAILY CONSTRUCTION ACTIVITIES THE SITE HEALTH AND SAFETY OFFICER IN CONJUNCTION WITH THE UXO TECHNICIAN WILL CONDUCT AND RECORD DAILY TAILGATE MEETINGS ADDRESSING THE POTENTIAL HAZARDS ASSOCIATED WITH THE PLANNED CONSTRUCTION ACTIVITIES.

35. SUBCONTRACTOR SHALL PROVIDE A CERTIFICATION OF THE DECONTAMINATION OF ALL EXCAVATION EQUIPMENT PRIOR TO REMOVING THE EQUIPMENT FROM THE CONSTRUCTION SITE.

MATERIAL NOTES

1. COMMON FILL AND VEGETATIVE COVER – THE SUBCONTRACTOR SHALL IDENTIFY A SOURCE FOR OFF-SITE COMMON FILL AND VEGETATION COVER. FOR EVERY 4,000 CUBIC YARDS ONE MULTI INCREMENT SAMPLE SHALL BE COLLECTED. THE SUBCONTRACTOR SHALL SUBMIT ANALYTICAL RESULTS TO SAIC A MINIMUM OF 7 DAYS PRIOR TO PLACEMENT. THE MATERIAL SHALL BE TESTED AND COMPARED AGAINST THE PARAMETERS LISTED IN SECTION 6.0 OF THE RD. PROPOSED OFF-SITE SOURCES MUST BE APPROVED BY OHIO EPA PRIOR TO USE. BACKFILL MUST BE CLEAN AND BE ABLE TO PROMOTE VEGETATION GROWTH. SAIC RESERVES THE RIGHT (AT NO ADDITIONAL COST TO SAIC) TO REJECT FILL MATERIAL IF MATERIAL IS NOT CONSIDERED CLEAN.

2. RECEIVED VEGETATIVE COVER SHALL NOT HAVE A PH LOWER THAN 5.0 OR HIGHER THAN 7.0 TESTED IN ACCORDANCE WITH ASTM D4972. SUBCONTRACTOR SHALL OBTAIN AND APPLY A PRESCRIBED SEEDING MIXTURE PLAN AS DESCRIBED IN SECTION 6.0 OF THE RD.

3. GEOTEXTILE – GEOTEXTILE FABRIC SHALL COMPLY WITH ODOT SPECIFICATION 712, MISCELLANEOUS MATERIALS, TYPE D (712.09).

4. EROSION AND SEDIMENTATION CONTROLS – PLACEMENT AND ANCHORING OF EROSION AND SEDIMENTATION CONTROLS SHALL BE COMPLETED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS, DRAWING C-4, AND RAINWATER AND LAND DEVELOPMENT MANUAL (ODNR 2006).

LIST OF SPECIFICATIONS

1. OHIO ARMY NATIONAL GUARD APPROVED GRASS SEED MIXES FOR TEMPORARY COVER AND FINAL SITE CLOSURES (JUNE 2008)

ESTIMATED WASTE QUANTITIES

	ESTIMATED IN SITU AMOUNTS		
WASTE MATERIAL	SURFACE AREA (YD2)	VOLUME (YD3)	WEIGHT (1) (TONS)
NONHAZARDOUS SEDIMENT	2743	102	153

ESTIMATED RESTORATION MATERIAL QUANTITIES

MATERIAL TYPE	QUANTITY
NO. 2 STONE	399 TONS (2)
STRAW BALES	42 BALES (4)
SILT FENCE	185 LINEAR (3)?
GRASS SEED	2 LBS (5)
WETLAND SEED	1 LB (7)
MULCH BLANKET/FABRIC	4023 SQ. FT (3)
FILL MATERIAL	AS TONS
RIP RAP	AS TONS

NOTES:

1. ASSUMES 1.5 TONS/CUBIC YARD SOIL DENSITY.
2. ASSUMING STONE BASE COURSE PLACED IN EQUIPMENT MOVEMENT AREA, FRAC TANK STORAGE AREA, EQUIPMENT STAGING AREA, AND CONSTRUCTION ENTRANCE.
3. ASSUMING AN AVERAGE SINGLE SIDE SLOPE LENGTH 9.88 FT
4. ASSUMING AN APPLICATION RATE OF 3 BALES PER 1,000 SQ. FT
5. ASSUMING AN APPLICATION RATE OF 18 LBS/ACRE.
6. SUBCONTRACTOR SHALL VERIFY QUANTITIES.
7. ASSUMING AN APPLICATION RATE OF 15 LBS/ACRE.

LEGEND FOR ALL DRAWINGS

SURVEY CONTROL POINTS

POINT NO.	NORTHING	EASTING	ELEVATION
10011	568451.83	2375071.84	984.51
10012	564208.42	2375914.88	987.23

(1) SURVEY CONTROL POINT: RAFT & AIC CAPPED REBAR LABELED "SG KEOUCK INC 10044RS"

DRAWING INDEX

DRAWING NO.	DRAWING TITLE
C-1	TITLE SHEET
C-2	GENERAL NOTES
C-3	EXISTING SITE CONDITIONS
C-4	CONSTRUCTION SITE PLAN
C-5	DRY SEDIMENT REMOVAL AND SAMPLING PLAN
C-6	TRAFFIC MANAGEMENT PLAN
C-7	SITE RESTORATION PLAN

LIST OF PERMITS AND NOTIFICATIONS

1. ODNR ENDANGERED SPECIES PROTECTION NOTIFICATION
2. SHPO, PROTECTION OF HISTORIC PROPERTIES
3. MEC AVOIDANCE REVIEW BY USACE, HUNTSVILLE DISTRICT
4. WETLAND NOTIFICATION/PERMIT

LIST OF SUBMITTALS

1. SITE SAFETY AND HEALTH PLAN (SSHP) ADDENDUM
2. BACKFILL SAMPLE RESULTS
3. VEGETATIVE COVER SAMPLE RESULTS
4. WASTE PROFILES
5. FINAL WASTE MANIFESTS FOR CONTAMINATED DRY SEDIMENT
6. OHIO EPA MONTHLY REPORT
7. CONFIRMATION SAMPLE RESULTS

FUZE AND BOOSTER QUARRY LANDFILL/PONDS REMEDIAL DESIGN

GENERAL NOTES

US Army Corps of Engineers
Ravenna Army Ammunition Plant
Ravenna, Ohio

US Army Corps of Engineers Louisville District

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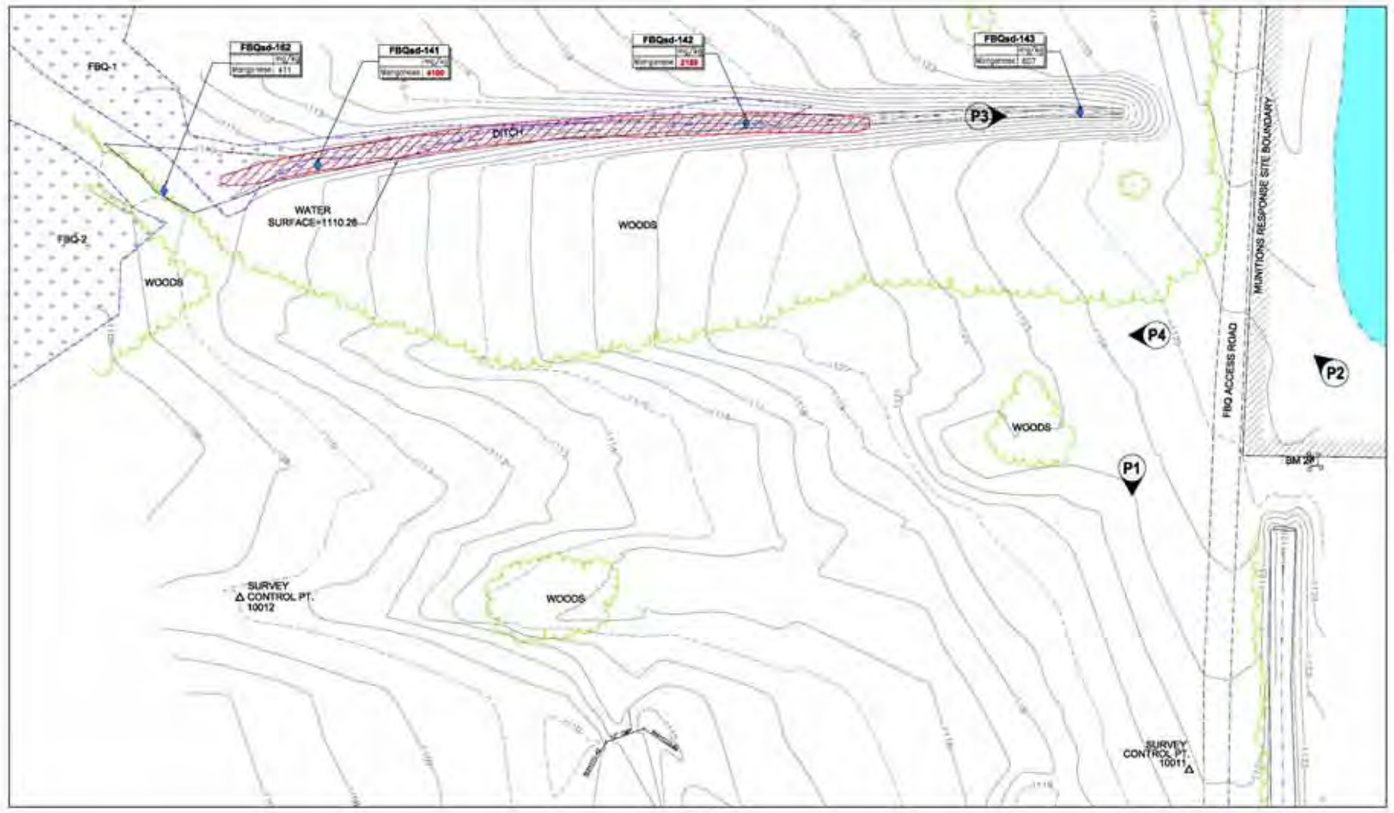
C-2



NOTES:

1. SUB-CONTRACTOR SHALL VERIFY EXISTING SITE CONDITIONS.

LEGEND:

- TREE LINE
- TREE
- ACCESS ROAD
- 1' CONTOUR
- 5' CONTOUR
- DITCH
- WETLAND AREA
- MUNITIONS RESPONSE SITE BOUNDARY
- SURVEY CONTROL POINT
- BENCHMARK
- 2003 PHASE I/PHASE II RI SAMPLE LOCATION
- 2180 MANGANESE OVER THE REMEDIAL ACTION CLEANUP GOAL
- FS MODELED AREA
- P1 PHOTOGRAPH NUMBER WITH VIEW DIRECTION

P1 **LOOKING SOUTH** NOT TO SCALE

P2 **LOOKING NORTHWEST** NOT TO SCALE

P3 **LOOKING EAST** NOT TO SCALE

P4 **LOOKING WEST** NOT TO SCALE

NORTH

SCALE: 1" = 80'

FUZE AND BOOSTER QUARRY LANDFILL / PONDS REMEDIAL DESIGN

EXISTING SITE CONDITIONS

US Army Corps of Engineers
Ravenna Army Ammunition Plant
Ravenna, Ohio

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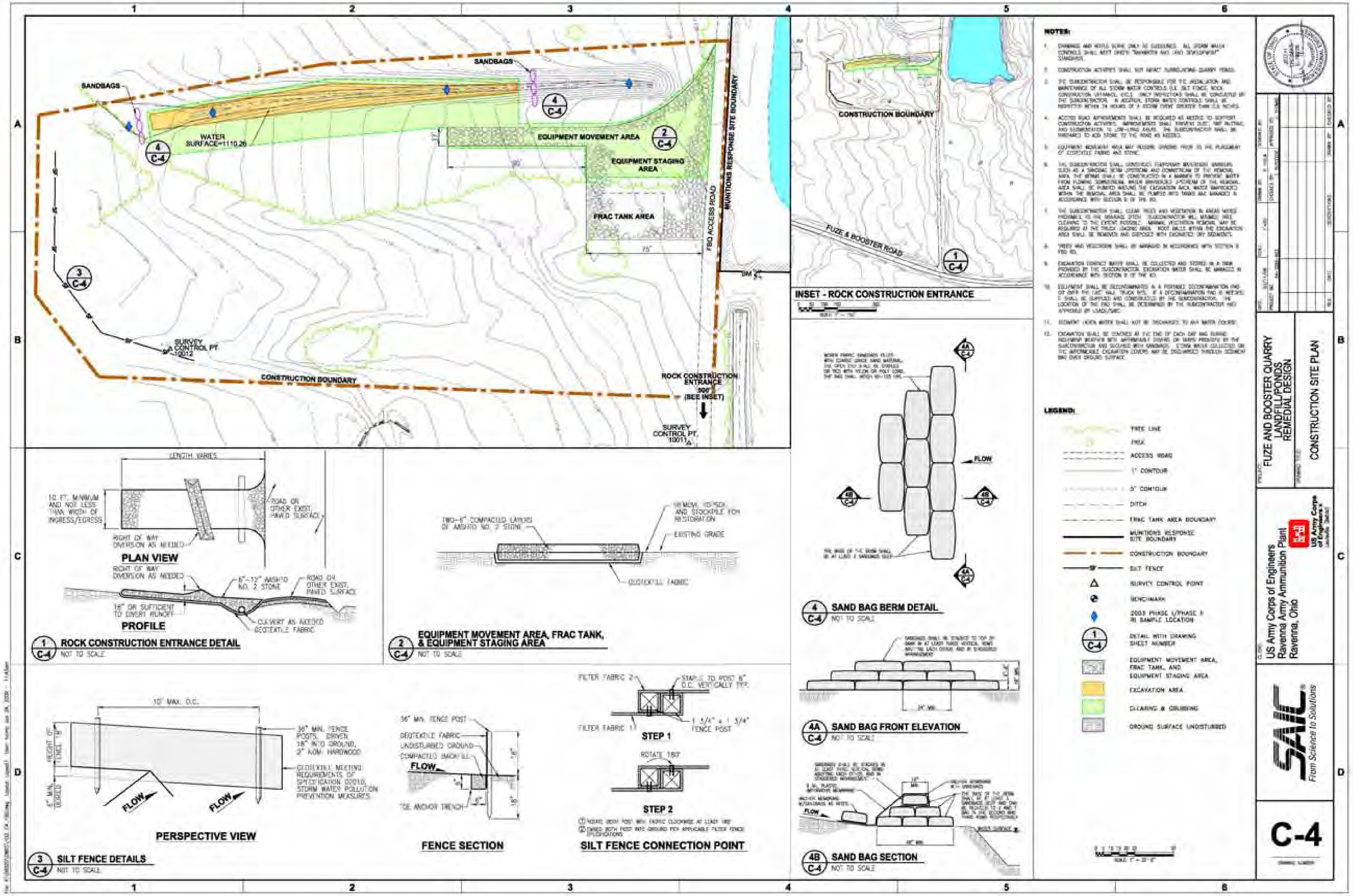
C-3


SANDBAGS
WATER SURFACE=1110.26
EQUIPMENT MOVEMENT AREA
EQUIPMENT STAGING AREA
FRAC TANK AREA
FBQ ACCESS ROAD
MUNITIONS RESPONSE SITE BOUNDARY
SURVEY CONTROL PT. 10012
CONSTRUCTION BOUNDARY
ROCK CONSTRUCTION ENTRANCE 500' (SEE INSET)
SURVEY CONTROL PT. 10011
FUZE & BOOSTER ROAD
INSET - ROCK CONSTRUCTION ENTRANCE
NOTES:
LEGEND:
TREE LINE
ACCESS ROAD
1' CONTOUR
5' CONTOUR
DITCH
FRAC TANK AREA BOUNDARY
MUNITIONS RESPONSE SITE BOUNDARY
CONSTRUCTION BOUNDARY
SILT FENCE
SURVEY CONTROL POINT
BENCHMARK
2003 PHASE I/PHASE II RI SAMPLE LOCATION
DETAIL WITH DRAWING SHEET NUMBER
EQUIPMENT MOVEMENT AREA, FRAC TANK, AND EQUIPMENT STAGING AREA
EXCAVATION AREA
CLEARING & GRUBBING
GROUND SURFACE UNDISTURBED
PLAN VIEW
PROFILE
ROCK CONSTRUCTION ENTRANCE DETAIL
NOT TO SCALE
EQUIPMENT MOVEMENT AREA, FRAC TANK, & EQUIPMENT STAGING AREA
NOT TO SCALE
SAND BAG BERM DETAIL
NOT TO SCALE
SAND BAG FRONT ELEVATION
NOT TO SCALE
SAND BAG SECTION
NOT TO SCALE
PERSPECTIVE VIEW
FENCE SECTION
SILT FENCE CONNECTION POINT
STEP 1
STEP 2
SILT FENCE DETAILS
NOT TO SCALE
FLOW
US Army Corps of Engineers
Ravenna Army Ammunition Plant
Ravenna, Ohio
FUZE AND BOOSTER QUARRY LANDFILL/PONDS REMEDIAL DESIGN
CONSTRUCTION SITE PLAN
SAIC
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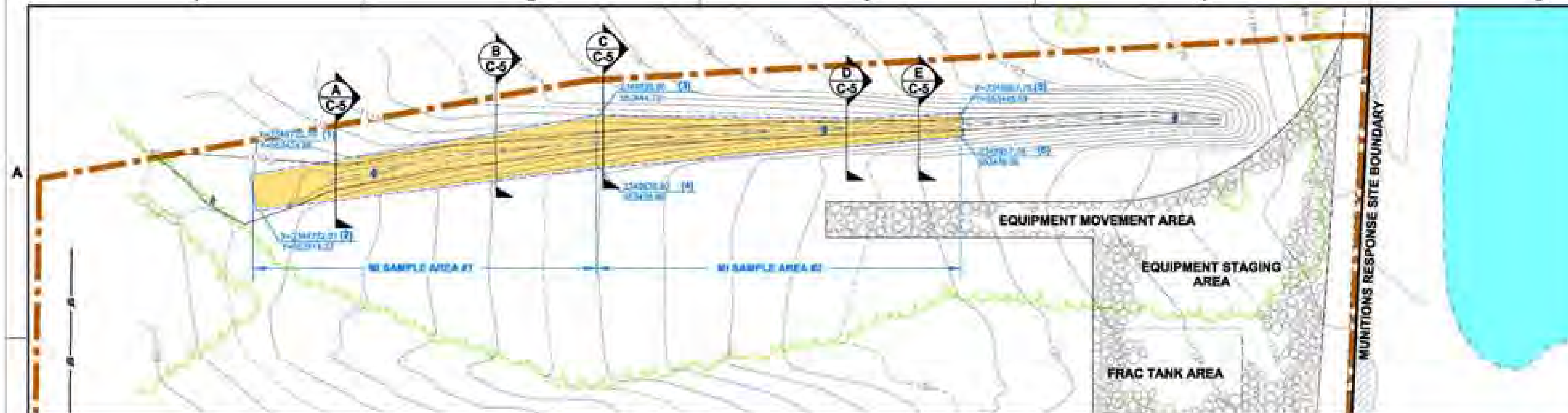
C-4

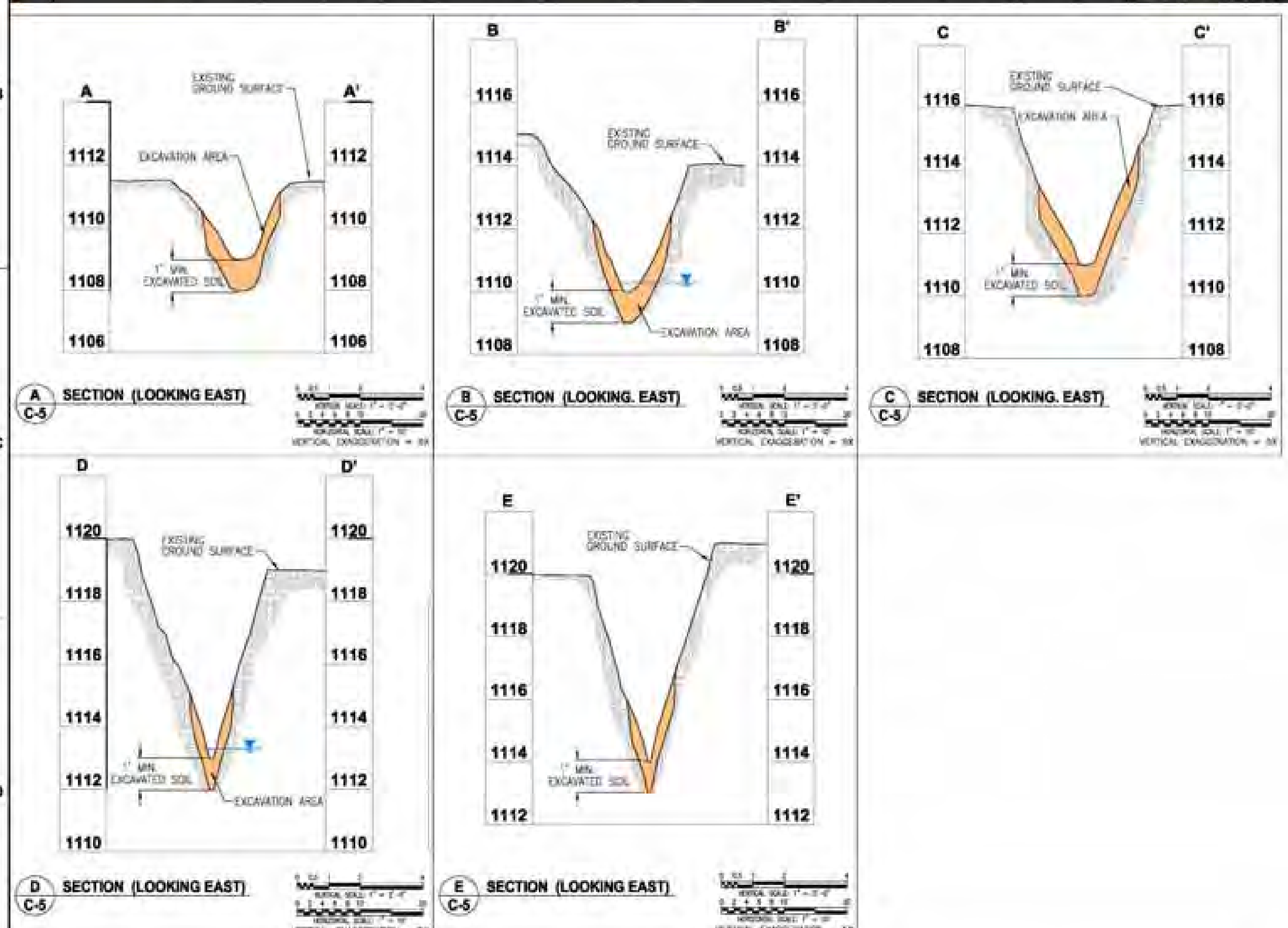


NOTES:

1. THE SUBCONTRACTOR SHALL WORK FROM CLEAN AREAS ONLY. EXCAVATOR TRACKS SHALL BE POSITIONED BETWEEN THE REMOVAL AREA AND THE EQUIPMENT MOVEMENT AREA DURING EXCAVATION ACTIVITIES.
2. ON-ROAD HAUL TRUCKS SHALL BE POSITIONED OVER 6 MIL HIGH DENSITY POLYETHYLENE (HDPE) SECURED WITH METAL STAPLES OR EQUIVALENT. ANY SPILLED MATERIAL ON HDPE SHALL BE IMMEDIATELY COLLECTED AND DISPOSED IN THE HAUL TRUCK.
3. DRY SEDIMENT REMOVAL SHALL BE "LIVE LOADED" DIRECTLY INTO ON-ROAD HAUL TRUCKS. TRAILER BEDS OF THE ON-ROAD HAUL TRUCKS SHALL BE LINED IF REQUIRED BY THE DISPOSAL FACILITY. IN ADDITION, TRAILER BEDS OF THE ON-ROAD TRUCKS SHALL BE COVERED PRIOR TO LEAVING THE PROJECT SITE.
4. THE CONTAMINATED DRY SEDIMENT SHALL BE DISPOSED IN ACCORDANCE WITH SECTION 5 OF THE FBQ REMEDIAL DESIGN (RD).
5. THE EXCAVATOR BUCKET SHALL BE DECONTAMINATED OVER THE LAST HAUL TRUCK BED PRIOR TO DEPARTURE OR PORTABLE DECONTAMINATION PAD SUPPLIED BY THE SUBCONTRACTOR. DECONTAMINATION WATER SHALL BE KEPT AT A MINIMUM TO ENSURE WASTE MATERIAL PASSES DISPOSAL FACILITY PAINT FILTER TEST AND RUNOFF DOES NOT OCCUR.
6. SAIC SHALL COLLECT ONE MULTI-INCREMENT (MI) SAMPLE FROM TWO SECTIONS OF THE EXCAVATION FOOTPRINT IN ACCORDANCE WITH SECTION 7 OF THE FBQ RD.
7. THE EXCAVATION SHALL BE RESTORED IN ACCORDANCE WITH SPECIFICATIONS ON DRAWING C-7.
8. MUNITIONS AND EXPLOSIVES OF CONCERN (MEC) CLEARANCE SHALL BE CONDUCTED IN ACCORDANCE WITH THE FBQ RD.
9. EXCAVATION COORDINATES ARE IN OHIO STATE PLANE NAD 83 FEET.

SEQUENCE OF CONSTRUCTION:

1. CONSTRUCTION SITE SETUP AS DETAILED ON DRAWING C-4 AND C-6.
2. CONFIRM EXCAVATION DEPTHS AND COLLECT CONFIRMATION SAMPLES IN ACCORDANCE WITH THE RD.
3. SURVEY SOIL REMOVAL AREA BASED ON LIMITS OF EXCAVATION.
4. RESTORE IN ACCORDANCE WITH SPECIFICATIONS ON DRAWING C-7 AFTER ACHIEVEMENT OF CLEANUP GOALS AND APPROVAL FROM USACE/SAIC.



DRY SEDIMENT SAMPLE SURVEY

STATION	EASTING (X)	NORTHING (Y)
FBQsd-141	2349781.39	553426.2
FBQsd-142	2349912.32	553440.82
FBQsd-143	2350029.9	553444.86
FBQsd-162	2349707.3	553417.17

MI SAMPLE AREA COORDINATE TABLE

MI SAMPLE		EASTING (X)	NORTHING (Y)
AREA 1	(1)	2349720.73	553424.93
	(2)	2349722.97	553414.33
	(3)	2349835.86	553444.73
	(4)	2349830.66	553425.86
AREA 2	(3)	2349835.86	553444.73
	(4)	2349833.56	553429.86
	(5)	2349957.78	553445.63
	(6)	2349957.78	553428.86

LEGEND:

- TREE LINE
- TREE
- ACCESS ROAD
- 1' CONTOUR
- 5' CONTOUR
- DITCH
- FRAC TANK AREA BOUNDARY
- MUNITIONS RESPONSE SITE BOUNDARY
- CONSTRUCTION BOUNDARY
- SILT FENCE
- 2023 PHASE I/PHASE II MI SAMPLE LOCATION
- SECTIONS WITH DRAWING SHEET NUMBER
- EQUIPMENT MOVEMENT AREA, FRAC TANK, AND EQUIPMENT STAGING AREA
- EXCAVATION AREA
- GROUND SURFACE UNDISTURBED

NORTH

SCALE: 1" = 40'

FUZE AND BOOSTER QUARRY LANDFILL PONDS REMEDIAL DESIGN

DRY SEDIMENT REMOVAL AND SAMPLING PLAN

US Army Corps of Engineers
Ravenna Army Ammunition Plant
Ravenna, Ohio

US Army Corps of Engineers® Louisville District

SAIC® From Science to Solutions

C-5

DO NOT ENTER

NEWTON FALLS RD.

NEWTON FALLS RD.

SIGN F

SIGNS C,D

FUZE & BOOSTER RD.

PROJECT SITE

INSET A

SIGNS A,B,C,D,&E

GEORGE RD.

WILCOX-WAYLAND RD.

PARIS-WINDHAM RD.

SOUTH SERVICE RD.

TO 80

5

TO 76

MAIN ENTRANCE POST 1

NORTH

NOTES:

1. ALL VEHICLES MUST CROSS RVAAP/CAMP RAVENNA THROUGH THE MAIN ENTRANCE POST 1 (5484 STATE RT. 5, RAVENNA, OHIO 44266).
2. ALL VEHICLES AND CONTENTS ARE SUBJECT TO SEARCH AND INSPECTION.
3. WEAPONS, LIGHTERS OR SIMILAR FIRE STARTERS, AND ALCOHOL ARE PROHIBITED ONSITE. PROHIBITED ITEMS MAY BE LEFT WITH SECURITY WHILE ONSITE. SECURITY WILL CONFISCATE ANY PROHIBITED ITEMS DISCOVERED DURING INSPECTIONS.
4. ALL PERSONNEL ENTERING RVAAP/CAMP RAVENNA MUST COMPLETE SECURITY FORMS AND COORDINATE ENTRY WITH RVAAP SECURITY (330) 358-7201) AND RVAAP OPERATIONS AND MAINTENANCE CONTRACTOR (330) 358-5000) BEFORE ARRIVING AT THE PLANT.
5. ALL DIRT TRUCKS WILL HAVE OPERATIONAL LOAD COVERS IN GOOD CONDITION (I.E. FREE OF HOLES, TEARS, ETC.). LOADS WILL BE COVERED PRIOR TO DEPARTING THE PROJECT AREA AND WILL STAY IN PLACE UNTIL UNLOADING AT THE APPROVED DISPOSAL SITE.
6. ON-ROAD HAUL TRUCKS HAULING WASTE SHALL BE LINED IN ACCORDANCE WITH THE APPROVED DISPOSAL FACILITY REQUIREMENTS.
7. SPEED LIMITS OF 25 MILES PER HOUR (MPH) DURING DAYLIGHT HOURS AND 20 MPH AT NIGHT IN THE RVAAP/CAMP RAVENNA WILL BE MAINTAINED.
8. ROADS SHALL NOT BE BLOCKED. RVAAP/CAMP RAVENNA TRAFFIC SHALL BE MAINTAINED ON AT LEAST ONE HALF OF THE ROADWAY WIDTH AT ALL TIMES.
9. SUBCONTRACTOR SHALL CONFIRM NO OVERHEAD HAZARDS (I.E. POWER LINES), MANHOLES, AND WATER VALVES WILL IMPEDE REMOVAL ACTIVITIES.
10. SIGN LETTERING SHALL BE BLACK ON A FLUORESCENT ORANGE BACKGROUND WITH A BAKED ENAMEL FINISH. LETTERING SHALL NOT BE LESS THAN 2 INCH HIGH. SIGNS WILL BE CONSTRUCTED AS AN A-FRAME STYLE SUCH THAT THEY CAN BE EASILY PLACED AND REMOVED BY SUBCONTRACTOR.
11. SIGNS WILL BE PLACED ALONG ROADWAYS DURING CONSTRUCTION MOBILIZATION. SIGNS WILL BE WEIGHED DOWN (POSSIBLY WITH SANDBAGS) TO ENSURE THEY DO NOT MOVE DURING HIGH WIND EVENTS. DURING EXTENDED TIMES AWAY FROM THE PROJECT SITE (E.G., DURING CONFIRMATION SAMPLE ANALYSES), THE SIGNS WILL BE REMOVED FROM THE ROADWAY AND PLACED IN STORAGE.

LEGEND:

- FENCE
- ROADWAY
- EXISTING BUILDING
- FORMER BUILDING LOCATION
- WATER
- TRUCK TRAFFIC ROUTE

CAUTION
CONSTRUCTION
VEHICLES
ENTERING AND EXITING
ROADWAY AHEAD

SIGN A

WARNING

CONSTRUCTION AREA

SIGN B

(CONTRACTORS NAME)
CONSTRUCTION
TRAFFIC
ROUTE

SIGN C

(CONTRACTORS NAME)
CONSTRUCTION
TRAFFIC
ROUTE

SIGN D

STOP!

ALL VISITORS MUST SIGN-IN

VISITORS MUST BE APPROVED FOR ENTRY BY THE SAIC CONSTRUCTION MANAGER

CONTACT: _____

SIGN E

(CONTRACTORS NAME)
CONSTRUCTION
TRAFFIC
ROUTE

SIGN F

SIGN A

SIGNS B,&E

SIGN C

SIGN A

SIGN D

NORTH

PROJECT SITE

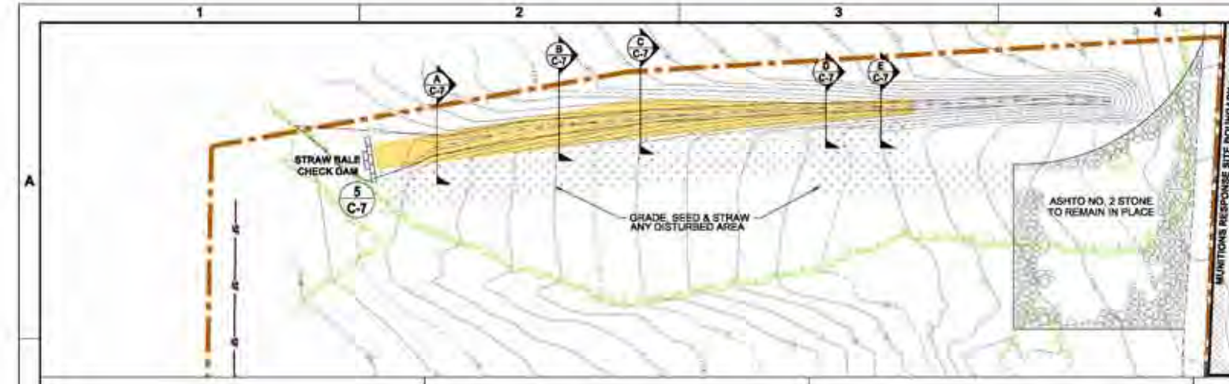
FUZE AND BOOSTER QUARRY LANDFILL PONDS REMEDIAL PLAN

TRAFFIC MANAGEMENT PLAN

US Army Corps of Engineers
Ravenna Army Ammunition Plant
Ravenna, Ohio

SAIC From Science to Solutions

C-6

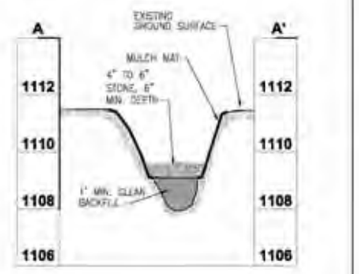


NOTES:

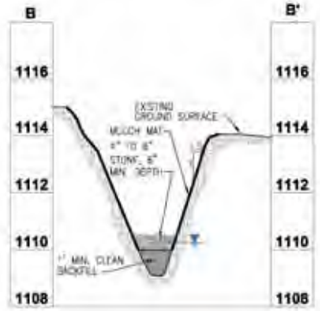
1. SUBCONTRACTOR SHALL RESTORE THE EXCAVATED DRAINAGE DITCH WITH CLEAN BACKFILL AND/OR RIP RAP, AND MULCH MAT SUCH THAT DRAINAGE WATER FLOW IS RE-ESTABLISHED, FLOWING AWAY FROM THE EXCAVATION PONDS.
2. SUBCONTRACTOR SHALL GRADE AND SEED ANY AREA DISTURBED BY CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH THE REFERENCED GRASS SEED MIXES FOR TEMPORARY COVER AND FINAL SITE CLOSURES SPECIFICATION DETAILED IN THE PWP.
3. THE SUBCONTRACTOR SHALL REMOVE PLACED STONE FROM THE EQUIPMENT MOBILIZATION AREA, TANK STORAGE AREA AND DECONTAMINATION STAGING AREA (IF PLACED). REMOVED STONE SHALL BE SPREAD OVER THE EXISTING ACCESS ROAD.
4. THE SANDBAG BERMS WILL BE REMOVED AFTER EXCAVATION ACTIVITIES ARE COMPLETED. THE SUBCONTRACTOR WILL NOT REMOVE SANDBAG BERMS WITHIN THE DITCH UNTIL AFTER THE STRAW CHECK DAM IS IN PLACE. THE STRAW CHECK DAM WILL BE INSTALLED IMMEDIATELY DOWNGRADIENT OF EXCAVATION AREA.
5. EROSION CONTROL MATTING (MULCH MAT) SHALL BE INSTALLED ALONG THE DISTURBED DITCH. SILT FENCE AND STRAW CHECK DAM SHALL REMAIN IN PLACE UNTIL SEED HAS TAKEN ROOT AND 4" (LEAST THAN COVER HAS BEEN ACHIEVED (AS APPROVED BY USACE/SAIC).
6. THE ROCK CONSTRUCTION ENTRANCE SHALL REMAIN IN PLACE.
7. ALL PROJECT SIGNS NOTED ON DRAWING C-4 SHALL BE REMOVED DURING ANY AND ALL OF REMEDIAL ACTIVITIES (E.G., MW-7 CONFIRMATION SAMPLING AND SOIL ANALYSIS) AND AFTER CONSTRUCTION.
8. ANY STONE USED TO IMPROVE THE ACCESS ROAD SHALL REMAIN IN PLACE.

LEGEND

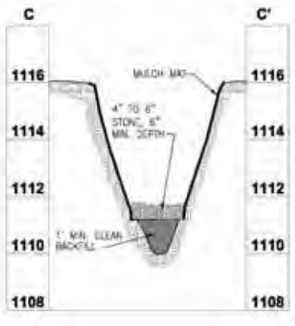
- TREE LINE
- TREE
- ACCESS ROAD
- 1' CONTOUR
- 5' CONTOUR
- DITCH
- MUNITIONS RESPONSE SITE BOUNDARY
- CONSTRUCTION BOUNDARY
- MULCH MAT
- 5 / C-7 — DETAIL WITH DRAWING SHEET NUMBER
- C / C-7 — SECTION WITH DRAWING SHEET NUMBER
- STONE
- EXCAVATION AREA
- CLEAN BACKFILL
- GRADE, SEED & STRAW AREA
- GROUND SURFACE (UNDISTURBED)



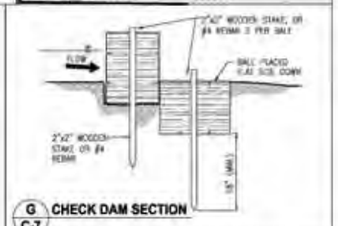
A / C-7 SECTION (LOOKING EAST)



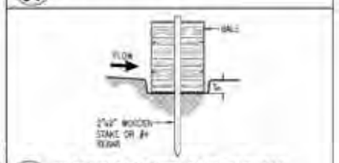
B / C-7 SECTION (LOOKING. EAST)



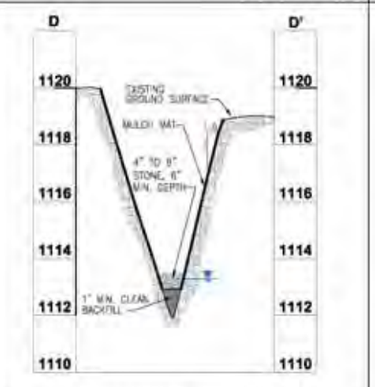
C / C-7 SECTION (LOOKING. EAST)



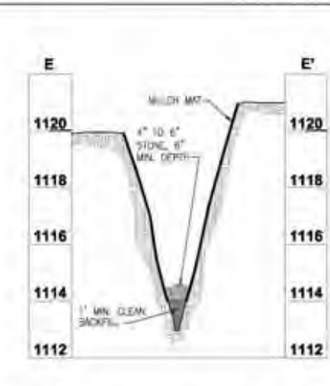
G / C-7 CHECK DAM SECTION



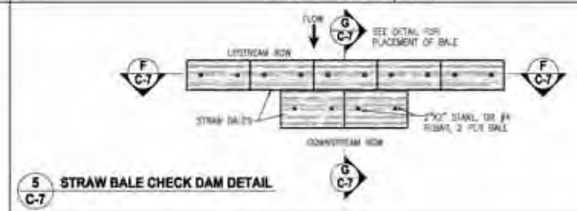
6 / C-7 PLACEMENT UPSTREAM ROW DETAIL



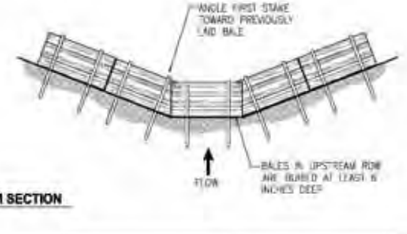
D / C-7 SECTION (LOOKING EAST)



E / C-7 SECTION (LOOKING EAST)



5 / C-7 STRAW BALE CHECK DAM DETAIL



F / C-7 CHECK DAM SECTION

NORTH

FUZE AND BOOSTER QUARRY LANDFILL PONDS REMEDIAL DESIGN

SITE RESTORATION PLAN

US Army Corps of Engineers
Ravenna Army Ammunition Plant
Ravenna, Ohio

From Science to Solutions

C-7

ATTACHMENT C.
CONSTRUCTION FORMS AND CHECKLISTS

RVAAP Fuze and Booster Quarry Landfill/Ponds Remedial Action

DAILY CHECKLIST	**DATE:**

Days since last rainfall:_____ Amount of last rainfall: _____Inches

Approximate Temperature: _____ Weather Condition: _____

Completed by: _____

Yes	**No**	**N/A**	
☐	☐	☐	***DAILY TAILGATE SAFETY BRIEFING AND FORM COMPLETED***
			DAILY INSPECTIONS
☐	☐	☐	**SWP3 controls (berms, silt fence, inlet protection, etc.) Morning Inspection:**
			Time Completed:_____
☐	☐	☐	Is standing water present?
☐	☐	☐	Is excavation water present?
			If yes, describe action: _____
☐	☐	☐	Are there structural controls in place? If yes, complete table below.

Type of Control	**Location of Control**	**Condition of Control**	**Sediment Depth (Inches)**

Any Maintenance required: _____

Work to be performed by:_____On or before:_____

General Work Area Inspection:

Time Completed:_____

☐ ☐ ☐ Work area in good shape (e.g., no debris)? If no, describe actions taken.

Intials _____.

DAILY CHECKLIST	**DATE:**

Yes	No	N/A	
☐	☐	☐	Main construction entrance free from soils? If no, describe actions taken.
☐	☐	☐	Is excavation covered nightly and during inclement weather? If no, describe actions taken.
☐	☐	☐	Is spill kit maintained onsite and inspected daily? If no, describe actions taken.
☐	☐	☐	Are fuel tanks stored with secondary containment? If no, describe actions taken.
☐	☐	☐	Is there continuous dust in construction area? If yes, describe actions taken.

Comments/Actions taken: _____

_____

_____

_____

_____

_____

Equipment Inspection

Time Completed: _____

☐	☐	☐	Is Frac Tank near capacity (17,500 gallons)? If yes, describe actions taken.
☐	☐	☐	Is Frac Tank leaking? Is there evidence of wall failure? If yes, describe actions taken.
☐	☐	☐	Are pumps and hoses functioning properly, without leaks? If no, describe actions taken.
☐	☐	☐	Are excavation vehicles operating correctly? If no, describe actions taken.
☐	☐	☐	Are excavation vehicles safety features operation correctly? If no, describe actions taken.
☐	☐	☐	Are orange safety flags visible and clean on excavation equipment? If no, describe actions taken.
☐	☐	☐	Is there any visible leaking fluids (i.e. oil, hydraulic, coolants…)? If yes, describe actions taken.

Comments/Actions taken: _____

_____

_____

_____

_____

_____

☐	☐	☐	Roll-off Boxes
☐	☐	☐	Trucks

☐ ☐ ☐ **Excavation Area Inspection**

Time Completed: _____

Depth of excavation: _____ ft Width of excavation: _____ ft

Length of excavation: _____ ft Soil Type: _____

Intials _____.

DAILY CHECKLIST	**DATE:**

Yes **No** **N/A**

☐ ☐ ☐ Crossing excavation prevented (> ft).
☐ ☐ ☐ Personnel kept away from sidewalls.
☐ ☐ ☐ Equipment and spoils at least two feet from edge.
☐ ☐ ☐ Cave in protection needed.
☐ ☐ ☐ Cave in protection adequate Type of Protection: _____
☐ ☐ ☐ Excavation sloped. If yes, what angle: _____.
☐ ☐ ☐ Water kept out of excavation. If no, describe actions taken.
☐ ☐ ☐ Excavation work WITHOUT entry. If no, contact Project Manager prior to entry for additional controls measures (i.e. safe entry exit, hazardous atmosphere).

☐ ☐ ☐ ***PHOTOGRAPHS TAKEN***

What was photographed	**Number taken (photo log numbers)**

☐ ☐ ☐ ***DAILY MEASUREMENTS OF EXCAVATION AREA***

- o estimated volume/tons _____
- o number of trucks _____

☐ ☐ ☐ ***COMPLETED TRUCK INSPECTION FORMS***

☐ ☐ ☐ ***COORDINATE WITH CONTRACTOR ON NEXT DAY'S EXCAVATION PLAN***
☐ ☐ ☐ Excavation area
☐ ☐ ☐ Number of trucks available
☐ ☐ ☐ Weather forecast

☐ ☐ ☐ ***EXCAVATOR BUCKET WRAPPED IN POLY AND SECURED***

☐ ☐ ☐ ***DAILY COVER (EXCAVATION)***

Intials _____.

DAILY CHECKLIST	**DATE:**

Yes **No** **N/A**

☐ ☐ ☐ ***EQUIPMENT AND SAFETY FENCE SECURED AROUND EXCAVATION AREA***

☐ ☐ ☐ ***LOG BOOK COMPLETED***

☐ ☐ ☐ ***ARE SHIPPING PAPERS/MANIFESTS READY FOR NEXT WORK DAY***

☐ ☐ ☐ ***COMPLETED SWPS INSPECTION AFTER RAIN EVENT DURING WORKING HOURS.***

END OF DAY INSPECTION

☐ ☐ ☐ **SWP3 controls (berms, silt fence, inlet protection, etc.) End of Day Inspection:**

Time Completed:_____

☐ ☐ ☐ Is standing water present?

☐ ☐ ☐ Is excavation water present?

If yes, describe action: _____

_____

_____

☐ ☐ ☐ Are there structural controls in place? If yes, complete table below.

Type of Control	**Location of Control**	**Condition of Control**	**Sediment Depth (Inches)**

Any Maintenance required: _____

_____

_____

_____

Work to be performed by:_____ On or before:_____

QA By:_____

Intials _____.

RVAAP Fuze and Booster Quarry Landfill/Ponds Remedial Action

DAILY REPORT		**DATE:**
Weather Condition	**A.M.**	
	P.M.	
Subcontractors On-Site		
Equipment On-Site		
Visitors On-Site		
Work Performed		
Unexpected Materials Encountered		
Soil Characteristics and Properties		
Schedule Status/Update		
Deviations from Approved Removal Plans and Specifications		
Summary of Communications		
Corrective Action and/or Recommendations for Corrective Action		
Comments		

Completed by: _____ QA by _____

RVAAP Fuze and Booster Quarry Landfill/Ponds Remedial Action
Daily Tailgate Safety Brief Log

Date: Conducted by:

I have been briefed by the Site Safety and Health Officer or designated alternate on the potential safety hazards associated the following planned work activities for today:

1 _____
2 _____
3 _____
4 _____
5 _____
6 _____
7 _____
8 _____
9 _____
10 _____
11 _____
12 _____
13 _____
14 _____
15 _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

Signature: _____ Print Name: _____

SSHO Signature: _____

RVAAP Fuze and Booster Quarry Landfill/Ponds Remedial Action
Manifest Log

Disposal Date	Type of Waste	Source/ Location	Date of Generation	Transporter	Truck License No.	Disposal Facility	Waste Profile No.	Manifest Document No.	Facility Quantity (tons)	Copy of manifest leaving site (Y/N)	Signed Manifest Rec'd (Y/N)	Signed Manifest to Regs (Y/N)	Notes

RVAAP Fuze and Booster Quarry Landfill/Ponds
Site and Silt Fence Inspection Form

Date:_____ Time: _____

Weather: (include days since last rainfall and amount in inches of last rainfall)

_____
_____
_____

SILT FENCE INSPECTION

Are silt fences intact? Yes ☐ No☐
If no, describe status when arrived at site and maintenance required for silt fences:

_____
_____
_____
_____
_____
_____

Percentage of grass coverage _____ %

Where photos taken at the site ? Yes ☐ No☐

SITE INSPECTION

Is the site in good shape (e.g., no debris)? Yes ☐ No☐
If no, describe status when arrived at site and maintenance required to improve site condition:

_____
_____
_____
_____
_____
_____

If site requires additional actions beyond what can be done during the inspection, please contact the Project Manager immediately to coordinate site improvements.

ADDITIONAL COMMENTS

_____
_____
_____
_____

Recorded By:_____Date:_____

QC Checked By:_____ Date:_____

RVAAP Fuze and Booster Quarry Landfill/Ponds Remedial Action
Visitor Log

I have been briefed on the potential hazards on the work site. I hereby agree to comply with all safety requirements during my visit and will follow the instructions of the Site Safety and Heath Officer.

Print Name	Signature	Agency	Date/Time	Reason for Visit

RVAAP Fuze and Booster Quarry Landfill/Ponds Remedial Action
Health and Safety Plan Signature Log

I have reviewed and understand the contents of the Health and Safety Plan. I hereby agree to comply with all the requirements outlined herein.

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

Signature: ______________________ Date: ______________________

Print Name: ______________________ Agency: ______________________

RVAAP Fuze and Booster Quarry Landfill/Ponds
Site Restoration Inspection Form

Date/Time: _____ Completed by: _____

SITE RESTORATION INSPECTION

Final grading completed and vegetative layer installed?	Yes ☐ No ☐
Temporary SWP3 controls removed?	Yes ☐ No ☐
Final SWP3 controls installed?	Yes ☐ No ☐
Were all disturbed areas seeded/hydroseeded?	Yes ☐ No ☐
Is seed established? (70% coverage is required)	Yes ☐ No ☐
Is silt fencing intact?	Yes ☐ No ☐
Signs of erosion (cracks/ruts/gullies/minimal grass coverage/slope failure)?	Yes ☐ No ☐

Maintenance required for above issues:

_____
_____
_____

RVAAP Fuze and Booster Quarry Landfill/Pond Remedial Action
Truck Inspection Form

Date/Time:_____ **Completed by:**_____

Truck/License Number:_____ ***Trucking Company***:_____

Type of Load Hazardous Waste Soil or Non-hazardous Waste Soil (circle one)

Is the truck lined (if required by disposal facility)? Yes ☐ No☐

Are all sides of truck and its wheels cleaned of all debris? Yes ☐ No☐
If no, describe actions taken.

_____

_____

_____

_____

Is the truck covered? Yes ☐ No☐

Is waste manifest (or shipping papers) completed and in the truck? Yes ☐ No☐

Comments:

_____

_____

_____

_____

DRAFT REMEDIAL DESIGN FOR THE RVAAP-16 FUZE AND BOOSTER QUARRY LANDFILL/PONDS AT THE RAVENNA ARMY AMMUNITION PLANT, RAVENNA OHIO
COMMENT RESPONSE TABLE
JUNE 16, 2009

Comment Number	Page or Sheet	New Page or Sheet	Comment	Recommendation	Response
Ohio EPA (Todd Fisher)					
O-1.	Page 1-11, Figure 1-3	Page 1-11, Figure 1-3	Water bodies and settling basins are not shown in Legend	Add water bodies and settling basins to Legend	Agree. Legend will be updated accordingly.
O-2.	Page 4-1, lines 19-21	Page 4-1, lines 19-21	The text states that both MI sample areas are shown in Attachment B- Drawing C-4. This is incorrect.	Change text to read "these two areas are shown in Attachment B- Drawing C-5."	Agree. Text revised as recommended.
O-3.	Page 5-7, lines 8-9	N/A	The text states that "the flow gate will be closed by RVAAP personnel." Is this gate still operational?	Please confirm that gate is operational.	Agree. SAIC will contact RVAAP O&M Manager to confirm operational status of flow gate.
O-4.	Page 5-7, line 24	Page 5-7, line 24	The text states that "the Subcontractor will install silt fencing, as specified in Drawing Attachment B-C-3." This is incorrect.	Change text to read "Subcontractor will install silt fencing, as specified in Drawing Attachment B-C.4."	Agree. Text revised as recommended.
O-5.	Page 6-3, lines 6-7	Page 6-3, lines 6-7	The text states that "A Competent Person will be on site to ensure the ground surface is stable enough for the removal activities." Could there be another phrase to use instead of "A Competent Person." The RVAAP team expects all site personnel to be "competent."	Please make the appropriate changes to the text.	Clarification. The terminology comes from OSHA regulations. For clarification, the text will be revised as follows: "An Excavation Competent Person, as defined by OSHA, will be on site to ensure the ground surface is stable enough for the removal activities."

O-6.	Page 10-4, lines 7-8	Page 10-4, lines 7-8	The text states that "USACE/SAIC will review material certifications for the backfill material, vegetative cover, and seed in accordance with Section 7 and Drawings C-6." This is incorrect.	Please change text to read "USACE/SAIC will review material certifications for the backfill material, vegetative cover, and seed in accordance with Section 8 and Drawing C-7."	Agree. Text revised as recommended.
O-7.	Attachment A, page 2-1, 15-16	Attachment A, page 2-1, 15-16	The text states that "Currently, the installation is jointly operated by the U.S. Army Rock Island Base Realignment and Closure (BRAC) Field Office and OHARNG." This is incorrect. The installation is jointly operated by U.S. BRAC-D and OHARNG, not Rock Island.	Use elements of the facility description in the RD (Section 1.3, pages 1-2 and 1-3). This information appears to be more accurate and up-to-date.	Agree. Text revised as recommended.
O-8.	Attachment A, page 3-1 Table 3-1	Attachment A, page 3-1 Table 3-1	Table 3-1 does not list Drowning as a possible hazard. Ohio EPA disagrees with this analysis. Drowning should always be considered a hazard when working in close proximity to water bodies.	Please indicate on Table 3-1 that Drowning is a possible hazard.	Agree. Table 3-1 will be revised to address drowning as a potential hazard. The text for control will be as follows "personal floatation devices will be worn when working within 6 feet of water deeper than 3 feet".
O-9.	Attachment A, page 3-4, Table 3-3, Controls	N/A	The text states that "pant legs should be tucked in boots or otherwise to minimize tick entry."	Recommend adding "along with duct tape"	Clarification. As opposed to making this a requirement, SAIC will request the Site Safety and Health Officer to make a recommendation to the field staff to tape the pant legs to avoid tick entry.
O-10.	Attachment B, Drawing C-1	Attachment B, Drawing C-1	Figure has no scale.	Please add scale or indicate "Not To Scale" on drawing.	Agree. The drawing will be updated as recommended.
O-11.	Attachment B, Drawing C-2	Attachment B, Drawing C-2	In the Legend, water is shown in gray instead of blue.	Change gray shade to blue shade.	Agree. The Legend will be updated as recommended.

O-12.	Attachment B, Drawing C-3	Attachment B, Drawing C-2, C-4, C-5, and C-7.	Several cross-sections show ground below grade as a "weave" pattern. This is not represented in the legend.	Please add "weave" pattern to legend.	Agree. A gray weave representing the ground surface will be added to drawing legends C-2, C-4, C-5, and C-7.
O-13.	Attachment B, Drawing C-5	Attachment B, Drawing C-2, C-4, C-5	The "dot-dashed" lines showing area boundaries are not represented in the legend.	Please add "dot-dash" lines to the legend.	Agree. Dash-Dash-Dot line representing the Frac Tank Area will be added to drawing legends C-2, C-4, and C-5.
O-14.	Attachment B, Drawing C-6	Attachment B, Drawing C-6	Most buildings in the Fuze and Booster Load Lines have been removed; however, they are still being shown on this drawing.	Please indicate on the legend that the buildings are "existing" and/or "former" locations.	Agree. The symbol representing the building will state "Existing or Former Building Locations"
Camp Ravenna Environmental (Katie Elgin)					
CR-1.	Pg 1-3, Line 36-37	Pg 1-3	"OHARNG has prepared a comprehensive Environmental Assessment and an Integrated Natural Resources Management Plan (INRMP) to address future use of Camp Ravenna property (OHARNG 2001)." Our EA and INRMP do not establish future use of the property. They are tools used to assess potential impacts from the intended future use. I recommend deleting this statement.	Delete "OHARNG has prepared a comprehensive Environmental Assessment and an Integrated Natural Resources Management Plan (INRMP) to address future use of Camp Ravenna property (OHARNG 2001)."	Agree. Text revised as recommended.
CR-2.	Pg 5-1, Section 5.1.1	N/A	Since the work activities are occurring on OHARNG property, the OHARNG would like to review the draft copies of the USFWS and SHPO coordination letters prior to agency submittal.	The OHARNG will review the draft copies of the USFWS and SHPO coordination letters prior to agency submittal	Agree. At the time of submission of this response table, OHARNG has reviewed and approved copies of the USFWS and SHPO coordination letters.

CR-3.	Pg. 5-2 Lines 1-4	Pg. 5-2	"OHARNG has also completed extensive surveys of the bald eagle (federally threatened), Mitchell satyr butterfly (federally endangered), northern monkshood (federally threatened), and eastern massasauga (federal candidate). These species have not been found at Camp Ravenna." We have not done specific surveys for each of these individual species. We have conducted flora and fauna surveys as part of our INRMP process. Additionally, the bald eagle is no longer federally threatened. Suggested text: "The OHARNG has also completed extensive flora and fauna surveys which have included surveying the Mitchell satyr butterfly (federally endangered), northern monkshood (federally threatened), and eastern massasauga (federal candidate). No federally listed species have been identified at Camp Ravenna."	Suggested text: "The OHARNG has also completed extensive flora and fauna surveys which have included surveying the Mitchell satyr butterfly (federally endangered), northern monkshood (federally threatened), and eastern massasauga (federal candidate). No federally listed species have been identified at Camp Ravenna."	Agree. Text revised as recommended.

CR-4.	Pg 5-2, Section 5.1.2 Protection of Historic Properties	Pg 5-2, Section 5.1.2 Protection of Historic Properties	Please replace all the text in this section with the following text: "The FBQ area and the AOC are located within an area identified on the disturbance map in the OHARNG Integrated Cultural Resources Management Plan (ICRMP) as being highly disturbed by past construction activity. The disturbance in such areas is considered so great that any historic properties, if present, would have been destroyed or disturbed to the degree that they have lost historic integrity and have no value as historic properties. The Area of Potential Effect (APE) for the remediation activities consists of the previously-constructed drainage ditch and the immediate vicinity and is within the previously disturbed area. Based on the past disturbance history of the APE, it is has been determined that there is no potential for the remedial action to impact historic properties. A letter outlining the remedial action and the determination of no affect on historic properties will be sent to the Ohio Historic Preservation Office (OHPO) for their review and concurrence. Implementation of the remedial action will not take place until the OHPO has reviewed and concurred with the determination.	Delete all current text in Section 5.1.2 and replace it with the following: "The FBQ area and the AOC are located within an area identified on the disturbance map in the OHARNG Integrated Cultural Resources Management Plan (ICRMP) as being highly disturbed by past construction activity. The disturbance in such areas is considered so great that any historic properties, if present, would have been destroyed or disturbed to the degree that they have lost historic integrity and have no value as historic properties. The Area of Potential Effect (APE) for the remediation activities consists of the previously-constructed drainage ditch and the immediate vicinity and is within the previously disturbed area. Based on the past disturbance history of the APE, it is has been determined that there is no potential for the remedial action to impact historic properties. A letter outlining the remedial action and the determination of no affect on historic properties will be sent to the Ohio Historic Preservation Office (OHPO) for their review and concurrence. Implementation of the remedial action will not take place until the OHPO has reviewed and concurred with the determination. With any ground disturbing activity there is always the potential of an inadvertent discovery of human remains or funerary objects. If such items are encountered during the remedial action, excavation will immediately stop and the OHARNG	Agree. Text revised as recommended.

			With any ground disturbing activity there is always the potential of an inadvertent discovery of human remains or funerary objects. If such items are encountered during the remedial action, excavation will immediately stop and the OHARNG Cultural Resources Manager, USACE COR, SAIC Project Manager, and RVAAP Facility Manager will be notified. Standard Operation Procedure #6 in the OHARNG ICRMP will be implemented. Excavation will not resume until the site has been released by the OHARNG Cultural Resources Manager."	Cultural Resources Manager, USACE COR, SAIC Project Manager, and RVAAP Facility Manager will be notified. Standard Operation Procedure #6 in the OHARNG ICRMP will be implemented. Excavation will not resume until the site has been released by the OHARNG Cultural Resources Manager."	
CR-5.	Pg 8-2, Section 8.2 Removal of Placed Stone	Pg 8-2, Section 8.2 Removal of Placed Stone	"The subcontractor will remove any stone placed at the equipment movement, frac tank storage, and equipment staging areas." This stone can actually remain in place except for the 12'x90' area on the west side adjacent to the ditch. We can use this area for parking.	Stone placed at the equipment movement, frac tank storage, and equipment staging areas can remain in place except for the 12'x90' area on the west side adjacent to the ditch.	Agree. Text and drawings will be revised accordingly.
CR-6.	Pg 9-2, Table 9-1, Surface vegetation	Pg 9-2, Table 9-1, Surface vegetation	"Trees shall be cut into manageable pieces, chipped, and piled away from remedial activities. Remaining wood chips will be removed from the AOC by the Subcontractor." Instead of chipping all the trees, cut the trees (up to a 4 inch diameter) to a manageable length and neatly stack it close to the site. Chip the trees that have a diameter less than 4 inches and you can blow the chips around onsite. They will eventually	Cut the trees (up to a 4 inch diameter) to a manageable length and neatly stack it close to the site. Chip the trees that have a diameter less than 4 inches and blow the chips around onsite.	Agree. Table 9-1 will be updated. The 3nd column will be revised as follows: "Trees greater than four inches in diameter will be cut and stacked neatly at the AOC away from remedial activities. Trees less than four inches in diameter shall be cut into manageable pieces and chipped. Wood chips not used for absorbent material will be spread over the AOC by the Subcontractor.~~and piled away from remedial activities."~~ The last paragraph of the 4th column will be

			decompose on their own. The stacked cut trees will be sold as firewood.		deleted as follows: ~~Remaining wood chips will be removed by from the AOC by the Subcontractor~~
CR-7.	Pg 10-3, Sections 10.4.1 and 10.4 Spill Response	Pg 10-3, Sections 10.4.1 and 10.4 Spill Response	Please note that spill control and response activities must be in accordance with the Camp Ravenna spill plan. All spills must be reported to Camp Ravenna Operations and the RVAAP Army staff. Spills should be reported on the Camp Ravenna Spill Incident Reporting Form.	Report all spills on Camp Ravenna property to the facility staff and use the spill reporting form.	Agree. As SAIC does not currently have them on file, we request a copy of the Camp Ravenna Spill Plan and the Camp Ravenna Spill Incident Reporting Form. Section 10.5 will be revised as follows: "Spills will be responded to as presented in Section 12.1.2 of the Facility-Wide Safety and Health Plan and the Camp Ravenna Spill Plan. In the event of a spill or leak, the employee making the discovery will immediately notify the SSHO and the SAIC Construction Manager. These spills can include, but are not limited to, releases of fuels, lubricants, and hydraulic fluids. The SAIC Construction Manager will ensure the spill is reported to Camp Ravenna Operations and RVAAP Army Staff as well ensure the incident is documented on a Camp Ravenna Spill Incident Reporting Form."
CR-8.	Pg 13-1, Emergency Phone Numbers	Attach A Pg 13-1, Emergency Phone Numbers	Please add in the Camp Ravenna Operations/Range Control (614)336-6793 or (614)336-6562.	Please add in the Camp Ravenna Operations/Range Control (614)336-6793 or (614)336-6562.	Agree. The information is added to the Emergency Phone Number list, as recommended.